Final October 28, 2014

City of Guadalupe Wastewater Collection System & Treatment Plant Master Plan

System Evaluation, Condition Assessment and Capital Improvement Plan

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WATER • WASTEWATER • WATER REUSE

City of Guadalupe

Wastewater Collection System & Treatment Plant Master Plan 2014

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List of Acronyms

ADD	Average Daily Demand
ADF	Average Daily Flow
ADWF	Average Dry Weather Flow
AFY	Acre-Foot per Year
AWWF	Average Wet Weather Flow
BOD	Biological Oxygen Demand
BOD_5	5-day Biological Oxygen Demand
CF	Cubic Foot
CF/day	Cubic Foot per Day
CF/hr	Cubic Foot per Hour
City	City of Guadalupe
CIWQS	California Integrated Water Quality System
CMMS	Computerized Maintenance Management System
CY/wk	Cubic Yard per Week
d/D	Depth over Diameter
DO	Dissolved Oxygen
DRP	Design Review Permit
EWWCIP	Existing Wastewater Capital Improvement Project
F:M	Food-to-Microorganism Ratio
FM	Flow meter
Fps	Foot per Second
FRM	Fluid Resource Management
Ft	Foot
FT/FT	Foot per Foot
Ft/sec	Feet per Second
FWWCIP	Future Wastewater Capital Improvement Project
GIS	Geographic Information System (GIS)
GPCD	Gallons per Capita per Day
GPD	Gallons per Day
GPD/SF	Gallons per Day per Square Foot
GPM	Gallons per Minute
GPS	Global Positioning System
HDPE	High Density Polyethylene
HP	Horsepower
Hr	Hour
hrs/wk	Hours per Week
HRT	Hydraulic Retention Time
I/I	Inflow/Infiltration
In	Inches
lb/day	Pound per Day

lb/hr	Pound per Hour
lb/SF-hr	Pound per Square Foot per Hour
LF	Linear Foot
MG	Million Gallons
mg/L	Milligram per Liter
MG/wk	Million Gallons per Week
MGD	Million Gallons per Day
MKN	Michael K Nunley & Associates
MLSS	Mixed Liquor Suspended Solids
Mm	Millimeter
MMF	Maximum Month Flow
NA	Not Available
No.	Number
NOV	Notice of Violations
PDDWF	Peak Day Dry Weather Flow
PDF	Peak Day Flow
PDWWF	Peak Day Weather Flow
PHDWF	Peak Hour Dry Weather Flow
PHF	Peak Hour Flow
PHWWF	Peak Hour Wet Weather Flow
Ppd	Pounds per Day
Psig	Pounds per Square Inch
PVC	Polyvinyl Chloride
RAS	Return Activated Sludge
Rpm	Revolutions per Minute
SBCAG	Santa Barbara County Association of Governments
SCADA	Supervisory Control and Data Acquisition
scfm	Standard Cubic Feet per Minute
SRT	Solids Retention Time
SS	Settleable Solids
SSOS	Sanitary Sewer Overflow or Spill
TDH	total dynamic head
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
ton/wk	Ton per Week
TSS	Total Suspended Solids
VAC	Value Added Cooler
VCP	Vitrified Clay Pipe
VFD	Variable Frequency Drive
WAS	Waste Activated Sludge
WDR	Waste Discharge Requirements
WWMP	Wastewater Collection and Treatment Plant Master Plan
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

Overview

The City of Guadalupe is an incorporated city of 7,080 residents (based on 2010 Census) located in northern Santa Barbara County, approximately four miles inland from the Pacific Ocean along the scenic coastal Highway 1. The City is approximately 1.4 square miles in size and is situated in the heart of the fertile Santa Maria Valley, an agricultural region of statewide and national importance. US Highway 101 (US 101), a regional highway linking California's coastal cities, is located 10 miles to the east. The City of Santa Barbara is located approximately 60 miles to the south and San Luis Obispo is located 25 miles to the north. Neighboring communities include the cities of Santa Maria, 10 miles to the east, and Pismo Beach, 15 miles to the north. The topography in the vicinity of the City is relatively flat and the average elevation is 85 feet above mean sea level. The predominant land use surrounding Guadalupe is agriculture. (Guadalupe Community Plan, 2009)

Population

According to the 2000 census, the population of Guadalupe was 5,659. The population of the City increased to 7,080 by 2010. This represents a growth rate of approximately 2.3% per annum (2000-2010). The Census also identified 1,810 occupied housing units in the City, representing approximately 3.9 persons per dwelling. By comparison, the City of Santa Maria recorded populations of 77,423 and 99,553 for 2000 and 2010 respectively, representing an annual growth rate of 2.5%. The average dwelling unit occupancy for Santa Maria is approximately 3.7 persons per occupied dwelling.

In August 2012, the City Council adopted the Revised DJ Farms Specific Plan. This Revised Specific Plan establishes land uses and development standards that will govern development of the 209 acre DJ Farms property. The plan accommodates development of approximately 802 single-family lots in varying sizes, and 21.5 acres of commercial land uses that would be phased through the year 2040. The number of residential units to be developed increased from 481 in the 1995 Specific Plan, to 802 units in the 2012 Plan.

The Cabrillo Economic Development Corporation (Developer) is proposing to construct a 38-unit affordable apartment complex, Guadalupe Court, on a three acre lot located on the south side of 11th Street near the City of Guadalupe's (City) eastern city limits. The proposed apartment complex is estimated to have a total occupancy of 168 people based on information provided by Developer. This development would be served by the Gularte Lift Station.

Table ES-1 identifies the City's potential future population including DJ Farms and other proposed development within the City at the time this report was prepared for the City.

Table ES-1: Buildout Population

Population	Source	Notes	Persons
2010 Population	2010 California Census		7,080
Unoccupied Dwellings	2010 California Census	77 dwellings at 3.9 persons per dwelling	300
DJ Farms	DJ Farms Specific Plan	Population estimate provided by developer and assumes 4 persons per dwelling	3,208
Vacant Developable Residential Lots R-1	City Land Use Information	29 dwellings at 3.9 persons per dwelling	113
Vacant Developable Residential Lots R-2 & R-3	City Land Use Information	5.4 acres medium and high density residential undeveloped at 29.6 persons per acre	160
Guadalupe Court	Cabrillo Economic Development Corporation	Population estimate provided by developer	168
		Buildout Population	**11,029**

Additional Future Development

The following future developments will impact the City's collection, treatment and disposal facilities and were reviewed as part of this master plan.

Apio Production Line Expansion

The average daily demand (ADD) for the overall Apio facility during calendar year 2012 was 312,010 GPD, representing approximately 36% of the total City 2012 water sales. Apio's production line averages 270,000 GPD. In July 2013 Apio submitted an after-the fact application to the City of Guadalupe's Planning Department for a revision to their Design Review Permit (DRP) approved on May 12, 2009. If the DRP were to be approved, the total permissible future water usage is estimated to be 383,000 GPD during average conditions, with a peak day use of 449,000.

From the City's water billing system, the two VAC lines installed onsite receive water from meters APIO003 and APIO009 respectively. Michael K Nunley & Associates (MKN) requested and received water usage data from January 2014 to May 2014 for all Apio meters to review the increased water usage from the APIO009 VAC line. **Table ES-2** below identifies that water usage for the APIO003 VAC line has remained relativity constant, while water usage for the newly installed APIO009 VAC line has increased to approximately 100,000 GPD, which is close to the full water usage requested by Apio in the DRP.

Table ES-2: Apio Historical Average Daily Water Usage

Calendar Year*	Usage (GPD)								Apio Average Daily Demand
	API0001	API0002	API0003	API0004	API0006	API0007	API0008	API0009	
2014**	441	679	232,673	15	23,223	36,256	15	103,893	397,193
2013	348	3,635	239,524	12	32,312	29,881	20	3,648	309,380
2012	303	7,138	235,745	57	40,339	28,395	33	NA	312,010
2011	289	7,611	214,981	51	32,963	32,488	18	NA	288,402
2010	533	11,396	214,147	57	38,347	37,740	27	NA	302,247
2009	547	19,389	204,802	137	30,209	45,567	12	NA	300,663

*Water usage is based on calendar year sales/water usage information provided by the City of Guadalupe.
**Water usage is based on calendar year sales/water usage information provided by the City of Guadalupe and averaged from January 2014 to May 2014.

Existing Wastewater Collection, Treatment and Disposal Systems

The wastewater collection system consists of 15 miles of gravity collection system piping ranging from 3 to 24 inches, 0.3 miles of force main, an inverted siphon, approximately 300 manholes, and three lift stations ranging from 100 to 400 gallons per minute (GPM) in simplex operation. The wastewater treatment plant (WWTP) and effluent disposal process includes screening, biological treatment, sludge dewatering, effluent storage, and land application via spray distribution.

Existing Wastewater Flows

A detail discussion of the existing City flow conditions are discussed in Section 3 of this report. Based on our review and analysis of existing WWTP effluent flow records, existing water usage records, and flow monitoring data from the detailed Apio wastewater study, existing wastewater flow estimates were developed for use in the capacity analysis of the collection and treatment systems, and are shown in **Table ES-3**.

Table ES-3: Existing Wastewater Flows			
Flow Condition	**Flow (MGD)**	**Peaking Factor**	**Source**
Average Daily Flow (ADF)	0.68	--	City of Guadalupe WWTP 2013 Daily Flow Records
Maximum Month Flow (MMF)	0.77	1.13	City of Guadalupe WWTP 2013 Daily Flow Records
Peak Day Flow (PDF)	0.93	1.37	City of Guadalupe WWTP 2013 Daily Flow Records
Peak Hour Flow (PHF)	2.71	3.98	Flow Monitoring from April 22, 2014 to June 6, 2014

Future Wastewater Flows

For the purpose of this Master Plan, it was assumed that population growth within the City would be attributed not only to the development of DJ Farms, but would also include development of existing vacant or underutilized residential lots within the City, as well as the occupation of existing unoccupied residences. Although build-out is estimated to occur in the year 2044, actual build-out may occur earlier or later, as future decisions by the City may alter the ultimate boundaries, population, and wastewater flows of the City. At the time of this report the City will require that Apio limit their maximum water usage of 373 AFY. The City is proposing this water usage cap for the Apio expansion because of impacts to the City's available water supplies from the severe drought conditions throughout California over the last several years. This reduction in water usage by Apio is accounted for in **Table ES-4** for estimated future flows.

Table ES-4: Potential Future Wastewater Flow			
Source	**Population**	**Per Capita Flow (GPCD)**	**Average Day Flow (gpd)**
Unoccupied Residential Dwellings	300	80	24,000
Vacant Developable R-1 Residential Lots	113	80	9,040
Vacant Developable R-2 & R-3 Residential Lots	160	80	12,800
Proposed Guadalupe Court Development	168	80	13,440
		Future City Infill	59,280
		Existing City Flow	436,459
		Total Future City Flow	**495,739**
		Existing Apio Flow	243,541
		Future Apio Expansion	31,245
		Total Future Apio Flow	**274,786**
Future DJ Farms	3208	82	263,056
		Total Future Flow	**1,033,581**

There may be instances where flows associated with new development not currently accounted for in this Master Plan will result in conditions that exceed the capacity of existing sewer pipes. Such cases will need to be analyzed on a case-by-case basis when the developments are proposed to determine if supplemental system improvements are needed.

Peaking factors from **Table ES-3** were applied to the Future Average Day Flows to estimate future flow conditions. The estimated future flow conditions are summarized in **Table ES-5** below, and were used to analyze the capacity of the existing collection system during future wastewater flow conditions.

Table ES-5: Future Wastewater Flow Conditions		
Flow Condition	**Flow (MGD)**	**Peaking Factor**
Average Daily Flow (ADF)	1.03	--
Maximum Month Flow (MMF)	1.17	1.13
Peak Day Flow (PDF)	1.41	1.37
Peak Hour Flow (PHF)	4.10	3.98

Capital Improvements Summary

The recommended capital improvements were developed to meet the City's existing and future wastewater needs based on assumptions and discussions in this report. **Tables ES-6, ES-7, and ES-8** provide opinion of probable construction costs for improvement projects necessary to meet both existing and future demands. **Figures ES-1** and **ES-2** identify the locations of the recommended capital improvements for the wastewater collection system, treatment plant, and disposal system.

Gravity Collection System

The City's existing 12-inch trunk sewer main that runs from Sixth Street to Mahoney Lane is undersized and conveys 85% of the City's wastewater flow, which includes the Highway 1 Lift Station, Pioneer Lift Station, Gularte Lift Station, Apio development, and the Treasure Park area. MKN completed several hydraulic model simulations to analyze the impacts from the following alternatives:

- ❒ Conveying all of the existing flow through the existing 12-inch trunk sewer
- ❒ Diverting Apio's existing/future flows to the DJ Farms Trunk Sewer
- ❒ Diverting Apio's existing/future flows, the Pioneer Lift Station flows, and the Highway 1 Lift Station flows to the DJ Farms Trunk Sewer

Table ES-6 identifies the required collection system CIPs assuming existing wastewater flows, and assuming Apio and the Highway 1 lift station are configured "as-is" (e.g Apio sewer line and Highway 1 Lift Station force mains are not re-directed to DJ Farms Trunk sewer). **Table ES-7** identifies the required collection system CIPs if Apio and Highway 1 Lift Station are redirected to the DJ Farms Trunk Sewer. The planning-level cost estimates suggest that the project costs are comparable for both alternatives, but costs associated with acquiring a longitudinal pipeline easement in the Caltrans right-of-way are unknown, and are not included in the total project cost for the alternative CIP shown in Table 9-4. Construction and easement acquisition challenges for the alternative CIP will be significant. If this alternative is considered, the City should carefully explore the feasibility and costs associated with of acquisition of easements from CalTrans or adjacent property owners, and should consider construction challenges as well as alternative alignments. Additionally, although diverting flow to the DJ Farms trunk sewer will increase available capacity in the 12-inch trunk sewer between 6th Street and Mahoney Lane (thereby significantly reducing the cost of EWWCIP-5), it is anticipated that overall operation and condition of the 12-inch pipeline would necessitate replacement of a significant amount of the 12-inch pipe at some point in the future.

If the CIPs shown in **Table ES-6** are implemented to correct existing collection system deficiencies, no additional CIPs will be necessary to address future flows.

Lift Stations

It is recommended to replace the Pioneer Street Lift Station. The Pioneer Lift Station is past its useful life, is a confined space safety hazard, the pumps are oversized for existing ADF & PHFs conditions, and the force main is not located within City easement or right-of-way. It is recommended the City design a new lift station meet existing and future flow conditions as identified in this Master Plan. It is also recommended to reroute the existing force main along Eighth Street to Highway 1 so that the force main is accessible in the City's right-of-way.

It is recommended to replace the Highway 1 Lift Station. The Highway 1 Lift Station is past its useful life, is a confined space safety hazard, is undersized to meet existing and future PHF conditions, and the configuration of the force main

discharge point causes surcharging in the TrusPro pipeline. It is recommended the City design a new lift station to meet existing and future flow conditions as identified in this Master Plan. It is also recommended to reroute the existing force main along Highway 1 to a potential location on Fifth Street.

It is recommended the City complete a physical evaluation and perform required maintenance of the Gularte Lift Station. The lift station has sufficient pumping capacity and wet well volume to convey existing and future flows, but lift station components are in need of maintenance and/or replacement.

Wastewater Treatment Plant and Effluent Disposal Facilities

The recommended improvements to the wastewater treatment and effluent disposal/reuse facilities fall into two categories. The recommended improvements to meet existing system deficiencies (Phase 1) were carried over from the Technical Memorandum 2 – Basis of Design (Dudek, Draft August 2010) after an evaluation of the facilities. The 2010 Basis of Design Report also included a recommendation to rehabilitate the grit removal system. The grit removal system is not considered critical to meeting the treatment requirements, but may be important for operations and can be a more economical way to collect and dispose of solids. For these reasons, the grit removal system improvements project is proposed for Phase 2. The Phase 2 improvements are recommended to address the potential future deficiencies, as identified in Section 8 and listed in **Table ES-8**.

Phase 1 – Recommended Improvements to Meet Existing Requirements

- Influent Pump Station:
  - Remove and replace three existing influent pumps, mounting components and guide rails
  - Install controls and alarms
  - Replace two sets of existing 8-inch discharge piping and check valves (one was recently replaced)
  - Replace one VFD (other two were installed in 2008)
  - Replace existing VFD enclosure with dust control and air conditioning with room for future fourth VFD
- Effluent Reuse System Improvements
  - Install 2,200 LF of welded HDPE or PVC pipe in place of unprotected effluent ditch
  - Rehabilitate effluent pond levees and increase height in areas subjected to flooding. Repair eroded roadway along Pond C.
  - Replace equalization pipe and gate connecting Ponds B and C, and replace sluice gate between Ponds A and B.
- Irrigation Pump Station Improvements
  - Replace irrigation pumps (3) and controls (including VFDs, sensors, alarms) to match requirements for new spray irrigation system
  - Install new electrical/control building with dust control and ventilation
  - Install new effluent filters
  - Install fencing around pump station site to protect it from roaming cattle
  - Install new alarm system with telemetry
  - Install all weather access roadway to irrigation pump station (approximately 4,200 LF)
- Spray Irrigation System Improvements
  - Install 12 underground laterals off the existing force main with 30 to 40 sprinklers and steel bollards around each sprinkler head to protect them from grazing cattle.

Phase 2 – Recommended Improvements to Meet Future Requirements

- Influent Pump Station:
  - Add fourth pump and appurtenances, discharge piping and valves, and VFD
- Grit Removal System Improvements
  - Remove and replace existing grit removal equipment, including grit pump, grit classifier, piping and valves. Convert grit pumping system to top-mounted pumping configuration.
- Aeration Basin and Secondary Clarifiers
  - Install second Biolac® Aeration Basin with two integral clarifiers

Table ES-6: Capital Improvements Recommended to Address Existing Deficiencies

Lift Stations

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
EWWCIP-1	Pioneer Lift Station Replacement	Pioneer Street at Eighth Street	250 GPM @ 70 TDH	Confined Space Safety Hazard, pumps are oversized for existing ADF & PHFs, force main not located within City easement	Replace existing lift station with submersible pump station or above-grade Smith & Loveless replacement. Reroute existing force main to Highway 1 at Eighth Street		0 to 2 Years	$454,350
EWWCIP-2	Highway 1 Lift Station Replacement	Highway 1 at Sixth Street	400 GPM @ 15 TDH	Confined space safety hazard, existing PHF exceed pump capacity in simplex operation, function of downstream gravity manhole causes wastewater backup in TrusPro pipeline	Replace existing lift station with larger pumps (500-600 gpm) in submersible pump station or above-grade Smith & Loveless replacement. Reroute force main (160 lf) to manhole at Highway 1 and Sixth Street.		0 to 2 Years	$607,880
EWWCIP-3	Gularte Lift Maintenance Project	Gularte Lane and	100 GPM @ 32 TDH	Sufficient hydraulic capacity, but wet well, pipes, and fitting show be evaluated and rehabilitate to extend useful life	Perform physical inspection/evaluation of existing lift station facility and rehabilitate facility components to extend useful life as necessary		0 to 2 Years	$20,000
							Subtotal Lift Stations	**$1,082,230**

Collection System Pipelines

Project	Project Name	Location	Existing Facility	Deficiency		Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
				ADF (d/D >0.50)	**PHF (d/D > 0.75)**				
EWWCIP-4	Eleventh Street Gravity Sewer	Highway 1 to Gularte Lane	2,300 lf of 6-inch pipe	0.58-0.80	0.85-1.00	2,300 lf of 8-inch pipe		2 to 10 Years	$829,400
EWWCIP-5	12-inch Trunk Sewer	Sixth Street to Mahoney Lane	2,900 lf of 12-inch pipe	1.00	1.00	2,900 lf of 18-inch pipe	This CIP eliminates deficiencies #3 thru #9 identified in Section 6. Would also include rerouting gravity sewer from private property into City right-of-way	0 to 2 Years	$1,261,500
EWWCIP-6	Campodonico Avenue Gravity Sewer	Fifth Street to Third Street	520 lf of 6-inch pipe	0.17	1.00	520 lf of 12-inch pipe		2 to 10 Years	$196,040
	Campodonico Avenue Gravity Sewer	Seventh Street to Sixth Street	300 lf of 6-inch pipe	1.00	1.00	300 lf of 8-inch pipe		2 to 10 Years	$95,700
EWWCIP-7	Pioneer Street Gravity Sewer	Wong Street to Maryknoll Drive	270 lf of 6-inch pipe	0.84-1.00	1.00	270 lf of 10-inch pipe	This CIP reduces deficiency #11 and eliminates #12 identified in Section 6	2 to 10 Years	$93,960
EWWCIP-8	Tognazzini Avenue Gravity Sewer	Fifth Street to mid-block Tognazzini Avenue	98 lf of 6-inch pipe	0.82-1.00	1.00	98 lf of 10-inch pipe	This CIP reduces deficiency #13 and eliminates #14 identified in Section 6	2 to 10 Years	$34,104
EWWCIP-9	Carlin Drive Gravity Sewer	Carlin Drive to Mahoney Lane	410 lf of 8-inch pipe	0.69	1.00	410 lf of 10-inch pipe	CIPs required in addition to the completion of EWWCIP-5	2 to 10 Years	$142,680
EWWCIP-10	Mahoney Lane Gravity Sewer	Carlin Drive to Pagaling Drive	310 lf of 8-inch pipe	0.67	1.00	310 lf of 10-inch pipe	CIPs required in addition to the completion of EWWCIP-5	2 to 10 Years	$107,880
EWWCIP-11	Surfbird Lane Gravity Sewer	From Blue Heron Lane to Snowy Plover Lane	265 lf of 8-inch pipe	0.62	1.00	265 lf of 12-inch pipe	CIPs required in addition to the completion of EWWCIP-5	2 to 10 Years	$99,905
EWWCIP-12	Riverview Development Gravity Sewer	Riverview Development at entrance to WWTP	125 lf of 8-inch pipe	0.48	0.79	125 lf of 10-inch pipe	CIPs required in addition to the completion of EWWCIP-5	2 to 10 Years	$43,500
								Subtotal Collection System Pipelines	**$2,904,669**

Table ES-6 (Continued): Capital Improvements Recommended to Address Existing Deficiencies

Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
EWWCIP-13	Influent Pump Station	Wastewater Treatment Plant	(3) 20-hp pumps with VFDs	Pumps are past design life, VFDs need protection, controls/alarms needed	Replace (3) pumps, mounting components and guide rails. Install controls and alarms. Replace 2 sets of discharge piping and	Design completed with 2012 WWTP Improvements (Dudek)	2 to 10 Years	$30,700
EWWCIP-14	Treated Effluent Pipeline and Holding Pond Rehabilitation	Wastewater Plant treated effluent facilities	Effluent ditch, three holding ponds	Effluent ditch is unprotected. Holding pond levees and roadways have eroded and ponds are subject to flooding.	Install 2,200 LF of welded HDPE or PVC pipe in place of effluent ditch. Rehab holding pond levees and increase height to protect from flooding. Repair eroded roadways.		0 to 2 Years	$1,620,000
EWWCIP-15	Irrigation Pump Station	Wastewater Plant treated effluent facilities	Wet well with one operational irrigation pump. Alarm system not functional, VFDs and controls in cramped space with minimal protection.	Irrigation pump station is past design life, and in need of repairs and rehabilitation.	Replace irrigation pumps (3) and controls to match requirements of new spray irrigation system. Install electrical building with dust control and ventilation. Install effluent filters, fencing, and new alarm system with telemetry. Install all weather access road.		0 to 2 Years	$750,000
EWWCIP-16	Spray Irrigation System	Wastewater Plant treated effluent facilities	2 laterals with high capacity spray guns	Original system was damaged from cattle. Existing spray guns do not distribute irrigation efficiently and need to be repositioned twice a day.	Install 12 underground laterals off the existing force main with 30 to 40 sprinklers and steel bollards around each sprinkler head to protect them from grazing cattle.		2 to 10 Years	$580,000
							Subtotal Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities	**$2,980,700**
							Total	**$6,967,599**

City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure ES-1:

CIPS for Existing System Deficiencies

EWWCIP-1

EWWCIP-2

EWWCIP-3

PIONEER LS

HWY 1 LS

GULARTE LS

WWTP

TWELFTH ST

PERALTA ST

OLIVERA ST

PACHECO ST

TENTH ST

NINTH ST

ESCALANTE ST

ELEVENTH ST

LA GUARDIA LN

EIGHTH ST

RUBIO

SIXTH ST

STATE HWY 1

OBISPO ST

FIFTH ST

GARRETT ST

WONG ST

LINDY DR

MARYKNOLL DR

FOURTH ST

HOLLY ST

FIR ST

ELM ST

THIRD ST

MAHONEY LN

CARLIN DR

PAGALING DR

CHAPMAN DR

SANCHEZ DR

HERNANDEZ DR

ALMAGUER ST

SECOND ST

CEDAR ST

BIRCH ST

AMBER ST

SIMAS ST

FLOWER AV

TOGNAZZINI AV

CAMPODONICO AV

ALLEY

PIONEER ST

CAMP LN

MILLS LN

NELSON DR

JULIA DR

SNOWY PLOVER LN

BLUE HERON LN

SURFBIRD LN

PACIFIC DUNES WY

PACIFIC DUNES CI

SANTA INES ST

CALLE CESAR E. CHAVEZ ST

SANTA BARBARA ST

PELICAN LN

IBIS CI

EGRET LN

POINT SAL DUNES WY

LA PURISMA ST

SANDPIPER LN

MAIN ST

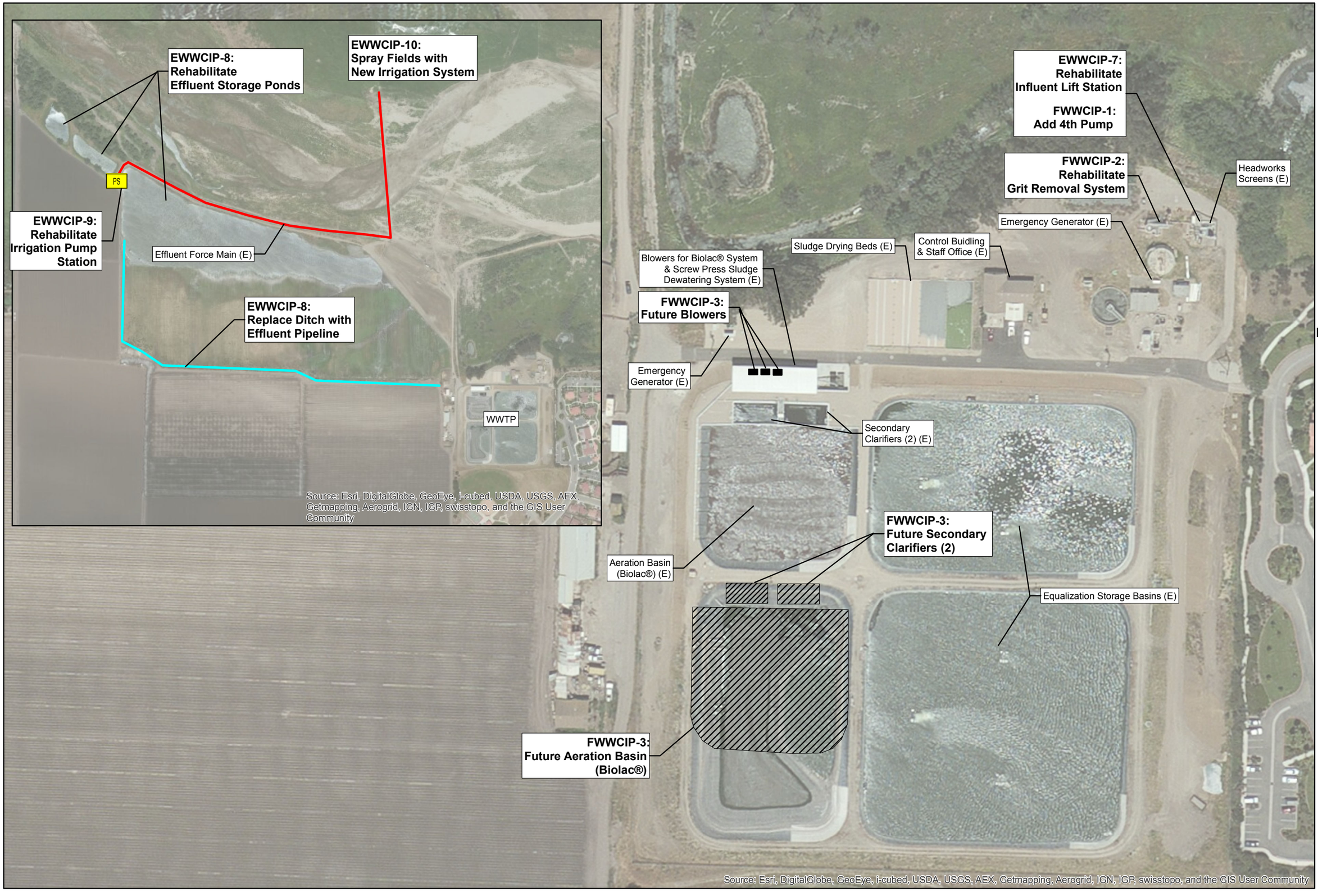
STATE HWY 166

Legend

- EWWCIP-4
- EWWCIP-5
- EWWCIP-6
- EWWCIP-7
- EWWCIP-8
- EWWCIP-9
- EWWCIP-10
- EWWCIP-11
- EWWCIP-12
- PS Pump Station
- Existing Collection System
- City Limits

1 inch:700 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure ES-2:

WWTP Facilities Recommended Improvements

1 inch:100 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

Table ES-7: Alternative Capital Improvements to Address Existing Deficiencies (Not Recommended)

Lift Stations

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
EWWCIP-1	Pioneer Lift Station Replacement	Pioneer Street at Eighth Street	250 GPM @ 70 TDH	Confined Space Safety Hazard, pumps are oversized for existing ADF & PHFs, force main not located within City easement	Replace existing lift station with submersible pump station or above-grade Smith & Loveless replacement. Reroute existing force main to Highway 1 at Eighth Street		NA	$454,350
EWWCIP-2	Highway 1 Lift Station Replacement	Highway 1 at Sixth Street	400 GPM @ 15 TDH	Confined space safety hazard, existing PHF exceed pump capacity in simplex operation, function of downstream gravity manhole causes wastewater backup in TrusPro pipeline	Replace existing lift station with larger pumps (500-600 gpm) in submersible pump station or above-grade Smith & Loveless replacement. Reroute force main (3,000 lf) to DJ Farms Trunk Sewer.	**Costs do not include easement acquisition along Highway 1 for new force main.**	NA	$1,014,000
EWWCIP-3	Gularte Lift Station Maintenance Project	Gularte Lane and	100 GPM @ 32 TDH	Sufficient hydraulic capacity, but wet well, pipes, and fitting show be evaluated and rehabilitate to extend useful life	Perform physical inspection/evaluation of existing lift station facility and rehabilitate facility components to extend useful life as necessary		NA	$20,000
							Subtotal Lift Stations	**$1,488,350**

Collection System Pipelines

Project	Project Name	Location	Existing Facility	Deficiency		Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
				ADF (d/D >0.50)	**PHF (d/D > 0.75)**				
EWWCIP-4	Eleventh Street Gravity Sewer	Highway 1 to Gularte Lane	2,300 lf of 6-inch pipe	0.58-0.80	0.85-1.00	2,300 lf of 8-inch pipe		NA	$829,400
EWWCIP-5	12-inch Trunk Sewer	Sixth Street to Fifth Street	625 lf of 12-inch pipe	NA	NA	800 lf of 12-inch pipe	Reroute existing trunk sewer pipes into City right-of-way and out of private properties. Assumes that flow from Apio, Pioneer LS, and Highway 1 LS are diverted to DJ Farms trunk sewer.	NA	$301,600
EWWCIP-6	DJ Farms Trunk Sewer	From DJ Farms to WWTP	NA	NA	NA	7,500 lf of 18-inch pipe	Assumes City would contribute 30% to construction costs.	NA	$965,700
								Subtotal Collection System Pipelines	**$2,096,700**

Table ES-7 (Continued): Alternative Capital Improvements to Address Existing Deficiencies (Not Recommended)

Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
EWWCIP-7	Influent Pump Station	`Wastewater Treatment Plant	(3) 20-hp pumps with VFDs	Pumps are past design life, VFDs need protection, controls/alarms needed	Replace (3) pumps, mounting components and guide rails. Install controls and alarms. Replace 2 sets of discharge piping	Recommended CIP consistent with existing design from 2012 Improvements.	NA	$30,700
EWWCIP-8	Treated Effluent Pipeline and Holding Pond Rehabilitation	Wastewater Plant treated effluent facilities	Effluent ditch, three holding ponds	Effluent ditch is unprotected. Holding pond levees and roadways have eroded and ponds are subject to flooding.	Install 2,200 LF of welded HDPE or PVC pipe in place of effluent ditch. Rehab holding pond levees and increase height to protect from flooding. Repair eroded roadways.		NA	$1,620,000
EWWCIP-9	Irrigation Pump Station	Wastewater Plant treated effluent facilities	Wet well with one operational irrigation pump. Alarm system not functional, VFDs and controls in cramped space with minimal protection.	Irrigation pump station is past design life, and in need of repairs and rehabilitation.	Replace irrigation pumps (3) and controls to match requirements of new spray irrigation system. Install electrical building with dust control and ventilation. Install effluent filters, fencing, and new alarm system with telemetry. Install all weather access road.		NA	$750,000
EWWCIP-10	Spray Irrigation System	Wastewater Plant treated effluent facilities	2 laterals with high capacity spray guns	Original system was damaged from cattle. Existing spray guns do not distribute irrigation efficiently and need to be repositioned twice a day.	Install 12 underground laterals off the existing force main with 30 to 40 sprinklers and steel bollards around each sprinkler head to protect them from grazing cattle.		NA	$580,000
							Subtotal Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities	**$2,980,700**
							Total*	**$6,565,750**

* Costs do not include easement acquisition along Highway 1 for new force main.

Table ES-8: Capital Improvements Recommended to Address Future System Deficiencies

Lift Stations

Project	Project Name	Location	Existing Facility	Deficiency		Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Collection System Pipelines

Project	Project Name	Location	Existing Facility	Deficiency		Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
FWWCIP-1	Influent Pump Station	Wastewater Treatment Plant	(3) 20-hp pumps with VFDs	4th pump is required to maintain redundancy at future flows	Install 4th pump, mounting components, guide rails, discharge piping and valves, and VFD.	Install before PHF > 2350 gpm	Phased with Future Development	$35,000
FWWCIP-2	Grit Removal System	Wastewater Treatment Plant	Abandoned grit system	With historical clogging problems, grit system was bypassed and equipment has been abandoned.	Remove and replace existing grit pump, grit classifer, piping and valves. Convert grit pumping to top-mounted pump configuration.	Design completed with 2012 WWTP Improvements (Dudek). Review hydraulics and efficiencies at future flows before implementing project.	Phased with Future Development	$424,000
FWWCIP-3	Extended Aertion Basin 2	Wastewater Treatment Plant	(1) Extended aeration basin with 2 integral clarifiers	Future flows and loadings are greater than design criteria for existing aeration basin.	Install second aeration basin (Biolac) with aeration equipment and 2 integral clarifiers, and (3) blowers. Basin and clarifiers are to be same size as existing.	Install when BOD loadings for existing basin are between 12 and 15 ppd/1000 CF. (At existing loads, this is estimated to occur between 0.74 and 0.93 MGD).	Phased with Future Development	$3,580,000
							Subtotal Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities	**$4,039,000**
							Total	**$4,039,000**

SECTION 1 INTRODUCTION

1.1 Purpose and Scope

The planning horizon for the Wastewater Collection and Treatment Plant Master Plan (WWMP) is the City of Guadalupe's (City) build-out population estimate of 10,861 residents estimated to occur in the year 2044. The purpose of this study is to identify improvements to the wastewater collection, treatment, and disposal systems necessary to meet existing and future wastewater flows, and to develop a wastewater facilities improvement program to assist the City in long term planning and budgeting. A summary of the tasks undertaken to accomplish this are provided below:

1.1.1 Data Collection and Review

The data collection and review effort involved working with City staff, regional agencies and wastewater equipment vendors to collect the following wastewater facility information:

- ❑ Wastewater treatment plant (WWTP) daily flow records
- ❑ Pump curves and settings for City lift stations
- ❑ Lift station run time records
- ❑ Monthly water billing information
- ❑ Daily rainfall records
- ❑ Existing and build-out land use information
- ❑ Existing and projected population estimates
- ❑ Prior planning documents
- ❑ Pipe, valve, and hydrant information
- ❑ Wastewater collection and treatment plant asbuilt plans
- ❑ Flow monitoring data

1.1.2 Wastewater Flow

Existing Average Day Flow (ADF) was determined using daily WWTP flow records from 2012 to 2013. Additional historical wastewater flow data was not available. Build-out ADD was estimated using per capita flow factors within the City limits (excluding DJ Farms), Apio planned expansion, and the DJ Farms Development. Existing Peak Hour Flow (PHF) was determined via a flow monitoring study completed by Fluid Resource Management (FRM) during April 22 to June 6, 2014.

1.1.3 Design Criteria

The City of Guadalupe has adopted the City of Santa Maria design standards for wastewater collection facility sizing and design. These design standards along with industry accepted design criteria for lift stations, force mains, wastewater treatment, and disposal systems were utilized to evaluate the City's existing wastewater infrastructure.

1.1.4 Collection System Hydraulic Model Development

As the basis of the hydraulic model, a Geographic Information System (GIS) database and mapping was developed for the existing City wastewater collection system. A field survey was completed to collect northing and easting GPS

coordinates, elevations, and digital photos for approximately 100 sewer manholes within the collection system. Pipe characteristics, survey field data, and average daily flows were developed in the GIS database and imported into the hydraulic model. Bentley's SewerCAD V8i hydraulic modeling software was used to simulate the operation of the wastewater collection system. The hydraulic model was calibrated using results of flow monitoring study performed by FRM.

1.1.5 Collection System Hydraulic Analysis and Recommendations

The hydraulic analyses were performed to analyze the adequacy of the existing collection system, lift stations, and force mains under existing and future demand scenarios. Upgrades were recommended based on identified deficiencies.

1.1.6 Wastewater Treatment and Disposal Analysis and Recommendations

A site condition assessment, summary of previous recommended improvements not constructed at the time this Master Plan was completed, and limited hydraulic analyses were performed to analyze the adequacy of the WWTP under existing and future demand scenarios. Upgrades were recommended based on identified deficiencies.

1.1.7 Capital Improvement Program Cost and Prioritization

The capital improvement program has two objectives: (1) to identify improvements necessary to correct hydraulic deficiencies in the existing system, and (2) to identify improvements necessary to meet the flows and loadings of new development. Planning-level cost opinions and prioritizations for these facilities are also provided.

SECTION 2 POPULATION AND LAND USE

2.1 Overview

This section provides an overview of the existing and future population and land uses in the City of Guadalupe. The City of Guadalupe is an incorporated city of 7,080 residents (based on 2010 Census) and located in northern Santa Barbara County, approximately four miles inland from the Pacific Ocean along the scenic coastal Highway 1. The City is approximately 1.4 square miles in size and is situated in the heart of the fertile Santa Maria Valley, an agricultural region of statewide and national importance. US Highway 101 (US 101), a regional highway linking California's coastal cities, is located 10 miles to the east. The City of Santa Barbara is located approximately 60 miles to the south and San Luis Obispo is located 25 miles to the north. Neighboring communities include the cities of Santa Maria, 10 miles to the east, and Pismo Beach, 15 miles to the north. The topography in the vicinity of the City is relatively flat and the average elevation is 85 feet above mean sea level. The predominant land use surrounding Guadalupe is agriculture. (Guadalupe Community Plan, 2009)

2.2 Population and Land Use

According to the 2000 census, the population of Guadalupe was 5,659. The population of the City increased to 7,080 by 2010. This represents a growth rate of approximately 2.3% per annum (2000-2010). The Census also identified 1,810 occupied housing units in the City, representing approximately 3.9 persons per dwelling. By comparison, the City of Santa Maria recorded populations of 77,423 and 99,553 for 2000 and 2010 respectively, representing an annual growth rate of 2.5%. The average dwelling unit occupancy for Santa Maria is approximately 3.7 persons per occupied dwelling. **Table 2-1** provides an overview of the existing zoning within the City, excluding the DJ Farms Development.

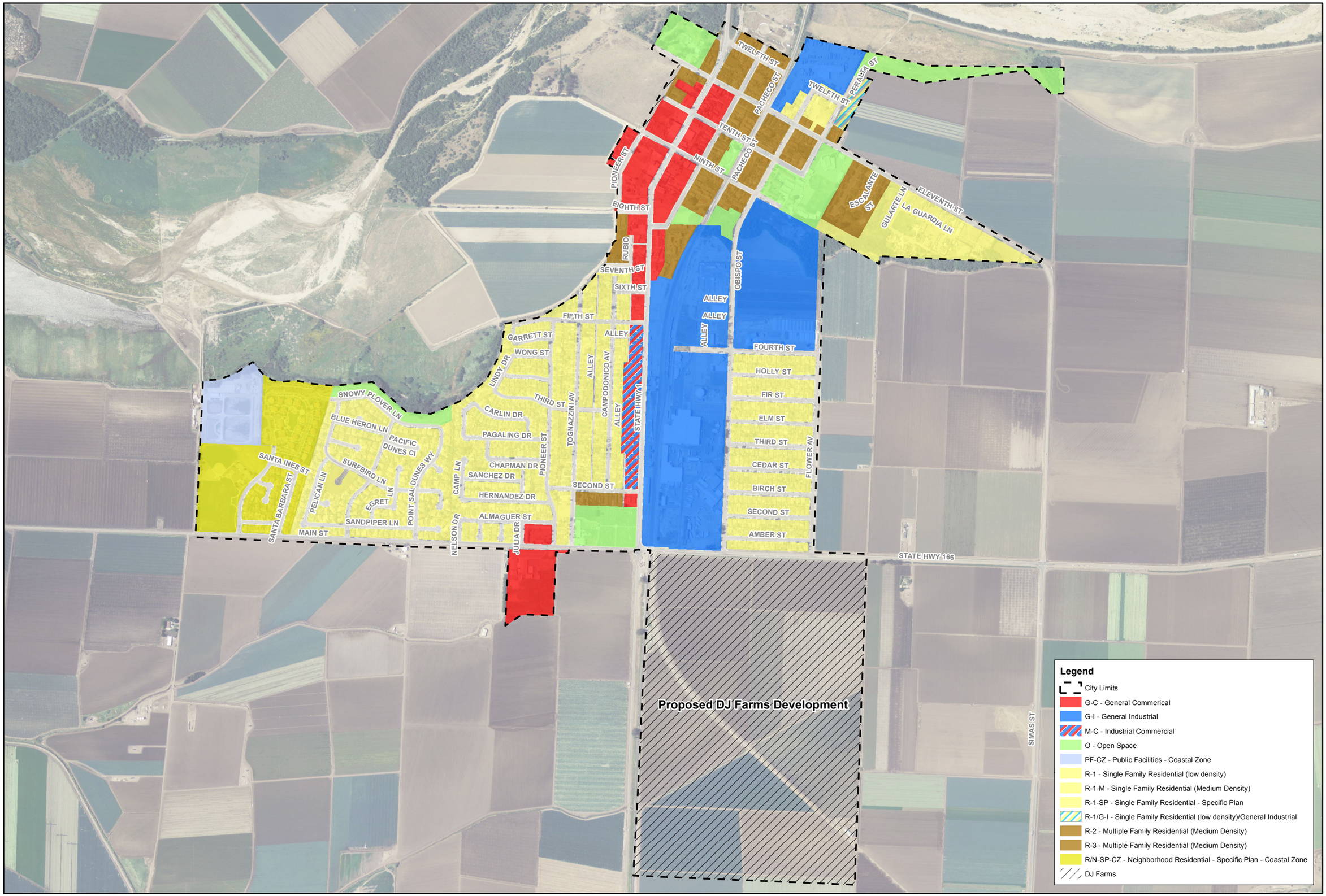
Table 2-1: Existing Zoning for City

Zoning	Description	Parcels	Acres
G-C	General Commercial	129	41.7
G-I	General industrial	55	120.5
M-C	Industrial Commercial	21	8.2
O	Open Space	19	39.3
PF-CZ	Public Facilities - Coastal Zone	1	13.4
R/N-SP-CZ	Neighborhood Residential - Specific Plan - Coastal Zone	52	37.6
R-1	Single Family Residential (low density)	548	104.6
R-1-M	Single Family Residential (Medium Density)	396	45.5
R-1-SP	Single Family Residential - Specific Plan	257	47.6
R-2	Multiple Family Residential (Medium Density)	44	18.7
R-3	Multiple Family Residential (High Density)	200	28.8
	DJ Farms Development	2	209.0
	Total	**1,726**	**715**

City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 2-1:

Existing Zoning



1 inch:1,000 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

2.2.1 DJ Farms Specific Plan Revision

In August 2012, the City Council adopted the Revised DJ Farms Specific Plan. This Revised Specific Plan establishes land uses and development standards that will govern development of the 209 acre DJ Farms property. The plan accommodates development of approximately 802 single-family lots in varying sizes and 21.5 acres of commercial land uses that would be phased through the year 2040. The number of residential units to be developed increased from 481 in the 1995 Specific Plan, to 802 units in the 2013 Plan. According to the adopted DJ Farms Specific Plan, growth within the City for the past two decades has been almost entirely associated with new residential development. In the DJ Farms Specific Plan, it was assumed that the City's growth through build-out will be attributed solely to the build-out of DJ Farms, and that an additional 3,208 persons would be associated with the development. **Table 2-2** identifies the proposed zoning planned for the DJ Farms Development.

Table 2-2: DJ Farms Development Proposed Zoning

Zoning	Description	Parcels	Acres
C-N	Neighborhood Commercial	3	14.6
C-S	Service Commercial		6.9
PF	Public Facilities	4	13.1
R-1-3000	Residential Small Lot	322	44.6
R-1-5000	Medium Density Residential	357	71.4
R-1-6000	Low Density Residential	108	25.4
R-1-7000	Very Low Density Residential	15	4.6
REC	Recreation	16	15.9
SCHOOL	School Site	1	12.5
	Total	**826**	**209.0**

In the DJ Farms Specific Plan, City buildout was estimated to be 10,288 persons in the year 2040, representing 1.25% growth per annum. For the purposes of this Master Plan, it was assumed that population growth within the City would be attributed not only to the development of DJ Farms, but would also include development of existing vacant or underutilized residential lots within the City, and the occupation of existing unoccupied residences. Using this approach, the buildout population of Guadalupe was estimated to be 11,029 persons as presented in **Table 2-3**.

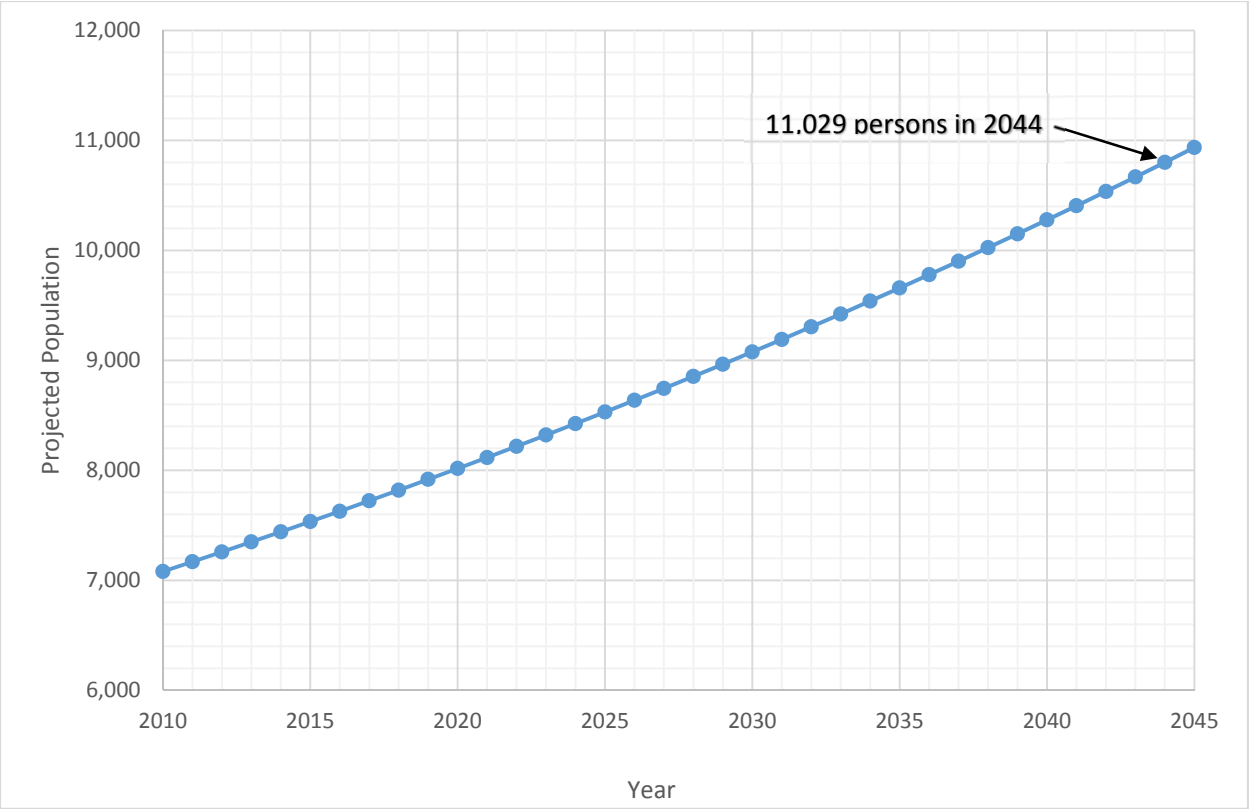
Table 2-3: Buildout Population

Population	Source	Notes	Persons
2010 Population	2010 California Census		7,080
Unoccupied Dwellings	2010 California Census	77 dwellings at 3.9 persons per dwelling	300
DJ Farms	DJ Farms Specific Plan	Population estimate provided by developer and assumes 4 persons per dwelling	3,208
Vacant Developable Residential Lots R-1	City Land Use Information	29 dwellings at 3.9 persons per dwelling	113
Vacant Developable Residential Lots R-2 & R-3	City Land Use Information	5.4 acres medium and high density residential undeveloped at 29.6 persons per acre	160
Guadalupe Court	Cabrillo Economic Development Corporation	Population estimate provided by developer	168
		Buildout Population	**11,029**

Using the 1.25% per annum growth rate stated in the DJ Farms Master Plan (1.25%), the buildout population of 11,029 would occur in the year 2044. This assumed growth rate is also consistent with other planning documents such as the Santa Barbara County Association of Governments (SBCAG) 2010-2040 Regional Growth Forecast (1.06%), and the 2002

Guadalupe Water Master Plan (1.9%). **Figure 2-2** below shows the anticipated growth projection to build-out using 1.25% growth per annum.

Figure 2-2: City of Guadalupe Projected Population Growth (i=1.25% per annum)



2.3 Additional Future Development

The following future developments will impact the City's collection, treatment and disposal facilities and were reviewed as part of this master plan.

2.3.1 Apio Production Line Expansion

In 2002, the City's biggest water user, Apio (a vegetable processing, washing and packaging facility), consumed an average of 55,000 gallons per day (GPD), representing approximately 10% of the total City water sales. It was noted in the 2002 Master Plan that there were plans to double Apio's water demand. The average daily demand (ADD) for the overall Apio facility during calendar year 2012 was 312,010 GPD, representing approximately 36% of the total City 2012 water sales. Apio's production line averages 270,000 GPD. In July 2013 Apio submitted an after-the fact application to the City of Guadalupe's Planning Department for a revision to their Design Review Permit (DRP) approved on May 12, 2009. The 2009 Design Review Permit allowed expansion of existing uses by approximately 56,880 square feet of cold storage space. The requested revision to the 2009 Design Review Permit would allow Apio to utilize approximately 24,000 square feet of the existing onsite cold-storage warehouse space for vegetable processing facilities, hereafter referred to as the Value Added Cooler (VAC). Approximately 12,000 square feet of this VAC line expansion was installed in August 2013 and is currently in operation. It was estimated that the already installed VAC line will increase existing daily water usage by 56,160 GPD with a projected peak/maximum day increase of 122,655 GPD. In addition to the 56,160 GPD originally requested in the revised DRP application submitted last year, Apio subsequently requested an amendment to the revised DRP application to allow for a second VAC line to be added to the facility at some point in the future. This second VAC line would also consume approximately 56,160 GPD. With the existing VAC, along with two additional VAC lines, the total future water usage was estimated to be 383,000 GPD during average conditions, with a peak day use of 449,000.

From the City's water billing system, the two VAC lines installed onsite receive water from meters APIO003 and APIO009 respectively. Michael K Nunley & Associates (MKN) requested and received water usage data from January 2014 to May 2014 for all Apio meters to review the increased water usage from the APIO009 VAC line. **Table 2-4** below identifies that water usage for the APIO003 VAC line has remained relativity constant, while water usage for the newly installed APIO009 VAC line has increased to approximately 100,000 GPD, which is close to the full water usage requested by Apio in the DRP.

Table 2-4: Apio Historical Average Daily Water Usage

Calendar Year*	Usage (GPD)								Apio Average Daily Demand
	API0001	API0002	API0003	API0004	API0006	API0007	API0008	API0009	
2014**	441	679	232,673	15	23,223	36,256	15	103,893	397,193
2013	348	3,635	239,524	12	32,312	29,881	20	3,648	309,380
2012	303	7,138	235,745	57	40,339	28,395	33	NA	312,010
2011	289	7,611	214,981	51	32,963	32,488	18	NA	288,402
2010	533	11,396	214,147	57	38,347	37,740	27	NA	302,247
2009	547	19,389	204,802	137	30,209	45,567	12	NA	300,663

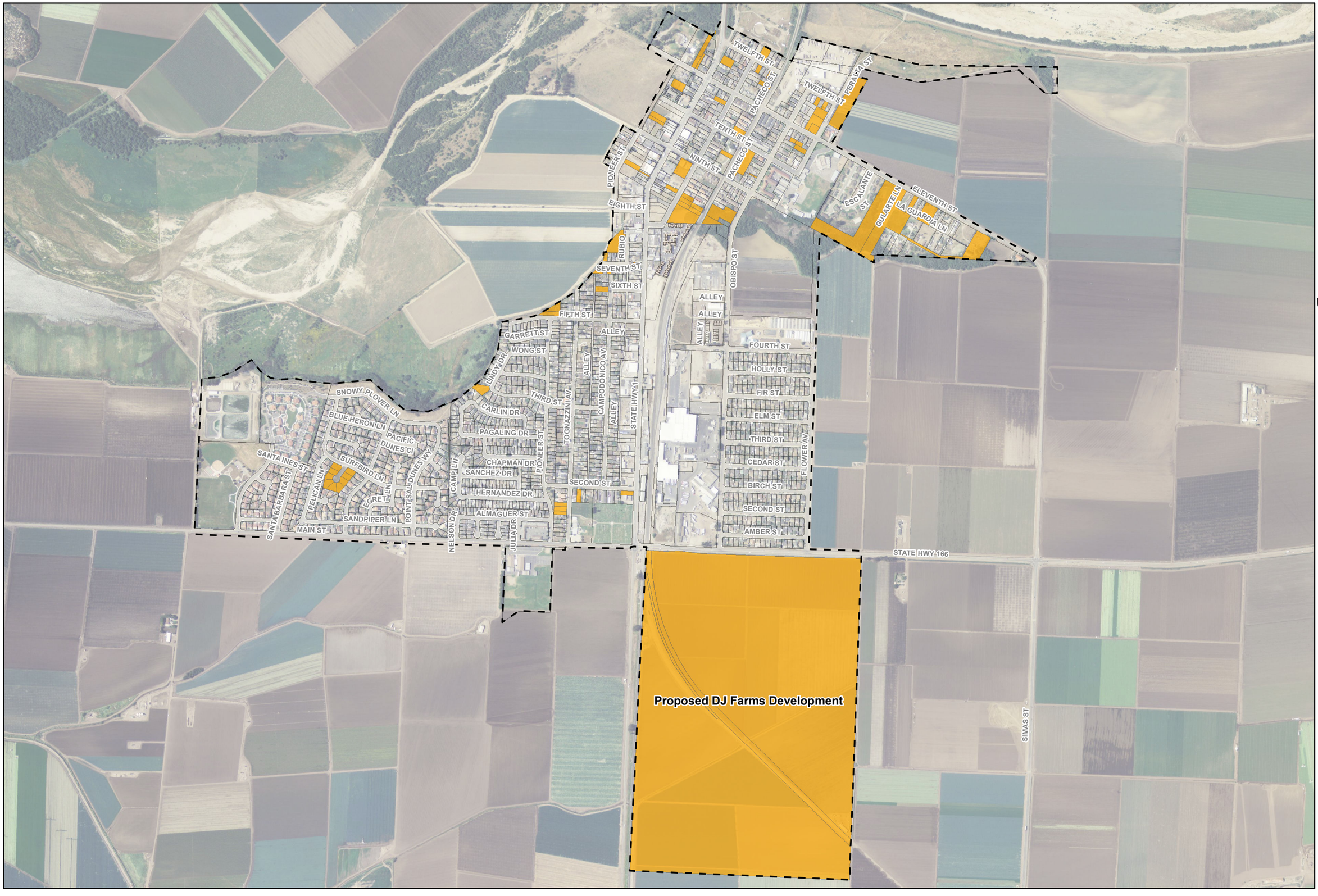
*Water usage is based on calendar year sales/water usage information provided by the City of Guadalupe.
**Water usage is based on calendar year sales/water usage information provided by the City of Guadalupe and averaged from January 2014 to May 2014.

At the time of this report, the City will require that Apio limit their existing water usage to their pre-expansion 4 year average demand from 2009-2012 (337 AFY) with a future allocation not to exceed 372 AFY. A decrease in water demand will also reduce Apio wastewater flows to the collection system under existing and future conditions.

2.3.2 Guadalupe Court Residential Project

The Cabrillo Economic Development Corporation (Developer) is proposing to construct a 38-unit affordable apartment complex, Guadalupe Court, on a three acre lot located on the south side of 11th Street near the City of Guadalupe's (City) eastern city limits. The proposed apartment complex is estimated to have a total occupancy of 168 people based on information provided by Developer. This development would be served by the Gularte Lift Station.

The Gularte Lift Station is the newest of the City's three lift stations, rehabilitated in 2005 by Fluid Resource Management (FRM), and is located at the intersection of Gularte Lane and La Guardia Lane. Gularte Lift Station is a duplex submersible lift station with a fiberglass wet well and Myers Submersible Grinder pumps. This lift station collects residential wastewater flow from the adjacent neighborhood and serves approximately 25 parcels.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 2-3:

Undeveloped Parcels

Legend

- Undeveloped
- City Limits

1 inch:1,000 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

SECTION 3 WASTEWATER FLOWS

3.1 Historical Wastewater Treatment Plant Flow Records

This section provides an overview of the historical WWTP treatment flows, flow conditions analyzed as part of the collection system and treatment plant evaluation, and existing and future wastewater flows. MKN reviewed the wastewater treatment plant's daily effluent flow records provided by the City and total monthly precipitation data collected by the County of San Luis Obispo from January 2012 to December 2013 for the Nipomo South weather station (this station is located approximately 3 miles from the City of Guadalupe). The potential impact from inflow and infiltration was reviewed.

Infiltration is the water entering a sewer system from groundwater through such means as cracks in manhole walls, defective pipes, pipe joints, or connections. Infiltration does not include inflow and is relatively constant over a period of days, weeks, or even months in areas where high groundwater persists near sewer services. Inflow is the water discharged into a sewer system and service connections from such sources as manhole covers, roof and foundation drains, or cross connections from storm sewers and catch basins. Inflow does not include infiltration. Inflow varies rapidly with rainfall conditions, with flows rising and falling within minutes or hours of a severe storm event with significant runoff. Typically, potential influence of infiltration on treatment plant flow rates can be estimated by observing patterns in the total rainfall plotted with the average daily flows for each month. Based on comparison of total precipitation data and WWTP monthly effluent flows (**Figure 3-1**), it appears infiltration is not significant at the Guadalupe WWTP.

The impact of inflow can be estimated by the difference between wet weather and dry weather peak daily flows. Plant records indicate peak day flows during wet weather months are relatively consistent with dry weather peak day flows, suggesting that inflow is not a significant contribution. For these reasons, inflow/infiltration (I/I) is not considered further in this capacity analysis. However, California has been experiencing severe drought conditions, with particularly low rainfall in 2013. Without normal precipitation, it is difficult to quantify impacts of inflow and infiltration and this should be considered for future assessments.

Figure 3-1: Historical Wastewater Treatment Plant Effluent Flow and Rainfall

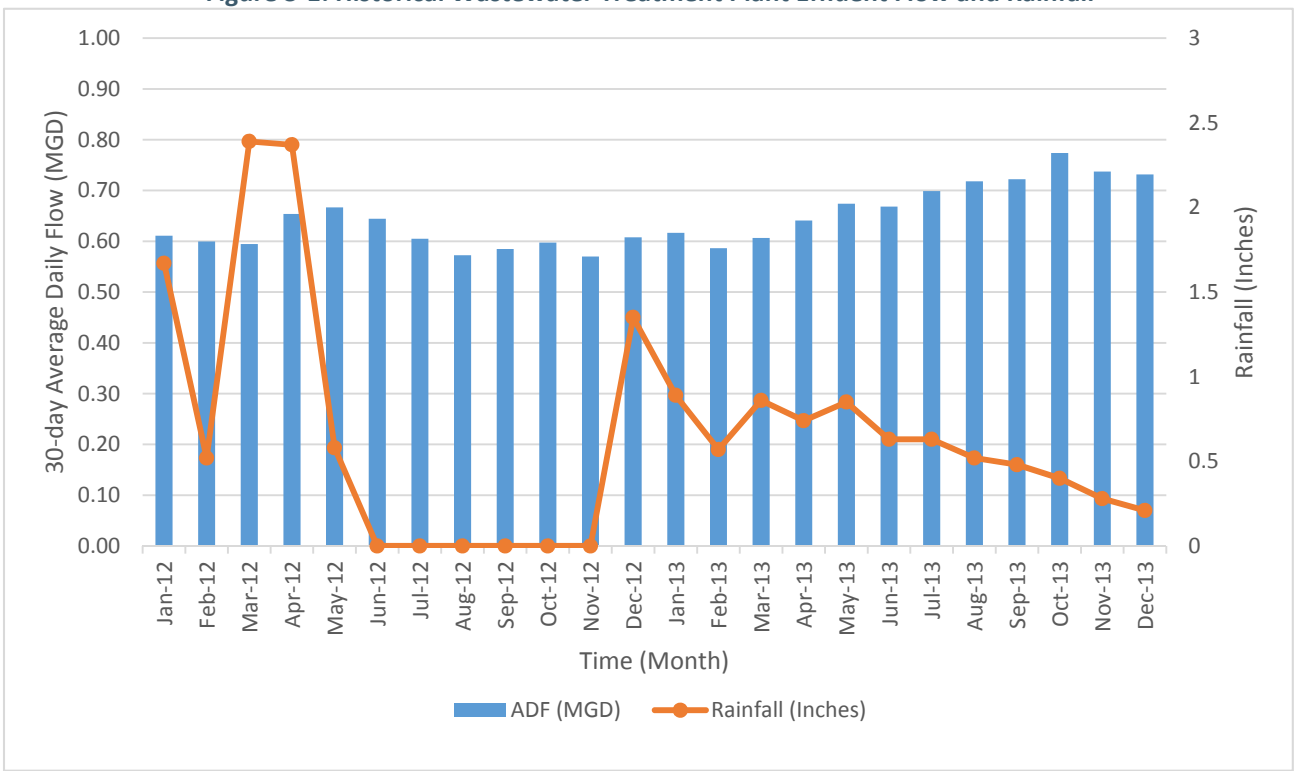


Table 3-1 below provides a summary of the historical wastewater flow records. Comprehensive daily effluent flow data was only available for calendar years 2012 and 2013. Flows from 2013 were used for planning purposes in this master plan report.

Table 3-1: Historical WWTP Effluent Flows

Year	2012	2013
Flows (MGD)		
Average Daily Flow (ADF)	0.61	0.68
Average Dry Weather Flow (ADWF)	0.60	0.70
Average Wet Weather Flow (AWWF)	0.67	0.67
Maximum Monthly Flow (MMF)	0.61	0.77
Peak Day Dry Weather Flow (PDDWF)	0.87	0.89
Peak Day Wet Weather Flow (PDWWF)	0.87	0.93
Peak Day Flow (PDF)	0.87	0.93

Additional dry weather flow monitoring was completed during April 22, 2014 to June 6, 2014 to evaluate dry weather flow conditions. A detailed discussion of the flow metering effort is provided later in this Section.

3.2 Wastewater Flow Conditions

The following flow conditions were used to analyze the wastewater collection system, lift stations, treatment system, are referenced throughout the report and are defined below:

3.2.1 Average Daily Flow (ADF)

ADF is the average daily wastewater flow over the course of a year and is generally obtained by averaging the mean monthly flows conveyed to a WWTP through the course of a year. The ADF was determined using annual average flow for 2013. The existing ADF is estimated at 0.68 MGD.

3.2.2 Maximum Month Flow (MMF)

MMF is the average daily flow during the month with the maximum cumulative flow. MMF is often the regulated flow parameter for a WWTP's discharge permit. The current waste discharge requirements for the City's WWTP, as specified in the California Regional Water Quality Control Board (CRWQCB) Waste Discharge/Recycled Water Requirements Order No. R3-2005-0015, limit plant effluent to a maximum month flow of 0.96 MGD. The existing MMF is estimated at 0.77 MGD based on plant flow records.

3.2.3 Average Dry Weather (ADWF) and Wet Weather (AWWF) Flows

ADWF and AWWF are the average of daily flow rates experienced during wet and dry weather months respectively. Consideration of average dry and wet weather flows allows analysis of treatment systems at appropriate flow rates and temperatures for the dry and wet seasons. Based on historical rainfall data for the area, wet weather months are assumed to be October through April. The existing ADWF and AWWF are estimated at 0.70 and 0.67 MGD respectively based on WWTP flow records.

3.2.4 Peak Day Dry Weather Flow (PDDWF) and Wet Weather Flow (PDWWF)

PDDWF and PDWWF are the maximum daily flow rates experienced at the WWTP during dry and wet weather months respectively. The existing PDDWF and PDWWF are estimated at 0.89 and 0.93 MGD respectively.

3.2.5 Peak Day Flow (PDF)

PDF is the maximum daily flow rate experienced at the WWTF and is used to design or evaluate hydraulic retention times for certain treatment processes. The existing PDF is estimated at 0.93 MGD.

3.2.6 Peak Hour Dry Weather Flow (PHDWF)

PHDWF is the maximum one-hour flow experienced by the system, and is typically used for sizing collection system piping, lift stations, flow meters, interceptors, and headworks systems. Peak hour flow is typically derived from WWTF influent records, flow monitoring, or empirical equations used to estimate PHF based on service area population. For this report, peak hour dry weather flow was estimated using a PHDWF peaking factor estimated as part of the flow monitoring study that was conducted from April 22, 2014 to June 6, 2014 for the Apio wastewater hydraulic evaluation. Two peaking factors were determined from the flow monitoring project one for City flow and another for Apio flow. City peak hour flow was calculated to be 2.05 MGD (assuming a PF of 4.7), while Apio PHDWF flow was calculated to be 0.65 MGD.

3.2.7 Peak Hour Wet Weather Flow (PHWWF)

PHHWF data was not available because of the severe drought conditions. However, the collection should be evaluated to verify it can handle PHWWF.

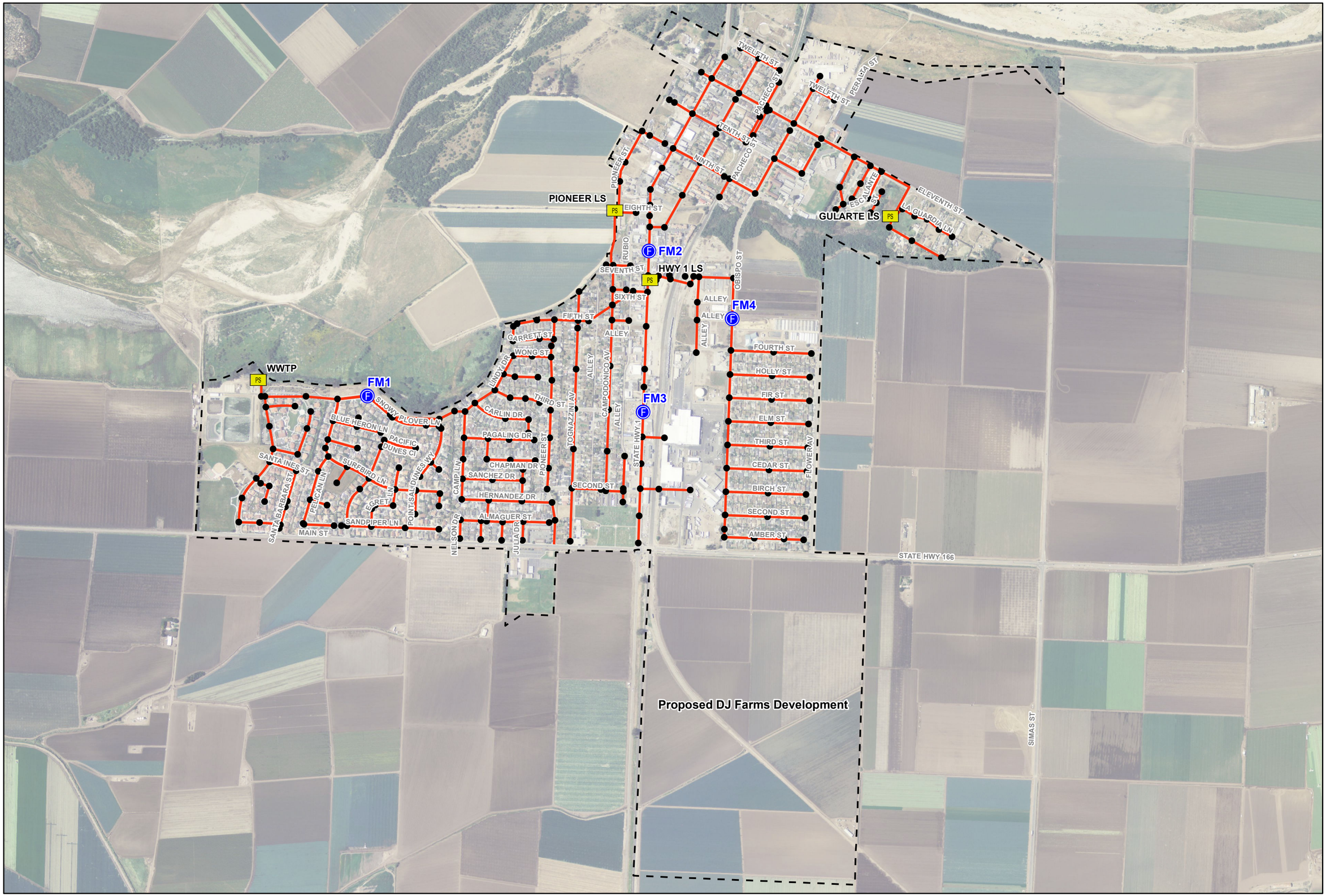
3.3 Flow Monitoring Study

As part of a separate detailed water distribution and wastewater collection study for Apio's revision to their Design Review Permit (DRP) approved on May 12, 2009, four flow meters were installed in key locations throughout the City's collection system to collect average daily flow, peak hour dry weather flow, and diurnal flow patterns for the City and Apio wastewater flows. The purpose of the study as to complete a detailed hydraulic analysis of the collection system from the Apio facility to the WWTP. Flow measurements were collected for approximately six weeks from April 22, 2014 to June 6, 2014 for the aforementioned flow conditions.

Figure 3-2: Flow Meter Installation

Fluid Resource Management (FRM) was hired to install flow meters at strategic locations in the City's collection system. Four Greyline Instruments Stingray pipe band flow meters, as shown in **Figure 3-2**, were installed in key locations throughout the City as shown in **Figure 3-3.** The insertion-type flow meters consist of a circular metal band with sensors, and were installed inside the upstream pipe within the sewer manhole. The meters are installed so that the wastewater entering the manhole flows over the sensors, which reads the wastewater temperature, depth, and velocity every 5 minutes.

It was recommended by FRM that the flow meters remain in the collection system for a minimum duration of four weeks to minimize impacts of common data collection issues associated with clogging from rags, grease, pipe cleaning or flow meter power failures. Data was collected for approximately seven weeks from April 22, 2014 to June 6, 2014 and reviewed by MKN on a weekly basis. Two weeks of continuous flow data, near the end of the flow study, were used for the analysis because of initial data collection issues associated with equipment failures at FM3 (Apio location). No useable flow data was available from flow meter FM4 (Treasure Park area) because of continued grit buildup on the flow meter from the upstream collection system throughout the flow monitoring study period.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 3-3:

Flow Meter Study

Legend

- Manholes
- Flow Meter
- Pump Station
- Manholes
- Sewer System
- City Limits

1 inch:1,000 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

For the initial DRP application, Apio estimated that a second VAC line would increase average daily wash water usage by 56,160 GPD with a projected maximum day increase of 122,655 GPD. In addition to this original 56,160 GPD request, Apio subsequently requested an amendment to the DRP application to allow for a third VAC line to be added to the facility at some point in the future. This third VAC line would also consume approximately 56,160 GPD. The total amended water usage requested would increase Apio's "existing" average daily wash water use by an estimated 112,320 GPD with a projected maximum day increase of 178,825 GPD.

Since a second VAC line has been in full operation as of December 2013, MKN requested and received current water usage data from January 2014 to May 2014 for all Apio meters to review the increased water usage from the APIO009 VAC line. **Table 3-2** below identifies that water usage for the APIO003 VAC line has remained relativity constant, while water usage for the newly installed APIO009 VAC line has increased to approximately 100,000 GPD, which is close to the full water usage requested by Apio in the DRP.

Table 3-2: Apio Historical Average Daily Water Usage

Calendar Year*	Usage (GPD)								Apio Average Daily Demand
	API0001	API0002	API0003	API0004	API0006	API0007	API0008	API0009	
2014**	441	679	232,673	15	23,223	36,256	15	103,893	397,193
2013	348	3,635	239,524	12	32,312	29,881	20	3,648	309,380
2012	303	7,138	235,745	57	40,339	28,395	33	NA	312,010
2011	289	7,611	214,981	51	32,963	32,488	18	NA	288,402
2010	533	11,396	214,147	57	38,347	37,740	27	NA	302,247
2009	547	19,389	204,802	137	30,209	45,567	12	NA	300,663

*Water usage is based on calendar year sales/water usage information provided by the City of Guadalupe.
**Water usage is based on calendar year sales/water usage information provided by the City of Guadalupe and averaged from January 2014 to May 2014.

Table 3-3 summarizes the results of the flow monitoring data collection and analysis and chart data of the recorded results are included in Appendix A of the master plan report.

Table 3-3: Flow Meters Results

Flow Meter	FM1	FM2	FM3	FM4
Street Location	On Snowy Plover Ln east of Surfbird Ln	On Highway 1 north of Sixth St and south of Olivera St	On Highway 1 600 feet north of Second St	Obispo Street north of Fourth St
System Location	East of WWTP	North of HWY 1 Lift Station	South of HWY 1 Lift Station	East of railroad sewer crossing
Pipe Diameter (inches)	24	15	12	10
Dry Weather Flow Monitoring Results - May 20, 2014 to June 5, 2014 (2 weeks)				
Average Day Flow (GPD)	933,991	128,000	341,939	No Useable Flow Data Available
Peak Day Flow (GPD)	1,130,183	197,768	473,229	
Average Day Flow (GPM)	649	89	237	
Peak Hour Flow (GPM)	1,770	418	644	
Peak Instantaneous Flow (GPM)	3,179	1,442	733	
Peaking Factor (PHF/ADF)	2.7	4.7	2.7	

Peaking factors from FM2 (City flow) and FM3 (Apio flow) were used to develop peak hour flows for the City's residential and commercial flows and Apio's flow conditions.

3.4 Existing Wastewater Flows

For the collection system and treatment plant hydraulic analysis a baseline wastewater flow condition was established using 2013 water usage information for the City and Apio, 2013 daily WWTP flows, direction from Apio on the water usage that returns to the collection system as wastewater, and verification of these estimated flow from the recently completed flow monitoring study (see Section 3.3). The basis of the flow estimation process consists of comparing the City's 2013 average daily water demand, 2013 average daily wastewater flow at the WWTP, and based on this information determine the percentage of water that returns as wastewater to the collection system. Irrigation water usage was assumed not to return to the collection system, Apio identified the specific water usage discharged to the collection system as wastewater. Apio's known wastewater flow was subtracted from the recorded ADF at the WWTP and the remaining wastewater flow was allocated throughout the City users based on a percentage of water usage per parcel. The estimated ADF for the City and Apio that was used to load the hydraulic model for this master plan is summarized in **Table 3-4**.

Table 3-4: Estimated Wastewater Average Day Flow

Source	2013 Water Usage (GPD)	2013 Estimated Baseline ADF (GPD)
City	510,486	436,459
Apio (Meters 1-8)	305,734	243,541*
Irrigation & Misc.	54,122	-
Total	**870,342****	**680,000*****

*Water from Apio meters 1-4 & 8 return 100% to the wastewater collection system based on information provided by Apio.
**Based on monthly water usage information provided by the City for 2013.
***Based on daily wastewater flows at the WWTP provided by the City for 2013.

Based on our review and analysis of WWTP effluent flow records, existing water usage records, and flow monitoring data, the following peaking factors as identified in **Table 3-5** were developed for use in the capacity analysis of the collection and treatment systems. During the April 2014 flow monitoring study two peak hour peaking factors were developed. A 4.7 peaking factor was observed for the City, while Apio was observed to have a 2.7 peaking factor. For the purpose of this master plan a combined peak hour peaking factor of 3.98 was developed after applying the above described peaking factors to the City and Apio flows identified in **Table 3-4**.

Table 3-5: Existing Wastewater Flows

Flow Condition	Flow (MGD)	Peaking Factor	Source
Average Daily Flow (ADF)	0.68	--	City of Guadalupe WWTP 2013 Daily Flow Records
Maximum Month Flow (MMF)	0.77	1.13	City of Guadalupe WWTP 2013 Daily Flow Records
Peak Day Flow (PDF)	0.93	1.37	City of Guadalupe WWTP 2013 Daily Flow Records
Peak Hour Flow (PHF)	2.71	3.98	Flow Monitoring from April 22, 2014 to June 6, 2014

3.5 Future Wastewater Flows

For the purposes of this Master Plan, it was assumed that population growth within the City would be attributed not only to the development of DJ Farms, but would also include development of existing vacant or underutilized residential

lots within the City, as well as the occupation of existing unoccupied residences. Although build-out is estimated to occur in the year 2044, actual build-out may occur earlier or later, as future decisions by the City may alter the ultimate boundaries, population, and wastewater flows of the City.

At the time of this report the City will require that Apio limit their existing water usage to 337 AFY with a maximum future usage of 373 AFY. The City is proposing this water usage cap for the Apio expansion because of impacts to the City's available water supplies from the severe drought conditions throughout California over the last several years. This reduction is future water usage by Apio is accounted for in **Table 3-6** for estimating future flows.

There may be instances where new development, not currently accounted for in this Master Plan, will result in hydraulic capacity requirements that exceed the capacity of existing sewer pipes. Such cases will need to be analyzed on a case-by-case basis when the developments are proposed to determine if supplemental system improvements are needed. To estimate the City's build-out wastewater flows, the General Plan land use, DJ Farms Specific Plan, and potential future flow from Apio were used to project future wastewater flow and is summarized in **Table 3-4**. A future per capita wastewater flow of 80 GPD was assumed for City unoccupied residential and future developable lots. This value is slightly less than the DJ Farms Specific Plan estimates, but provides a projected demand that is conservative compared to existing wastewater flows. Based on the population from 2013 and the ADD estimated from the billing records, the residential per capita flow is 61 GPCD and the existing gross per capita average flow is 96 GPCD. It is anticipated that much of the future development will be lower density residential housing.

Table 3-6: Future Wastewater Flows

Source	Population	Per Capita Flow (GPCD)	Average Day Flow (gpd)
Unoccupied Residential Dwellings	300	80	24,000
Vacant Developable R-1 Residential Lots	113	80	9,040
Vacant Developable R-2 & R-3 Residential Lots	160	80	12,800
Proposed Guadalupe Court Development	168	80	13,440
		Future City Infill	59,280
		Existing City Flow	436,459
		Total Future City Flow	**495,739**
		Existing Apio Flow	243,541
		Future Apio Expansion	31,245
		Total Future Apio Flow	**274,786**
Future DJ Farms	3208	82	263,056
		Total Future Flow	**1,033,581**

The total additional future flows from **Table 3-6** were added to the existing flows shown in **Table 3-4** to estimate the future average daily flow. Peaking factors from **Table 3-5** were applied to estimate future flow conditions. The estimated future flows are summarized in **Table 3-7** below, and were used to analyze the capacity of the existing collection system during future wastewater flow conditions.

Table 3-7: Future Wastewater Flows

Flow Condition	Flow (MGD)	Peaking Factor
Average Daily Flow (ADF)	1.03	--
Maximum Month Flow (MMF)	1.17	1.13
Peak Day Flow (PDF)	1.41	1.37
Peak Hour Flow (PHF)	4.10	3.98

SECTION 4 WASTEWATER COLLECTION, TREATMENT AND DISPOSAL SYSTEM OVERVIEW

4.1 Overview

This section provides an overview of the City's existing wastewater collection, treatment, and disposal system facilities. The City of Guadalupe provides wastewater collection, treatment and effluent disposal services for approximately 7,080 City residents and customers (2010 Census). The wastewater collection system consists of 15 miles of gravity collection system piping ranging from 3 to 24 inches, 0.3 miles of force main, an inverted siphon, approximately 300 manholes, and three lift stations ranging from 100 to 400 GPM in simplex operation with corresponding force mains. The wastewater treatment and effluent disposal process includes a screening, biological treatment, sludge dewatering, effluent storage, and land application via spray distribution. Detailed descriptions of the City's wastewater facilities are provided below.

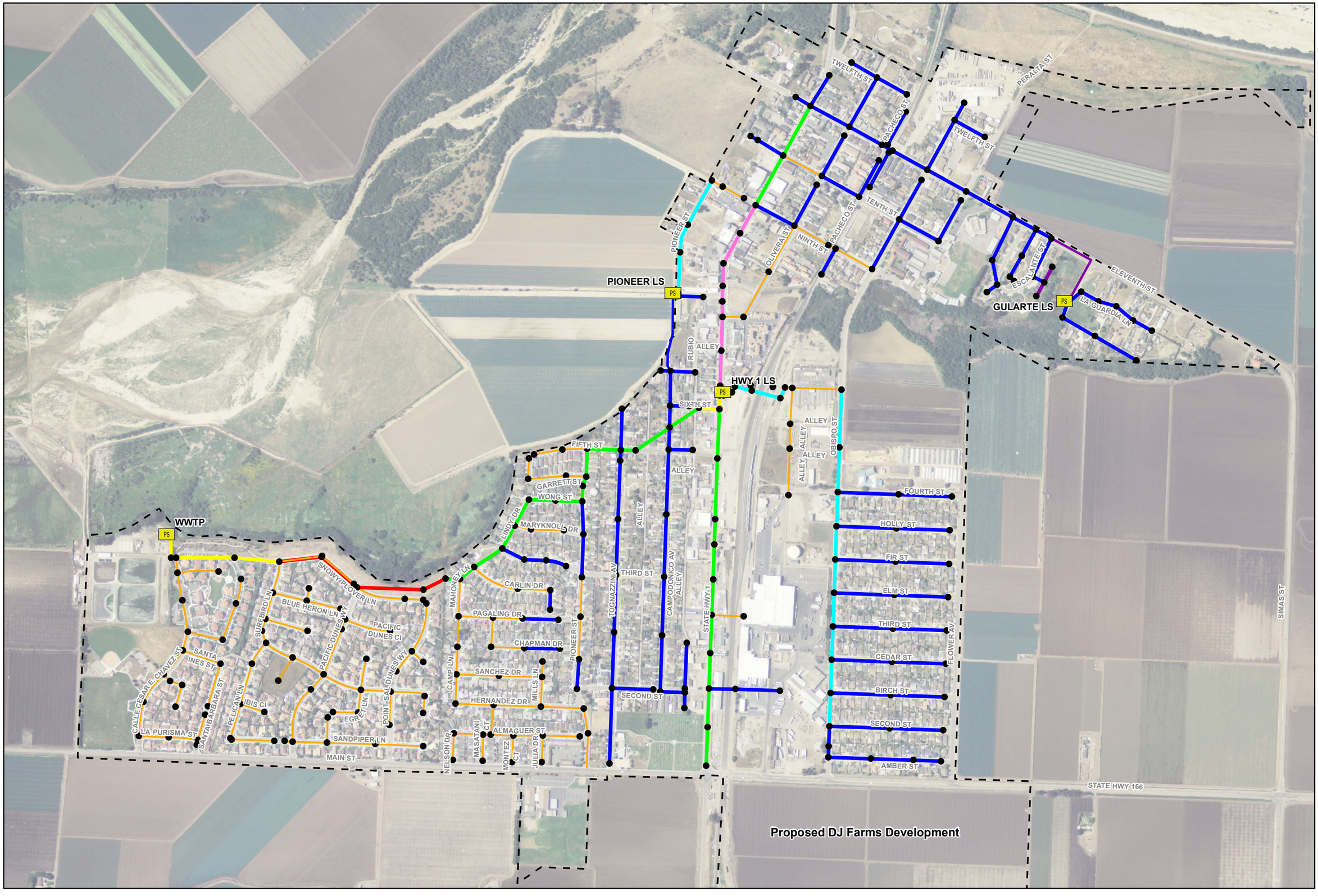
4.2 Gravity Collection System

The City's existing collection system is shown in **Figure 4.1** and as mentioned earlier consists of approximately 15 miles of gravity sewer, including a three barrel inverted siphon located at the intersection of Highway 1 and Eighth Street. An inventory of the existing collection system network is also summarized in **Table 4-1**. The collection system is comprised primarily of Polyvinyl Chloride (PVC) pipe with 2.5 miles of Vitrified Clay Pipe (VCP) serving the Treasure Park area.

Table 4-1: Existing Pipeline Inventory

Diameter (Inches)	Length	
	Feet	Miles
3	270	0.1
6	31,478	6.0
8	29,082	5.5
10	4,407	0.8
12	6,779	1.3
15	1,603	0.3
18	1,358	0.3
24	1,526	0.3
Total	**76,503**	**14.5**

With the addition of the DJ Farms Development the City's collection system with be expanded to include a new lift station, 1,600 lf of 6 inch force main, six miles of 6 inch gravity sewer pipe, one mile of 8 inch gravity sewer pipe, and 1.5 miles of 12 inch gravity sewer as shown in **Figure 4-2**.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 4-1:

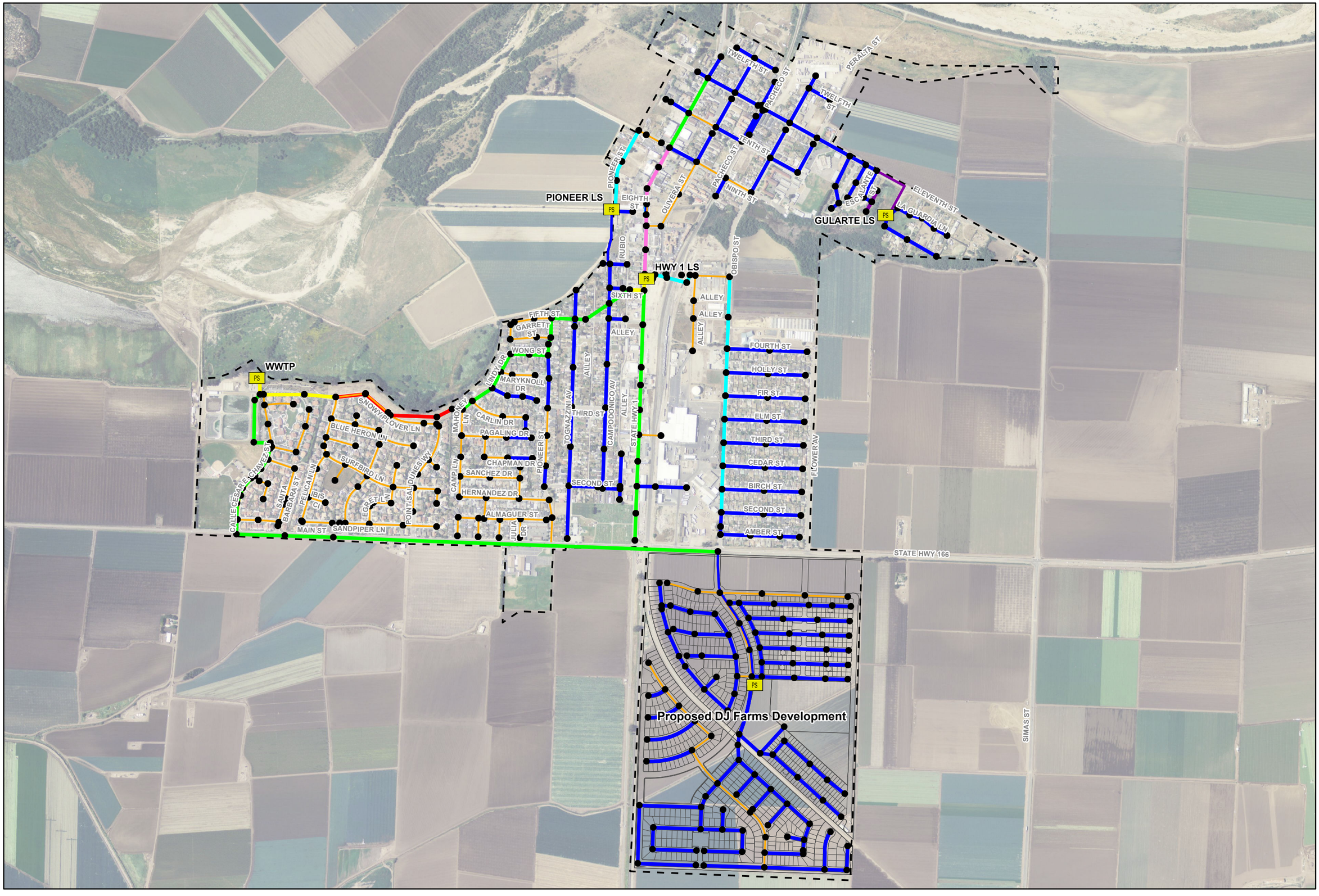
Existing Collection System

Legend

- PS — Pump Station
- Manholes
- 3" & 4"
- 6"
- 8"
- 10"
- 12"
- 15"
- 18"
- 24"
- City Limits

1 inch:700 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 4-2:

Future Collection System

Legend

- PS — Pump Station
- Manholes
- 3" & 4"
- 6"
- 8"
- 10"
- 12"
- 15"
- 18"
- 24"
- DJ Farms
- City Limits

1 inch:1,000 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

4.3 Lift Stations

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

4.3.1 Highway 1 Lift Station

The Highway 1 Lift Station is the largest of the three lift stations and is located near the intersection of Highway 1 and Sixth Street. The Highway 1 LS is a Smith and Loveless wet pit/dry pit lift station with Smith and Loveless X-Peller Vertical Close-Coupled Non-Clog pumps and was constructed in the 1960s. This lift station collects residential and downtown commercial flow from the adjacent neighborhood, receives flow from the Gularte Life Station and serves approximately 388 parcels. A photo of the lift station site in shown in **Figure 4-3**.

Figure 4-3: Highway 1 Lift Station

4.3.2 Pioneer Street Lift Station

Constructed in the 1950s, the Pioneer Street Lift Station is the oldest of the three lift stations and is located near the intersection of Pioneer Street and Eight Street. The Pioneer Street LS is a duplex wet pit/dry pit lift station with Chicago Pump Solids-Handling Vertical Open Shaft pumps. This lift station primarily collects residential flow from the adjacent neighborhood and serves approximately 25 parcels. Based on available sewer atlas information and discussion with City Wastewater Staff, it is our understanding that the Pioneer Lift Station served a much larger service area when it was originally constructed. It appears that it served the downtown City area before flows were redirected to the Highway 1 Lift Station in the late sixties. This would explain why the pumps at the lift station are oversized for the flows from the current service, which is discussed in more detail in Section 7 of this report. A photo of the Pioneer Lift Station site is shown in **Figure 4-4**.

4.3.3 Gularte Lift Station

Rehabilitated in 2005, the Gularte Lift Station is the newest of the three lift stations, and is located at the intersection of Gularte Lane and La Guardia Lane and is the smallest lift station in the City's collection system. Gularte LS is a duplex submersible lift station with a fiberglass wet well and Myers Submersible Grinder pumps. This lift station primarily collects residential flow from the adjacent neighborhood and serves approximately 22 parcels. A photo of the lift station site in shown in **Figure 4-5**.

Figure 4-5: Pioneer Street Lift Station

Figure 4-4: Gularte Lift Station

Table 4-3 below provides a detailed summary of the City's three lift stations with respect to facility pumps and operation.

Table 4-2: Lift Station Overview					
Name		**Highway 1**		**Pioneer**	**Gularte**
Date Constructed		1968		1950	2005
Date Refurbished		NA		NA	NA
Lift Station Type		Wet pit/Dry pit		Wet pit/Dry pit	Submersible
Pump Manufacturer		Smith & Loveless	Smith & Loveless	Chicago Pump	Myers
Number of Pumps		1	1	2	2
Horsepower (HP), each		5	3	7 1/2	3
Impeller Trim (in) or Impeller Code		8	7 5/8	Unknown	4
Pump Model #		4B2Y	4B2A	61-26652	WG30-23-25
Pump Type		X-Peller Non-Clog	Vertical Close-Coupled Non-Clog	Solids-Handling Vertical Open Shaft	Submersible Grinder
Voltage		220	220	230/460	230
Speed (rpm)		1170	1170	1750	3450
Motor Type		Constant Speed	Constant Speed	Constant Speed	Constant Speed
Pump Design Point	gpm	420	400	250	100
	TDH (ft)	16	15	70	32
Permanent Standby Generator		Unknown		Unknown	Unknown
Portable Generator Power Receptacle		Unknown		Unknown	Unknown
Bypass Capabilities		Unknown		Unknown	Unknown
Wet Pit Coating		Unknown		Unknown	Unknown
Wet Well Diameter (ft)		7		Not Applicable	4.00
Wet Well Width (ft)		Not Applicable		10.00	Not Applicable
Wet Well Ground Elevation (ft)		81.81		69.99	77.74
Wet Well Invert Elevation (ft)		64.06		Unknown	63.74
Wet Well Total Depth (ft)		17.75		Unknown	14.00
Lowest Inlet Pipe Invert (ft)		65.30		Unknown	70.24
Force Main Diameter (in)		4.00		4.00	4.00
Force Main Material		Ductile Iron		VCP	PVC
Force Main Length (ft)		37.00		636.30	806.00
Force Main Start Elevation (ft)		65.34		58.99	73.74
Force Main End Elevation (ft)		73.10		77.03	81.77
Force Main Total Static Head (ft)		7.76		18.04	8.03

Figure 4-6 identifies the parcels that contribute wastewater flow to each of the lift station tributary areas throughout the collection system.

City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 4-6: Lift Station Service Areas

PIONEER LS
GULARTE LS
HWY 1 LS
WWTP
Proposed DJ Farms Development
TWELFTH ST
PERALTA ST
PACHECO ST
TENTH ST
NINTH ST
PIONEER ST
EIGHTH ST
ESCALANTE ST
ELEVENTH ST
LA GUARDIA LN
RUBIO
SEVENTH ST
SIXTH ST
FIFTH ST
OBISPO ST
ALLEY
FOURTH ST
HOLLY ST
FIR ST
ELM ST
THIRD ST
CEDAR ST
BIRCH ST
SECOND ST
AMBER ST
FLOWER AV
GARRETT ST
WONG ST
LINDA DR
CAMPODONICO AV
TOGNAZZINI AV
STATE HWY 1
CARLIN DR
PAGALING DR
CHAPMAN DR
SANCHEZ DR
HERNANDEZ DR
ALMAGUER ST
NELSON DR
JULIA DR
SNOWY PLOVER LN
BLUE HERON LN
PACIFIC DUNES CT
SURFBIRD LN
PELICAN LN
CAMP LN
DUNES WAY
SANTA INES ST
SANTA BARBARA ST
CORET LN
SANDPIPER LN
MAIN ST
STATE HWY 166
SIMAS ST

Legend

Hydraulic Model

- SMP 2014 Model
- Not Modeled
- PS Pump Station
- GULARTE LS
- HIGHWAY 1 LS
- PIONEER LS
- City Limits

1 inch:1,000 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

4.4 Operation and Maintenance Problems Areas

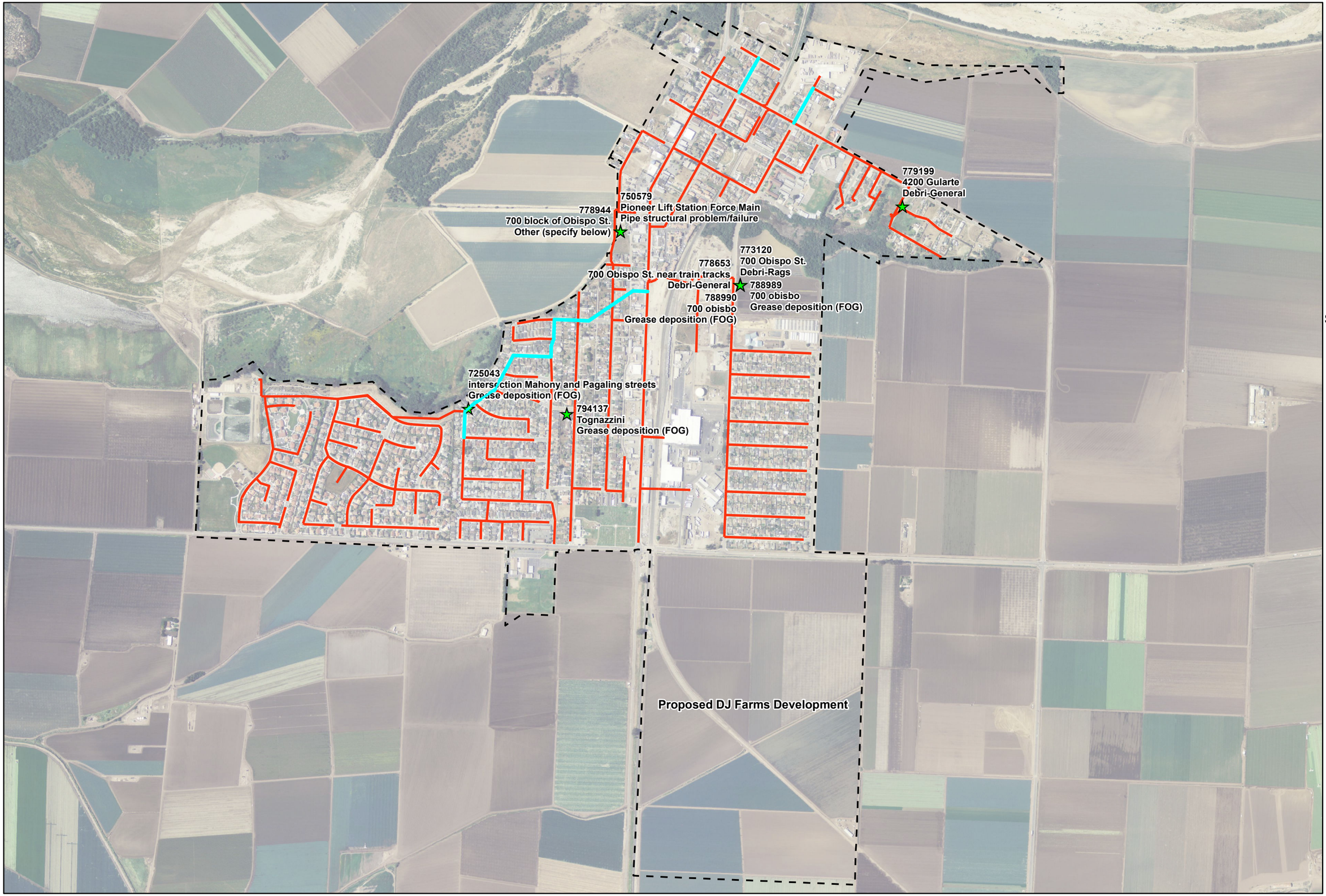
At the time of this report there were several observed and reported problem areas throughout the collection system. It was observed that all sewer manholes (approximately 16 total) on the 12 inch trunk sewer pipe, from the intersection of Sixth Street at Highway 1 to where it transitions to a 24 inch trunk sewer pipe on Mahoney Lane (2,900 linear feet), were surcharged with one to two feet of standing wastewater. It is assumed that the 12 inch trunk main is undersized to convey pumped flow from the Highway 1 Lift Station, Apio wastewater flow, and the local residential neighborhood served by this trunk main.

Figure 4-7: Flooded Manhole on Campodonico Avenue

It was also noted by City Wastewater Operations staff that the 8 inch pipe segment on Mahoney Lane from Pagaling Drive to Carlin Drive, the 6 inch pipe segment on Olivera Street from Eleventh Street to Twelfth Street, and the 6 inch on Obispo Street From Eleventh Street to Twelfth Street, all have bellies or other sagging issues with the pipe that cause sewerage backups. The City has also received several Notice of Violations (NOVs) since 2010 for Sanitary Sewer Overflow or Spill (SSOS). Violation history was provided by the California Integrated Water Quality System (CIWQS) database, and is summarized in **Table 4-4** below. Overflow locations are identified on **Figure 4-8** along with the collection system issues previously described.

Table 4-3: Wastewater Collection System Notice of Violations

Violation ID	Type	Violation Description	Date
959036	SSOS	Debris-Rags; rags and debris caused line to back up. Some grease was involved caused 1400 gallons of sewage to spill from Manhole; manhole lid at 813 Guadalupe to Street/Curb and Gutter; contained by fire dept.to street and curb. Surface water body affected.	11/30/2013
957431	SSOS	Debris-Rags restricted line with rags and grease caused 3900 gallons of sewage to spill from Gravity Mainline; spilled on paved street at 865 Guadalupe street to Paved Surface; a storm drain leading to a dry creek. Surface water body affected.	10/27/2013
947894	SSOS	Grease deposition (FOG) caused 80 gallons of sewage to spill from Manhole at Tognazzini to Street/curb and gutter. No surface water body affected.	5/12/2013
940637	SSOS	Grease deposition (FOG) caused 200 gallons of sewage to spill from Manhole; the spill occurred in area near railroad tracks of hard ground and no storm drains or water ways in the area. At 700 Obispo to Unpaved surface. No surface water body affected.	12/6/2012
912486	SSOS	Ragging caused approximately 4000 gallons of sewage to spill from Gravity sewer; Manhole at 700 Obispo St. to Separate storm drain; Street/curb and gutter; less than 100 gallons entered storm drain, remainder contained on curb , gutter, and street surfaces. Surface water body affected.	11/12/2011
894803	Order Conditions	Failure to complete, approve, and certify any of the required Sewer System Management Plan (SSMP) elements in CIWQS on time.	3/28/2011
921867	SSOS	Debris-General caused 1000 gallons of sewage to spill from Gravity sewer at Pagaling and Mahoney to Separate storm drain; Street/curb and gutter. No surface water body affected.	7/29/2010
863876	SSOS	Pipe failure caused 600 gallons of sewage to spill from Pioneer Lift Station Force Main to unpaved surface; Pooled on ground above force main. No surface water body affected.	3/10/2010
921868	SSOS	Debris caused 20 gallons of sewage to spill from gravity sewer at 4200 Gularte to Street/curb and gutter. No surface water body affected.	2/15/2010



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 4-8:

Collection System NOVs and Problem Areas

Legend

- SSOS
- Problem Areas
- Sewer System
- City Limits

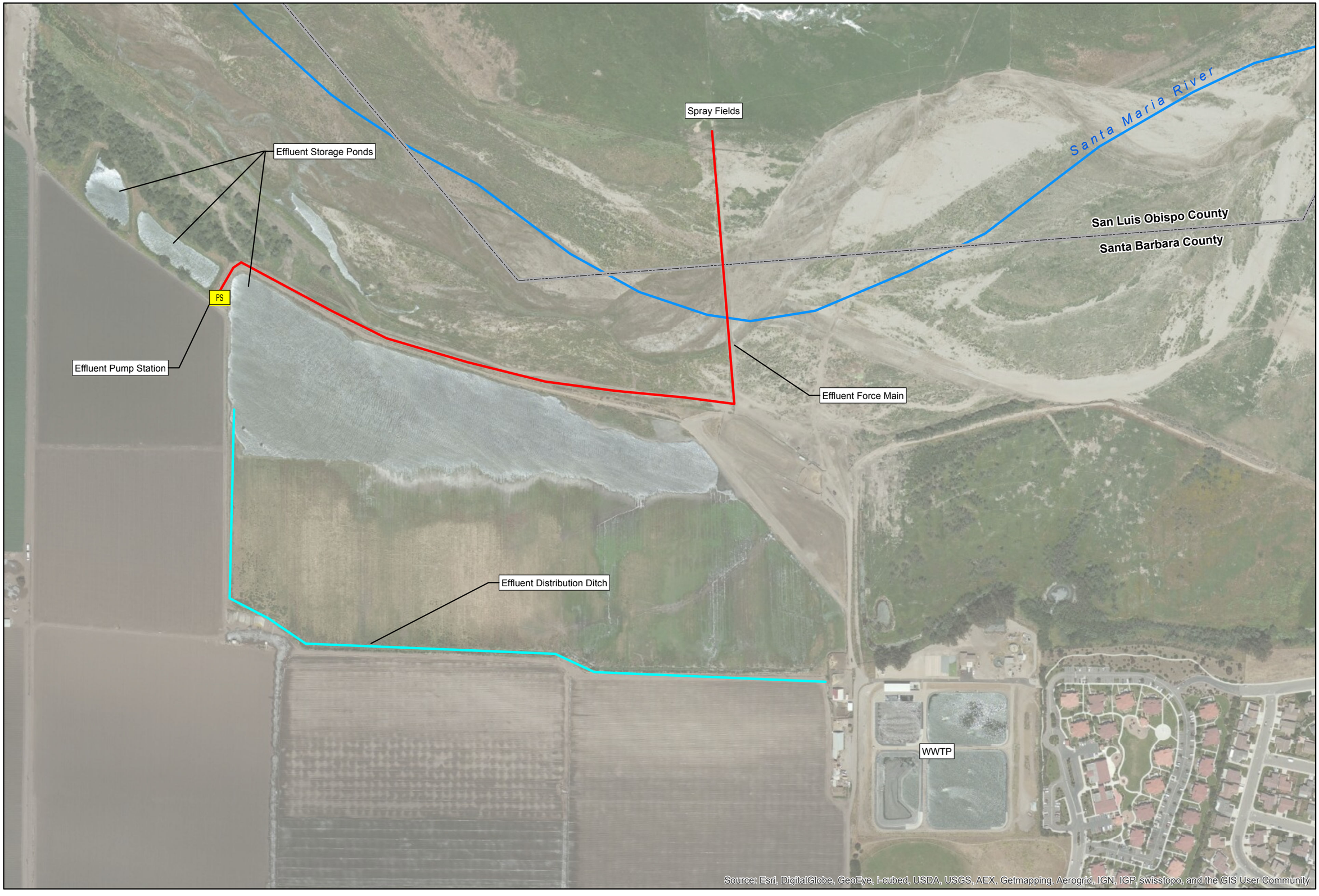
1 inch:1,000 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

4.5 Wastewater Treatment Plant and Disposal System

The City recently completed WWTP improvements to improve effluent quality and meet permit requirements. The improvements included a new headworks screen, a secondary treatment process conversion from AIPS ponds to Biolac® treatment system with integral clarifiers, and a new screw press sludge dewatering system. The project was the first phase of a larger improvement plan recommended to meet permit conditions and improve operability over a 30-year design life. The project scope was reduced to meet available grant funding while performing the minimal improvements necessary to ensure compliance with the existing Waste Discharge Requirements. With the reduced scope came a recommendation that the City procure funding to complete the improvement plan within the next two to three years. The Concept Design Report (Technical Memorandum No 1, Dudek, May 2010) presented both the full recommended project and the reduced project that would meet the grant funding budget.

The first phase of WWTP Improvements were completed in 2012. However, the recommended project in the Concept Design Report (ibid) included additional improvements to ensure a reliable and effective operation. These additional improvements include replacement and/or refurbishment of facilities located at the influent pump station, as well as grit removal system, effluent distribution ditch, irrigation pump station, effluent storage ponds, and sprayfields. **Figure 4-9** provides an overview of the existing wastewater treatment and disposal facilities. Additional details of the WWTP and an evaluation of the capacity for existing and future estimated flows are provided in **Section 8**.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 4-9:

Existing WWTP & Disposal Facilities

1 inch:400 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

SECTION 5 DESIGN CRITERIA

5.1 Overview

This section provides an overview of the design criteria used to analyze the City's existing gravity collection system, lift stations, and force mains. The City of Guadalupe has adopted the City of Santa Maria design standards for gravity collection system pipe design. These design standards along with industry accepted design criteria for lift stations and force mains were utilized to evaluate the ability of the City's existing wastewater infrastructure to meet existing and future demands.

5.2 Gravity Collection System

Table 5-1 summarizes the design criteria used to evaluate the ability of the City's existing collection system piping under existing and future flow conditions.

Table 5-1: City of Guadalupe Sewer Design Requirements	
Minimum Pipe Size	
Use	**Diameter (in)**
Residential	6
Multi-family Residential	8
Commercial	8
Industrial	8
Minimum Grade Requirements for 6 and 8 inch pipe to achieve 1.8 fps	
Diameter (in)	**Pipe Slope (%)**
6	0.38%
8	0.25%
Minimum Grade Requirements for 10 inch and larger pipe to achieve 2.0 fps	
Diameter (in)	**Pipe Slope (%)**
10	0.20%
12	0.18%
15	0.14%
18	0.12%
21	0.095%
24	0.080%
27	0.065%
30	0.060%
Where the use of a larger diameter pipe is desired for the purposes only of achieving a flatter slope in the line (and not for reasons of providing necessary capacity), it must be demonstrated that the pipe will flow half full or fuller under the anticipated ultimate flow conditions.	
Velocity Requirements (Flowing one-half full)	
Diameter (in)	**Velocity (fps)**
6 and 8	1.8 minimum
10 and greater	2.0 minimum
All diameters	10 maximum
Depth/Diameter (d/D) Requirements	
Average Day Flow Conditions	$d/D < 0.50$
Peak Hour Flow Conditions	$d/D < 0.75$

5.3 Lift Stations

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

5.3.1 Pump Capacity

It is recommended that lift stations are designed as duplex pumping system to provide redundancy if one pump fails or requires service, to alternative pump cycles to minimize wear on the pump components, and to provide supplemental pumping capacity to convey instantaneous peak flows. Each pump should be sized to convey the peak hour flow entering the wet well.

5.3.2 Wet Well Capacity and Pump Cycle Times

To determine the capacity of the lift station wet wells under existing and future ADF and PHF inflow conditions, the active volume is evaluated. The active wet well volume is the volume between the "lead pump off" and "lead pump on" set points. The minimum recommended active volume for the City lift station was determined using the following equation:

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

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

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

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

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

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

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

5.4 Force Main Evaluation

Force mains are analyzed to determine if they are properly sized to convey the lift station pumped flow, while maintaining minimum pipeline velocities to re-suspend solids and provide pipeline cleaning. It is recommended that lift station force mains convey minimum velocities of 3.5 feet per second with maximum velocities less than 5.0-10 feet per second to minimize head loss and surge events.

SECTION 6 COLLECTION SYSTEM ANALYSIS AND EVALUATION

6.1 Overview

This section provides an overview of the hydraulic model, and summarizes the results of the collection system analysis and pipeline deficiencies under existing and future flow conditions.

6.2 Model Development

A hydraulic model was prepared using Bentley SewerCAD V8i SELECT Series 3 hydraulic modeling software to simulate the operation of the gravity collection system. SewerCAD incorporates the Manning's equation for open channel flow, and Hazen-Williams formula for pressure pipes (lift station force mains). A representative model of the existing pipes and pumping facilities was developed using following information:

- The City's 2003 wastewater atlas
- GPS field survey to collect survey coordinates, elevation data and digital photos of 100 of the collection system sewer manholes
- Field visits with City staff to each lift station
- Pump curves from pump vendors for the lift stations

The gravity wastewater collection system was developed in an ESRI GIS geodatabase and integrated with the County of Santa Barbara's current aerial photography and GIS parcel basemap. Collection system information was provided for the DJ Farms Development and imported into the GIS geodatabase. A field survey was completed to collect northing and easting GPS coordinates, elevations, and digital photos for approximately 100 sewer manholes within the collection system. Pipe characteristics, survey field data, and average daily flows were recorded in the GIS database and imported into the hydraulic model. Bentley's SewerCAD V8i hydraulic modeling software was used to simulate the operation of the wastewater collection system. **Figure 6-2** provides an overview of the collection system pipes that were evaluated as part of the Master Plan project.

6.2.1 Flow Allocation

To determine the distribution of flows into the collection system, a baseline flow condition was established as described in Section 3.3. The wastewater flows were then allocated throughout the City based on a percentage of water usage per parcel.

Each manhole imported in the hydraulic model was "loaded" with the wastewater flows from the upstream parcels entering the collection at the manhole. **Figure 6-1** shows the wastewater "sewersheds" that were developed for loading in the hydraulic model.

Future impacts to the collection system from the DJ Farms Development was not analyzed since flow from the development is planned to flow through a dedicated trunk sewer pipe directly to the WWTP.

Figure 6-1: Wastewater Flow Allocation

6.2.2 Model Settings

Design criteria described in Section 5 of this Master Plan were used to complete the gravity collection system hydraulic analysis. Gravity pipes were analyzed based on a maximum percent full (d/D) ratio, defined as the depth of flow in a

pipe divided by the diameter of the pipe. A summary of the pipeline criteria as described in Section 5 is presented in **Table 6-1**:

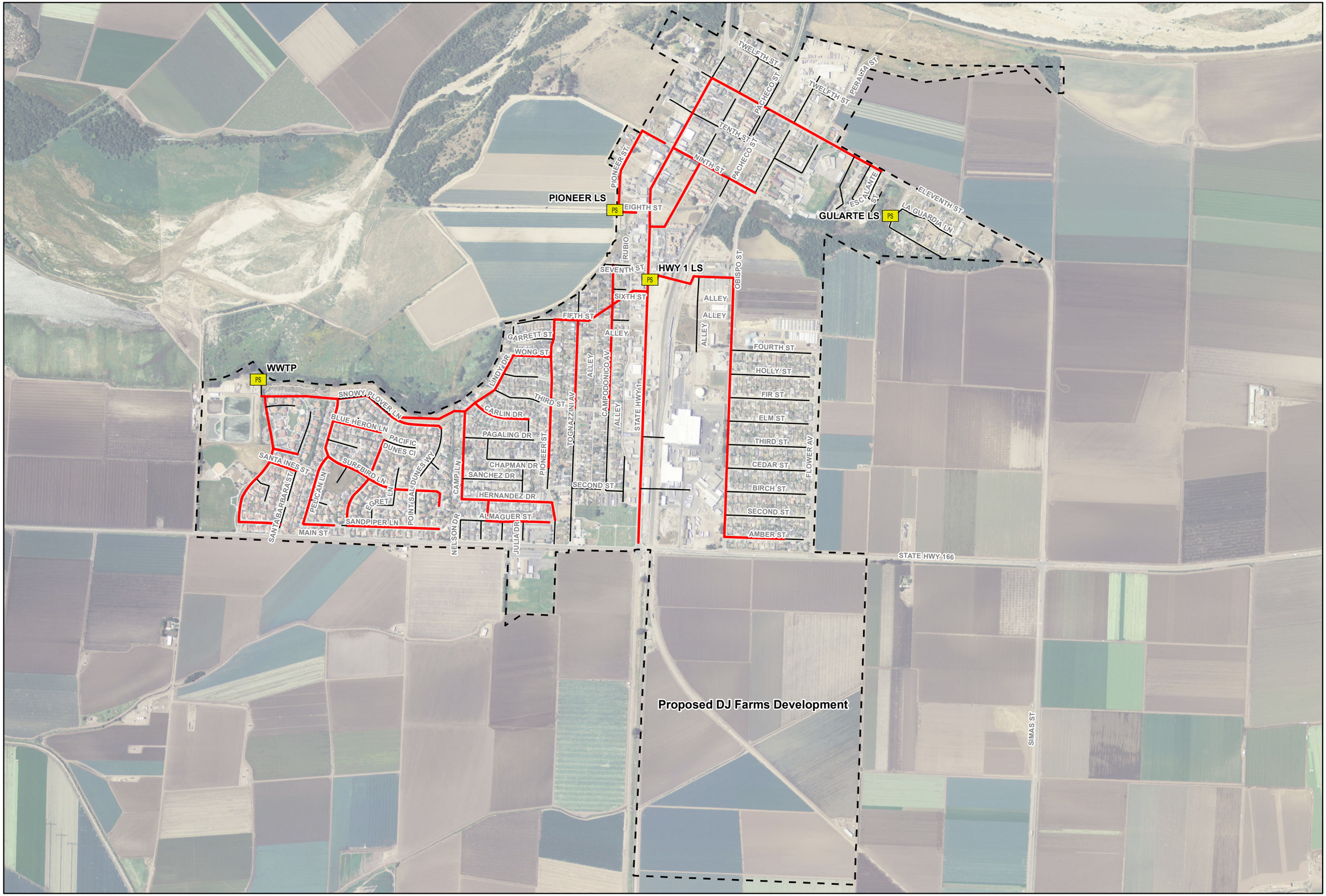
Table 6-1: Gravity Pipeline Evaluation Criteria	
Design Criteria	**Value**
Pipeline Capacity during ADF Conditions (d/D)	< 0.50
Pipeline Capacity during PHF Conditions (d/D)	< 0.75
Minimum Velocity (fps)	1.8-2.0
Maximum Velocity (fps)	10.0
Manning's coefficient for PVC pipelines	0.010
Manning's coefficient for VCP pipelines	0.013

Additional model settings included:

- ❒ Adjustment of lift station pump curves to account for minor losses and friction losses to simulate the performance of the pumps in the hydraulic model
- ❒ Lift station wet well levels were set to the low wet well level (pump off position) to simulate "worst-case" static lift conditions
- ❒ Lift stations were set to "on" during existing and future ADF and PHF flow conditions
- ❒ All hydraulic simulations were completed under steady state time analysis and using an "Analysis" calculation type
- ❒ Hazen-Williams coefficient of 120-140 was used for lift station force mains and force mains were assigned minor loses

6.3 Model Calibration

Once the collection system network, lift station, flow patterns, and peaking factors were input into the hydraulic model, hydraulic simulations were performed to determine how closely the computer model simulated observed field flow and capacity conditions. To accomplish this MKN used the flow monitoring data collected and analyzed for the detailed Apio analysis as described in Section 3.3. This data was used to compare and adjust the average daily and peak hour flow scenarios developed for the hydraulic model. The results of the flow monitoring study are included in Appendix A of this report.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 6-2:

Master Plan Hydraulic Model

Legend

Hydraulic Model

- SMP 2014 Model
- Not Modeled
- PS Pump Station
- City Limits

1 inch:1,000 feet

MAP NOTES:
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PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

6.4 Hydraulic Model Analysis

The following provides an overview of the hydraulic analysis and evaluation competed to identify collection system capacity issues associated with existing, alternative, and future flow conditions.

6.4.1 Model Scenarios

The following SewerCAD scenarios were established to analyze the City's collection system under existing and future flow conditions, to investigate alternative pipeline alignments, and to evaluate rerouting of existing and future wastewater flow:

- *Existing ADF Scenario:* Existing ADF (680,000 gpd) conditions for the existing collection system configuration (Apio at 337 AFY maximum and all lift stations on and pumping)
- *Existing PHF Scenario:* Existing PHF (1,876 gpm) conditions for the existing collection system configuration (Apio at 337 AFY maximum and all lift stations on and pumping)
- *Existing CIPs Scenario:* Capital improvement projects required to correct system deficiencies triggered by existing flow conditions (Apio at 337 AFY maximum and all lift stations on and pumping)
- *12-inch trunk sewer Alternatives:*
  - Reroute Apio to DJ trunk sewer
  - Reroute Apio and Hwy 1 LS to DJ trunk sewer
- *Future ADF Scenario:* Future ADF (770,644 gpd) conditions for the existing collection system configuration (Apio limited to 372 AFY maximum and all lift stations on and pumping)
- *Future PHF Scenario:* Future PHF (2,128 gpm) conditions for the existing collection system configuration (Apio limited to 372 AFY maximum and all lift stations on and pumping)
- *Future CIPs Scenario:* Capital improvement projects required to correct system deficiencies triggered by future flow conditions (Apio at 372 AFY maximum and all lift stations on and pumping)

The DJ Farms trunk main was not analyzed as part of the Master Plan because preliminary design information was not available at the time of this report. However, the proposed DJ Farms trunk main on West Main should be evaluated to determine if there is sufficient capacity for the DJ Farms development at build-out, existing/future wastewater flow from Apio, and potentially existing/future flow from the Highway 1 Lift Station.

6.5 Capacity for Existing Flows

Table 6-2 provides an overview of the collection system deficiencies identified through the hydraulic model simulations during existing ADF and PHF conditions. **Figures 6-3** and **6-4** identify the pipe segments deficient during existing ADF and PHF flow conditions and pipe segments with velocities less than 1.8 fps. Overall the majority of the collection system pipe segments in the hydraulic model have undesirable shallow slope, which do not produce sufficient self-cleaning pipeline velocities. It should be noted that many of the deficiencies shown in **Table 6-2** are a result of a downstream condition, and are resolved when the downstream deficiency is addressed. Recommended CIPs are identified and prioritized in Section 9.2

Table 6-2: Collection System Deficiencies during Existing ADF & PHF Conditions					
Deficiency	**Name**	**Location**	**Existing Facility**	**ADF (d/D >0.50)**	**PHF (d/D > 0.75)**
Notes: Average Daily Flow (ADF), Peak Hour Flow (PHF)					
1	Eleventh Street Gravity Sewer	Highway 1 to Gularte Lane	2,300 lf of 6-inch pipe	0.58-0.80	0.85-1.00
2	12-inch Trunk Sewer	Sixth Street to Mahoney Lane	2,900 lf of 12-inch pipe	0.70-1.00	1.00
3	18-inch Trunk Sewer	Sixth Street to Highway 1	280 lf of 18-inch pipe	1.00	1.00
4	Highway 1 Gravity Sewer	Sixth Street to Fifth Street	405 lf of 12-inch pipe	1.00	1.00
5		Fifth Street to Second Street	2,200 lf of 12-inch pipe	0.03-.33	0.80-1.00
6	TrusPro Gravity Sewer	Highway 1 to TrusPro Property	40 lf of 8-inch & 500 lf of 10-inch pipe	0.74-1.00	1.00
7		TrusPro Property to Obispo Street	465 lf of 8-inch & 100 lf of 10-inch pipe	0.19-0.32	1.00
8	Obispo Street Gravity Sewer	TrusPro Property to Elm Street	1,700 lf of 10-inch pipe	0.17-0.22	0.85-1.00
9	Campodonico Avenue Gravity Sewer	Seventh Street to Fifth Street	650 lf of 6-inch pipe	1.00	1.00
10		Fifth Street to Third Street	1,050 lf of 6-inch pipe	0.17	1.00
11	Pioneer Street Gravity Sewer	Wong Street to Third Street	630 lf of 6-inch pipe	0.84-1.00	1.00
12		Third Street to Chapman Drive	680 lf of 8-inch pipe	0.07-0.08	1.00
13	Tognazzini Avenue Gravity Sewer	Fifth Street to mid-block Tognazzini Avenue	570 lf of 6-inch pipe	0.82-1.00	1.00
14		Mid-block of Tognazzini Avenue to Third Street	520 lf of 6-inch pipe	0.15	1.00
15	Carlin Drive Gravity Sewer	Carlin Drive to Mahoney Lane	410 lf of 8-inch pipe	0.69	1.00
16	Mahoney Lane Gravity Sewer	Carlin Drive to Pagaling Drive	310 lf of 8-inch pipe	0.67	1.00
17	Surfbird Lane Gravity Sewer	From Blue Heron Lane to Snowy Plover Lane	265 lf of 8-inch pipe	0.62	1.00
18	Riverview Development Gravity Sewer	Riverview Development at entrance to WWTP	125 lf of 8-inch pipe	0.48	0.79
Shaded cells indicate pipe segment deficiencies during existing ADF and/or PHF conditions					

City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 6-3:

Existing ADF Collection System Deficiencies

1 inch:700 feet

MAP NOTES:
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City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 6-4:

Existing PHF Collection System Deficiencies

PIONEER LS

GULARTE LS

HWY 1 LS

WWTP

1 inch:700 feet

Legend

- Sanitary Sewer Pumps
- Sewer Manholes
- Velocity < 1.8 fps
- d/D > 0.75
- No Capacity Deficiencies
- Forcemain
- City Limits

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

Table 6-3 identifies the collection system deficiencies if the City were to redirect Apio's existing/future wastewater flows to the future DJ Farms trunk sewer, planned to be located in West Main Street. Strikeouts and/or bold text indicate changes in pipeline deficiencies and/or deficiencies that would no longer exist if Apio wastewater flow was diverted to the DJ Farms trunk sewer. Diverting existing/future Apio flows reduced deficiencies from 18 to 15.

Table 6-3: Collection System Deficiencies by Diverting Apio Flow to DJ Farms Trunk Sewer

Deficiency	Name	Location	Existing Facility	ADF (d/D >0.50)	PHF (d/D > 0.75)
1	Eleventh Street Gravity Sewer	Highway 1 to Gularte Lane	2,300 lf of 6-inch pipe	0.58-0.80	0.85-1.00
2	12-inch Trunk Sewer	Sixth Street to Mahoney Lane	2,900 lf of 12-inch pipe	0.62-1.00	1.00
3	18-inch Trunk Sewer	Sixth Street to Highway 1	280 lf of 18-inch pipe	0.25-0.38	1.00
4	**Highway 1 Gravity Sewer**	Sixth Street to Fifth Street	405 lf of 12-inch pipe	0.21	1.00
5		Fifth Street to Apio	**500 lf of 12-inch pipe**	0.06	1.00
6	TrusPro Gravity Sewer	Highway 1 to TrusPro Property	40 lf of 8-inch & 600 lf of 10-inch pipe	0.19-0.38	1.00
~~7~~		~~TrusPro Property to Obispo Street~~	~~465 lf of 8-inch & 100 lf of 10-inch pipe~~	~~0.19-0.32~~	~~1.00~~
~~8~~	~~Obispo Street Gravity Sewer~~	~~TrusPro Property to Elm Street~~	~~1,700 lf of 10-inch pipe~~	~~0.17-0.22~~	~~0.85-1.00~~
9	Campodonico Avenue Gravity Sewer	Seventh Street to Fifth Street	650 lf of 6-inch pipe	1.00	1.00
10		Fifth Street to Third Street	1,050 lf of 6-inch pipe	0.17	1.00
11	**Pioneer Street Gravity Sewer**	Wong Street to Third Street	630 lf of 6-inch pipe	0.88	1.00
12		Third Street to Pagaling Drive	**324 lf of 8-inch pipe**	0.07-0.08	0.97
13	Tognazzini Avenue Gravity Sewer	Fifth Street at Tognazzini Avenue	570 lf of 6-inch pipe	1.00	1.00
14		Fifth Street at Tognazzini Avenue to Third Street	461 lf of 6-inch pipe	0.15	1.00
15	Carlin Drive Gravity Sewer	Carlin Drive to Mahoney Lane	410 lf of 8-inch pipe	0.59	1.00
16	Mahoney Lane Gravity Sewer	Carlin Drive to Pagaling Drive	310 lf of 8-inch pipe	0.59	1.00
17	Surfbird Lane Gravity Sewer	From Blue Heron Lane to Snowy Plover Lane	265 lf of 8-inch pipe	0.57	0.89
~~18~~	~~Riverview Development Gravity Sewer~~	~~Riverview Development at entrance to WWTP~~	~~125 lf of 8-inch pipe~~	~~0.45~~	~~0.70~~

Shaded cells indicate pipe segment deficiencies during existing ADF and/or PHF conditions

Table 6-4 identifies the collection system deficiencies if the City were to redirect **Apio's, Pioneer Lift Station, and the Highway 1 Lift Station** existing/future wastewater flows to the future DJ Farms trunk sewer planned to be located in West Main Street. Strikeouts and/or bold text indicate changes in pipeline deficiencies and/or deficiencies that would no longer exist if Apio wastewater flow was diverted to the DJ Farms trunk sewer. By diverting the existing/future Apio and Highway 1 Lift Station wastewater flows the number of pipeline deficiencies are reduced from 18 to 1.

Table 6-4: Collection System Deficiencies by Diverting Apio & Highway 1 LS to DJ Farms Trunk Sewer

Deficiency	Name	Location	Existing Facility	ADF (d/D >0.50)	PHF (d/D > 0.75)
1	Eleventh Street Gravity Sewer	Highway 1 to Gularte Lane	2,300 lf of 6-inch pipe	0.58-0.80	0.85-1.00
~~2~~	~~12-inch Trunk Sewer~~	~~Sixth Street to Mahoney Lane~~	~~2,000 lf of 12-inch pipe~~	~~0.30-0.61~~	~~0.55-0.98~~
~~3~~	~~18-inch Trunk Sewer~~	~~Sixth Street to Highway 1~~	~~280 lf of 18-inch pipe~~	~~1.00~~	~~1.00~~
~~4~~	~~Highway 1 Gravity Sewer~~	~~Sixth Street to Fifth Street~~	~~405 lf of 12-inch pipe~~	~~1.00~~	~~1.00~~
~~5~~		~~Fifth Street to Second Street~~	~~2,200 lf of 12-inch pipe~~	~~0.03-.33~~	~~0.80-1.00~~
~~6~~	~~TrusPro Gravity Sewer~~	~~Highway 1 to TrusPro Property~~	~~40 lf of 8-inch & 500 lf of 10-inch pipe~~	~~0.74-1.00~~	~~1.00~~
~~7~~		~~TrusPro Property to Obispo Street~~	~~465 lf of 8-inch & 100 lf of 10-inch pipe~~	~~0.19-0.32~~	~~1.00~~
~~8~~	~~Obispo Street Gravity Sewer~~	~~TrusPro Property to Elm Street~~	~~1,700 lf of 10-inch pipe~~	~~0.17-0.22~~	~~0.85-1.00~~
~~9~~	~~Campodonico Avenue Gravity Sewer~~	~~Seventh Street to Fifth Street~~	~~535 lf of 6-inch pipe~~	~~0.78-0.81~~	~~0.79-1.00~~
~~10~~		~~Fifth Street to Third Street~~	~~1,050 lf of 6-inch pipe~~	~~0.17~~	~~1.00~~
~~11~~	~~Pioneer Street Gravity Sewer~~	~~Wong Street to Mary Knoll Drive~~	~~269 lf of 6-inch pipe~~	~~0.49~~	~~0.93~~
~~12~~		~~Third Street to Chapman Drive~~	~~680 lf of 8-inch pipe~~	~~0.07-0.08~~	~~1.00~~
~~13~~	~~Tognazzini Avenue Gravity Sewer~~	~~Fifth Street south on Tognazzini Avenue~~	~~98 lf of 6-inch pipe~~	~~0.67~~	~~1.00~~
~~14~~		~~Mid-block of Tognazzini Avenue to Third Street~~	~~461 lf of 6-inch pipe~~	~~0.15~~	~~1.00~~
~~15~~	~~Carlin Drive Gravity Sewer~~	~~Carlin Drive to Mahoney Lane~~	~~410 lf of 8-inch pipe~~	~~0.69~~	~~1.00~~
~~16~~	~~Mahoney Lane Gravity Sewer~~	~~Carlin Drive to Pagaling Drive~~	~~310 lf of 8-inch pipe~~	~~0.42~~	~~0.78~~
~~17~~	~~Surfbird Lane Gravity Sewer~~	~~From Blue Heron Lane to Snowy Plover Lane~~	~~265 lf of 8-inch pipe~~	~~0.43~~	~~0.78~~
~~18~~	~~Riverview Development Gravity Sewer~~	~~Riverview Development at entrance to WWTP~~	~~125 lf of 8-inch pipe~~	~~0.48~~	~~0.79~~

Shaded cells indicate pipe segment deficiencies during existing ADF and/or PHF conditions

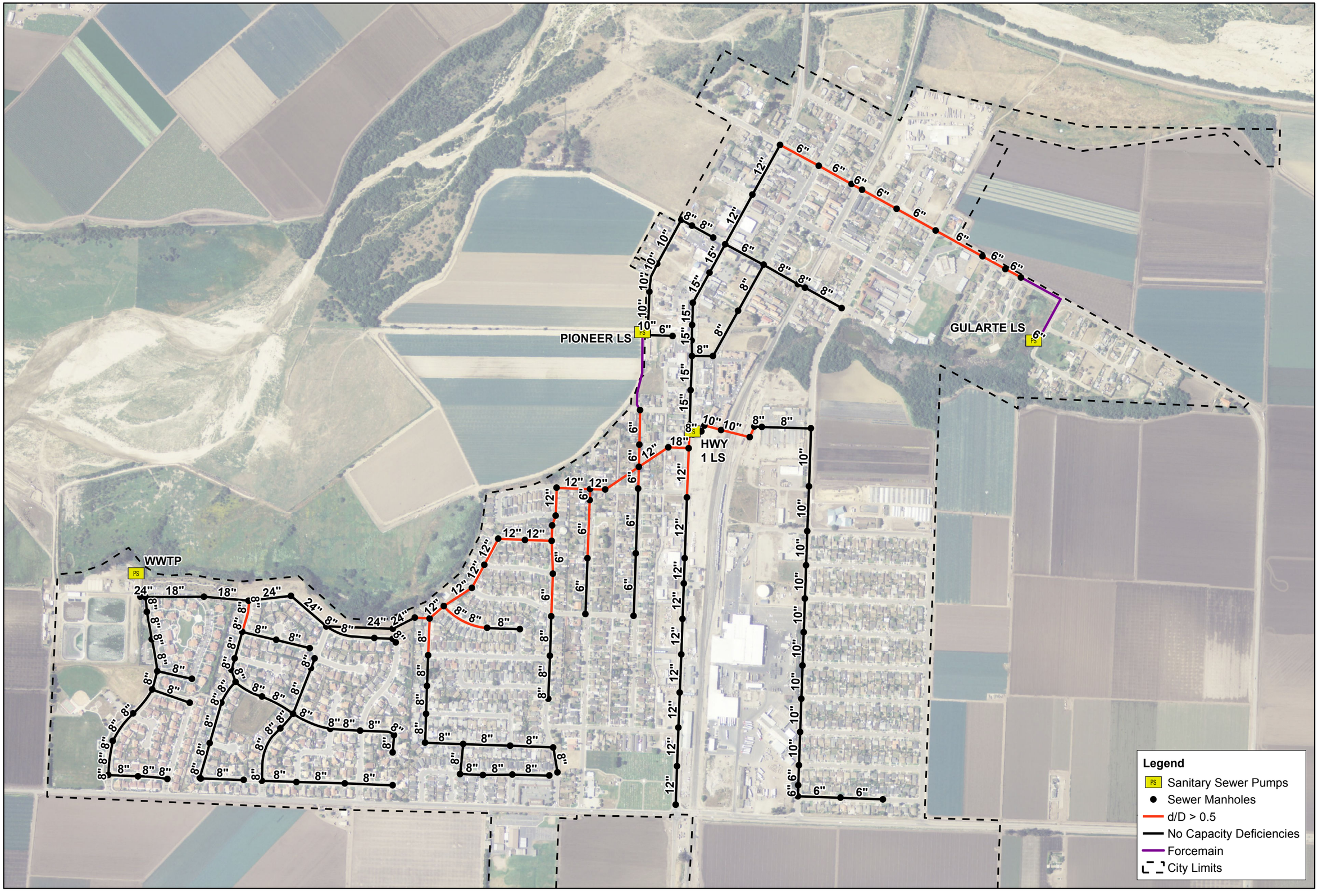
6.6 Capacity of Future Flows

Table 6-5 provides an overview of the collection system deficiencies identified through the hydraulic model simulations during future ADF and PHF conditions. Future City infill wastewater flows exacerbate existing pipeline capacity, but do not generate additional pipeline capacity issues. **Figures 6-5** and **6-6** identify the pipe segments deficient during future ADF and PHF flow conditions and pipe segments with velocities less than 1.8 fps. Overall the majority of the collection system pipe segments in the hydraulic model have undesirable shallow slope, which do not produce sufficient self-cleaning pipeline velocities. Shaded cells indicate pipe segment deficiencies during future ADF and/or PHF conditions.

Table 6-5: Collection System Deficiencies during Future ADF & PHF Conditions

Deficiency	Name	Location	Existing Facility	ADF (d/D >0.50)	PHF (d/D > 0.75)
1	Eleventh Street Gravity Sewer	Highway 1 to Gularte Lane	2,300 lf of 6-inch pipe	0.59-0.82	1.00
2	12-inch Trunk Sewer	Sixth Street to Mahoney Lane	2,900 lf of 12-inch pipe	0.70-1.00	1.00
3	18-inch Trunk Sewer	Sixth Street to Highway 1	280 lf of 18-inch pipe	1.00	1.00
4	Highway 1 Gravity Sewer	Sixth Street to Fifth Street	405 lf of 12-inch pipe	1.00	1.00
5		Fifth Street to Second Street	2,200 lf of 12-inch pipe	0.05-.35	1.00
6	TrusPro Gravity Sewer	Highway 1 to TrusPro Property	40 lf of 8-inch & 595 lf of 10-inch pipe	0.74-1.00	1.00
7		TrusPro Property to Obispo Street	465 lf of 8-inch	0.19-0.22	1.00
8	Obispo Street Gravity Sewer	TrusPro Property to Elm Street	1,700 lf of 10-inch pipe	0.17-0.22	0.85-1.00
9	Campodonico Avenue Gravity Sewer	Seventh Street to Fifth Street	650 lf of 6-inch pipe	1.00	1.00
10		Fifth Street to Third Street	1,050 lf of 6-inch pipe	0.17	1.00
11	Pioneer Street Gravity Sewer	Wong Street to Third Street	630 lf of 6-inch pipe	1.00	1.00
12		Third Street to Chapman Drive	680 lf of 8-inch pipe	0.07-0.08	1.00
13	Tognazzini Avenue Gravity Sewer	Fifth Street to mid-block Tognazzini Avenue	570 lf of 6-inch pipe	1.00	1.00
14		Mid-block of Tognazzini Avenue to Third Street	461 lf of 6-inch pipe	0.17	1.00
15	Carlin Drive Gravity Sewer	Carlin Drive to Mahoney Lane	410 lf of 8-inch pipe	0.71	1.00
16	Mahoney Lane Gravity Sewer	Carlin Drive to Pagaling Drive	310 lf of 8-inch pipe	0.68	1.00
17	Surfbird Lane Gravity Sewer	From Blue Heron Lane to Snowy Plover Lane	265 lf of 8-inch pipe	0.63	1.00
18	Riverview Development Gravity Sewer	Riverview Development at entrance to WWTP	125 lf of 8-inch pipe	0.63	1.00

Table 6-5 identifies pipeline deficiencies based future wastewater flow from potential City infill development. Since the DJ Farms development will have a dedicated trunk sewer along West Main for the development wastewater, future pipeline capacity issues are not triggered by the DJ Farms development. Based on the Apio and Highway Lift Station hydraulic simulations for existing flow conditions it is recommended that the City consider redirecting Apio's flows, and consider redirecting the Highway 1 Lift Station flows to the DJ Farms Trunk Sewer.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 6-5:

Future ADF Collection System Deficiencies

1 inch:700 feet

MAP NOTES:
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City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 6-6:

Future PHF Collection System Deficiencies

PIONEER LS

GULARTE LS

HWY 1 LS

WWTP

1 inch:700 feet

Legend

- Sanitary Sewer Pumps
- Sewer Manholes
- d/D > 0.75
- No Capacity Deficiencies
- Velocity < 1.8 fps
- Forcemain
- City Limits

MAP NOTES:
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SECTION 7 LIFT STATION ANALYSIS AND EVALUATION

7.1 Overview

This section provides an overview of the hydraulic evaluation and condition assessment of the City's three lift stations under existing and future flow conditions.

7.2 Analysis

For each lift station, a system curve was developed to estimate the existing pump performance. The system curve represents the total dynamic head (TDH) developed by the pump for any given flow rate. TDH is the sum of static head (elevation), minor head losses (bends, valves, fittings), and friction loss. Static head was estimated using ground elevations from the GPS field survey, fluid level pump control points, and the force main discharge elevation. Lift station system curves can vary with the fluid level in the wet well and assumed friction coefficient. Accordingly, two system curves were developed to bracket the high and low anticipated TDH. The manufacturer's pump curve shows the anticipated flow for any given TDH. The intersection of the pump curve and system curves allows an estimate for the actual lift station pumped flows. In addition, the Best Efficiency Point (BEP) of the pumps are included on each pump curve/system curve plot (when available). **Figures 7-1, 7-2**, **7-3, 7-4,** and **7-5** present the current system curves plotted against the existing lift station pump curves during simplex and duplex operation. Manufacturer pump curves and available lift station details are included in Appendix B of this report.

Figure 7-1: Highway 1 Lift Station Pump 1 Curve Vs System Curves

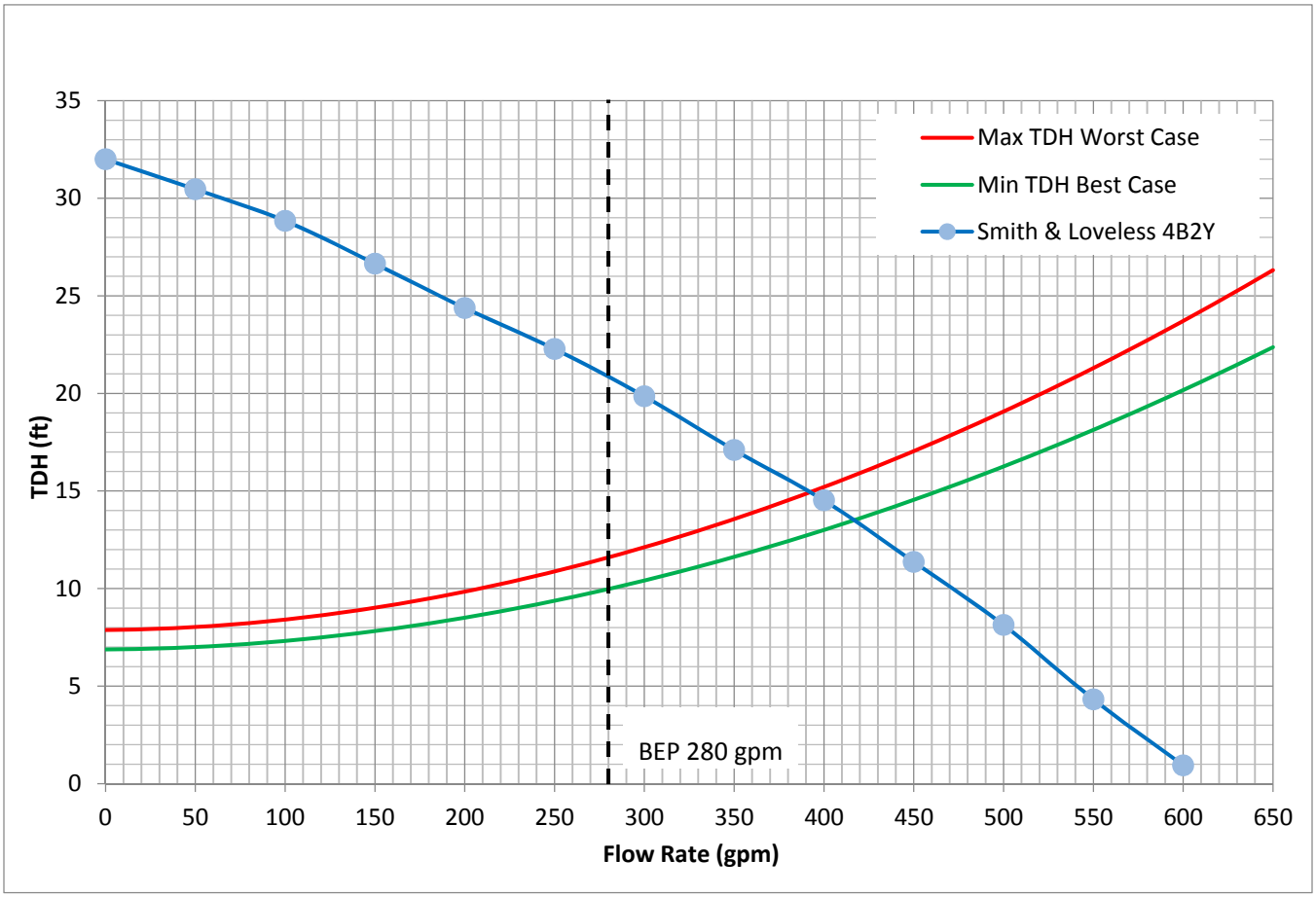


Figure 7-2: Highway 1 Lift Station Pump 2 Curve Vs System Curves

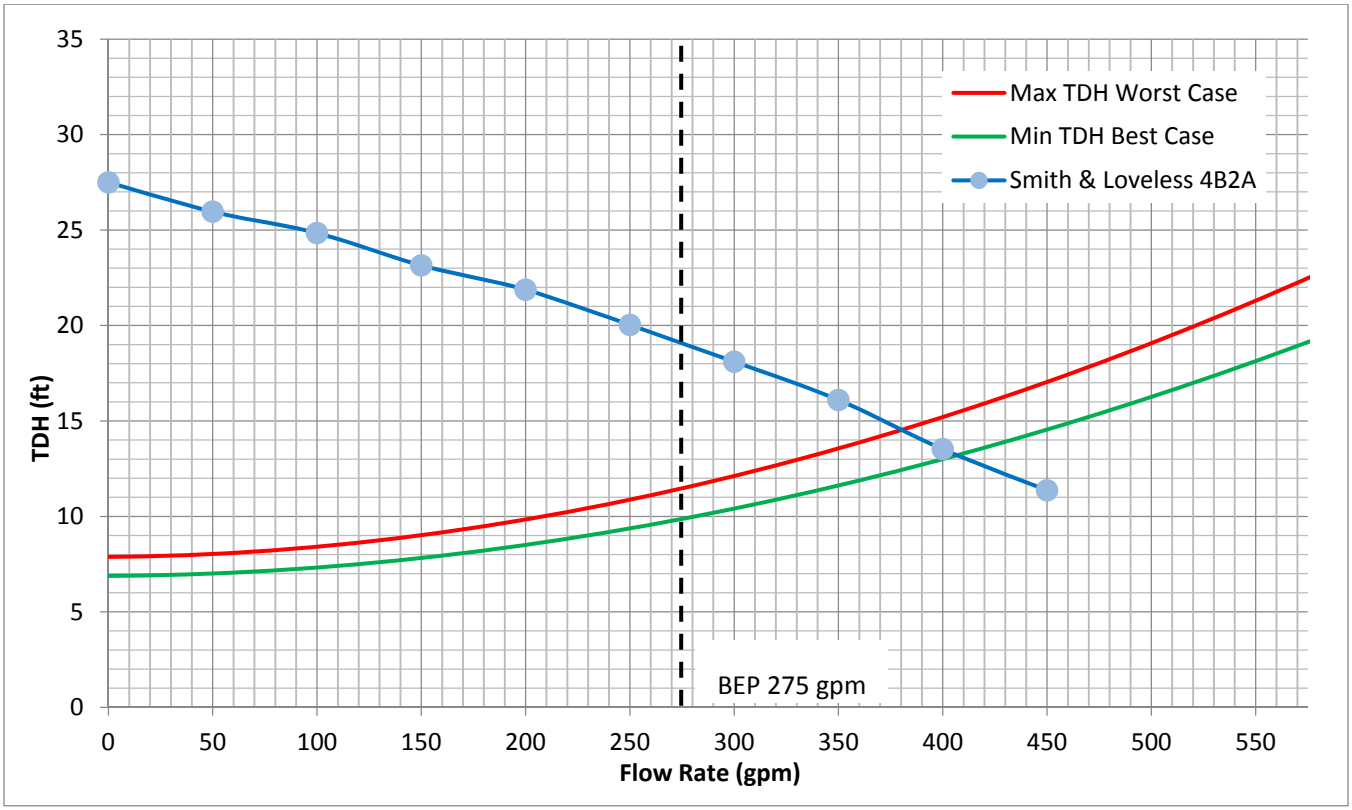


Figure 7-3: Highway 1 Composite Pump Curve Vs System Curves

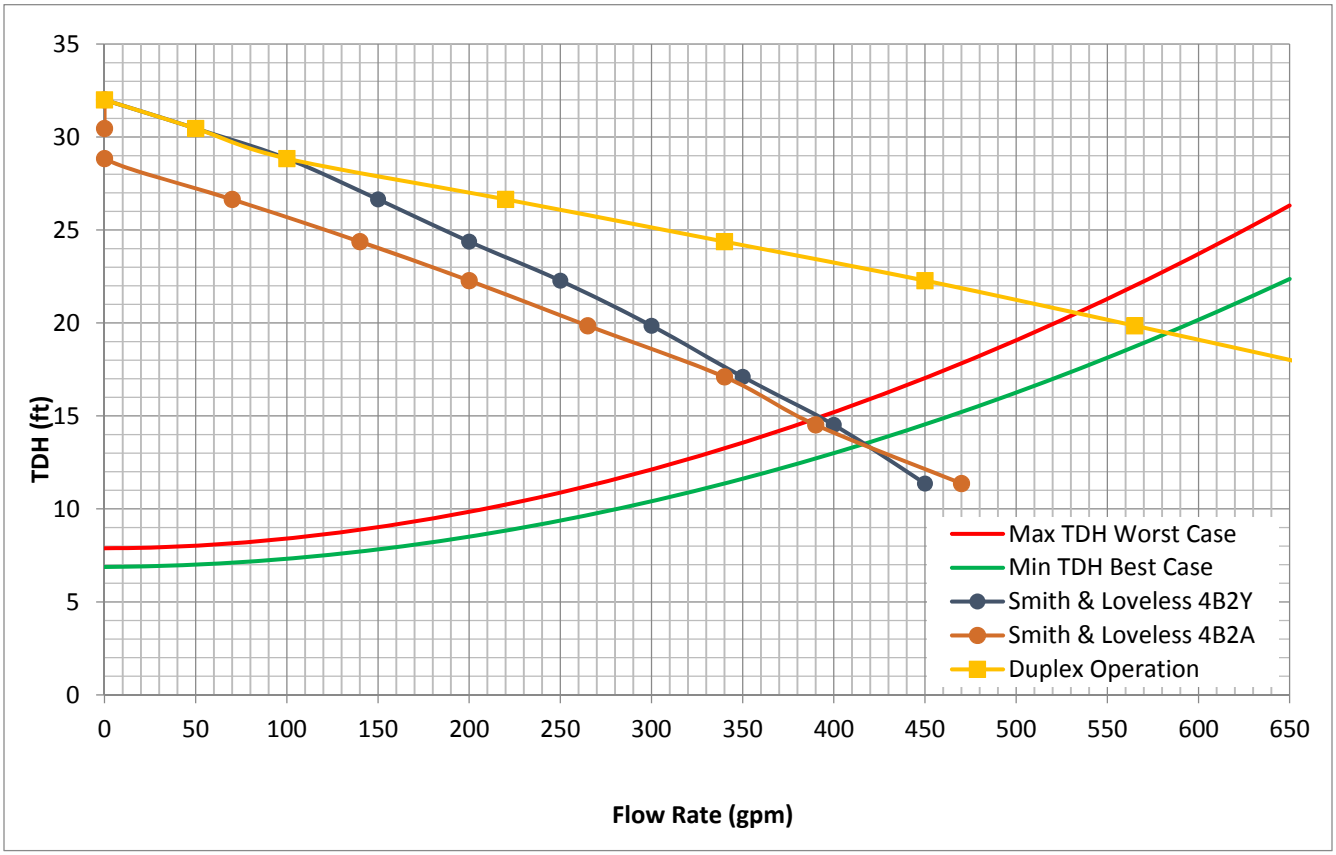


Figure 7-4: Pioneer Lift Station Pump Curve Vs System Curves

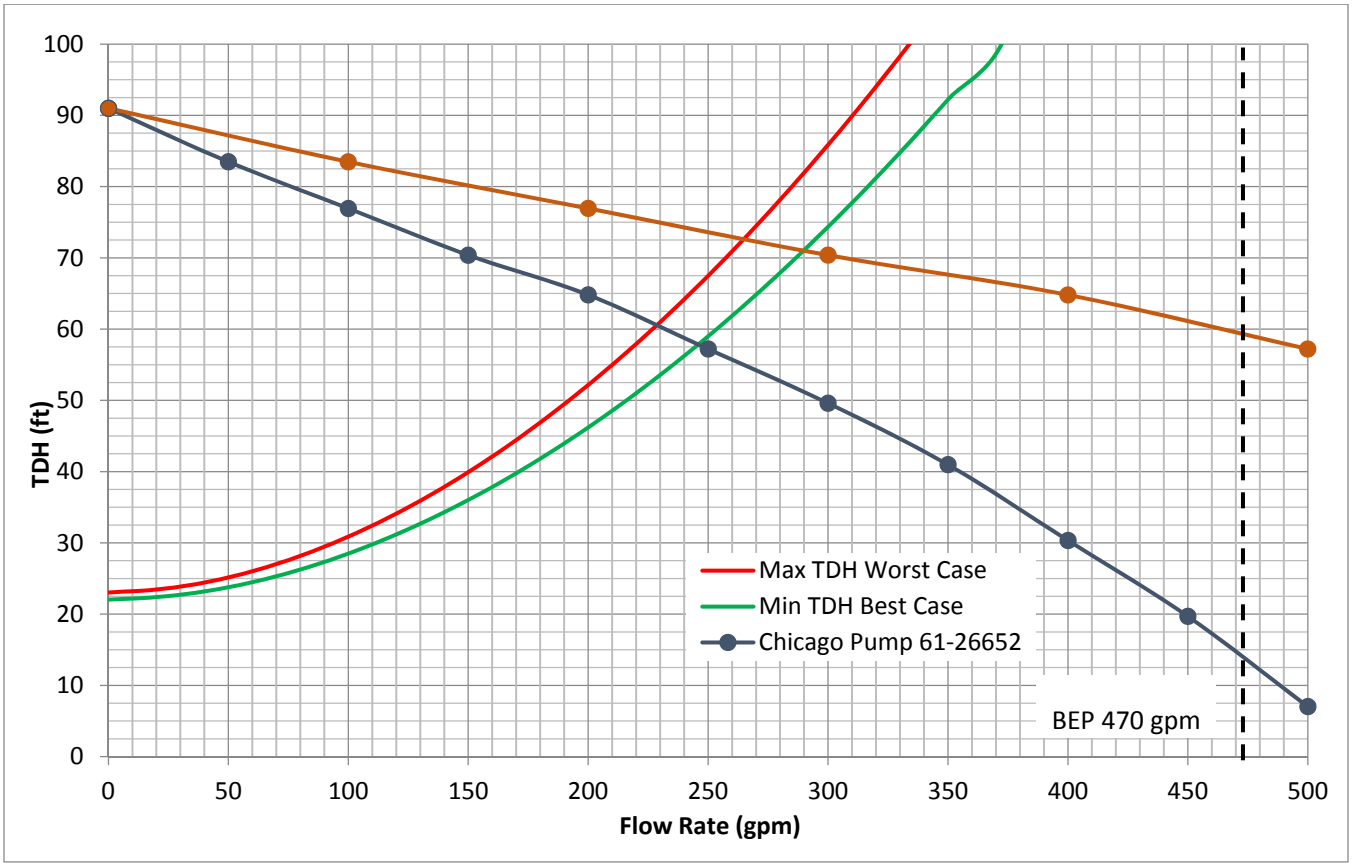
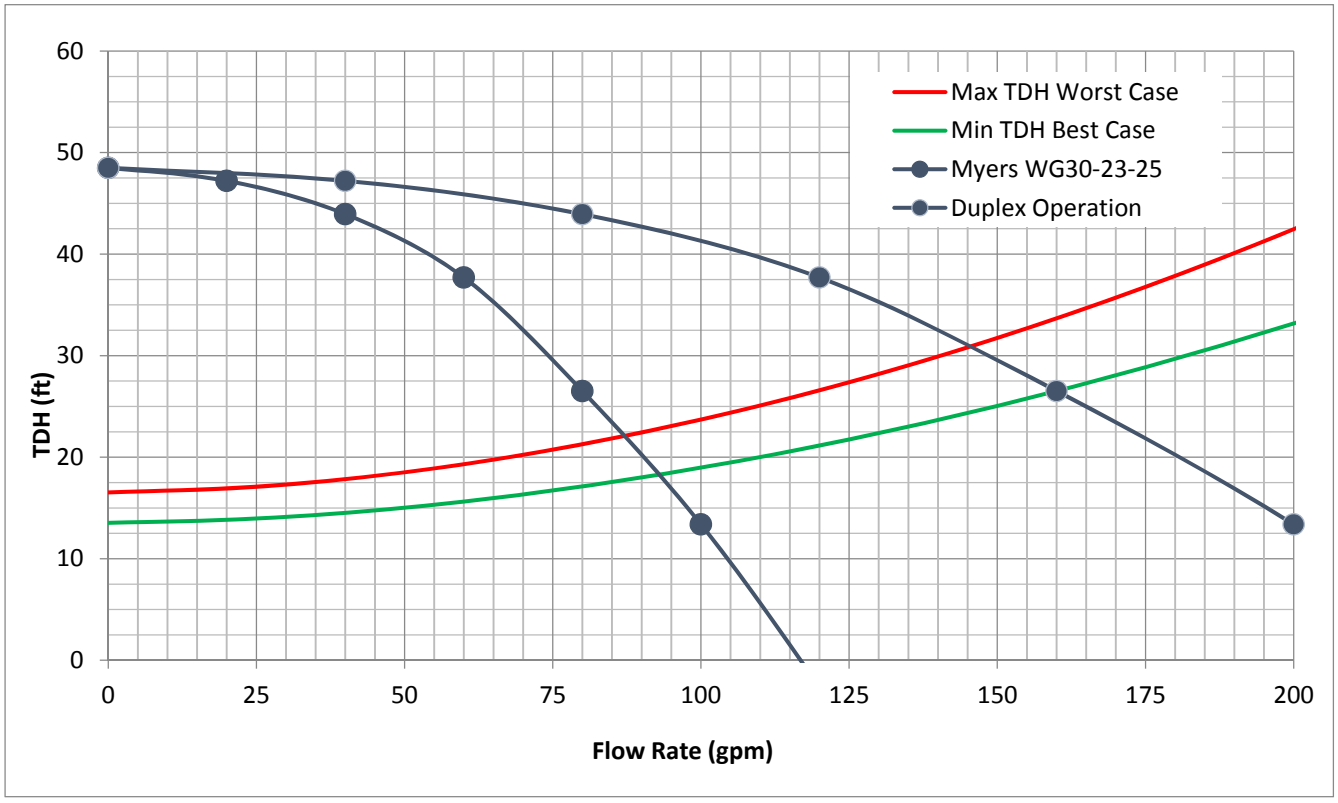


Figure 7-5: Gularte Lift Station Pump Curve Vs System Curves



7.3 Condition Assessment

The location of each existing lift station and their corresponding service areas are shown in **Figure 7-5.** In order to assess the condition of the existing lift station facilities, MKN visited the lift station sites with staff from the City's Wastewater Operations Division. Observed deficiencies and input from City's staff are summarized below for each lift station.

Figure 7-6: Highway 1 Lift Station Dry pit

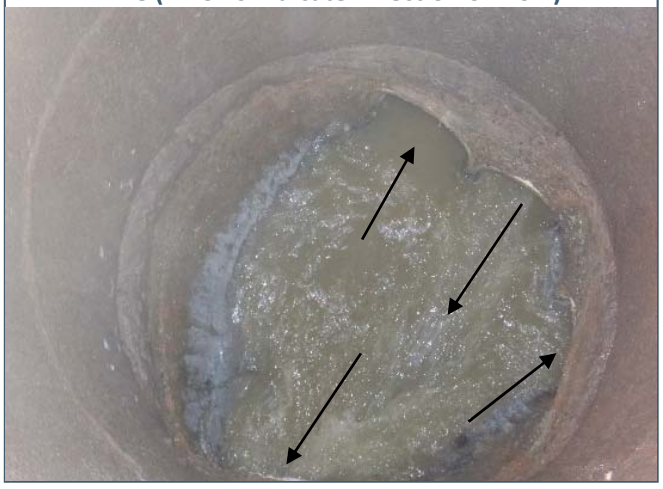
7.3.1 Highway 1 Lift Station

The Highway 1 Lift Station is 1960s Smith & Loveless wet pit/dry pit configuration where effluent is collected in the wet well and the lift station pumps are located inside the dry pit.

- The lift station is 50 years old and is beyond its useful life. The lift station should be replaced.
- When the lead pump turns on it floods the downstream discharge manhole and sends wastewater from the lift station upstream into the TrusPro railroad crossing pipeline for several hundred feet. This results in surcharging and capacity issues.
- The wet well has an emergency overflow pipe connected to the downstream discharge manhole and when the lead pump turns on it forces wastewater back into the wet well, refilling the wet well as it discharges. This operation will run the pumps longer than necessary and cause unnecessary wear on the station pumps, and reduces the overall capacity of the lift station.
- To service the pumps, operators are required to enter the dry pit and descend 17 feet to access the pumps and controls. A ladder is provided, but no other safety equipment is available. The lift station dry pit is a confined space and requires two operators, gas monitoring, positive ventilation and a tripod/harness system for safe entry.
- The lift station pumps do not have hour meters to track runtime for the pumps.
- City operators upgraded the lead pump impeller and motor with a Smith & Loveless Xpeller Rotating Assembly with motor in fall 2013 because of constant clogging of the pump from debris in the upstream wastewater.
- Operators have indicated an interest in the Smith & Loveless above ground enclosed suction lift pump station as a possible upgrade.
- This lift station is not connected to the City SCADA system.

Figure 7-8: Highway 1 Wet Well Refilling from Downstream Gravity Manhole during Pump Cycle

Figure 7-7: Reverse Flow Condition Surcharging TrusPro Line (Arrows Indicate Direction of Flow)



7.3.2 Pioneer Lift Station

The Pioneer Lift Station is the oldest of the three lift stations, constructed in the 1950s. It is also a wet pit/dry pit configuration with a 10'x5' rectangular wet well and a building structure enclosing the dry pit vault access hatches.

Figure 7-9: Looking at ground level from dry pit

- The lift station over 60 years old and is beyond its useful life. The lift station should be replaced.
- Based on pump runtime data for this lift station, on average a single pump will only run 45-90 minutes per day. The pump station is oversized for the current sewer flows.
- Only one pump was in operation at the time of the evaluation. This significantly increases the risk of a sewage spill.
- This lift station is not connected to the City's SCADA system.
- The lift station building and wet well vault are directly adjacent to a stormwater outlet that discharges to an earthen channel that eventually terminates at the Santa Maria River. In the event of a sewer overflow, wastewater could be discharged into the channel.
- To service the pumps operators are required to enter the dry pit and decent 10 feet to access the pumps. A ladder is provided, but no other safety equipment is available. The lift station dry pit is a confined space and requires two operators, gas monitoring, positive ventilation and a tripod/harness system for safe entry.
- The interior walls of the lift station dry pit are discolored and may be representative of structural damage.
- The overall piping and valves appear to be in acceptable condition, but it unclear how often these facilities are exercised as part of a City maintenance program.
- One of the pumps has a leaking pump seal and the support stand underneath the pump was covered with fluid. In addition the floor of the dry pit was wet and it is unclear the cause of the wet floor, which could be a safety concern for a City operator.
- According to staff, the existing VCP force main may pass under residential buildings, and has a history of failure.

Figure 7-11: Leaking pump seal

Figure 7-10: Glass Float System

7.3.3 Gularte Lift Station

The Gularte Lift Station was refurbished in 2005 with a package lift station consisting of a fiberglass wet well and duplex submersible grinder pumps. This lift station appeared to be in the best working condition when comparted to the City's two other lift stations.

- ❒ The existing float support and guiderail supports are severely corroded and should be repaired and/or replaced with stainless steel hardware to extend the useful lift of this lift station.
- ❒ This lift station is not connected to the City's SCADA system.
- ❒ Operators have to reach under the hinged side of the access lid, which could make it difficult and unsafe to close the discharge lines ball valves to take a pump out of service.
- ❒ It was not apparent during the site visit if there is an external valve vault that contains the piping manifold.
- ❒ The exact location of the force main discharge point is not known by City staff, and the manhole field survey did not locate the discharge point.
- ❒ An environmentally sensitive wetland area exists directly adjacent to the lift station.
- ❒ Pumps should be inspected for wear and remaining useful life.
- ❒ Due to the presence of a large floating scum mat, it is recommended the lift station receive more frequent cleaning and maintenance.

Figure 7-13: Severely Corroded hardware

Figure 7-12: Scum level appears to rise over pipe

7.4 Lift Station Ability to Meet Existing Flow Conditions

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

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

Table 7-1 provides an overview of the pump capacity of the City's three lift stations. In addition, pump runtime records for the month of January 2014 were provided by City for the Pioneer and Gularte Lift Stations only. Runtime data was not available for the Highway 1 Lift Station because an hour meter is not installed at the station. The runtime data is representative of one month and may not identify current average or peak day flows.

Table 7-1: Lift Station Pump Capacity for Existing Flows				
Flow Conditions		Lift Station		
		Highway 1[1]	**Pioneer**	**Gularte**
# Residential Parcels		258	1	22
# Commercial Parcels		99	22	None
Estimated Average Daily Flow	gpd	104,708	6,708	4,403
	gpm	72	5	3
Runtime Records[2]	gpd	NA	11,350	6,248
	gpm	NA	8	4
Upstream LS Pumped Flow	gpm	100	NA	NA
Estimated Peak Hour Flow	Peaking Factor	4.7	4.7	4.7
	gpm	427	22	14
Runtime Records	gpd	Not available	21,150	12,870
	gpm	Not available	15	9
Simplex Pump Capacity	gpm	380-420	230-250	82-92
Duplex Pump Capacity	gpm	565-690	270-290	145-160
1. The Highway 1 Lift Station receives pump flow from the Gularte Lift Station and the Gularte Lift Station runs approximately 1 hour per day.				
2. The Highway 1 Lift Station does not have an hour meter and runtime data is not recorded for this station. Runtime data for the month of January 2014 provided by City staff. A detailed review of runtime records to determine average daily and peak flow was not completed for the report.				

Based on the pumping capacity analysis completed in **Table 7-1**, the Pioneer and Gularte Lift Stations appear to have sufficient pumping capacity, with a single pump, to convey existing ADF and PHF conditions and may be oversized based on the estimated existing peak hour inflow conditions. The Highway 1 Lift Station appears to be sufficient to convey ADF conditions, but insufficient to convey PHF conditions with a single pump in operation. It is assumed that the second pump turns on as needed to convey PHF at the Highway 1 Lift Station.

Table 7-2 provides an overview of the existing lift station volumes and calculated active volumes for proper pump cycle times. The Highway 1 and Gularte Lift Station operational active volumes were calculated using existing asbuilt plan and manufacturer documentation. Asbuilt plans were not provided by the City and/or do not exist for the Pioneer Lift Station. In addition the internal wet well dimension of the Pioneer Lift Station could not be measured during the infield condition assessment.

Table 7-2: Minimum Active Volume for Existing Flow Conditions								
Lift Station	wet well Diameter	Volume Per Foot	QPUMP	Operational Active Volume	Operational Active Volume	Calculated		
						Active Volume	Cycle Time	Active Depth
	feet	gal/feet	gpm	gal	feet	gal	min	feet
Highway 1	7.0	287.9	405	293	1.0	1012	10	3.5
Pioneer	NA	NA	250	NA	NA	625	10	NA
Gularte	4.0	94.0	110	94	1.0	275	10	2.9

The calculated active volume, as shown above, provides a starting point for the design of new lift station facilities. Factors such as pump flow, lift station inflow, peak hour flow, wet well dimensions, pipe inverts, manufacturer recommended pumps starts per hour to minimize excessive pump wear, and force main velocities influence the final required wet well active volume. A pump cycle time analysis was not completed for the three lift stations since detailed

asbuilt plans and pump set points were not available. As part of this Master Plan it is recommended that the Highway 1 and Pioneer Lift Station be replaced, at which point a full redesign of the lift stations will be completed. In addition, a separate capacity assessment technical memorandum was completed for the Gularte Lift Station in June 2014, which identified the lift stations has sufficient active depth to adjust pump cycle times for existing and future flow conditions.

For lift station force mains it is recommended that pipeline velocities be greater than 3.5 feet per second in force mains to provide cleaning velocities, but less than 5.0-10 feet per second to minimize head loss and surge events. **Table 7-3** provides an overview of the hydraulic analysis completed for the City's lift station force mains.

Table 7-3: Force Main Evaluation for Existing Flows

		Lift Station		
		Highway 1	**Pioneer**	**Gilarte**
Force Main Properties				
Force Main Diameter	inches	4	4	4
Hazen Williams C	--	130	130	130
Force Main Length	feet	43	636	806
Elevation Head	feet	7.8	18.0	8.0
Design Flows				
Simplex Flow	gpm	405	240	110
Head	feet	16	70	32
Force main Hydraulics				
Velocity	ft/sec	10.3	6.1	2.8
Travel Time to Gravity system	min	0.07	1.73	4.78

Overall the lift station force mains appear to operate within the velocity recommendations identified above during normal pumping operations. The Gularte Lift Station's velocity is slightly slower than recommended and may not provide the required velocity to property clean the force main. Future rehabilitation and/or replacement of the existing City lift stations should evaluate force main changes to maintain minimum and maximum force main velocities.

7.5 Capacity for Future Flow Conditions

Table 7-7 provides an overview of the pump capacity of the City's three lift stations. Based on the analysis, the Pioneer and Gularte Lift Stations have sufficient pumping capacity to meeting future average day and peak hour flow conditions. The Highway 1 Lift Station has insufficient capacity under future peak hour flow conditions with a single pump in operation, but can convey peak hour flow if both pumps running. It is recommended that a single pump is sized to convey peak hour flow, with a second pump available if one pump is out of service, and to provide pumping support for extreme instantaneous peak flows.

Table 7-4: Lift Station Pump Capacity for Future Flows

Flow Conditions		Lift Station		
		Highway 1	**Pioneer**	**Gularte**
# Residential Parcels		258	1	22
# Commercial Parcels		99	22	NA
Estimated Average Daily Flow	gpd	151,629	11,508	19,090
	gpm	105	8	13
Upstream LS Pumped Flow	gpm	100	NA	NA
Estimated Peak Hour Flow	Peaking Factor	4.70	4.70	4.70
	gpm	533	38	62
Simplex Pump Capacity	gpm	390-420	230-250	105-115
Duplex Pump Capacity	gpm	565-690	270-290	165-180

SECTION 8 WASTEWATER TREATMENT PLANT ANALYSIS AND EVALUATION

8.1 WWTP Overview

The wastewater treatment plant (WWTP) was constructed in the 1960's and included a headworks, aeration basin, clarifiers, anaerobic digesters, sludge drying beds and percolation ponds. Improvements made in 1979 converted the WWTP to a lagoon process, demolished the aeration basin, abandoned the digesters and headworks, and constructed a spray distribution system and offsite holding ponds. The 1992 improvements included new headworks, grit removal system, sludge drying beds, irrigation pump station and spray distribution. In 2004 the lagoons were converted to Advanced Integrated Pond System (AIPS) including expansion of the onsite treatment pond volume and abandonment of the sludge drying beds. The most recent WWTP Improvements were completed in 2012 and included a new headworks screen, a secondary treatment process conversion from AIPS ponds to Biolac® extended aeration system with integral clarifiers, and a new screw press sludge dewatering system. The process flow diagram is shown in **Figure 8-1** and the existing site plan is shown in **Figure 8-2**.

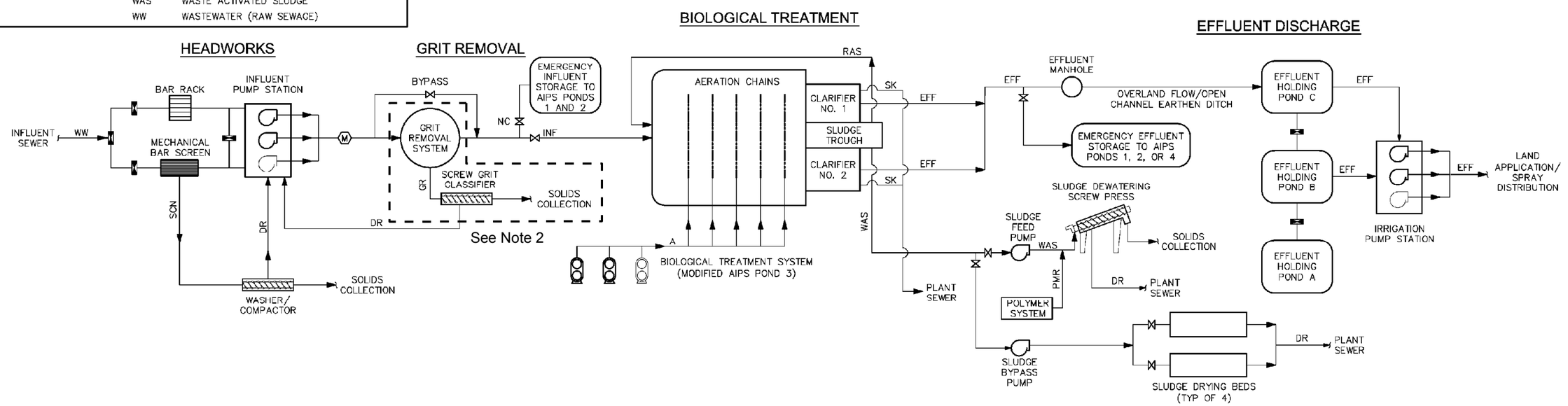
The 2012 Improvements Project was constructed to bring the WWTP into compliance with the City's existing Waste Discharge Requirements (WDR) permit. The design allows for future expansion, and the process is compatible with advanced treatment facilities that may allow for additional recycled water uses if desired in the future. The basis of design for the Improvements Project is described in Technical Memorandum 2 – Basis of Design (Dudek, Draft August 2010). At the time of the design (2010), the WWTP had been experiencing ongoing WDR violations since 2005. The project was designed to correct several mechanical and process deficiencies, and maximize value of the available grant funding. The Report recommended additional improvements be built within 2 to 3 years including installation of an effluent piping system, restoration of the effluent holding ponds, rehabilitation of the irrigation pump station and spray distribution system. Additionally, some of the improvements that were part of the Phase 1 Project were not ultimately included in the construction contract and should be considered for near-term projects, including the rehabilitation of the influent lift station and the grit removal system. The project was designed for a hydraulic capacity of 0.96 MGD, consistent with the WDR limits, and based on population projections it was expected to sustain wastewater needs to 2031.

SYMBOLS

- PUMP
- STANDBY PUMP
- FLOW DIRECTION
- SLIDE GATE
- METER
- VALVE
- BLOWER
- STANDBY BLOWER

PIPING SERVICE ABBREVIATIONS

A	AIR
DR	DRAIN
EFF	SECONDARY EFFLUENT
GR	GRIT
IA	INSTRUMENT AIR
INF	INFLUENT (POST SCREENINGS/GRIT REMOVAL)
ML	MIXED LIQUOR
POT	POTABLE WATER
PMR	POLYMER
PW	PLANT WATER
RAS	RETURN ACTIVATED SLUDGE
S	SEWER
SCN	SCREENINGS
SK	SKIMMINGS/SCUM
WAS	WASTE ACTIVATED SLUDGE
WW	WASTEWATER (RAW SEWAGE)



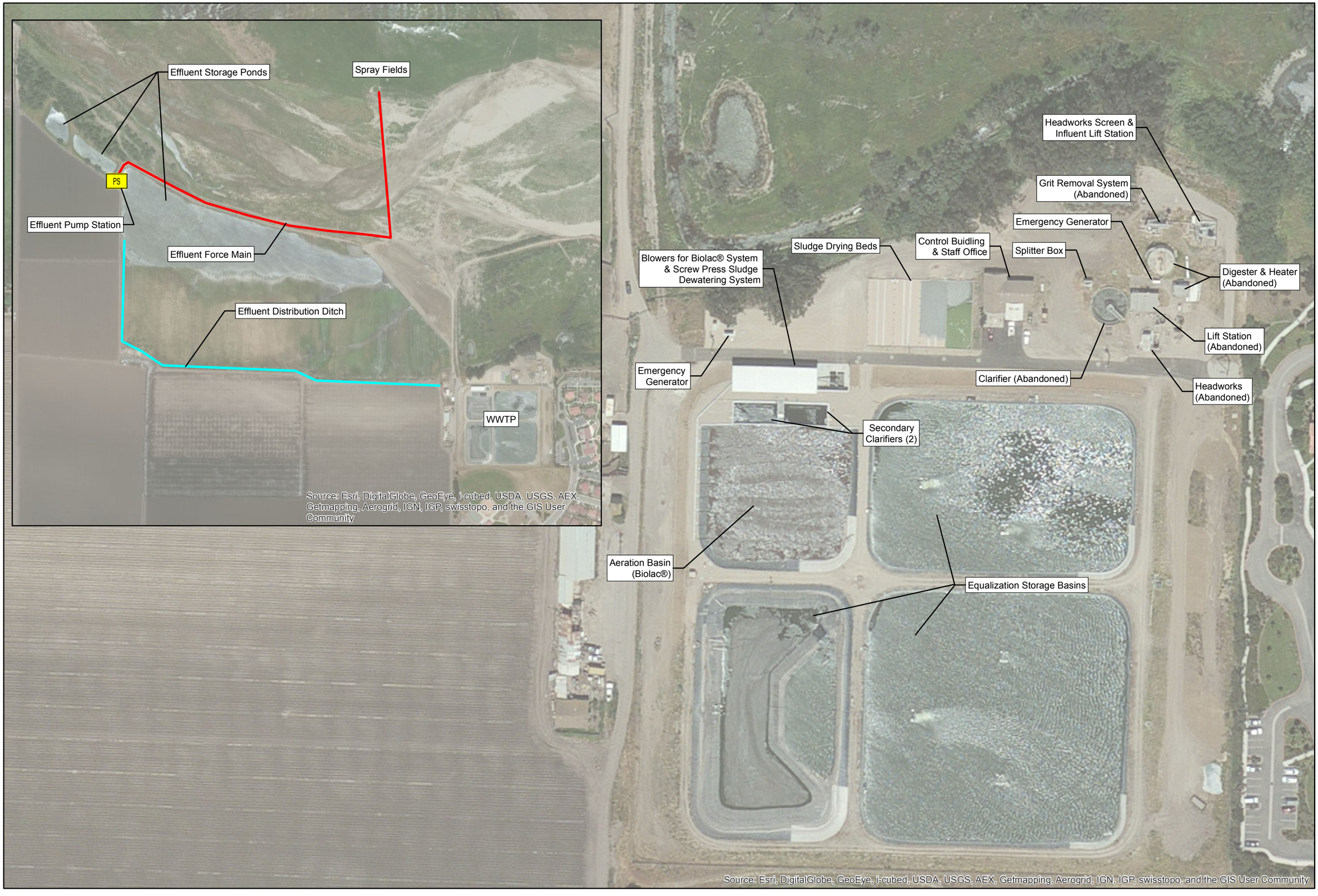
Notes:
1. Process Flow Diagram per City of Guadalupe Wastewater Treatment Plant Improvement Project As-Built drawings, Dudek,11/14/2012.
2. Grit Removal System improvements not yet completed.

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 8-1:

Existing WWTP Proces Flow Diagram



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 8-2:

Existing WWTP Facilities

1 inch:100 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

8.2 Waste Discharge Requirement Permit

Effluent requirements for the Guadalupe WWTP are set forth in Waste Discharge Requirements (WDR) Order No. R3-2005-0015 (**Appendix C**). The permitted capacity of the plant is 960,000 GPD (0.96 MGD) which is based on the average day flow for the maximum month, the maximum monthly flow (MMF). **Table 8-1** summarizes the permit effluent water quality requirements. Additional requirements regarding the discharge/recycled water usage, such as visible signage indicating recycled water use at the reuse sites, are also included.

Table 8-1: Waste Discharge Requirements – Effluent Quality

	Monthly 30-day Average	Maximum Daily
Settleable Solids (SS), mL/L	0.2	0.5
5-day Biological Oxygen Demand (BOD_5), mg/L	60	100
Total Suspended Solids (TSS), mg/L	60	100
Total Dissolved Solids (TDS), mg/L	1500	
Sodium, mg/L	230	
Chloride, mg/L	230	
pH	Within the range 6.5 to 8.4	
Dissolved Oxygen (DO), mg/L	Minimum 1.0 (at water surface in treatment ponds)	
Groundwater limitations	Discharge shall not cause: • Significant increase of mineral constituent concentrations in underlying groundwater, as determined by comparison of samples collected from wells up-gradient and down-gradient from the discharge. • Concentrations of chemicals and radionuclides in groundwater to exceed limits set forth in Title 22, Chapter 15, Articles 4 and 5 of the California Code of Regulations.	

8.3 Wastewater Flows

MKN reviewed available records for influent wastewater flows and loadings and assessed the anticipated community growth. Review of the existing and projected future wastewater flows are detailed in **Section 3** and summarized in the table below.

Table 8-2: Estimated Existing and Future Wastewater Flows

Flow Condition	Existing Flow (MGD)	Future Flow (MGD)	Peaking Factor
Average Day Flow (ADF)	0.68	1.03	--
Maximum Month Flow (MMF)	0.77	1.17	1.13
Peak Day Flow (PDF)	0.93	1.41	1.37
Peak Hour Flow (PHF)	2.71	4.10	3.98

The estimated future ADF and MMF are higher than the WDR limit of 0.96 MGD. The existing MMF is approximately 80% of the WDR limit.

8.4 Influent Loading

8.4.1 Existing Influent Loading

The Monitoring and Reporting Program (Attachment C of WDR No. R3-2005-0015) requires that representative samples of the influent wastewater be collected once per month using a 24-hour composite sample and analyzed for 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS). Reported monthly flows and influent concentrations, and calculated loadings for 2012 and 2013 are summarized in **Table 8-3**.

Table 8-3: Monthly Influent Concentrations and Loadings (2012 – 2013)

Year	Month	Average Daily Flow	Influent BOD-5		Influent TSS	
		(MGD)	(mg/L)	(lb/day)	(mg/L)	(lb/day)
2012	January	0.611	723	3684	213	1085
	February	0.600	335	1675	200	1000
	March	0.595	400	1985	430	2134
	April	0.654	231	1260	169	922
	May	0.667	282	1568	204	1134
	June	0.644	299	1607	178	957
	July	0.605	140	706	210	1059
	August	0.572	217	1036	483	2306
	September	0.585	284	1385	133	648
	October	0.596	410	2038	177	880
	November	0.587	293	1434	196	960
	December	0.608	218	1105	208	1054
2012 Average		0.610	319	1624	233	1178
2012 Maximum		0.667	723	3684	483	2306
2013	January	0.617	237	1219	174	895
	February	0.586	292	1428	170	831
	March	0.607	215	1088	246	1244
	April	0.641	262	1398	172	917
	May	0.674	327	1838	202	1135
	June	0.668	426	2374	209	1165
	July	0.703	127	744	73	428
	August	0.718	230	1377	45	269
	September	0.728	310	1883	201	1221
	October	0.774	266	1717	183	1181
	November	0.737	320	1967	220	1353
	December	0.732	198	1208	147	897
2013 Average		0.682	267	1520	170	961
2013 Maximum		0.774	426	2374	246	1353

The available data indicates that on average, influent flows increased by approximately 12 percent between 2012 and 2013, and influent BOD_5 and TSS loadings decreased by approximately 6 percent and 18 percent, respectively.

APIO is a vegetable processing, washing and packaging facility and a significant wastewater contributor in the City. Based on available records, it appears that APIO's water usage decreased from 2012 to 2013 (**Table 3-2**). However, for January to May 2014, APIO's average daily water demand has increased substantially from 2013. APIOs estimated contribution was approximately 36% of the total estimated wastewater flow for the City in 2013 (**Table 3-2**), and based on records for 2014 it appears to have increased. This may have an impact on the hydraulic capacity of the WWTP.

When evaluating the WWTP's ability to treat sewage from the City and APIO, the loading (biological and solids treatment) capacity should also be considered. The strength of the wastewater from industrial and agricultural facilities

is difficult to predict, since it can vary widely depending on operations. If the wastewater from APIO is low strength (measured by BOD concentrations), and flows increase substantially, biological treatment at the wastewater treatment facility may be impacted since it relies on carbon and nitrogen from the influent sewage to support the biological organisms that perform the treatment. Conversely, if the wastewater contains high concentrations of BOD, the treatment facility may require additional treatment capacity.

MKN reviewed monthly influent flows and loadings for 2014 available at the time of this report (January through July). These are summarized below in **Table 8-4**. Additionally, a 24-hour composite sample was taken on August 27, 2014 and tested for BOD_5 and TSS. The BOD_5 concentration was 387 mg/L and the TSS concentration was 196 mg/L. It is expected that 24-hour composite samples reflect the contributions from the City, including APIO, and can be considered representative samples. APIO typically discharges during the night, when City flows are lower. The Biolac Aeration Basin is a relatively large volume and operates with a long solids retention time (SRT), so most daily loading fluctuates are anticipated to be adequately buffered.

Table 8-4: Monthly Influent Flows and Loadings (January through July 2014)

Year	Month	Average Daily Flow	Influent BOD-5		Influent TSS	
		(MGD)	(mg/L)	(lb/day)	(mg/L)	(lb/day)
2014	January	0.739	257	1584	113	696
	February	0.639	115	613	61	325
	March	0.666	210	1166	172	955
	April	0.707	388	2288	164	967
	May	0.718	388	2323	164	982
	June	0.654	161	878	166	905
	July	0.750	300	1877	40	250
Jan – July 2014 Average		0.696	260	1533	126	726
Jan – July 2014 Maximum		0.750	388	2323	172	982

The average and maximum monthly flows and loadings for 2012, 2013, and the first seven months of 2014 are shown in the table below.

Table 8-5: Average and Maximum Month Flows and Loadings (2012, 2013, and Jan – July 2014)

Flow Condition	2012	2013	Jan – July 2014
Average Daily Flow (ADF) (MGD)	0.610	0.682	0.696
Maximum Monthly Flow (MMF) (MGD)	0.667	0.774	0.750
Average BOD_5 Concentration / Loading (mg/L / ppd)	319 / 1624	267 / 1520	260 / 1533
Max Month BOD_5 Concentration / Loading (mg/L / ppd)	723/ 3684	426 / 2374	388 / 2323
Average TSS Concentration / Loading (mg/L / ppd)	233 / 1178	170 / 961	126 / 726
Max Month TSS Concentration / Loading (mg/L / ppd)	483 / 2306	246 / 1353	172 / 982

In general, flows have increased and loadings have decreased over this time. For January through July 2014, the flows and loadings appear similar to 2013. The TSS concentrations for Jan through July of 2014 appear lower than 2013. However, the sample results for August 27, 2014 contained a TSS concentration of 196 mg/L, which is greater than measured results for Jan through July. For the purposes of this Master Plan, the influent loading for 2013 is considered to be representative of existing loadings and is used to estimate existing and future capacity of the plant.

8.4.2 Estimated Future Influent Loading

Future influent loadings were estimated to evaluate the existing system and potential alternative systems under future conditions. The projected BOD_5 and TSS loadings were determined by dividing the 2013 average daily and maximum monthly BOD_5 and TSS loadings (**Table 8-3**) by the ADF and MMF, respectively. This provides the loadings in terms of pounds per million gallons. These terms were multiplied by the projected flow rates to find the projected BOD_5 and TSS loadings shown in **Table 8-6**.

Table 8-6: Estimated Future Influent Loadings		
	Existing	**Future**
ADF (MGD)	0.68	1.03
Average BOD_5 Loading (ppd)	1,520	2,302
Average TSS loading (ppd)	961	1,455
MMF (MGD)	0.77	1.17
Maximum Month BOD_5 Loading (ppd)	2,374	3,596
Maximum Month TSS Loading (ppd)	1,353	2,049

8.5 Existing Effluent Quality

MKN reviewed monthly and annual reports provided by the City for 2012 and 2013. The WWTP takes effluent samples once per week. The figures below show the monthly mean effluent BOD-5 and TSS concentrations for 2012 through 2013. The WWTP improvements were constructed in 2011 and the existing treatment process was brought online in early 2012. Since then, the effluent quality has significantly improved. Sampling results show the effluent BOD-5 and TSS concentrations well below the limit of 60 mg/L between May and December 2013.

Figure 8-3: Monthly Mean Effluent BOD-5 Concentration (2012-2013)

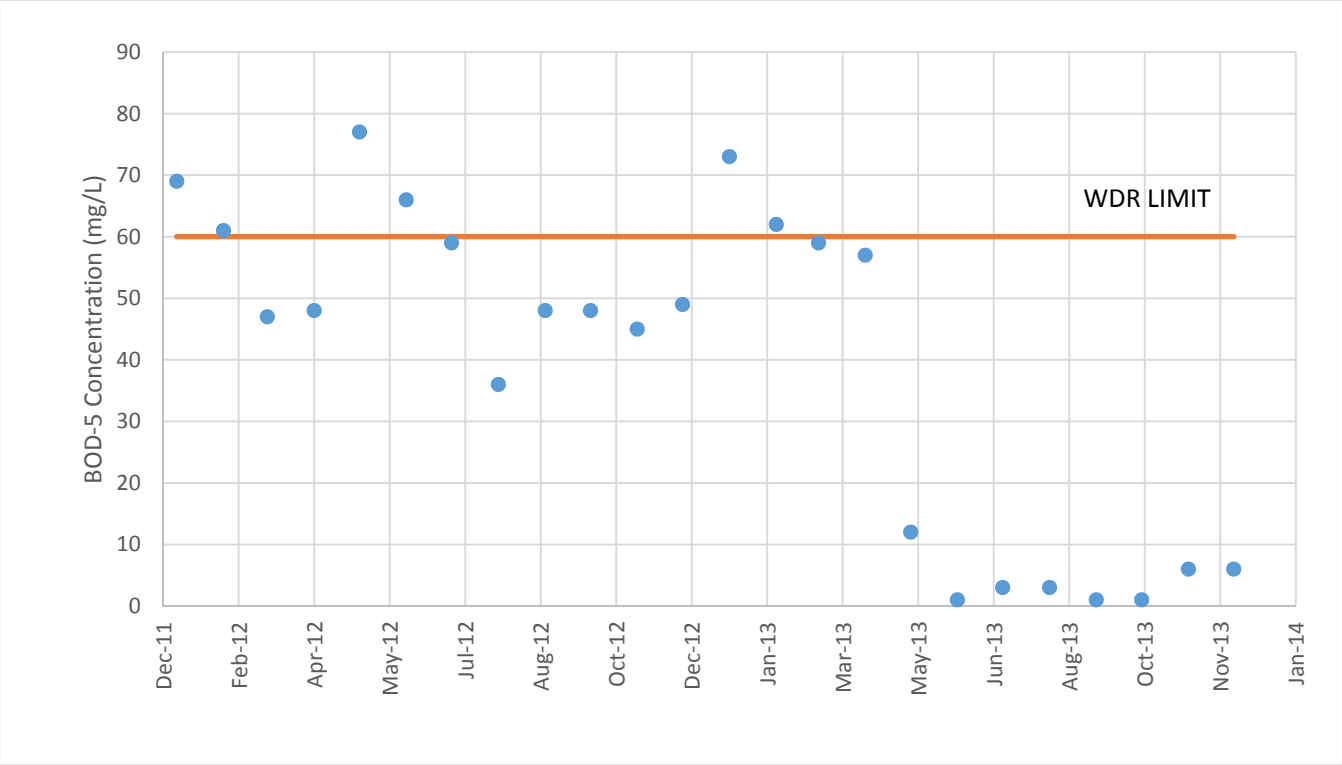
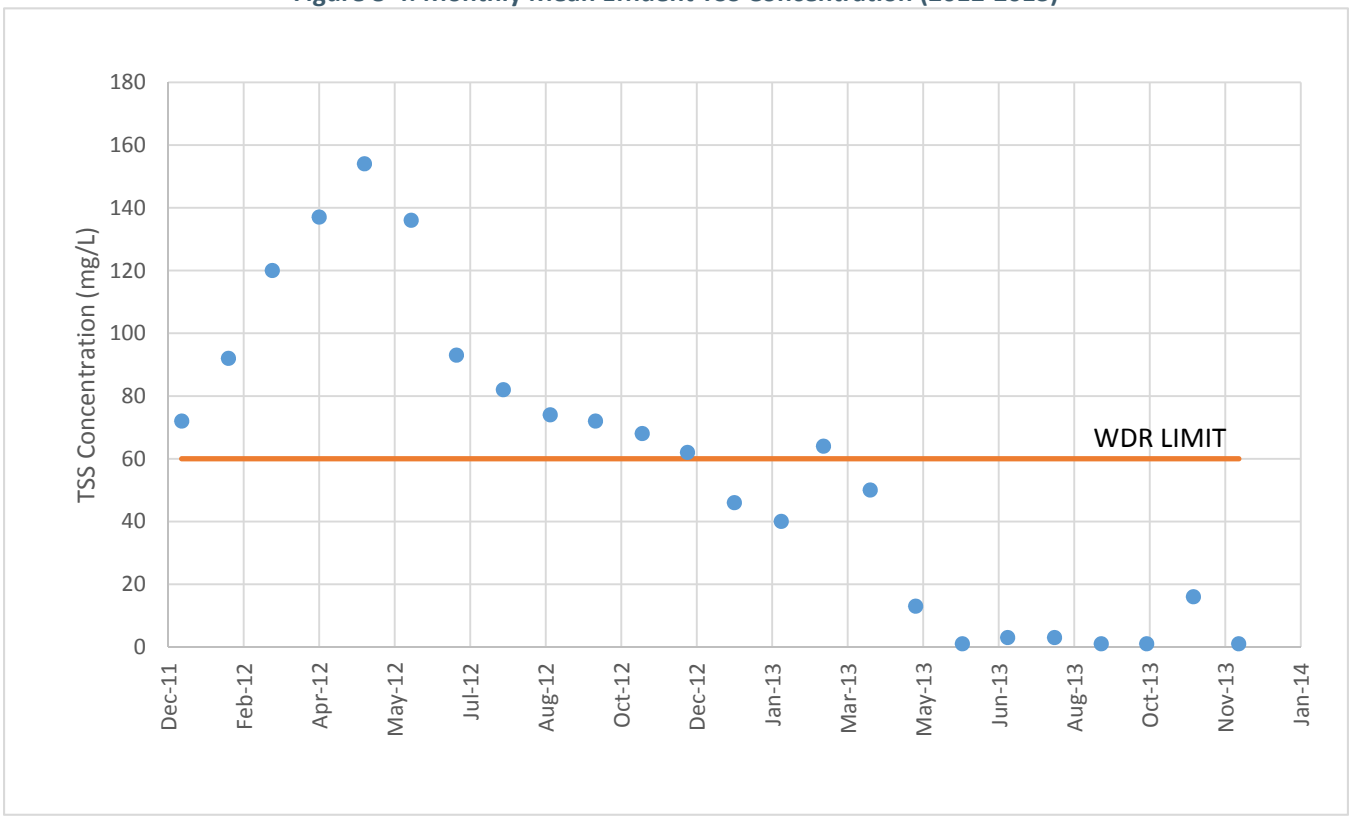


Figure 8-4: Monthly Mean Effluent TSS Concentration (2012-2013)



Reported semi-annual water quality results for 2012 and 2013 are summarized in the table below. Effluent TDS, sodium, and chloride concentrations are generally below the WDR limit, though measured TDS was at the limit of 1500 mg/L in October 2012. Boron, nitrogen, and sulfate are also reported, but no limit is included in the WDR. Reported data for April 2012 and April 2013 is suspect, however, since the data set is identical. MKN was not able to verify the data at the time of this report.

Table 8-7: Semi-Annual Monitoring Results (2012-2013)

Month	Effluent TDS (mg/L)	Effluent Sodium (mg/L)	Effluent Chloride (mg/L)	Effluent Boron (mg/L)	Effluent Nitrogen (mg/L)	Effluent Sulfate (mg/L)
Apr-12	1070	162	90	0.4	1.9	310
Oct-12	1500	180	20	0.25	3.2	200
Apr-13	1070	162	90	0.4	1.9	310
Oct-13	710	130	160	0.25	3.2	200
WDR LIMIT	1500	230	230	--	--	--

8.6 Description of Facilities

The general plant design parameters per the Wastewater Treatment Plant Improvement Project Record Drawings (Dudek, November 2012) are summarized in the table below.

Table 8-8: Existing WWTP General Design Parameters			
Parameter	**Unit**	**2012 Design, Q = 0.6 MGD**	**WDR Limit, Q = 0.96 MGD**
Influent Flow Rates			
Average Daily Flow (ADF) Rate	MGD	0.6	0.96
Peak Hour Flow (PHF) Rate (Wet Weather)	MGD	1.92	2.88
Influent Characteristics			
Biochemical Oxygen Demand (BOD-5)	mg/L	300	300
Total Suspended Solids (TSS)	mg/L	300	300
Total Kjeldahl Nitrogen (TKN)	mg/L	50	50
Ammonia as Nitrogen (assumed)	mg/L	35	35
Alkalinity (assumed)	mg/L	100-200	100-200

8.6.1 Headworks and Influent Pump Station

The headworks removes trash and large solids from the influent wastewater using a traveling-rake mechanically-cleaned bar screen. A bypass channel with manually cleaned bar screen is available for large flows or when the mechanical screen is down for maintenance. Screenings from the mechanical screen are dewatered and compressed with a screenings wash press and automatically bagged and collected into a roll-away dumpster. The influent pump station utilizes three submersible pumps (2 duty and 1 standby) to send flow to the secondary treatment system. Design parameters for the headworks and influent pump station are summarized in **Table 8-9**.

Table 8-9: Existing Headworks and Influent Pump Station Design Parameters			
Parameter	**Unit**	**2012 Design, Q = 0.6 MGD**	**WDR Limit, Q = 0.96 MGD**
Mechanically Cleaned Bar Screen			
Installation Year	Year	2012	2012
Number of Screens	No.	1	1
Design Peak Hour Flow Rate	MGD	2.88	2.88
Bar Spacing	mm	9.5	9.5
Channel Width	Ft	2.5	2.5
Channel Depth	Ft	2.8	2.8
Manually Cleaned Bar Screen (Bypass)			
Installation Year	Year	1992	1992
Number of screens	No.	1	1
Bar Screen opening	In	1	1
Channel width	Ft	2.75	2.75
Channel Depth	Ft	2.8	2.8
Screenings Washer/Compactor			
Installation Year	Year	2012	2012
Number of screenings washer/compactors	No.	1	1
Screenings Capacity (batch service)	CF/hr	16.3	16.3
Minimum % dry solids of compacted screenings	%	50	50
Influent Pump Station			
Installation Year	Year	1992	1992
Number of Submersible Solids Handling Pumps	No.	3 (2 duty, 1 standby)	3 (2 duty, 1 standby)
Pump horsepower (each)	HP	20	20

8.6.2 Secondary Treatment

The secondary treatment system consists of an aeration basin with Biolac® Wave Oxidation aeration system and two integral, rectangular clarifiers which utilize air lift pumps to collect settled activated sludge for return (return activated sludge, RAS) to the front of the aeration basin. Design parameters for the aeration basins and the clarifiers are summarized in **Table 8-10**.

Table 8-10: Existing Secondary Treatment Design Parameters

Parameter	Unit	2012 Design, Q = 0.6 MGD	WDR Limit, Q = 0.96 MGD
Aeration Basins			
Installation Year	Year	2012	2012
Number of Aeration Basins	No.	1	1
Width at Grade	FT	185	185
Length at Grade	FT	169	169
Side Water Depth	FT	11	11
Slope Ratio	FT/FT	3:1	3:1
Basin Volume	MG	1.58	1.58
Hydraulic Retention Time (HRT)	HR	63.2	39.5
Design MLSS	Mg/L	2,050	3,189
F/M Ratio	1/d	0.06	0.06
Sludge Retention Time (SRT)	Day	25.4	24.6
Integral Clarifiers			
Installation Year	Year	2012	2012
Number of Clarifiers	No.	2	2
Width	FT	55	55
Length at Water Level	FT	24	24
Surface Loading Rate	GPD/SF	227	364
Weir Loading Rate	GPD/SF	4,054	6,486
Return Activated Sludge (RAS) System			
Installation Year	Year	2012	2012
Maximum Return Activate Sludge Flow Rate	MGD	0.9	1.44
Aeration Blowers			
Installation Year	Year	2012	2012
Number of Blowers	No.	3 (2 duty, 1 standby)	3 (2 duty, 1 standby)
Design Capacity of each Blower	scfm	352	352
Design Total Dynamic Head of Each Blower	psig	5.4	5.4
Blower Speed	rpm	1,800	1,800

8.6.3 Solids Handling

When solids build up in the aeration basin, they're pumped from the Return Activated Sludge (RAS) line to a screw press for dewatering. Dewatered sludge is stored onsite, and eventually trucked to Bakersfield for disposal. The existing

sludge drying beds are periodically used when the screw press is down for maintenance. Design parameters for the solids handling facilities are provided in **Table 8-11**.

Table 8-11: Existing Solids Handling System Design Parameters			
Parameter	**Unit**	**2012 Design, Q = 0.6 MGD**	**WDR Limit, Q = 0.96 MGD**
Waste Activated Sludge (WAS)			
Installation Year	Year	2012	2012
Design Sludge Wasting Rate	lb/day	1,009	1,615
Sludge Concentration	mg/L	6,400	6,400
Progressive Cavity Sludge Feed Pumps			
Installation Year	Year	2012	2012
Number of pumps	No.	1	1
Design Flow Rate of Each Pump	gpm	28	44
Dewatering Screw Press			
Installation Year	Year	2012	2012
Number of Screw Presses	No.	1	1
Design Dry Solids Loading Rate	lb/hr	88	141
Duty Cycle	hrs/wk	80	80
Dewatered Sludge Characteristics			
Percent Dry Solids, Min	%	15	15
Solids Capture Rate	%	95	95
Sludge Cake Production Rate - Volume	CY/wk	26	41
Sludge Cake Production Rate - Weight	ton/wk	22.4	35.8
Sludge Drying Beds			
Installation Year	Year	1992	1992
Number of beds	No.	4	4
Total Surface Area (approximate)	SF	9,600	9,600

8.6.4 Treated Effluent Reuse

Treated effluent flows by gravity from the clarifiers to an open earthen ditch along the western border of a 50-acre area used as pasture for grazing cattle. The treated effluent is released at various points along the ditch and flows north across the pasture to a storage pond (Pond C). Two smaller ponds (Ponds A and B) are interconnected to the Pond C and used for wet weather storage. The effluent ponds A, B, and C were designed with approximate volumes of 6, 2.5 and 2 million gallons respectively. The irrigation pump station is located between Pond B and C and receives water directed from both pond through two 16-inch gravity pipes. The pump station consists of a 22-feet deep wet well with room for four submersible pumps. The effluent is pumped through a pipeline underneath the adjacent Santa Maria River to a spray field used for cattle grazing. The spray field is approximately 71 acres.

8.7 Historical Improvement Recommendations

The 2010 Concept Design Report (Dudek) included recommendations for improvements beyond the first phase of the WWTP Improvements completed in 2012. These additional improvements are recommended to ensure a reliable and effective operation and include replacement and/or refurbishment of the effluent distribution ditch, irrigation pump station, effluent storage pond, and sprayfields. The 2012 Design plans included the improvements to the influent pump station and grit removal system, but the work was not included in the construction contract due to insufficient funding. Additional details are summarized below:

- Influent Pump Station:
  - Remove and replace three existing influent pumps, mounting components and guide rails
  - Install controls and alarms

- Replace two sets of existing 8-inch discharge piping and check valves (one was recently replaced)
- Replace one VFD (other two were installed in 2008)
- Replace existing VFD enclosure with dust control and air conditioning

❒ Grit Removal System Improvements
- Remove and replace existing grit removal equipment, including grit pump, grit classifier, piping and valves. Convert grit pumping system to top-mounted pumping configuration.

❒ Effluent Reuse System Improvements
- Install 2,200 LF of welded HDPE or PVC pipe in place of unprotected effluent ditch
- Rehabilitate effluent pond levees and increase height in areas subjected to flooding. Repair eroded roadway along Pond C.
- Replace equalization pipe and gate connecting Ponds B and C, and replace sluice gate between Ponds A and B.

❒ Irrigation Pump Station Improvements
- Replace irrigation pumps (3) and controls (including VFDs, sensors, alarms) to match requirements for new spray irrigation system
- Install new electrical/control building with dust control and ventilation
- Install new effluent filters
- Install fencing around pump station site to protect it from roaming cattle
- Install new alarm system with telemetry

❒ Spray Irrigation System Improvements
- Install 12 underground laterals off the existing force main with 30 to 40 sprinklers and steel bollards around each sprinkler head to protect them from grazing cattle.

8.8 Condition Assessment

MKN visited the plant with City operations staff to review the existing process equipment and document the general condition. Our findings are summarized below.

8.8.1 Headworks

The headworks is approximately 20 feet deep, with two concrete channels. The mechanically-cleaned screen and screenings washer compactor system were installed in 2012 and considered to be in good working order, with only periodic and routine

Figure 8-6: Headworks Screen Channels

Figure 8-5: Mechanically-cleaned Screen and Washer-compactor

maintenance required since their installation. The manually-cleaned bar screen in the bypass channel, concrete, handrails, grating and gates also appear to be in good condition.

8.8.2 Influent Pump Station

Screened influent from the two headworks channels spill into the influent pump station wet well, which contains three 20 horsepower submersible pumps and space for a future (fourth) pump. The pumps are at the end of their useful life and have problems moving along the guide rails and seating. Rehabilitation of the influent lift station as detailed in the 2010 Concept Design Report is recommended to ensure reliable operation and reduce risk of sewer overflows.

Figure 8-7: Influent Pump Station Discharge Piping

8.8.3 Extended Aeration System (Biolac®) – Aeration Basin

The extended aeration system (Parkson Biolac®) was installed in 2012. According to staff, the system is in good working order and no maintenance on the diffusers, air hose or air valves has been required yet. Regular maintenance includes cleaning the DO probe in the aeration pond, and changing oil and air filters for the blowers.

Figure 8-8: Biolac® Aeration Basin

At the time of MKN's visit, Operations Staff reported the system was operating at a mixed liquor suspended solids (MLSS) concentration of approximately 2,300 mg/L. However, since their goal MLSS is 4,000 mg/L the plant hadn't wasted sludge in over six weeks in order to try to increase MLSS concentrations[1]. Based on the 2012 WWTP Improvements Record Drawings, the plant was designed for a MLSS concentration of 2,050 mg/L (at influent flow of 0.6 MGD). A higher MLSS concentration will have greater aeration requirements. The City may consider performing an Efficiency Study to review the design, aeration requirements, and recommended operational set points.

[1] MLSS is a measure of the active bacteriological content and an important operating characteristic for activated sludge systems.

8.8.4 Secondary Clarifiers 1 & 2

Also installed with the 2012 Improvements, the secondary clarifiers and associated equipment (weirs, air lift pumps, scum collectors, etc.) appear to be in good condition. Operations staff noted no significant maintenance. Routine maintenance includes washing down the weirs to remove algae. At the time of MKN's visit, Operations Staff reported that the sludge hadn't been settling well.

Figure 8-9: Secondary Clarifier

Operations staff has observed grit settling in the return activated sludge channel. The existing grit removal system is currently non-functional and offline. Rehabilitation of the grit removal system is recommended to reduce wear on downstream equipment and minimize labor and cost to remove grit later in the system. Grit can be difficult to remove from the aeration pond and sludge channels. Assuming the grit stays in suspension through the aeration pond and settles in the clarifier, it may eventually be wasted to the sludge dewatering equipment. Biosolids are typically more expensive by weight/volume to dispose of than grit from a wastewater plant.

8.8.5 Solids Handling Facilities - Screw Press Sludge Dewatering System & Sludge Drying Beds

The screw press dewatering system was installed with the 2012 Improvements. Piping and pumps were installed so that waste sludge could be directed to either the screw press or the sludge drying beds. At the time of our visit, City staff noted that they hadn't wasted sludge in over six weeks. With regard to mechanical dewatering systems, optimal polymer dosing may be more challenging to determine when wasting infrequently, especially if the mixed liquor suspended solids (MLSS) concentration changes much over time. Liquid polymer also has a limited shelf life, after which the effectiveness may be greatly reduced.

Figure 8-10: Screw Press Sludge Dewatering System

The City utilizes the sludge drying beds when the screw press is out of service. The 2012 Improvements included rehabilitation of the drying beds, which involved removing existing materials and installing layers of sand, pea gravel, and crushed rock and new perforated pipe.

Figure 8-11: Sludge Drying Beds

8.8.6 Effluent Disposal System

The effluent disposal system consists of an effluent ditch, a series of three holding ponds and an irrigation pump station. MKN was unable to view the holding ponds and irrigation pump station. At the time of the site visit, active irrigation in the surrounding agricultural fields made the dirt access roads impassable. According to City staff, only one of the three irrigation pumps is currently operating and was recently rebuilt. As previously described in the 2010 Concept Design Report (Dudek) and the 2007 Wastewater Treatment Plant Study (Black & Veatch), the effluent disposal/reuse system is in need of repair and rehabilitation to ensure reliable and effective operation. The historical recommendations are summarized in **Section 8.7**.

The condition of the system was documented in the 2010 Concept Design Report (Dudek). Notable observations in the report are summarized below:

- ❒ Equalization pipe connecting effluent holding Ponds C and B appears to be clogged, since the water level in Pond C is very high compared to Ponds A and B.
- ❒ Slide gate between Ponds A and B appears to have deteriorated.
- ❒ Entire area of Ponds A and B, and a small part of Pond C, are with the FEMA 100-year flood plain.
- ❒ Significant erosion was observed around Pond C, including erosion of the access road to the irrigation pump station and electrical poles and fence.
- ❒ The original berm elevations from the 1992 construction have not been maintained.
- ❒ (At the time of the report) two of the existing 88-horsepower pumps in the Irrigation Pump Station were replaced in 2006 and 2008 with two new 60-horsepower pumps are were reportedly working well.
- ❒ Irrigation Pump station ductile iron piping, pond intakes, and concrete structure appeared to be in good condition.
- ❒ Irrigation filters have never been serviced and cattle have damaged multiple parts of the filters.
- ❒ Irrigation pump station motor control center and VFDs are located in a small, cramped space without air conditioning and only minimal dust filtration. Operational and maintenance activities are difficult and potentially unsafe, and VFD failures have been frequent.
- ❒ Alarm system with telemetry is not functional.
- ❒ No pump lift crane makes pump maintenance difficult.
- ❒ Entire 71-acre spray irrigation pasture is within the FEMA 100-year floodplain

- ❒ Original spray irrigation system was damaged from grazing cattle and removed
- ❒ Two laterals with high capacity sprinkler guns currently distribute water, but do not distribute efficiently and have to be repositioned twice a day to minimize standing water.

8.9 Capacity of Existing System for Existing and Future Flows and Loadings

8.9.1 WWTP Overview

The existing and estimated future flows and loadings were compared to the 2012 plant design values to assess the overall WWTP capacity for existing service. The assessment is summarized in **Table 8-12** below. The information indicates that the existing WWTP maximum month flow (MMF) is at approximately 80% of the plant design value, which is also the WDR limit. The existing peak hour flow (PHF) is at approximately 70% of the design peak wet weather flow. Existing maximum month BOD loading appears to be at the design value (99%). This indicates that an increase in either flows or BOD concentrations may put the influent BOD loading above the design value for the plant. TSS existing and future loadings appear to be below the design values, at 56% and 85%, respectively.

Table 8-12: Comparison of Existing Wastewater Treatment System Design Parameters with Existing and Estimated Future Values

	Existing Value (2013)	Estimated Future Value[1]	Design Value[2]	Existing % of Design Value	Future % of Design Value
Average Day Flow (MGD)	0.68	1.03	0.96	71%	107%
Maximum Month Flow (MGD)	0.77	1.17	0.96	80%	122%
Peak Hour Flow (MGD)	2.71	4.10	2.88	70%	142%
BOD Loading (ppd)	2,374	3,596	2,402	99%	150%
TSS Loading (ppd)	1,353	2,049	2,402	56%	85%

Notes: [1] Estimated future flows and loadings developed in Sections 8.3 and 8.4.2.
[2] Design value based on the City of Guadalupe Wastewater Treatment Plant Improvement Project As Built Drawings, Dudek, 11/14/2012. Design loadings were estimated by multiplying the Maximum Month Flow rate and the design concentrations

The WDR permit flow limits are based on the maximum month flow (MMF) (the greatest 30-day average daily flow for the year). Typically, design flows for biological treatment processes are also based on the MMF. Often, once flows reach 80% of the plant capacity, it's advisable to start planning the next upgrade. Considering the existing MMF is at 80% of the design value and WDR limit and the high BOD loading, it is recommended that the City begin planning for an expansion. The expansion project should consider future flows and loadings. The capacity assessments for the individual processes with regard to existing and estimated future flows and loadings are detailed in the following sections.

8.9.2 Headworks

As described in previous sections, the headworks consists of two concrete channels; one with a mechanically-cleaned bar screen and the other with a manually-cleaned bar rack which serves as a bypass or overflow channel. Headworks screens are typically designed to handle peak hour flow (PHF) to ensure protection of downstream equipment. The mechanically-cleaned screen was installed as part of the 2012 Improvement Project. MKN reviewed the 2012 Improvement Project hydraulic profile (Drawing G-3) and the channel hydraulics considering the existing and estimated future PHF. The existing PHF (2.71 MGD) is less than the design PHF (2.88 MGD), and therefore it's expected the headworks has sufficient capacity for existing conditions.

The future PHF is estimated to be 4.10 MGD. Assuming the influent pump station water levels can be maintained to allow free flow across the weir in the headworks channel, the existing mechanically-cleaned screen channel appears to have sufficient hydraulic capacity for the future PHF. The bypass channel with manually-cleaned bar rack may need to be utilized intermittently, during times of high flows, and the controls for the bypass should be reviewed to ensure automatic overflow for water levels over a set point (i.e., 4 inches below top of channel) into the bypass channel.

8.9.3 Grit Removal System

The existing grit removal system has not been utilized in several years because of regular clogging problems at the grit pump. The Concept Design Report (Dudek, May 2010) reviewed alternatives for rehabilitation of the grit system, and recommended conversion of the grit pumping system to a top-mounted pump configuration. The 2012 Improvement Project Plans included drawings showing the grit system improvements, but ultimately the work was not included in the contract due to insufficient funding.

Grit removal is recommended to protect downstream equipment from wearing and reduce maintenance (in this case, removing settled grit from channels). For many extended aeration systems, including Parkson Biolac®, however, it is not considered essential for the treatment process, and whether it is recommended often is dependent on the estimated amount of grit in the system. Installation of a grit removal system may be economically beneficial since washed grit can be disposed of at a municipal landfill along with screenings. Whereas, if grit passes through the treatment system, the majority ends up being wasted with sludge and disposed of as biosolids, which has a higher cost of disposal.

The capital cost for the grit removal system improvements was estimated at $223,000 (2010 Concept Design Report, Dudek). This included removal and replacement of the mechanical grit removal equipment and was based on reusing the existing grit chamber and channels (concrete structure). The project should be evaluated for future installation, including a cost-benefit assessment, and a review of the hydraulics at estimated future flow conditions.

8.9.4 Influent Pump Station

The existing influent pump station consists of a wet well with three 20-horsepower submersible pumps (2 duty and 1 standby), and space for a fourth pump. The Concept Design report recommended rehabilitation of the lift station including replacement of the pumps, which are beyond their design life, piping, guiderails, and additional appurtenances as described in **Section 8.7**. The 2012 Improvement Project drawings included plans for this work, but it was not ultimately included in the contract due to insufficient funding.

MKN reviewed the influent pump station improvements design (2012) with consideration of existing and future anticipated flows (**Table 8-13**). In a multi-pump station, it is recommended that at least one pump is standby at peak hour flow, to provide some redundancy. The 2012 Improvement Project drawings show a capacity of 2,350 gpm with two pumps running at full speed and 3,200 gpm with all three pumps running (full speed).

Table 8-13: Evaluation of Influent Pump Station Design for Estimated Existing and Future Conditions

Flow Condition	Flow Rate (gpm)	2012 Design Capacity	Recommendations
Existing Estimated PHF	1,882	2 pumps at 100% speed: Q = 2350 MGD (1 standby)	Rehabilitate existing facilities per influent pump station improvements from 2012 design
Future Estimated PHF	2,847	3 pumps at 100% speed: Q = 3200 gpm (No standby)	Install 4th pump before PHF > 2350 gpm (3.38 MGD)

The existing PHF is estimated to be 2.71 MGD, or 1,882 gpm. It appears that the design will provide sufficient pumping capacity for existing flow conditions, and allow for one pump to be on standby during PHF. Variable frequency drives (VFDs) allow for turndown during lower flow conditions.

Future PHF is estimated to be 4.1 MGD, or 2,847 gpm, which would require all three pumps running. To maintain the recommended redundancy (at least one redundant pump), a fourth pump with discharge piping, valves and appurtenances is recommended to be installed before PHF reaches 2,350 gpm (3.38 MGD). Based on the peaking factor estimated in this report, this is equivalent to an average daily flow of 0.85 MGD, approximately 25% greater than existing (2013) flows. Since rehabilitation of the pump station is recommended as a short-term project and the rate of growth is unpredictable, the City may consider installing the supporting equipment and materials for the fourth pump (valves, discharge piping, and guide rails), so that only the VFD and pump will need to be purchased, installed and wired

in the future. As flows increase beyond the 2012 Design PHF (2.88 MGD), pump set points and wet well operating levels should be evaluated and adjusted as needed to optimize pump cycling and channel water levels.

8.9.5 Aeration Basin

The design criteria for a Parkson Biolac® aeration basin are relatively consistent with typical extended aeration process criteria and based mainly on the influent BOD_5 loading, the return activated sludge (RAS) rate, and mixed liquor suspended solids (MLSS) concentrations.

One way to evaluate the impact of BOD loading on the treatment system is by reviewing the loading relative to the active aeration basin volume. Typical extended aeration systems are designed for a volumetric BOD_5 loading between 5 and 15 pounds per day per 1,000 cubic feet (ppd/1000 CF) (Tchobanoglous, 2003). Parkson reported the typical design range is 8 – 12 ppd/1,000 CF, with a minimum of 5 ppd/1,000 CF during startup.

Another design metric is the food-to-microorganism ratio (F:M), which measures the BOD_5 loading relative to the MLSS concentration.

MKN reviewed these design criteria under estimated existing and future conditions. A comparison to the 2012 design values and the typical design ranges for extended aeration systems are summarized in the table below. The RAS rate was assumed to be 150% of influent flow. Existing MLSS concentration was assumed to be 2,500 mg/L, and future MLSS was assumed to be 3,000 mg/L. These operational parameters have an effect on the calculated F:M, but not the volumetric BOD_5 loading. Given these assumptions, the evaluation indicates the F:M is within the typical design range for extended aeration systems under estimated existing and future conditions. The volumetric BOD_5 loading is estimated to be approximately 11.2 ppd/1,000 CF under existing maximum month conditions, within the typical range of 5 – 15 ppd/1000 CF. Under estimated future conditions, however, the volumetric loading is estimated to be 17 ppd/1,000 CF, greater than the typical design maximum value.

Table 8-14: Evaluation of Aeration Basin Design Criteria under Estimated Existing and Future Conditions

	2012 Design Value	Estimated Existing Value	Estimated Future Value	Typical Range for Extended Aeration
ADF (MGD)	0.96	0.68	1.03	
MMF (MGD)	0.96	0.77	1.17	
Max Month Influent BOD_5 Loading (ppd)	2,402	2,374	3,596	
MLSS Concentration (mg/L)	3,189	2,500*	3,000*	2,000 – 5,000
RAS Rate (% of influent Q)	1.5	1.5*	1.5*	0.5 – 1.5
Basin Volume (MG)	1.58	1.58	1.58	
Volumetric BOD_5 Loading (ppd/1,000 CF)	11.2	11.2	17.0	5 - 15
F:M (lb BOD/lb MLSS)	0.04	0.07	0.06	0.03 – 0.1

Notes:
1. 2012 Design Values based on the City of Guadalupe Wastewater Treatment Plant Improvement Project As Built Drawings, Dudek, 11/14/2012.
2. Typical Range for Extended Aeration per Wastewater Engineering Treatment and Reuse 4th Edition (Tchobanoglous, 2003).
* Value assumed for calculations.

Given that the volumetric BOD loading under future conditions is greater than the typical design maximum, a second aeration basin is recommended to meet future conditions. The 2010 Concept Design Report (TM1, Dudek, May 2010) proposed a second basin of similar volume in the unused pond to the south of the existing aeration basin. A basin of the same volume will allow some operational flexibility if one pond needs to be taken offline temporarily. MKN reviewed the loadings and F:M for future conditions assuming two 1.58 MG aeration basins (**Table 8-15**). Ideally, the second basin should be operational when the maximum month volumetric BOD loadings reach 12 to 15 ppd/1,000 CF. Using the 90th percentile BOD concentration for 2012 – 2013 (value which 90% of the monthly concentrations were

below) of 410 mg/L, the corresponding ADFs were calculated to be between 0.74 and 0.93 MGD[2]. At these flow rates, the loading with two basins will be on the low end of the typical design range, approximately 6 – 7.5 ppd/1000 CF, and increase to approximately 8.5 ppd/1,000 CF at the estimated future ADF of 1.03 MGD. Accurate influent BOD monitoring will be important for planning the improvements and managing operation of the WWTP.

Table 8-15: Evaluation of Two Aeration Basins at Future Estimated Conditions

	Estimated Future Value with 2 basins
ADF (MGD)	1.03
MMF (MGD)	1.17
Max Month Influent BOD_5 Loading (ppd)	3596
MLSS Concentration (mg/L)	3000
RAS Rate (% of influent Q)	1.5
Basin Volume (MG)	3.16
Volumetric BOD_5 Loading (ppd/1,000 CF)	8.5
F:M (lb BOD/lb MLSS)	0.06

The second aeration basin will require similar piping and aeration equipment (air piping, valves, air hoses, diffusers, and blowers) as the existing aeration basin. Assuming a similar size, it appears that three additional blowers will fit under the steel shelter adjacent to the existing blowers. Two secondary clarifiers would be installed at the end of the aeration basin, consistent with the existing design. A summary of the design capacity assessment for the secondary clarifiers is provided in the next section.

8.9.6 Secondary Clarifiers

Secondary clarifiers allow for settling to reduce suspended solids and turbidity in the treated effluent. The design is typically based on surface overflow rate (SOR) and solids loading rate (SLR). The SOR is calculated by dividing the influent flow rate by the operational surface area of the clarifier (at the water level) and is measured in gallons per day per square foot (gpd/SF). The SLR reflects the areal solids loading to the clarifier based on MLSS concentrations in the aeration basin and can be measured in pounds per square foot per hour (lb/SF-hr).

MKN reviewed these design criteria under estimated existing and future conditions. A comparison to the 2012 design values and the typical design ranges for extended aeration systems are summarized in the table below. The RAS rate was assumed to be 150% of influent flow. Existing MLSS concentration was assumed to be 2,500 mg/L, and future MLSS was assumed to be 3,000 mg/L. These operational parameters have an effect on the calculated SLR, but not the SOR. Given these assumptions, the existing two secondary clarifiers appear to have sufficient capacity for existing and estimated future conditions, though the SOR and SLR will be on the high side of the typical range with only two clarifiers online in the future. However, since an additional aeration basin is recommended for future conditions (see previous section), two additional clarifiers are recommended to serve the second aeration basin. The SOR and SLR were calculated assuming four clarifiers online (two clarifiers per basin), as shown in the table below. In this case, the SLR is estimated to be within the typical range, but the calculated SOR is just below the typical minimum value. If a second aeration basin (with 2 clarifiers) is brought online, the clarifiers may perform better with a total of two in service (one per basin), particularly during at startup conditions when flows and loadings may be lower. Assuming at startup conditions for the second aeration basin and two new clarifiers are ADF at approximately 0.8 MGD, MLSS at 3000 mg/L and RAS flow rate 150% of influent flow rate, the SOR for two clarifiers online would be approximately 300 gpd/SF and the SLR would be approximately 0.8 lb/SF-hr.

[2] The planned DJ Farms Phase 1 development (400 homes) is expected to add approximately 0.13 MGD of wastewater to the system. The existing flow rates plus DJ Farms Phase 1 flow rates will equal an ADF of approximately 0.81 MGD.

Table 8-16: Evaluation of Secondary Clarifier Design Criteria under Estimated Existing and Future Conditions					
	2012 Design Value	**Estimated Existing Value (2 clarifiers)**	**Estimated Future Value (4 clarifiers)**	**Estimated Future Value (2 clarifiers)**	**Typical Range for Extended Aeration**
ADF (MGD)	0.96	0.68	1.03	1.03	
Clarifier Length at water level (Ft)	24	24	24	24	
Clarifier Width (Ft)	55	55	55	55	
No. of clarifiers online	2	2	4	2	
MLSS Concentration (mg/L)	3,189	2,500*	3,000*	3,000*	
RAS Rate (% of influent Q)	1.5	1.5*	1.5*	1.5*	
Surface Overflow Rate, Average (gpd/SF)	364	257	195	390	200 - 400
Solids Loading Rate, Average (lb/SF-hr)	1.0	0.56	0.51	1.02	0.2 – 1.0
Notes: 1. 2012 Design Values based on the City of Guadalupe Wastewater Treatment Plant Improvement Project As Built Drawings, Dudek, 11/14/2012. 2. Typical Range for Extended Aeration per Wastewater Engineering Treatment and Reuse 4th Edition (Tchobanoglous, 2003). * Value assumed for calculations.					

8.9.7 Sludge Dewatering System

The sludge dewatering system consists of a screw press with polymer feed system and a waste sludge feed pump. The capacity of the existing system was evaluated for estimated existing and future conditions. The following table summarizes the assumptions used.

Table 8-17: Sludge Dewatering System Operational Assumptions		
	Existing	Future
MMF (MGD)	0.77	1.17
Influent BOD_5 (mg/L) (2-yr average, 2012-2013)	293	293
Effluent BOD_5 (mg/L)	15	15
% Total Solids from Secondary Clarifier	0.5	0.5
Sludge Yield (lb Sludge/lb BOD removed)	0.75	0.75
WAS concentration (mg/L)	6400	6400
Notes: WAS concentration based on the City of Guadalupe Wastewater Treatment Plant Improvement Project As Built Drawings, Dudek, 11/14/2012.		

The 2012 Improvement Project As-Built Drawings (Dudek, 11/14/2012) show a sludge feed rate of 44 gpm for the sludge feed pump and a design dry solids loading rate of 141 lb/hr for the existing screw press. MKN estimated the existing and future dry solids rate to review the capacity of the dewatering system using the assumptions in the table above. The estimated dry solids loading rate for existing conditions is less than the design value, indicating sufficient capacity for existing conditions. According to the manufacturer, the existing screw press has a guaranteed capacity of 150 pounds of dry solids per hour. If the daily run times are increased to 14 hours, it appears the existing dewatering system has capacity for future conditions.

Table 8-18: Evaluation of Sludge Dewatering System			
	2012 Design Values	Existing Estimated Values	Future Estimated Values
MMF (MGD)	0.96	0.77	1.17
WAS Lbs Dry Solids (ppd)	1,669	1,339	2,035
WAS Flow Rate (MGD)	0.031	0.025	0.038
WAS Flow Rate (MG/wk)	0.219	0.176	0.267
Sludge Feed Rate (gpm)	44	44	44
Duty Cycle (hr/wk)	83	67	101
Daily Run Time (hr)	12	12	14
Dry solids loading rate (lb/hr)	141	112	145

8.9.8 Sludge Drying Beds

The sludge drying beds are currently used when the existing screw press is unavailable due to maintenance. Assuming the screw press is adequately maintained and operating properly, the sludge drying beds may be considered a redundancy. The sludge drying beds have a total surface area of approximately 9,600 SF. Assuming a maximum fill depth of 1 FT, the capacity of the sludge drying beds is approximately 9,600 CF. Based on the operational assumptions listed in **Tables 8-17** and **8-18**, the drying bed capacity is limited to just over two days of WAS at existing conditions and approximately 1.5 days at future conditions.

Table 8-19: Evaluation of Sludge Drying Beds				
Estimated Existing Drying Bed Capacity	Estimated Existing WAS	Holding Time at Existing Conditions	Estimated Future WAS	Holding Time at Future Conditions
9,600 CF	4,300 CF/day	2.2 days	6,500 CF/day	1.5 days

8.9.9 Effluent Disposal and Reuse Systems

As described in previous sections, the treated effluent disposal/reuse system is in need of repairs and rehabilitation to ensure reliable and effective operation. With only one irrigation pump currently in operation, there is no redundancy in the effluent system, putting the City at risk of an overflow if the pump fails. An improvements design based on the previous assessments and future estimated flows is recommended. An interim installation of a second irrigation pump sized to provide 100% redundancy is also recommended. Additionally, an all-weather surface roadway to the irrigation pump station is recommended to maintain access at all times.

Influent BOD and TSS concentrations are currently measured once per month. It is recommended that the City consider reviewing sampling procedures to help ensure accurate and consistent sampling and analysis, increase influent sampling frequency to weekly, and monitor the influent BOD loading.

SECTION 9 RECOMMENDED IMPROVEMENTS & OPINION OF PROBABLE COSTS

9.1 Maintenance and Operation

The following section identifies maintenance and operations tasks recommended to extend the useful life of the existing wastewater collection, treatment, and disposal facilities, and to more effectively manage future facilities.

9.1.1 Staffing

The City currently has two full time employees overseeing the City's wastewater collection system and treatment plant, consisting of one WWTP Supervisor and one Collection System Operator. The City is currently understaffed to properly operate, maintain, and perform preventative maintenance on the wastewater collection system and treatment systems. It is recommended that the City budget for an additional full-time staff member to assist with daily operations and preventative maintenance of the system.

9.1.2 Collection System

Since pipeline slopes for the majority of the collection system are inadequate and in many instances will not provide self-cleansing velocities during peak hour flow conditions, the City will continue to face issues associated with debris buildup within the collection system. At the time of this report it is our understanding that the City of Santa Maria is providing services to the City for cleaning and videoing the collection system. It is recommended that the City continue to clean, video, and monitor the collection system pipelines on an annual basis, bi-annual basis, and/or as required by the Regional Water Quality Control Board for the City Sewer System Management Plan (SSMP) compliance.

9.1.3 Lift Stations

As part of this master plan it is recommended that the Pioneer and Highway 1 Lift Station be replaced since both facilities are at the end of their useful life. The Pioneer force main is recommended for relocation or replacement, and relocation of the termination point of the Highway 1 Lift Station force main is recommended. With respect to the Gularte Lift Station, it is recommended that the City assess the condition of the lift station facility including the condition of the wet well, pumps, valving, piping, and force main, and maintain, replace or rehabilitate deficient components as necessary to keep the facility in good working order.

9.1.4 Wastewater Treatment Plant

The 2012 WWTP Improvements included conversion of the biological treatment system from the Advanced Integrated Pond System (AIPS) to an extended aeration system. The WWTP staff have been working to optimize operations of the system, and the monitoring reports indicate that effluent quality has improved considerably. During a site visit, operations staff noted a goal MLSS concentration that is higher than the plant design value. Higher MLSS concentrations will have greater aeration requirements. Aeration is typically the largest power requirement for a WWTP. The City might consider performing an Efficiency Study to review the biological treatment system design and determine optimal aeration and operational set points (MLSS concentration, return activated sludge (RAS) flow rate, waste activated sludge (WAS) flow and duty cycles, etc.) to maintain adequate effluent quality and minimize recurring costs.

The Irrigation Pump Station reportedly has only one functional irrigation pump. It is recommended that the City install a second pump of the same size to provide 100% redundancy and reduce the risk of overflow.

9.1.5 Asset Management Strategy

In conjunction with the recommended wastewater system staffing and to more efficiently plan, budget, manage and complete system-wide maintenance and repair tasks, it is recommended that the City implement an Asset Management Strategy. An Asset Management Strategy consists of integrating a Computerized Maintenance Management System (CMMS), asset inventory and condition/capacity assessment and Geographic Information Systems (GIS). The City has completed a preliminary asset inventory, capacity assessment, and GIS development as part of this Sewer Master Plan

update. Some common asset management software programs that the City may consider evaluating include Cityworks, Cartegraph, Lucity, Accela and Infro/Hanson.

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

MKN recommends that the City update and maintain their GIS wastewater collection database, atlas, and hydraulic model on a semi-annual basis. The updates should include new piping, lift stations, manholes, pumps, flow data, replacements, etc. The wastewater GIS can be expanded to include integration with asset management and automated work-order systems. For most asset management implementations, an agency's GIS database is the central repository for asset information. Maintaining the master plan hydraulic model will allow the City to model new developments or system changes outside the scope of the 2014 Sewer Master Plan.

9.2 Capital Improvements Summary

The recommended capital improvements were developed to meet the City's existing and future wastewater needs based on assumptions and discussions in this report. **Tables 9-3, 9-4,** and **9-5** provide opinion of probable construction costs for improvement projects necessary to meet both existing and future demands. **Figures 9-1** and **9-2** identify the locations of the recommended capital improvements for the wastewater collection system, treatment plant, and disposal system.

9.3 Gravity Collection System

The City's existing 12-inch trunk sewer main that runs from Sixth Street to Mahoney Lane is undersized and conveys 85% of the City's wastewater flow, which includes the Highway 1 Lift Station, Pioneer Lift Station, Gularte Lift Station, Apio development, and the Treasure Park area. MKN completed several hydraulic model simulations to analyze the impacts from the following alternatives:

- ❒ Conveying all of the existing flow through the existing 12-inch trunk sewer
- ❒ Diverting Apio's existing/future flows to the DJ Farms Trunk Sewer
- ❒ Diverting Apio's existing/future flows, the Pioneer Lift Station flows, and the Highway 1 Lift Station flows to the DJ Farms Trunk Sewer

Table 9-3 identifies the required collection system CIPs assuming existing wastewater flows, and assuming Apio and the Highway 1 lift station are configured "as-is" (e.g Apio sewer line and Highway 1 Lift Station force mains are not re-directed to DJ Farms Trunk sewer). **Table 9-4** identifies the required collection system CIPs if Apio and Highway 1 Lift Station are redirected to the DJ Farms Trunk Sewer. The planning-level cost estimates suggest that the project costs are comparable for both alternatives, but costs associated with acquiring a longitudinal pipeline easement in the Caltrans right-of-way are unknown, and are not included in the total project cost for the alternative CIP shown in Table 9-4. Construction and easement acquisition challenges for the alternative CIP will be significant. If this alternative is considered, the City should carefully explore the feasibility and costs associated with of acquisition of easements from CalTrans or adjacent property owners, and should consider construction challenges as well as alternative alignments. Additionally, although diverting flow to the DJ Farms trunk sewer will increase available capacity in the 12-inch trunk sewer between 6th Street and Mahoney Lane (thereby significantly reducing the cost of EWWCIP-5), it is anticipated that overall operation and condition of the 12-inch pipeline would necessitate replacement of a significant amount of the 12-inch pipe at some point in the future.

If the CIPs shown in **Table 9-3** are implemented to correct existing collection system deficiencies, no additional CIPs will be necessary to address future flows.

9.4 Lift Stations

It is recommended to replace the Pioneer Street Lift Station. The Pioneer Lift Station is past its useful life, is a confined space safety hazard, the pumps are oversized for existing ADF & PHFs conditions, and the force main is not located within City easement or right-of-way. It is recommended the City design a new lift station meet existing and future flow

conditions as identified in this Master Plan. It is also recommended to reroute the existing force main along Eighth Street to Highway 1 so that the force main is accessible in the City's right-of-way.

It is recommended to replace the Highway 1 Lift Station. The Highway 1 Lift Station is past its useful life, is a confined space safety hazard, is undersized to meet existing and future PHF conditions, and the configuration of the force main discharge point causes surcharging in the TrusPro pipeline. It is recommended the City design a new lift station to meet existing and future flow conditions as identified in this Master Plan. It is also recommended to reroute the existing force main along Highway 1 to a potential location on Fifth Street.

It is recommended the City complete a physical evaluation and perform required maintenance of the Gularte Lift Station. The lift station has sufficient pumping capacity and wet well volume to convey existing and future flows, however lift station components are in need of maintenance and/or replacement.

9.5 Wastewater Treatment Plant and Effluent Disposal Facilities

The recommended improvements to the wastewater treatment and effluent disposal/reuse facilities fall into two categories. The recommended improvements to meet existing system deficiencies (Phase 1) were carried over from the Technical Memorandum 2 – Basis of Design (Dudek, Draft August 2010) after an evaluation of the facilities. The 2010 Basis of Design Report also included a recommendation to rehabilitate the grit removal system. The grit removal system is not considered critical to meeting the treatment requirements, but may be important for operations and can be a more economical way to collect and dispose of solids. For these reasons, the grit removal system improvements project is proposed for Phase 2. The Phase 2 improvements are recommended to address the potential future deficiencies, as identified in Section 8.

Phase 1 – Recommended Improvements to Meet Existing Requirements

- Influent Pump Station:
  - Remove and replace three existing influent pumps, mounting components and guide rails
  - Install controls and alarms
  - Replace two sets of existing 8-inch discharge piping and check valves (one was recently replaced)
  - Replace one VFD (other two were installed in 2008)
  - Replace existing VFD enclosure with dust control and air conditioning with room for future fourth VFD
- Effluent Reuse System Improvements
  - Install 2,200 LF of welded HDPE or PVC pipe in place of unprotected effluent ditch
  - Rehabilitate effluent pond levees and increase height in areas subjected to flooding. Repair eroded roadway along Pond C.
  - Replace equalization pipe and gate connecting Ponds B and C, and replace sluice gate between Ponds A and B.
- Irrigation Pump Station Improvements
  - Replace irrigation pumps (3) and controls (including VFDs, sensors, alarms) to match requirements for new spray irrigation system
  - Install new electrical/control building with dust control and ventilation
  - Install new effluent filters
  - Install fencing around pump station site to protect it from roaming cattle
  - Install new alarm system with telemetry
  - Install all weather access roadway to irrigation pump station (approximately 4,200 LF)
- Spray Irrigation System Improvements
  - Install 12 underground laterals off the existing force main with 30 to 40 sprinklers and steel bollards around each sprinkler head to protect them from grazing cattle.

Phase 2 – Recommended Improvements to Meet Future Requirements

- Influent Pump Station:
  - Add fourth pump and appurtenances, discharge piping and valves, and VFD

- Grit Removal System Improvements
  - Remove and replace existing grit removal equipment, including grit pump, grit classifier, piping and valves. Convert grit pumping system to top-mounted pumping configuration.
- Aeration Basin and Secondary Clarifiers
  - Install second Biolac® Aeration Basin with two integral clarifiers

9.6 Typical Facility Lifecycle

Table 9-2 presents a general estimate of the life that can be expected for wastewater system facilities.

Table 9-1: Replacement Facility Expected Life	
Facility	**Expected Life**
Pipelines	60 years
Lift Stations (except pumps and electrical)	40 years
Electrical and control facilities at lift stations	20-30 years
Pumps	10-15 years

9.7 Opinion of Probable Cost

This section provides an expenditure program for capital improvements recommended through build-out. The program is derived from the recommendations of this report and the opinions of probable cost.

The program and cost opinions are based on the following assumptions:

- Except where other data are available, cost opinions are generally derived from bid prices from similar wastewater utility projects, with adjustments for inflation, size, complexity, and location. Where available, WWTP Improvement cost opinions were derived from previous design level cost opinions (Technical Memorandum 2 – Basis of Design, Dudek, Draft August 2010) and 2011 project bid results and adjusted using the Engineering News and Record Construction Cost Index (ENR CCI).
- Cost opinions are in 2014 dollars. When budgeting for future years, appropriate escalation factors should be applied.
- Cost opinions are "budget-level" and may not fully account for site-specific conditions or design decisions that will affect the actual costs.
- Engineering, project administration, and construction management are assumed 25 percent of total construction costs, with the exception of WWTP CIPs where design was completed (influent pump station and grit removal system). Since the design is complete, the remaining costs for this category were assumed to be 15 percent of total construction costs
- Construction contingency of 20 percent has been included for pipeline projects.
- Construction contingency of 30 percent has been included for lift station replacement and WWTP improvement projects.

The project and construction cost estimates are opinion of possible costs for budgeting purposes. This opinion is based on our judgment and are intended to provide budgetary estimates. Uncertain conditions such as local labor or contractor availability, wages, other work, material market fluctuations, price escalations, force majeure events and developing bidding conditions, etc. may affect the accuracy of this estimate. MKN & Associates, Inc., cannot guarantee contractor bids or actual costs will be accurately reflected by these estimates **Table 9-2** contains the unit cost for wastewater infrastructure improvements. Pipeline costs are based on work in existing streets and include excavation, installation, backfill, pavement repair, normal appurtenances, traffic control and connection of existing service to new main.

Table 9-2: Construction Cost Criteria	
Item Description	**Budgetary Cost**
4-inch or 6-inch force main	$110/LF
8-inch gravity pipeline	$220/LF
10-inch gravity pipeline	$240/LF
12-inch gravity pipeline	$260/LF
18-inch gravity pipeline	$300/LF
Engineering, project administration, and construction management	25%
Construction Contingency (Pipelines)	20%
Construction Contingency (Lift Stations/Treatment Plant Improvements)	30%

Table 9-3: Capital Improvements Recommended to Address Existing Deficiencies

Lift Stations

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
EWWCIP-1	Pioneer Lift Station Replacement	Pioneer Street at Eighth Street	250 GPM @ 70 TDH	Confined Space Safety Hazard, pumps are oversized for existing ADF & PHFs, force main not located within City easement	Replace existing lift station with submersible pump station or above-grade Smith & Loveless replacement. Reroute existing force main to Highway 1 at Eighth Street		0 to 2 Years	$454,350
EWWCIP-2	Highway 1 Lift Station Replacement	Highway 1 at Sixth Street	400 GPM @ 15 TDH	Confined space safety hazard, existing PHF exceed pump capacity in simplex operation, function of downstream gravity manhole causes wastewater backup in TrusPro pipeline	Replace existing lift station with larger pumps (500-600 gpm) in submersible pump station or above-grade Smith & Loveless replacement. Reroute force main (160 lf) to manhole at Highway 1 and Sixth Street.		0 to 2 Years	$607,880
EWWCIP-3	Gularte Lift Maintenance Project	Gularte Lane and	100 GPM @ 32 TDH	Sufficient hydraulic capacity, but wet well, pipes, and fitting show be evaluated and rehabilitate to extend useful life	Perform physical inspection/evaluation of existing lift station facility and rehabilitate facility components to extend useful life as necessary		0 to 2 Years	$20,000
							Subtotal Lift Stations	**$1,082,230**

Collection System Pipelines

Project	Project Name	Location	Existing Facility	Deficiency		Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
				ADF (d/D >0.50)	**PHF (d/D > 0.75)**				
EWWCIP-4	Eleventh Street Gravity Sewer	Highway 1 to Gularte Lane	2,300 lf of 6-inch pipe	0.58-0.80	0.85-1.00	2,300 lf of 8-inch pipe		2 to 10 Years	$829,400
EWWCIP-5	12-inch Trunk Sewer	Sixth Street to Mahoney Lane	2,900 lf of 12-inch pipe	1.00	1.00	2,900 lf of 18-inch pipe	This CIP eliminates deficiencies #3 thru #9 identified in Section 6. Would also include rerouting gravity sewer from private property into City right-of-way	0 to 2 Years	$1,261,500
EWWCIP-6	Campodonico Avenue Gravity Sewer	Fifth Street to Third Street	520 lf of 6-inch pipe	0.17	1.00	520 lf of 12-inch pipe		2 to 10 Years	$196,040
	Campodonico Avenue Gravity Sewer	Seventh Street to Sixth Street	300 lf of 6-inch pipe	1.00	1.00	300 lf of 8-inch pipe		2 to 10 Years	$95,700
EWWCIP-7	Pioneer Street Gravity Sewer	Wong Street to Maryknoll Drive	270 lf of 6-inch pipe	0.84-1.00	1.00	270 lf of 10-inch pipe	This CIP reduces deficiency #11 and eliminates #12 identified in Section 6	2 to 10 Years	$93,960
EWWCIP-8	Tognazzini Avenue Gravity Sewer	Fifth Street to mid-block Tognazzini Avenue	98 lf of 6-inch pipe	0.82-1.00	1.00	98 lf of 10-inch pipe	This CIP reduces deficiency #13 and eliminates #14 identified in Section 6	2 to 10 Years	$34,104
EWWCIP-9	Carlin Drive Gravity Sewer	Carlin Drive to Mahoney Lane	410 lf of 8-inch pipe	0.69	1.00	410 lf of 10-inch pipe	CIPs required in addition to the completion of EWWCIP-5	2 to 10 Years	$142,680
EWWCIP-10	Mahoney Lane Gravity Sewer	Carlin Drive to Pagaling Drive	310 lf of 8-inch pipe	0.67	1.00	310 lf of 10-inch pipe	CIPs required in addition to the completion of EWWCIP-5	2 to 10 Years	$107,880
EWWCIP-11	Surfbird Lane Gravity Sewer	From Blue Heron Lane to Snowy Plover Lane	265 lf of 8-inch pipe	0.62	1.00	265 lf of 12-inch pipe	CIPs required in addition to the completion of EWWCIP-5	2 to 10 Years	$99,905
EWWCIP-12	Riverview Development Gravity Sewer	Riverview Development at entrance to WWTP	125 lf of 8-inch pipe	0.48	0.79	125 lf of 10-inch pipe	CIPs required in addition to the completion of EWWCIP-5	2 to 10 Years	$43,500
								Subtotal Collection System Pipelines	**$2,904,669**

Table 9-3 (Continued): Capital Improvements Recommended to Address Existing Deficiencies

Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
EWWCIP-13	Influent Pump Station	Wastewater Treatment Plant	(3) 20-hp pumps with VFDs	Pumps are past design life, VFDs need protection, controls/alarms needed	Replace (3) pumps, mounting components and guide rails. Install controls and alarms. Replace 2 sets of discharge piping	Design completed with 2012 WWTP Improvements (Dudek)	2 to 10 Years	$30,700
EWWCIP-14	Treated Effluent Pipeline and Holding Pond Rehabilitation	Wastewater Plant treated effluent facilities	Effluent ditch, three holding ponds	Effluent ditch is unprotected. Holding pond levees and roadways have eroded and ponds are subject to flooding.	Install 2,200 LF of welded HDPE or PVC pipe in place of effluent ditch. Rehab holding pond levees and increase height to protect from flooding. Repair eroded roadways.		0 to 2 Years	$1,620,000
EWWCIP-15	Irrigation Pump Station	Wastewater Plant treated effluent facilities	Wet well with one operational irrigation pump. Alarm system not functional, VFDs and controls in cramped space with minimal protection.	Irrigation pump station is past design life, and in need of repairs and rehabilitation.	Replace irrigation pumps (3) and controls to match requirements of new spray irrigation system. Install electrical building with dust control and ventilation. Install effluent filters, fencing, and new alarm system with telemetry. Install all weather access road.		0 to 2 Years	$750,000
EWWCIP-16	Spray Irrigation System	Wastewater Plant treated effluent facilities	2 laterals with high capacity spray guns	Original system was damaged from cattle. Existing spray guns do not distribute irrigation efficiently and need to be repositioned twice a day.	Install 12 underground laterals off the existing force main with 30 to 40 sprinklers and steel bollards around each sprinkler head to protect them from grazing cattle.		2 to 10 Years	$580,000
							Subtotal Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities	**$2,980,700**
							Total	**$6,967,599**

City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 9-1:

CIPS for Existing System Deficiencies

EWWCIP-1

EWWCIP-2

EWWCIP-3

PIONEER LS

HWY 1 LS

GULARTE LS

WWTP

TWELFTH ST

PERALTA ST

OLIVERA ST

PACHECO ST

TENTH ST

NINTH ST

EIGHTH ST

ESCALANTE ST

ELEVENTH ST

LA GUARDIA LN

RUBIO

SIXTH ST

FIFTH ST

STATE HWY 1

OBISPO ST

GARRETT ST

WONG ST

LINDY DR

MARYKNOLL DR

THIRD ST

MAHONEY LN

CARLIN DR

PAGALING DR

CHAPMAN DR

SANCHEZ DR

HERNANDEZ DR

ALMAGUER ST

SECOND ST

PIONEER ST

TOGNAZZINI AV

CAMPODONICO AV

ALLEY

MILLS LN

CAMP LN

NELSON DR

JULIA DR

FOURTH ST

HOLLY ST

FIR ST

ELM ST

CEDAR ST

BIRCH ST

AMBER ST

FLOWER AV

SIMAS ST

STATE HWY 166

SNOWY PLOVER LN

BLUE HERON LN

SURFBIRD LN

PACIFIC DUNES WY

PACIFIC DUNES CI

SANTA INES ST

CAUCE CESAR E. CHAVEZ ST

SANTA BARBARA ST

PELICAN LN

IBIS CI

EGRET LN

POINT SAL DUNES WY

LA PURISMA ST

SANDPIPER LN

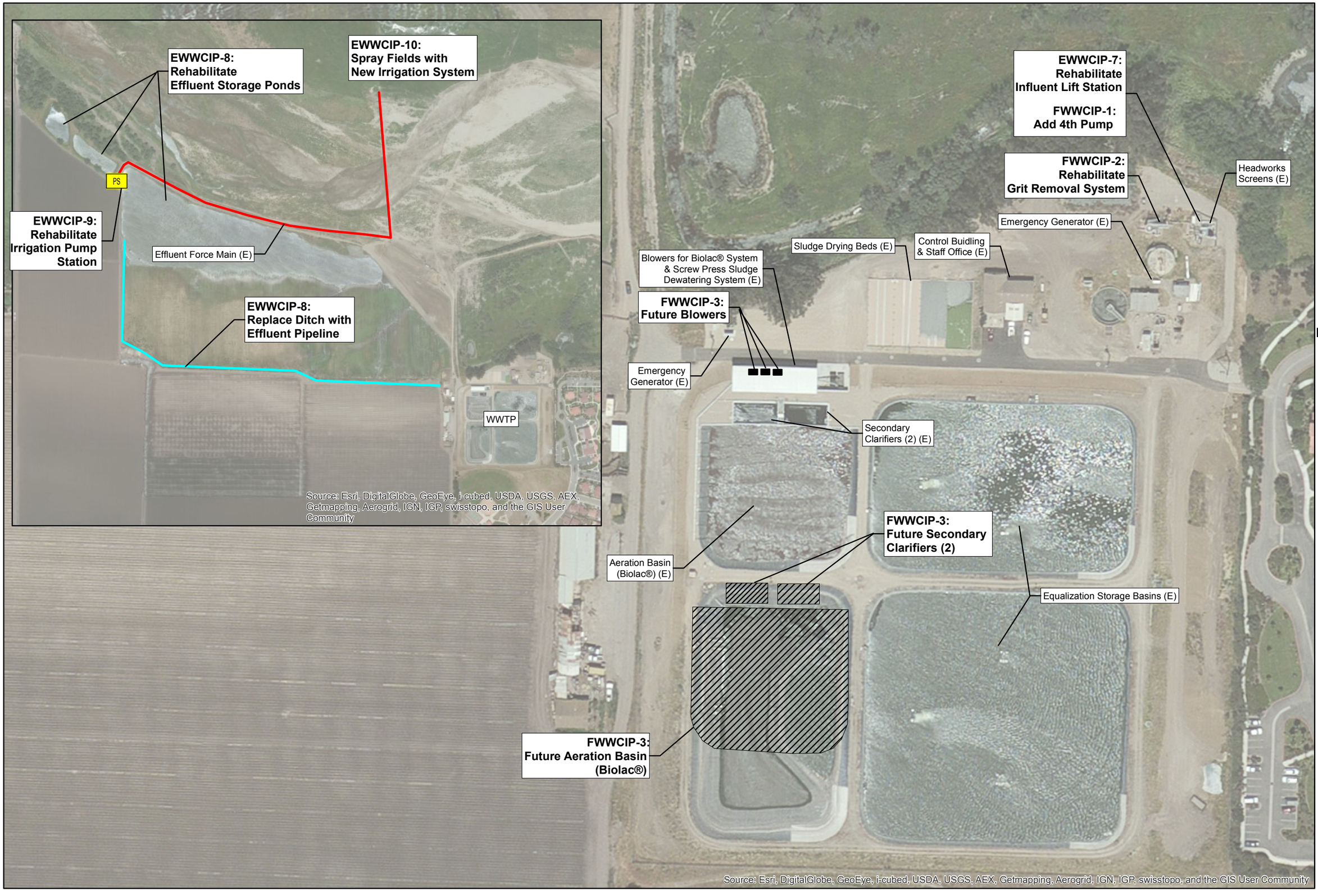
MAIN ST

Legend

- EWWCIP-4
- EWWCIP-5
- EWWCIP-6
- EWWCIP-7
- EWWCIP-8
- EWWCIP-9
- EWWCIP-10
- EWWCIP-11
- EWWCIP-12
- PS Pump Station
- Existing Collection System
- City Limits

1 inch:700 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.



City of Guadalupe Wastewater Collection & Treatment Plant Master Plan

Figure 9-2:

WWTP Facilities Recommended Improvements

1 inch:100 feet

MAP NOTES:
2012 AERIAL PHOTO PROVIDED BY USDA.
PARCEL BASEMAP PROVIDED BY COUNTY OF SANTA BARBARA GIS.

Table 9-4: Alternative Capital Improvements to Address Existing Deficiencies (Not Recommended)

Lift Stations

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
EWWCIP-1	Pioneer Lift Station Replacement	Pioneer Street at Eighth Street	250 GPM @ 70 TDH	Confined Space Safety Hazard, pumps are oversized for existing ADF & PHFs, force main not located within City easement	Replace existing lift station with submersible pump station or above-grade Smith & Loveless replacement. Reroute existing force main to Highway 1 at Eighth Street		NA	$454,350
EWWCIP-2	Highway 1 Lift Station Replacement	Highway 1 at Sixth Street	400 GPM @ 15 TDH	Confined space safety hazard, existing PHF exceed pump capacity in simplex operation, function of downstream gravity manhole causes wastewater backup in TrusPro pipeline	Replace existing lift station with larger pumps (500-600 gpm) in submersible pump station or above-grade Smith & Loveless replacement. Reroute force main (3,000 lf) to DJ Farms Trunk Sewer.	**Costs do not include easement acquisition along Highway 1 for new force main.**	NA	$1,014,000
EWWCIP-3	Gularte Lift Station Maintenance Project	Gularte Lane and	100 GPM @ 32 TDH	Sufficient hydraulic capacity, but wet well, pipes, and fitting show be evaluated and rehabilitate to extend useful life	Perform physical inspection/evaluation of existing lift station facility and rehabilitate facility components to extend useful life as necessary		NA	$20,000
							Subtotal Lift Stations	**$1,488,350**

Collection System Pipelines

Project	Project Name	Location	Existing Facility	Deficiency		Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
				ADF (d/D >0.50)	**PHF (d/D > 0.75)**				
EWWCIP-4	Eleventh Street Gravity Sewer	Highway 1 to Gularte Lane	2,300 lf of 6-inch pipe	0.58-0.80	0.85-1.00	2,300 lf of 8-inch pipe		NA	$829,400
EWWCIP-5	12-inch Trunk Sewer	Sixth Street to Fifth Street	625 lf of 12-inch pipe	NA	NA	800 lf of 12-inch pipe	Reroute existing trunk sewer pipes into City right-of-way and out of private properties. Assumes that flow from Apio, Pioneer LS, and Highway 1 LS are diverted to DJ Farms trunk sewer.	NA	$301,600
EWWCIP-6	DJ Farms Trunk Sewer	From DJ Farms to WWTP	NA	NA	NA	7,500 lf of 18-inch pipe	Assumes City would contribute 30% to construction costs.	NA	$965,700
								Subtotal Collection System Pipelines	**$2,096,700**

Table 9-4 (Continued): Alternative Capital Improvements to Address Existing Deficiencies (Not Recommended)

Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
EWWCIP-7	Influent Pump Station	`Wastewater Treatment Plant	(3) 20-hp pumps with VFDs	Pumps are past design life, VFDs need protection, controls/alarms needed	Replace (3) pumps, mounting components and guide rails. Install controls and alarms. Replace 2 sets of discharge piping	Recommended CIP consistent with existing design from 2012 Improvements.	NA	$30,700
EWWCIP-8	Treated Effluent Pipeline and Holding Pond Rehabilitation	Wastewater Plant treated effluent facilities	Effluent ditch, three holding ponds	Effluent ditch is unprotected. Holding pond levees and roadways have eroded and ponds are subject to flooding.	Install 2,200 LF of welded HDPE or PVC pipe in place of effluent ditch. Rehab holding pond levees and increase height to protect from flooding. Repair eroded roadways.		NA	$1,620,000
EWWCIP-9	Irrigation Pump Station	Wastewater Plant treated effluent facilities	Wet well with one operational irrigation pump. Alarm system not functional, VFDs and controls in cramped space with minimal protection.	Irrigation pump station is past design life, and in need of repairs and rehabilitation.	Replace irrigation pumps (3) and controls to match requirements of new spray irrigation system. Install electrical building with dust control and ventilation. Install effluent filters, fencing, and new alarm system with telemetry. Install all weather access road.		NA	$750,000
EWWCIP-10	Spray Irrigation System	Wastewater Plant treated effluent facilities	2 laterals with high capacity spray guns	Original system was damaged from cattle. Existing spray guns do not distribute irrigation efficiently and need to be repositioned twice a day.	Install 12 underground laterals off the existing force main with 30 to 40 sprinklers and steel bollards around each sprinkler head to protect them from grazing cattle.		NA	$580,000
						Subtotal Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities		**$2,980,700**
						Total*		**$6,565,750**

Table 9-5: Capital Improvements Recommended to Address Future System Deficiencies

Lift Stations

Project	Project Name	Location	Existing Facility	Deficiency		Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Collection System Pipelines

Project	Project Name	Location	Existing Facility	Deficiency		Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities

Project	Project Name	Location	Existing Facility	Deficiency	Capital Improvement Project (CIP)	Notes	Priority	Opinion of Cost ($)
FWWCIP-1	Influent Pump Station	Wastewater Treatment Plant	(3) 20-hp pumps with VFDs	4th pump is required to maintain redundancy at future flows	Install 4th pump, mounting components, guide rails, discharge piping and valves, and VFD.	Install before PHF > 2350 gpm	Phased with Future Development	$35,000
FWWCIP-2	Grit Removal System	Wastewater Treatment Plant	Abandoned grit system	With historical clogging problems, grit system was bypassed and equipment has been abandoned.	Remove and replace existing grit pump, grit classifer, piping and valves. Convert grit pumping to top-mounted pump configuration.	Design completed with 2012 WWTP Improvements (Dudek). Review hydraulics and efficiencies at future flows before implementing project.	Phased with Future Development	$424,000
FWWCIP-3	Extended Aertion Basin 2	Wastewater Treatment Plant	(1) Extended aeration basin with 2 integral clarifiers	Future flows and loadings are greater than design criteria for existing aeration basin.	Install second aeration basin (Biolac) with aeration equipment and 2 integral clarifiers, and (3) blowers. Basin and clarifiers are to be same size as existing.	Install when BOD loadings for existing basin are between 12 and 15 ppd/1000 CF. (At existing loads, this is estimated to occur between 0.74 and 0.93 MGD).	Phased with Future Development	$3,580,000
						Subtotal Wastewater Treatment Plant and Effluent Disposal/Reuse Facilities		**$4,039,000**
						Total		**$4,039,000**

APPENDIX A

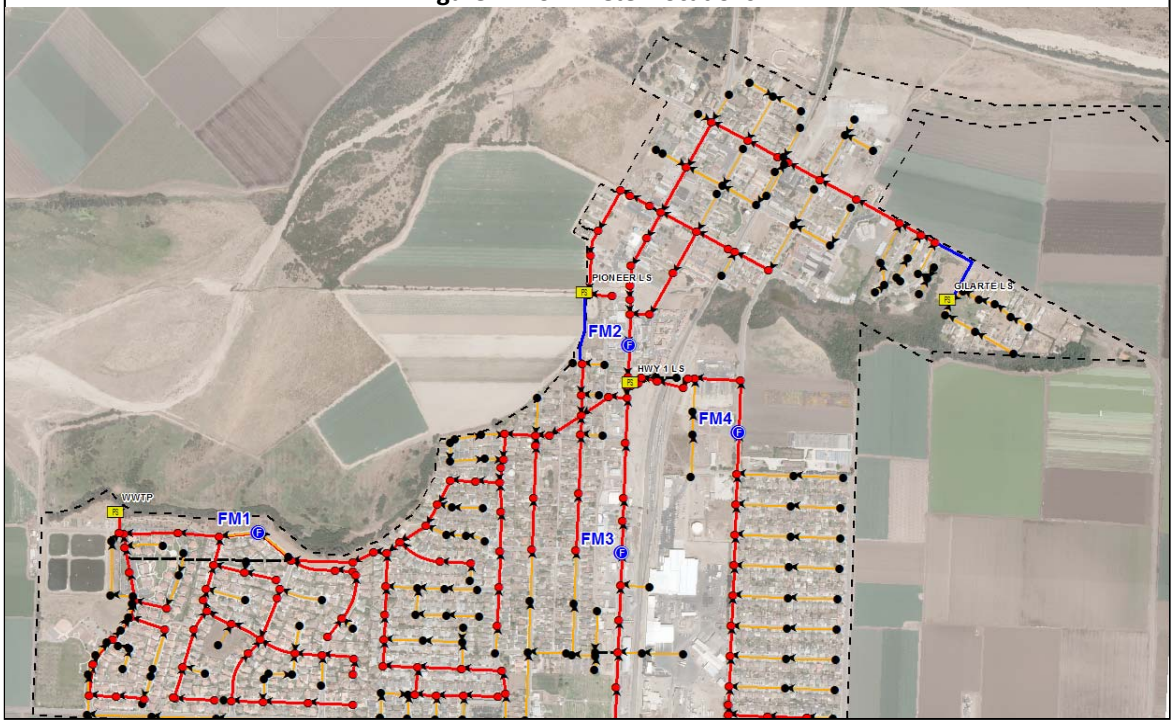
FLUID RESOURCE MANAGEMENT FLOW METER DATA

4. FLOW MONITORING STUDY

To refine the hydraulic model evaluation, the baseline wastewater flow estimates, peaking factors, and diurnal wastewater flow patterns of the City and Apio were evaluated through flow metering. Fluid Resource Management (FRM) was hired to install flow meters at strategic locations in the City's collection system. Four Greyline Instruments Stingray pipe band flow meters, as shown in **Figure 1**, were installed in key locations shown in **Figure 2**. The insertion-type flow meters consist of a circular metal band with sensors, and were installed inside the upstream pipe within the sewer manhole. The meters are installed so that the wastewater entering the manhole flows over the sensors, which reads the wastewater temperature, depth, and velocity every 5 minutes.

Figure 1: Flow Meter Installation

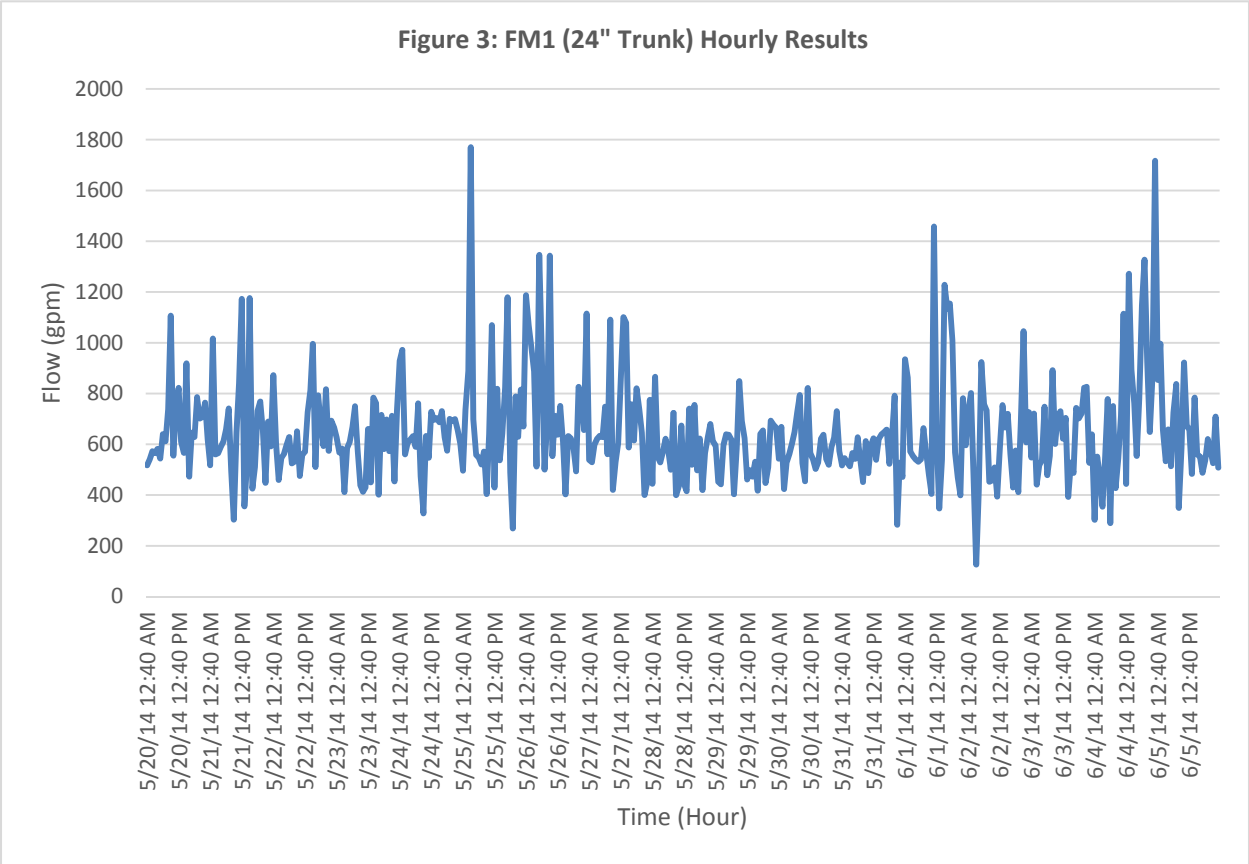
Figure 2: Flow Meter Locations



It was recommended by FRM that the flow meters remain in the collection system for a minimum duration of four weeks to minimize impacts of common data collection issues associated with clogging from rags, grease, pipe cleaning or flow meter power failures. Data was collected for approximately seven weeks from April 22, 2014 to June 6, 2014 and reviewed by MKN on a weekly basis. Two weeks of continuous flow data, near the end of the flow study, were used for the analysis because of initial data collection issues associated with equipment failures at FM3 (Apio location). No useable flow data was available from flow meter FM4 (Treasure Park area) because of continued grit buildup on the flow meter from the upstream collection system throughout the flow monitoring study period. **Table 3** summarizes the results of the flow monitoring data collection and analysis.

Table 3: Flow Monitoring Study				
Flow Meter	**FM1**	**FM2**	**FM3**	**FM4**
Street Location	On Snowy Plover Ln east of Surfbird Ln	On Highway 1 north of Sixth St and south of Olivera St	On Highway 1 600 feet north of Second St	Obispo Street north of Fourth St
System Location	East of WWTP	North of HWY 1 Lift Station	South of HWY 1 Lift Station	East of railroad sewer crossing
Pipe Diameter (inches)	24	15	12	10
Dry Weather Flow Monitoring Results - May 20, 2014 to June 5, 2014 (2 weeks)				
Average Day Flow (GPD)	933,991	128,000	341,939	No Useable Flow Data Available
Peak Day Flow (GPD)	1,130,183	197,768	473,229	
Average Day Flow (GPM)	649	89	237	
Peak Hour Flow (GPM)	1,770	418	644	
Peak Instantaneous Flow (GPM)	3,179	1,442	733	
Peaking Factor (PHF/ADF)	2.7	4.7	2.7	

Figures 3 through **5** show the hourly flow results of the flow meters during two weeks of the flow monitoring study. In general, once equipment issues were resolved the flow meters acquired representative data of the City's and Apio's average daily and peak hour flow conditions, and diurnal flow patterns.



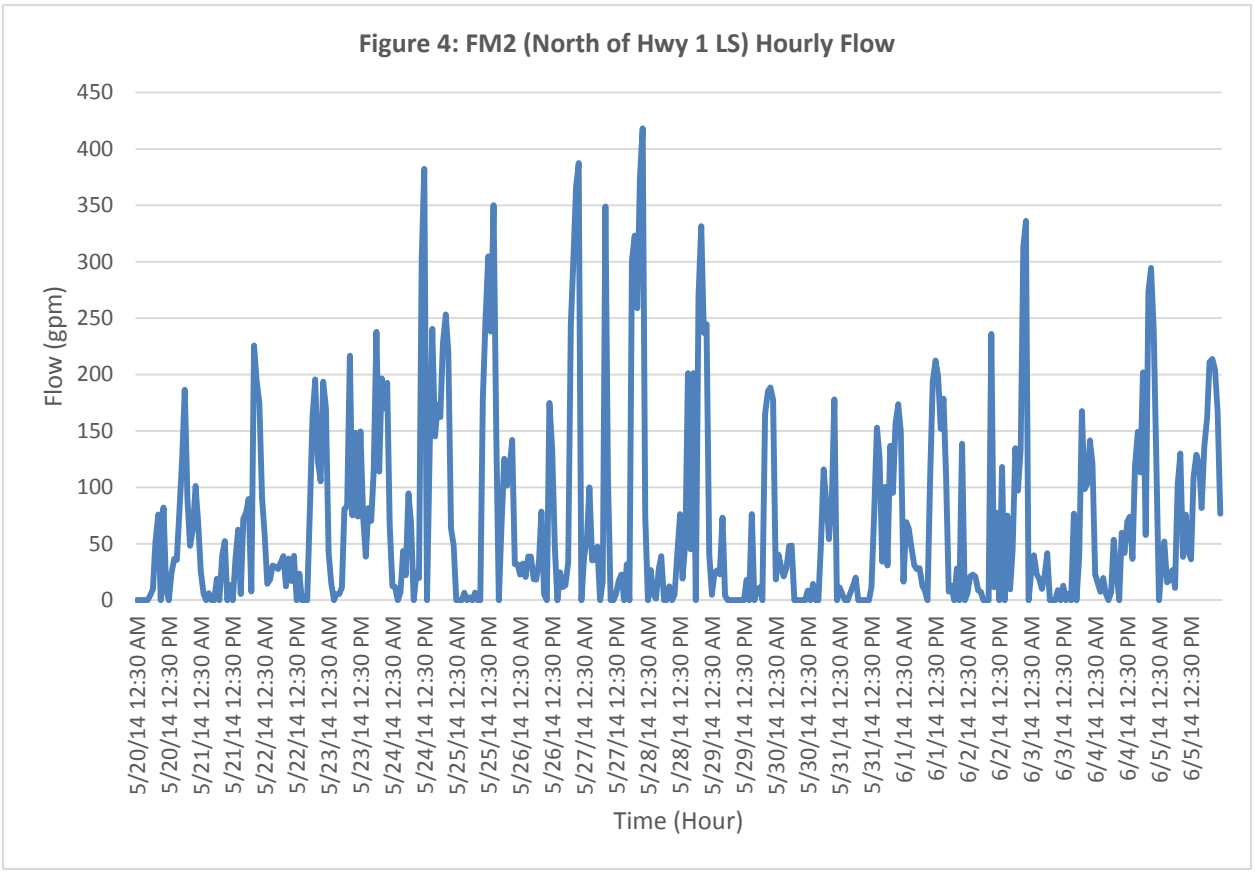


Figure 4: FM2 (North of Hwy 1 LS) Hourly Flow
Flow (gpm)
450
400
350
300
250
200
150
100
50
0
5/20/14 12:30 AM
5/20/14 12:30 PM
5/21/14 12:30 AM
5/21/14 12:30 PM
5/22/14 12:30 AM
5/22/14 12:30 PM
5/23/14 12:30 AM
5/23/14 12:30 PM
5/24/14 12:30 AM
5/24/14 12:30 PM
5/25/14 12:30 AM
5/25/14 12:30 PM
5/26/14 12:30 AM
5/26/14 12:30 PM
5/27/14 12:30 AM
5/27/14 12:30 PM
5/28/14 12:30 AM
5/28/14 12:30 PM
5/29/14 12:30 AM
5/29/14 12:30 PM
5/30/14 12:30 AM
5/30/14 12:30 PM
5/31/14 12:30 AM
5/31/14 12:30 PM
6/1/14 12:30 AM
6/1/14 12:30 PM
6/2/14 12:30 AM
6/2/14 12:30 PM
6/3/14 12:30 AM
6/3/14 12:30 PM
6/4/14 12:30 AM
6/4/14 12:30 PM
6/5/14 12:30 AM
6/5/14 12:30 PM
Time (Hour)

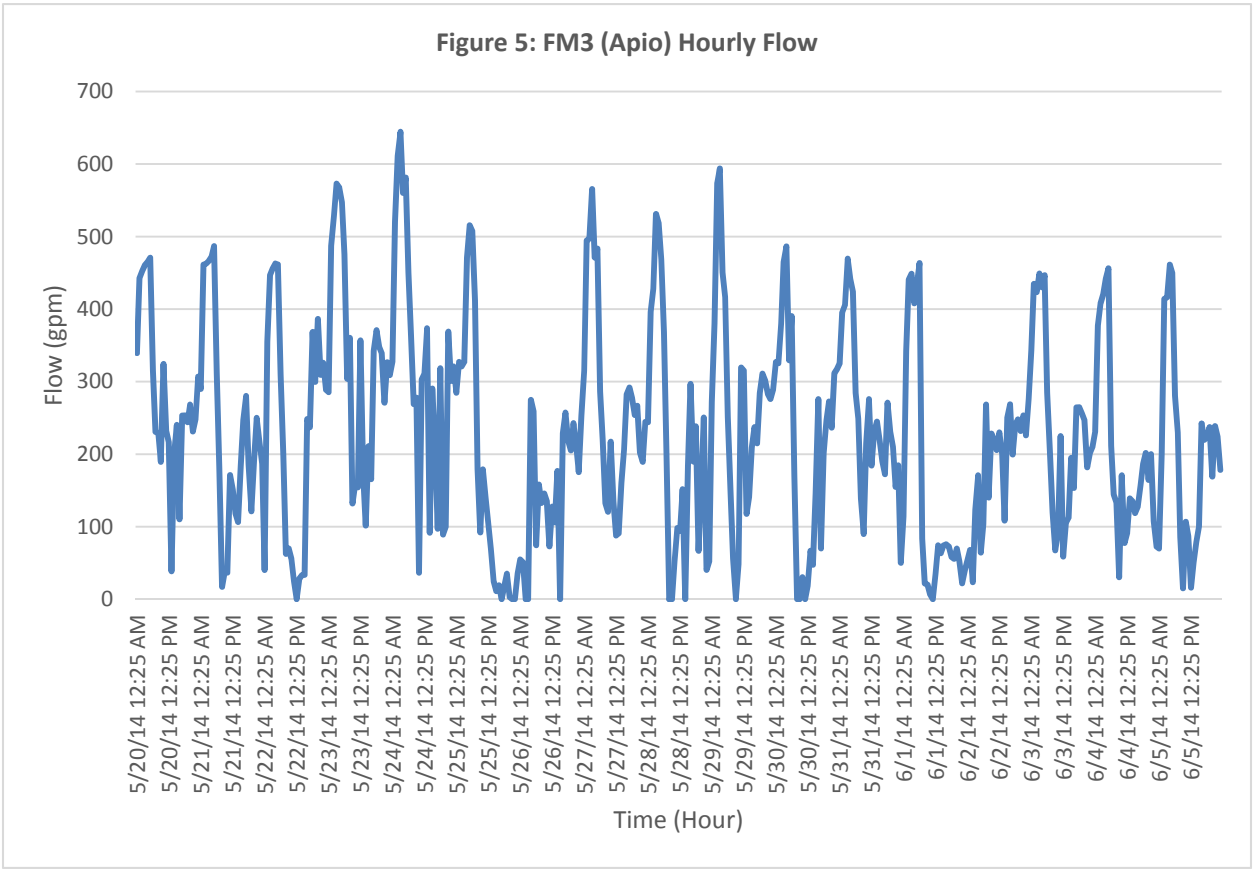


Figure 5: FM3 (Apio) Hourly Flow
Flow (gpm)
700
600
500
400
300
200
100
0
5/20/14 12:25 AM
5/20/14 12:25 PM
5/21/14 12:25 AM
5/21/14 12:25 PM
5/22/14 12:25 AM
5/22/14 12:25 PM
5/23/14 12:25 AM
5/23/14 12:25 PM
5/24/14 12:25 AM
5/24/14 12:25 PM
5/25/14 12:25 AM
5/25/14 12:25 PM
5/26/14 12:25 AM
5/26/14 12:25 PM
5/27/14 12:25 AM
5/27/14 12:25 PM
5/28/14 12:25 AM
5/28/14 12:25 PM
5/29/14 12:25 AM
5/29/14 12:25 PM
5/30/14 12:25 AM
5/30/14 12:25 PM
5/31/14 12:25 AM
5/31/14 12:25 PM
6/1/14 12:25 AM
6/1/14 12:25 PM
6/2/14 12:25 AM
6/2/14 12:25 PM
6/3/14 12:25 AM
6/3/14 12:25 PM
6/4/14 12:25 AM
6/4/14 12:25 PM
6/5/14 12:25 AM
6/5/14 12:25 PM
Time (Hour)

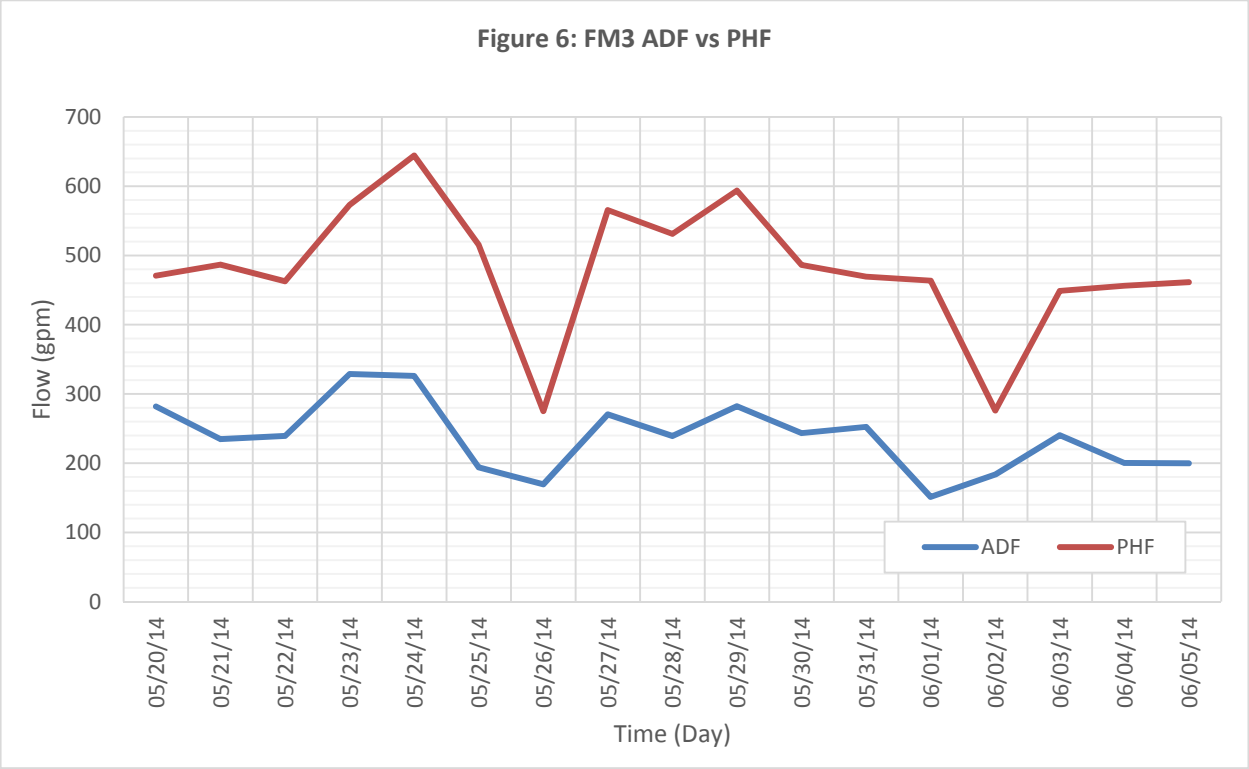
As identified by Apio, meters APIO001-APIO004, APIO008- APIO009 return 100% of used water to the collection system as wastewater. **Table 4** is a comparison between Apio's May 2014 water usage, estimated average daily wastewater flow from the May 2014 water usage based on the assumption above, and the results of the two week flow monitoring data for FM3 (Apio location).

Table 4: Apio Water and Wastewater Comparison

	API0001	API0002	API0003	API0004	API0006	API0007	API0008	API0009	GPD
May 2014 Water Usage*	531	627	193,732	48	21,644	42,322	0	132,903	391,807
Estimated Wastewater Flow**	531	627	193,732	48	-	-	0	132,903	327,841
Flow Monitoring Results FM3 (May 20, 2014 to June 5, 2014)									341,939
Flow Monitoring Results FM3 Adjusted (To remove 6,700 GPD from wastewater customers upstream and/or adjacent to the Apio facility)									335,239

*Water usage provided by the City of Guadalupe billing information for May 2014.
** Water from Apio meters 1-4 & 8-9 return 100% to the wastewater collection system based on information provided by Apio.

Since the flow results of the wastewater estimating and flow monitoring data are within an acceptable range (with 5 gpm on an average daily basis) MKN will assume an Apio Average Daily Flow (ADF) of 335,239 (233 gpm) with a Peak Hour Flow (PHF) of 644 gpm based on the peaking factor determined from the flow monitoring study. **Figures 6** through **8** provide an overview of the measured wastewater flows and diurnal flow patterns for the FM3 (Apio) flow meter. **Figure 6** illustrates Apio's average daily flow from May 5, 2014 to June 5, 2014 and peak hour flow that occurred each day. **Figure 7** illustrates Apio's diurnal flow pattern on the maximum flow day, which occurred on Friday May 23, 2014. **Figure 8** compares the diurnal flow patterns between the FM2 (representative City flow) and FM3 (Apio) flow meters.



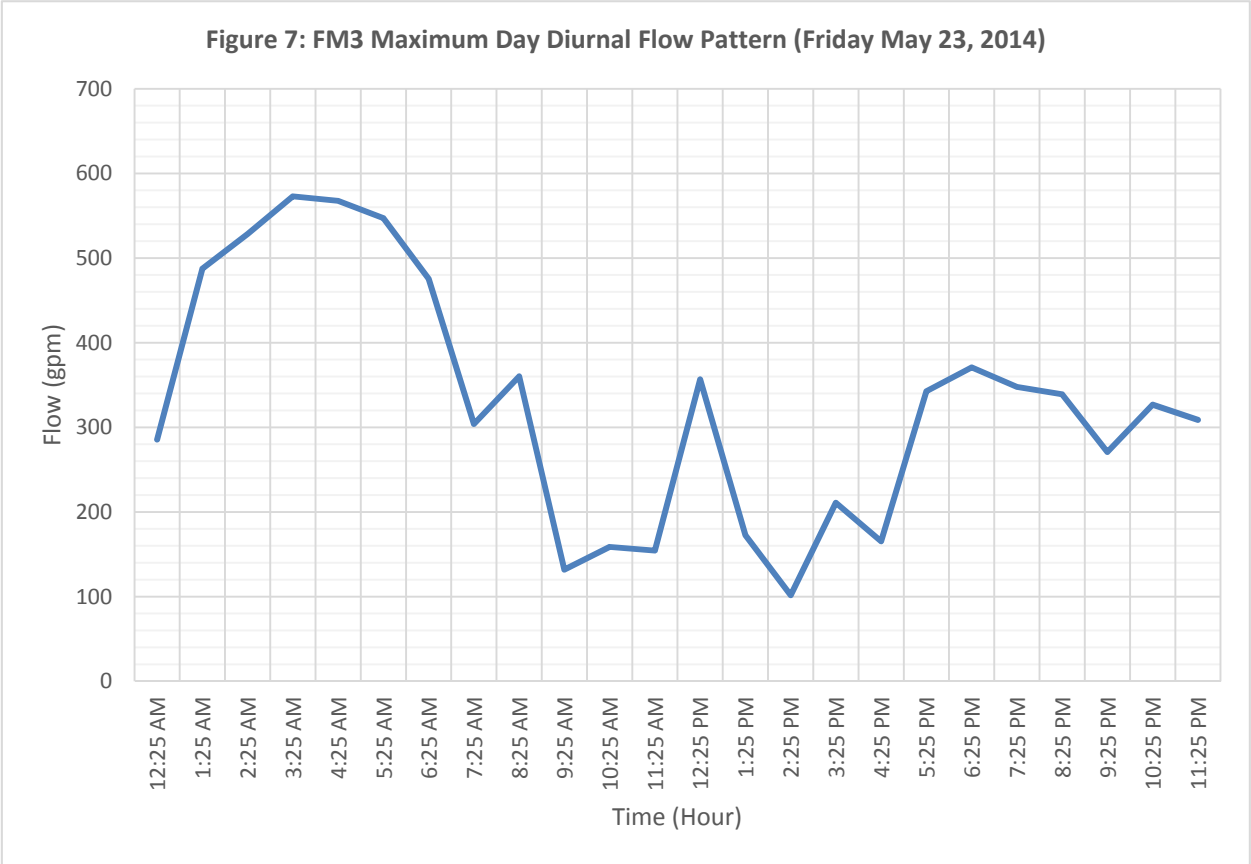


Figure 7: FM3 Maximum Day Diurnal Flow Pattern (Friday May 23, 2014)
Flow (gpm)
700
600
500
400
300
200
100
0
12:25 AM
1:25 AM
2:25 AM
3:25 AM
4:25 AM
5:25 AM
6:25 AM
7:25 AM
8:25 AM
9:25 AM
10:25 AM
11:25 AM
12:25 PM
1:25 PM
2:25 PM
3:25 PM
4:25 PM
5:25 PM
6:25 PM
7:25 PM
8:25 PM
9:25 PM
10:25 PM
11:25 PM
Time (Hour)

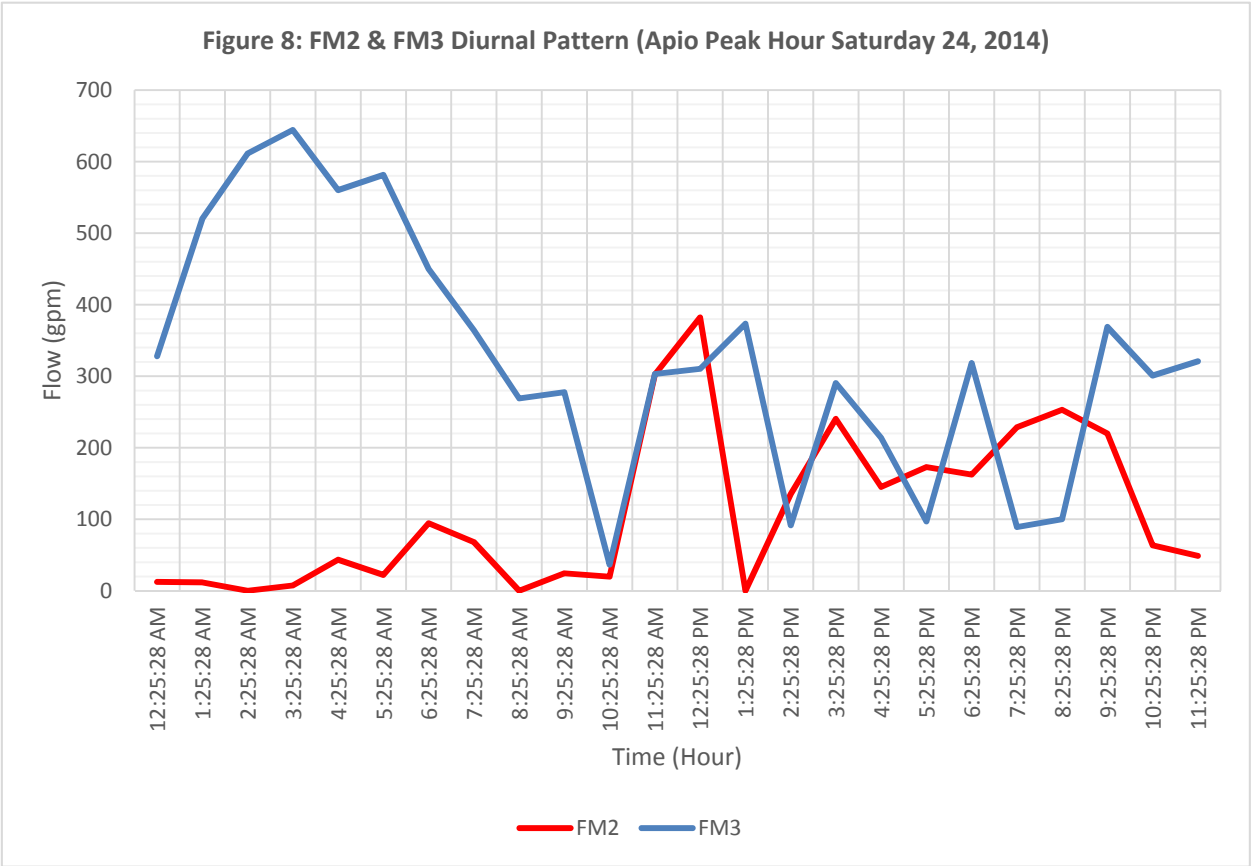


Figure 8: FM2 & FM3 Diurnal Pattern (Apio Peak Hour Saturday 24, 2014)
Flow (gpm)
700
600
500
400
300
200
100
0
12:25:28 AM
1:25:28 AM
2:25:28 AM
3:25:28 AM
4:25:28 AM
5:25:28 AM
6:25:28 AM
7:25:28 AM
8:25:28 AM
9:25:28 AM
10:25:28 AM
11:25:28 AM
12:25:28 PM
1:25:28 PM
2:25:28 PM
3:25:28 PM
4:25:28 PM
5:25:28 PM
6:25:28 PM
7:25:28 PM
8:25:28 PM
9:25:28 PM
10:25:28 PM
11:25:28 PM
Time (Hour)
FM2
FM3

APPENDIX B

MANUFACTURER PUMP CURVES AND LIFT STATION DETAILS

Smith & Loveless
DIVISION - UNION TANK CAR COMPANY

PUMP STATION ENGINEERING ORDER (PAGE 1)

LOCATION GUADALUPE, CALIFORNIA	STATION SERIAL NO. 07-4944
OWNER State Highway 05-SB-1-49	ENGINEER

GENERAL STATION DATA: Domed Head OUTLINE DRAWING NO. 81D3193

1. Station Size 7'-0" (Dia.) (~~Elliptical~~) Height 7'-3"
2. Suction Piping (MJ-C1) Size Pump 1 6" Pump 2 6" Pump 3 _____ Pump 4 _____
3. Pump Discharge Gate Valve Pump 1 6" Pump 2 6" Pump 3 _____ Pump 4 _____
4. Common Discharge Outlet (MJ-C1) Size 6" Location (Top) (~~Side~~) _____
5. Entrance Tube 36" Dia. x 12'-6" Long With (Parkway) (~~St. Manhole~~) Cover _____
6. Sump Pump Part No. 8L1 Blower Part No 7L7
7. Main Conduit Size 1 1/2" Aux Conduit None (Describe) --
8. Electrical Service System Data: 3 Phase 60 Cycle 220 Volts 4 Wire

110V Single Phase Current (~~not~~) Available _____ KVA Trans. Reqd. None V to 120VAC

Special Modifications: "DupliFlo" Control System
4" Valve in 6" Common.

PUMP & MOTOR DATA

PUMP DATA	PUMP 1	PUMP 2	PUMP 3	PUMP 4
Design Characteristics (GPM@TDH)	400 @ 15'	400 @ 15'		
Pump Model	4B2A	4B2A		
Impeller Diameter	7 5/8"	7 5/8"		
Rotation (CW) (CCW)	CW	CCW		
S&L Mech. Seal-Filter Ass'y (Size)	1 7/8"	1 7/8"		
Pump Serial Number				
MOTOR DATA				
Horsepower	3	3		
R.P.M.	1170	1170		
Phase/Cycle/Volts	3/60/220	3/60/220		
Motor Serial No. (Code Ltr.)				
Special Modifications and Related Data				

NOTE: System voltages will not normally agree with equipment voltages. For example: If rated voltage of system equipment (transformers, etc.) is 240VAC-3 phase, the motors and other 3 phase equipment operating from this system would be rated 220VAC-3 phase. It is rare exception that specially wound motors need be applied.

Smith & Loveless
DIVISION - UNION TANK CAR COMPANY

Serial No. 07-4944

PUMP STATION ENGINEERING ORDER (PAGE 2)

CONTROL PANEL DATA: TYPE NEMA I WIRING DIAGRAM NO. J07-4944D1 & 29D210
J07-4944C1

MOTOR CONTROL EQUIPMENT	PUMP 1	PUMP 2	PUMP 3	PUMP 4
(Across Line) (~~Part-Winding~~)				
Circuit Breaker – Trip Rating – Amps	20(4L79C)	20(4L79C)		
Magnetic Starter – Nema Size	0(4L12A)	0(4L12A)		
O.L. Coil No. 10177H – & Quan. 1036	3(4L54AY)	3(4L54AY)		

AUXILIARY CIRCUIT BREAKERS	LIGHTS	BLOWER DEHUMIDIFIER	SUMP PUMP	AIR COMPRESSORS & CONTROL	TRANSFORMER
Trip Rating – Amps	15	20	15	15	---

S&L BUBBLER CONTROL SYSTEM PRESSURE SWITCH SETTINGS	LOW LEVEL	HIGH LEVEL				ALARM
P.S. S&L Part No.	4L35B	4L35B				---
Cut-In (feet)	2.50	4.21				
Cut-Out (feet)	2.00	3.71				

OTHER CONTROL & AUXILIARY APPARATUS:

(The following equipment is standard equipment on all Smith & Loveless Pump Stations. It is listed here for the engineers and customers information only. Any deviations shall be listed in space provided below.)

1. Automatic Alternator
2. Air Compressors
3. S&L Air Flow Indicator
4. S&L Humidistat
5. S&L Thermostat (40°-80°)
6. Ash Tray – Trash Disposal
7. Nema 3 Wire – 1 Phase Duplex Receptacle
8. S&L Damtite Seal (Spare)
9. Built-in Dehumidifier
10. Plastic "Level-Set" Indicator Tube
11. Station Oper. Instructions & Maint. Chart
12. Magnesium Anodes (2 provided)
13. Spare Volute Gaskets
14. Spare Pump Filter Cone
15. Touch-Up Kit (Paint-Brushes)
16. Blower Timer

SPECIAL MODIFICATIONS – ADDITIONS – AUXILIARY EQUIPMENT

(1) California Breaker.

(2) California Code Station

(3) Furnish extra sensitive pressure switches.

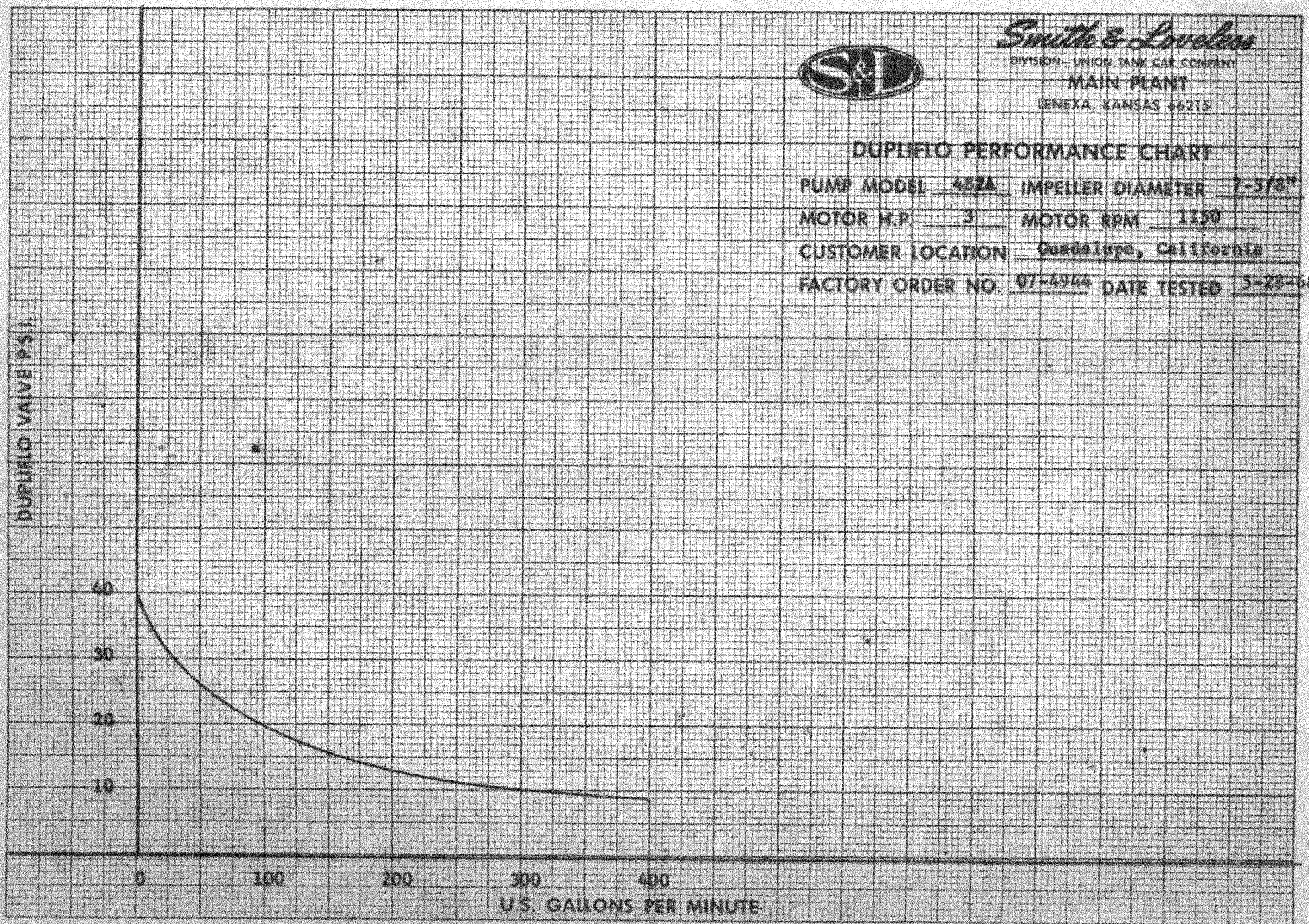
SALES ENGINEERING		Maintenance Manuals Required	COMPANION JOB SERIAL NOS
PREPARED BY	DATE		
G. F.	5/16/68	3	---
G. F. Rev.	5/31/68		

Form No. 04-6-6

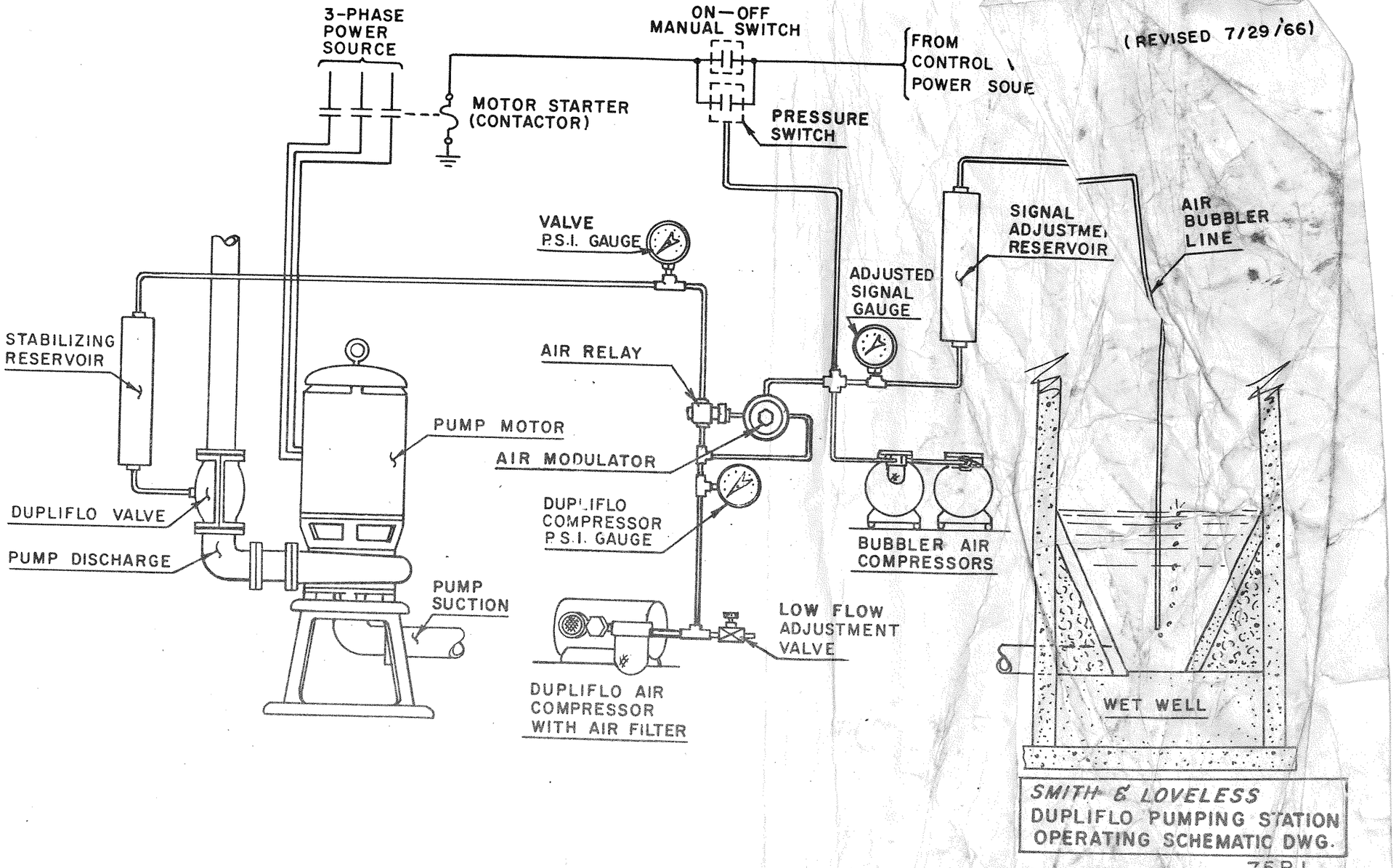
Smith & Loveless
DIVISION — UNION TANK CAR COMPANY
MAIN PLANT
LENEXA, KANSAS 66215

DUPLIFLO PERFORMANCE CHART

PUMP MODEL 4ZZA IMPELLER DIAMETER 7-5/8"
MOTOR H.P. 3 MOTOR RPM 1150
CUSTOMER LOCATION Guadalupe, California
FACTORY ORDER NO. 07-4964 DATE TESTED 5-28-68



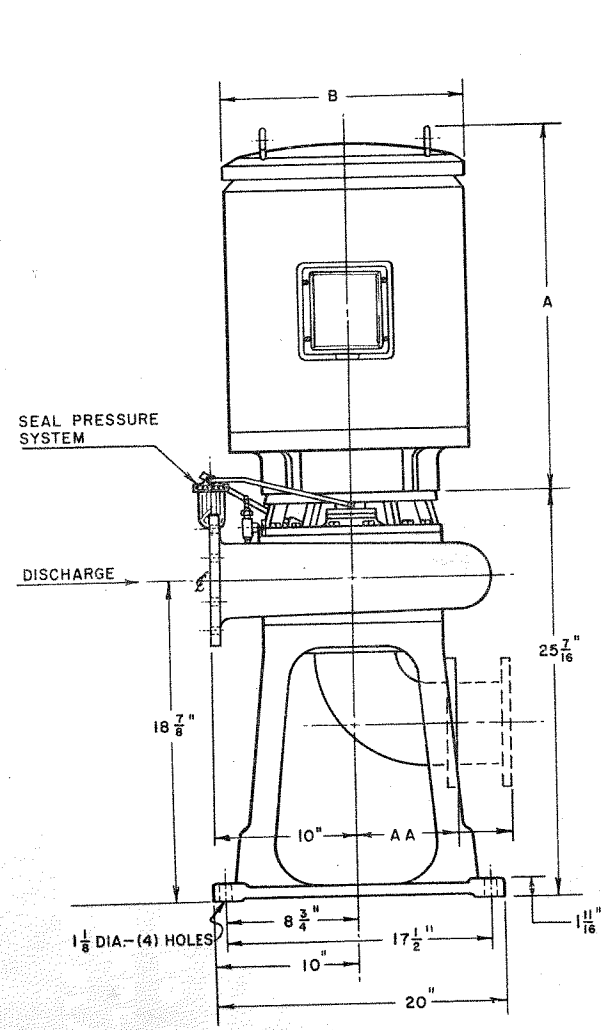
(REVISED 7/29/66)

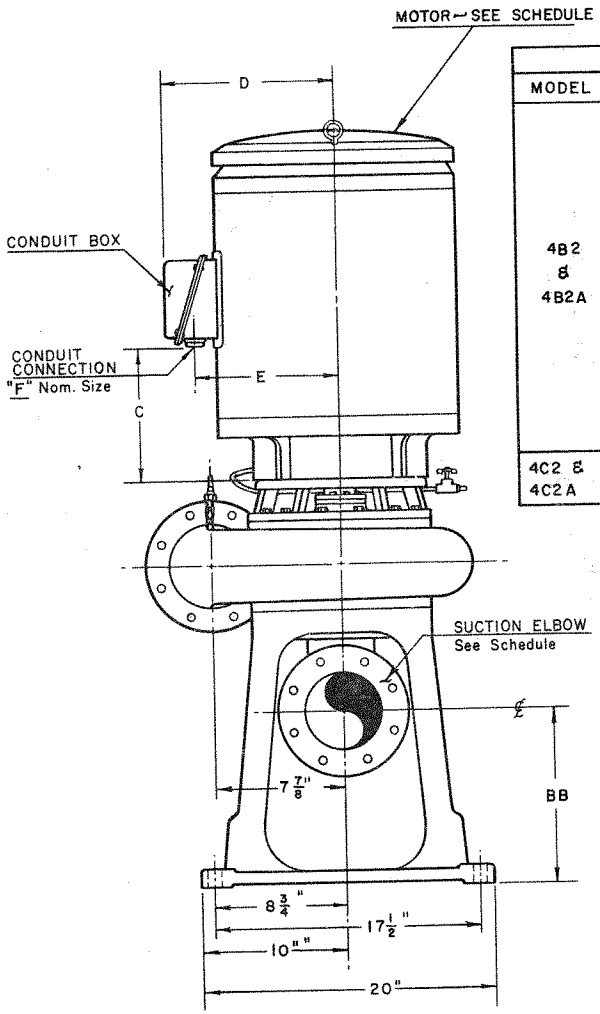


SMITH & LOVELESS
DUPLIFLO PUMPING STATION
OPERATING SCHEMATIC DWG.

75B1

SEWAGE PUMP
MODELS 4B2 & 4B2A – 4C2 & 4C2A





MOTOR SCHEDULE									
MODEL	H. P.	R.P.M.	FRAME SIZE	A	B	C	D	E	F
4B2 & 4B2A	1	900	D-213 PZ	21"	12"	4 1/2"	10"	8"	3/4"
	1 1/2	900	D-213 PZ	21"	12"	4 1/2"	10"	8"	3/4"
	2	1200	D-213 PZ	21"	12"	4 1/2"	10"	8"	3/4"
	2	900	D-215 PZ	21"	12"	4 1/2"	10"	8"	3/4"
	3	1200	D-215 PZ	21"	12"	4 1/2"	10"	8"	3/4"
	3	900	D-254UPZ	23"	14"	6 1/2"	10"	8"	1"
	5	1200	D-254UPZ	23"	14"	6 1/2"	10"	8"	1"
	7 1/2	1800	D-254UPZ	23"	14"	6 1/2"	10"	8"	1"
	7 1/2	1200	D-256UPZ	23"	14"	6 1/2"	10"	8"	1"
	10	1800	D-256UPZ	23"	14"	6 1/2"	10"	8"	1"
	15	1800	D-284UPZ	26"	18"	7 1/2"	11"	9"	1 1/4"
	20	1800	D-286UPZ	26"	18"	7 1/2"	11"	9"	1 1/4"
4C2 & 4C2A	25	1800	D-324UPZ	28"	20"	9 –"	14"	12"	1 –"

ELBOW SCHEDULE			
S&L PART NO.	ELBOW SIZE	AA	BB
28A92	4" x 4" (S&L)	11 1/2"	6 7/8"
2L7A	4" x 4" (STD.)	6 1/2"	8 3/8"
28C114	4" x 6" (S&L)	9 1/2"	6 7/8"
2L11A	4" x 6" (STD.)	8"	6 7/8"

NOTES :–

1. Flanges Are Faced & Drilled A.S.A. Class 125.
2. Dimensions Are For Drip-Proof Motors.

N64-375

TOLERANCES UNLESS OTHERWISE STATED: FRACT. ~ DECIMALS ~ ANGLES ~
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

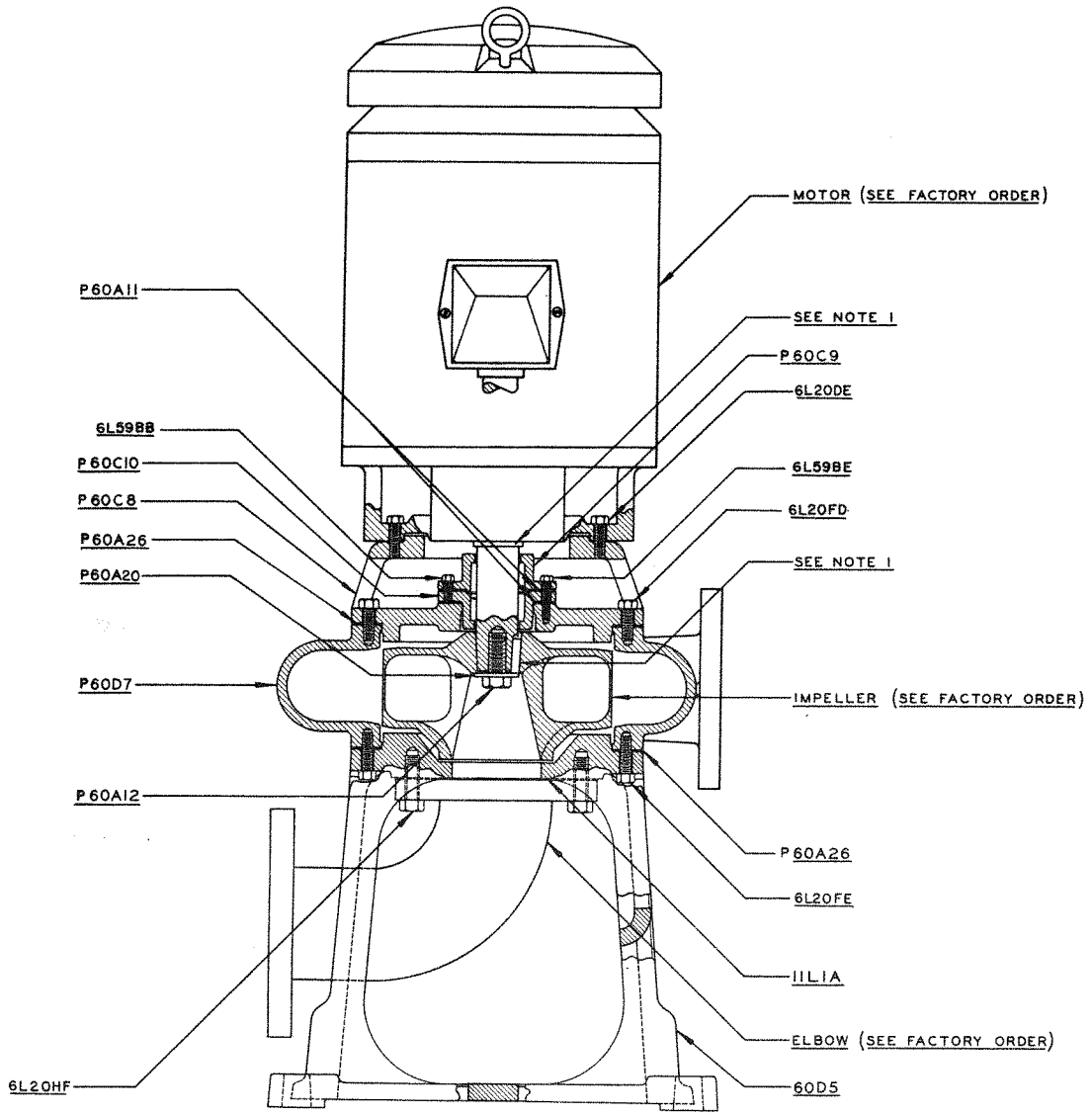
REV. LT.	REV. NO.	DATE	BY CHK'D
A	REV. 3-6	10-5 64	KDL MPS

DRAWN BY: HASLAM DATE 9-28-64
CHKD. BY: WAAGE DATE 9-29-64
APPVD. BY: VH DATE 2-27-67
SCALE none

Smith & Loveless
DIVISION – UNION TANK CAR COMPANY
MAIN PLANT
LENEXA, KANSAS 66208

FOR:
OUTLINE DIMENSIONS –
4B2-4B2A-4C2-4C2A
PUMPS

SERIAL NO.
DRWG. NO. 61D11



PARTS LIST		
PART NO.	QUAN.	PART NAME
P60D5	1	PUMP STAND
P60A26	AS REQ'D	GASKET - VOLUTE
P60D7	1	VOLUTE
P60C8	1	MOTOR ADAPTOR
P60C9	1	SEAL HOUSING - UPPER HALF
P60C10	1	SEAL HOUSING - LOWER HALF
P60A11	2	GASKET - SEAL HOUSING
P60A12	1	IMPELLER BOLT
P60A20	1	IMPELLER WASHER
11L1A	1	FLANGE GASKET
6L20HF	8	CAP SCREW $\frac{5}{16}$-11 x $1\frac{3}{4}$ LONG CAD. PLATED
6L20DE	4	CAP SCREW $\frac{3}{8}$-16 x $1\frac{3}{4}$ LONG CAD. PLATED
6L20FE	8	CAP SCREW $\frac{1}{2}$-13 x $1\frac{3}{4}$ LONG CAD. PLATED
6L59BE	3	CAP SCREW $\frac{5}{16}$-18 x $1\frac{1}{2}$ LONG STN. STEEL
6L59BB	3	CAP SCREW $\frac{5}{16}$-18 x $\frac{3}{4}$ LONG STN. STEEL
6L20FD	8	CAP SCREW $\frac{1}{2}$-13 x $1\frac{1}{4}$ LONG CAD. PLATED

NOTES:

1. NEOPRENE SLINGER RING & STAINLESS STEEL IMPELLER KEY INCLUDED WITH MOTOR.
2. SEE DRAWING 61D2 SEAL ASSEMBLY FOR MECHANICAL SEAL COMPONENTS.

REV. 6/1/67 PER N67-34
12/1/64 PER N64-444

SCALE:	
DRAWN BY: C.R. WELTY	
CHKD BY: C. Wagge	

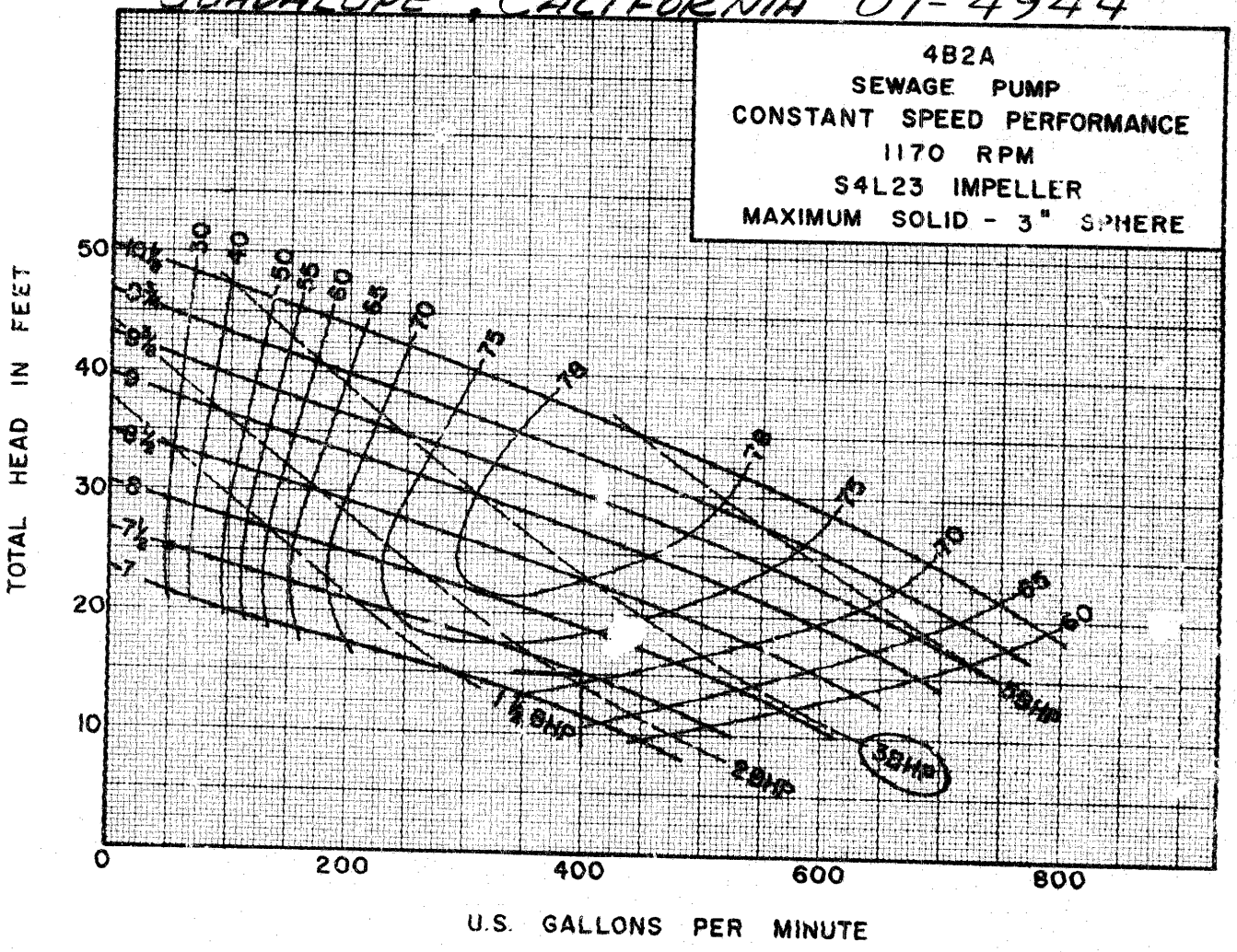
REVISIONS	
DATE	DESCRIPTION
9-58	NOTE 1 & 24A9
12-58	60A6 TO 60A26
1-62	6L20 NO.S
3-63	6L59 No's Were 6L20

Smith & Loveless, Inc.
P. O. BOX 8004 KANSAS CITY 15, MISSOURI
Manufacturing Plant Lenexa, Kansas

PUMP ASSEMBLY
4B2 & 4B2A PUMPS

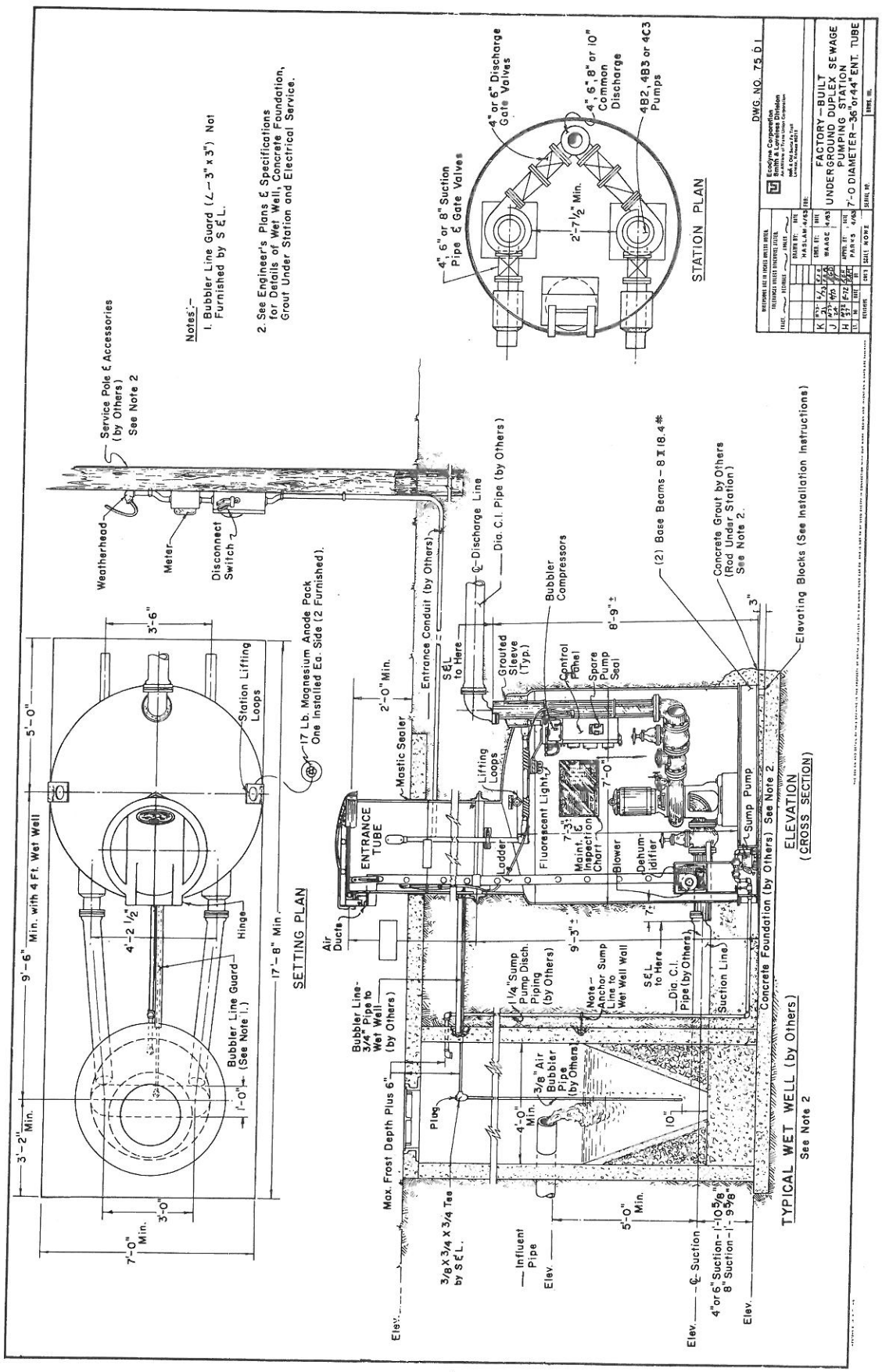
DATE 5-23-58 DRWG. NO. 6101

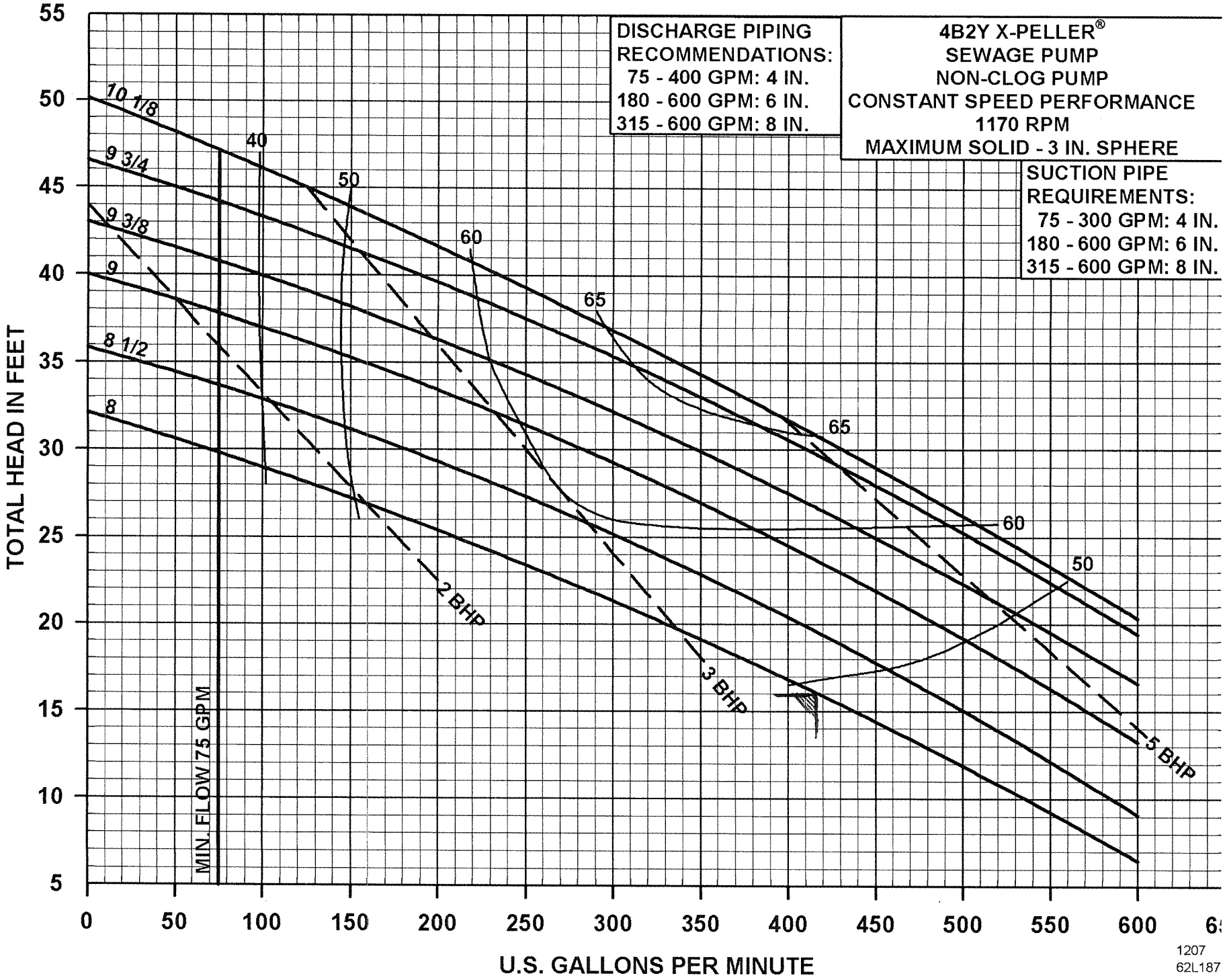
GUADALUPE, CALIFORNIA 07-4944



Smith & Loveless Engineering Data

A Division of Ecodyne Corporation • Main Plant: Lenexa, Kansas 66215




4B2Y X-PELLER®
SEWAGE PUMP
NON-CLOG PUMP
CONSTANT SPEED PERFORMANCE
1170 RPM
MAXIMUM SOLID - 3 IN. SPHERE
DISCHARGE PIPING
RECOMMENDATIONS:
75 - 400 GPM: 4 IN.
180 - 600 GPM: 6 IN.
315 - 600 GPM: 8 IN.
SUCTION PIPE
REQUIREMENTS:
75 - 300 GPM: 4 IN.
180 - 600 GPM: 6 IN.
315 - 600 GPM: 8 IN.
TOTAL HEAD IN FEET
U.S. GALLONS PER MINUTE
MIN. FLOW 75 GPM
10 1/8
9 3/4
9 3/8
9
8 1/2
8
40
50
60
65
65
60
50
2 BHP
3 BHP
5 BHP
55
50
45
40
35
30
25
20
15
10
5
0
50
100
150
200
250
300
350
400
450
500
550
600
1207
62L187

22785 Savi Ranch Parkway • Yorba Linda, CA 92887
3559 Landco Drive, Unit B • Bakersfield, CA 93308
Phone 805.223.3855 • Fax 714.693.1715
enmar@cortecheng.com

OIL & GAS / INDUSTRIAL / MUNICIPAL
CENTRAL COAST – NORTHERN LA

Attn:
Charlie Vasquez, Plant Manager
Guadalupe WWTF

Subject:
Commercial Proposal — S&L Pump Retrofit — Rev 1, 2013-09-27

Quantity:	(1)
Equipment:	Xpeller Rotating Assembly w/ Motor
Serial #:	07-4944
Pump Type:	S&L.4B2Y
Configuration:	Drop & bolt into existing pump volute
Motor:	5.0 HP, 1170 rpm, 3/60/220v
Net Price:	**$9,800.00**
Taxes:	**Not Included**
Freight:	**Destination**

Delivery expected **5 - 7 Weeks** after release.

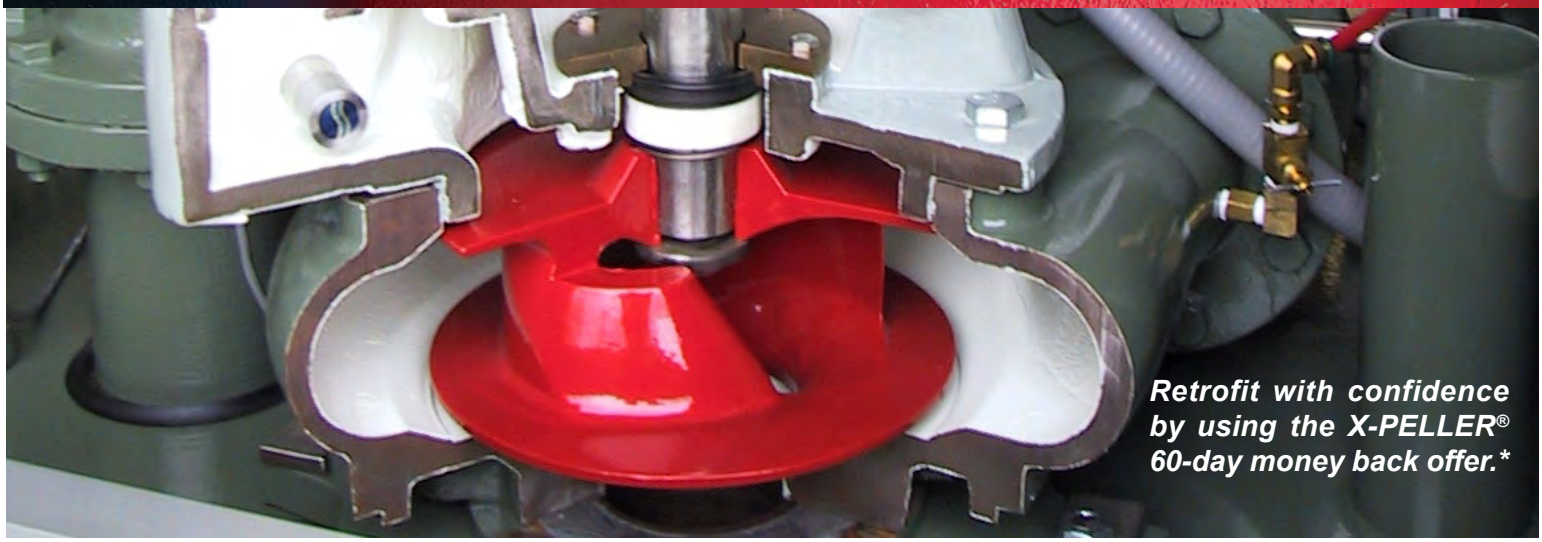
Terms:

a) Net 30 on shipment.
b) S&L offers a 60-day money back guarantee on the performance of the Xpeller.
c) **Items not included**: Controls, VFD's, Field Testing, Installation, Seismic Analysis, Anchor Bolts, Gauges and Valves.

Local Rep: Enmar Manghi || 805 223 3855 || enmar@cortecheng.com

Smith & Loveless Inc.
Above all others.™

X-PELLER® Impeller



Solve Your Clogging Problems with the S&L X-PELLER® Impeller

The **X-PELLER®** is specifically designed for high volumes of trash pumping applications and low flow conditions in 4" vacuum primed and 4" flooded suction Smith & Loveless pumps. In numerous field tests since 2000, it was successfully proven that the **X-PELLER®** effectively expels high volumes of stringy materials, rags and other unusual trash items because of its mono-port design. The **X-PELLER®** is successful in solving clogging problems.

X-PELLER® Features

- Designed for 900, 1200 and 1800 RPM
- Installs inside both 4" vacuum primed and flooded suction Smith & Loveless pumps
- Handles flows from 75 to 500 GPM
- Meets the Hydraulic Institute vibration standards
- Large open mono-port flow design dramatically reduces hang-up from stringy materials, rags and other unusual items in extreme pumping applications
- Fully trimmable to specific pumping conditions
- The **X-PELLER®** holds its balance through the full trim
- Virtually eliminates any clogging occurrences in extreme pumping applications

60-day money back **X-PELLER® offer: Buyers have 60 days from date of shipment to return the **X-PELLER®**. If they are not satisfied, Smith & Loveless will refund the money. Buyers are responsible for shipping and handling costs.*

Smith & Loveless is so confident in the X-PELLER® impeller that it is offering a 60-day money back offer* on all retrofit X-PELLER® purchases.

Local Rep: Enmar Manghi || 805 223 3855 || enmar@cortecheng.com

The Smith & Loveless X-PELLER® Comes with a 60-day Money Back Offer* to Give Better Peace of Mind.

"It (the X-PELLER®) worked great. We were getting clogs...every few days. (With the X-PELLER®) I think in the past year, we've only had two clogs."
- Kevin Leslie, Director of WPCA, East Windsor, Conn.

Retrofit Applications

Smith & Loveless has seen almost every wastewater pumping application out there. In 99 percent of the cases, the standard Smith & Loveless impeller easily handles wastewater solids. Some applications that might need extra help with trash and debris can include:

- Prisons
- Fairgrounds
- College residence halls
- Auto repair shops
- Hospitals
- Use with variable frequency drives on low flows
- Use for extremely low flows prone to clogging

In most cases, the Smith & Loveless dual-port impeller rarely clogs; however, in highly problematic installations, clogging problems are virtually eliminated after the **X-PELLER®** is installed. Numerous field tests successfully prove that the **X-PELLER®** effectively expels high volumes of trash, including stringy materials and rags because of its mono-port design.

"(Since installing the X-PELLER®), we haven't had to pull...pumps for a clogging situation. (We've gone for) six months with no clogging issues at all."
- Rick Russell , Collection Systems Manager, Rancho, Santa Fe Community Services District, Calif.

Represented by:

engineering data sheet

CHICAGO PUMP. PRODUCTS

SECTION 2110.4

TYPES

~~VCS — Vertical Open Shaft~~

VPM — Vertical Pedestal Mounted

~~HSB — Horizontal Ball Bearing~~

NON-CLOG PUMP CURVES

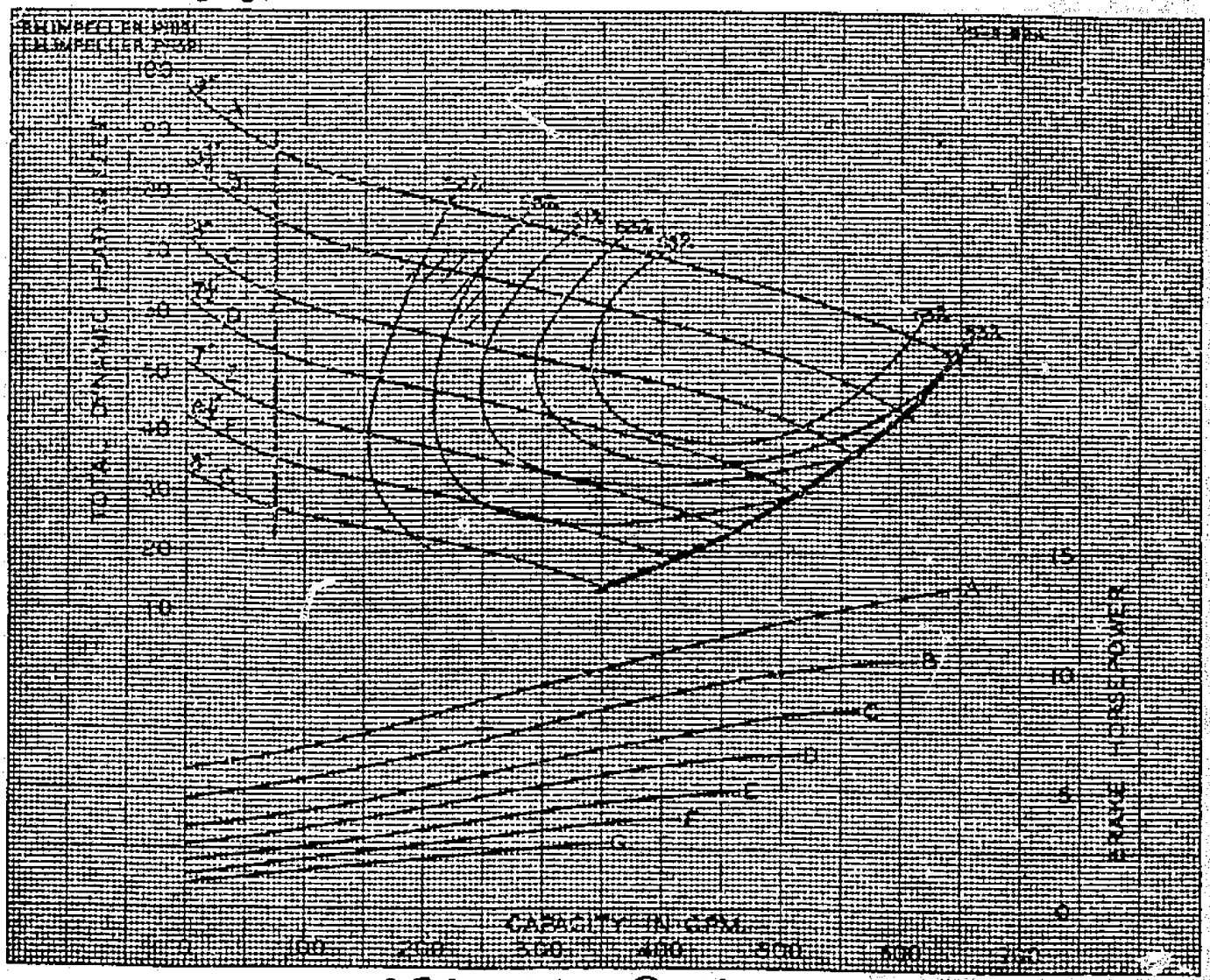
PUMP FRAME LMC - 4

4"/6" Suction — 2½" Sphere

4" Discharge — Enclosed Impeller

1750 RPM

S.O. # 61-26652



DUTY: 250 G.P.M. @ 70 FT. T.D.H.

NOTE: THE RECOMMENDED APPLICATION RANGE OF THIS PUMP IS SHOWN INSIDE OF HEAVY LINES.

DESCRIPTION OF COMPONENTS

Simonds Machinery Co.

SINCE 1905

259 Harbor Way
So. San Francisco, CA 94080
650-589-9900 Ph.
650-589-5900 Fax
e-mail: jcoste-smc@pacbell.net

May 24, 2005

Reference #052405JC1C

Fluid Resource Management, Inc.
624 Clarion Court
San Luis Obispo, CA 93401

Attention: Mr. Gary Ellison

Subject: City of Guadalupe

We are pleased to offer the following Myers selection pricing information in response to your verbal request:

One (1) Duplex Grinder Pump Packaged System complete as follows:

- ◊ Two (2) Myers Submersible Grinder Pumps, Model WGX30-23-25 in standard Class 1, Group C & D, UL listed explosion proof construction with impeller trimmed to duty condition of 100 GPM @ 32' TDH, dual mechanical seal in oil chamber, seal failure probes, 3 HP, 3450 RPM, 230-3-60, oil filled submersible motor, and 25' power and sensor cords.
- ◊ One (1) 48" diameter by 168" deep fiberglass basin with 6" inlet pipe sleeve for link seal type installation, non-sparking lift out rail assembly with built in check vale, upper guide rail support bracket, pump mounting hardware, guide rails, s.s. lifting cable with shackles, gate valves, schedule 80 PVC piping, explosion proof junction box, and float bracket.
- ◊ One (1) U.S.F. Fabrication Aluminum Access Cover, Model APS300-30x36 in standard construction with angle frame, single door, 300# PSF pedestrian load rating, s.s. slamlock, recessed padlock, spring assist, and nut rail with nuts for mounting upper guide rail support brackets.
- ◊ One (1) Custom Control Panel, Duplex, in NEMA 4X FRP enclosure sized for 230-3-60 input power, 3 HP, with hi & low water alarm visual indication, auxiliary contacts, H-O-A selector switches, run lights, ETM's, Intrinisically safe float control, control tansformer, dead front door, seal failure indication lights, automatic alternation, and terminals for field wiring connections.
- ◊ Four (4) Conery Mercury Float Switch, Model 2900-25W in standard construction with adjustable suspension weight, 25' cords, and normally open contacts for start/stop/alarm functions.
- ◊ One (1) Conery Mercury Float Switch, Model 2901-25W as above except with

SINCE 1905

Simonds Machinery Co.

3 259 Harbor Way)5
So. San Francisco, CA 94080
650-589-9900 Ph.
650-589-5900 Fax
e-mail: jcostes-smc@pacbell.net

Letter of Transmittal

Date: **December 1, 2005**
Subject: **City of Guadalupe**
Our Reference No.: **SO606**

To: **Fluid Resource Management, Inc.**
624 Clarion Court
San Luis Obispo, CA 93401

ENTRY 1 ups GROUND TRACKING NUMBER 1Z 950 567 03 1011 704 0

Attention: **Mr. Gary Ellison**

ENCLOSED FIND:

COPIES	DRAWING / CURVE NO.	DESCRIPTION
Six		O & M Manuals

( ) For Your Information
(x) For Record Purposes
( ) Approval Required Prior to Manufacturing
( ) Approval Required Prior to Shipping
( ) Returned For Corrections
(x) In Accordance With Your Request

( ) Released to Production
( ) Approved As Submitted
( ) Approved With Corrections Noted
( ) Please Submit _____ Copies
( ) Please Resubmit _____ Copies
( ) Other – See Below

Comments:

SIMONDS MACHINERY COMPANY

John L. Costes

John L. Costes
Project Sales Engineer

DUPLEX PUMP CONTROL
SUBMITTAL DATA

		DATE: May 24, 2005	
JOB NAME: City of Guadalupe		QUOTATION NO.: 052405JC1C	
ENGINEER:		P.O. NO.:	
REFERENCE: Fluid Resource Management, Inc.	HORSEPOWER: 3HP Per Pump	VOLTAGE/PHASE/HZ: 240/3/60	
PART NUMBER: BDP-240V-3HP/4X+ID+P+E+AI+AD+R+HT+IS+MD		FULL LOAD AMPS: 2 X 17.8	AMPS

California Motor Controls pump control panels come with the following standard features. The options that are included with this panel are indicated below with ►.

UL Type 4X enclosure
UL 508E type self-protected starters, with:
- 42K AIC short-circuit interupting capacity
- Door interlocking, padlockable disconnect handles
- Interchangeable trip modules for easy voltage or horsepower change
- Ambient compensated adjustable electronic overload protection
- Single phase and phase imbalance protection

Control power transformer (except for 120/1 type panels)
Transformer primary fuse protection
Hand-Off-Auto selector switches
RUN indicator lights
Terminals for all field wiring connections
Terminals for motor over-temperature cut-outs
Automatic alternator

Each panel is built per Underwriters' Laboratories UL508 procedure for Enclosed Industrial Control Equipment as is labeled. ISR panels are built per UL508A and per UL698A and are labeled as such.

PILOT CONTROLS

4 Float Switches
► Intrinsically safe relays
Pump Commander MFD

ENCLOSURE

► Inner Door (dead front)
► Padlockable
Anti-condensation heater

OTHER

► Power ON indicator
► Elapsed Time Meters
Phase monitor

ALARM

High level alarms
► Indicator
► Domelight
Buzzer with silence PB
Horn with silence PB

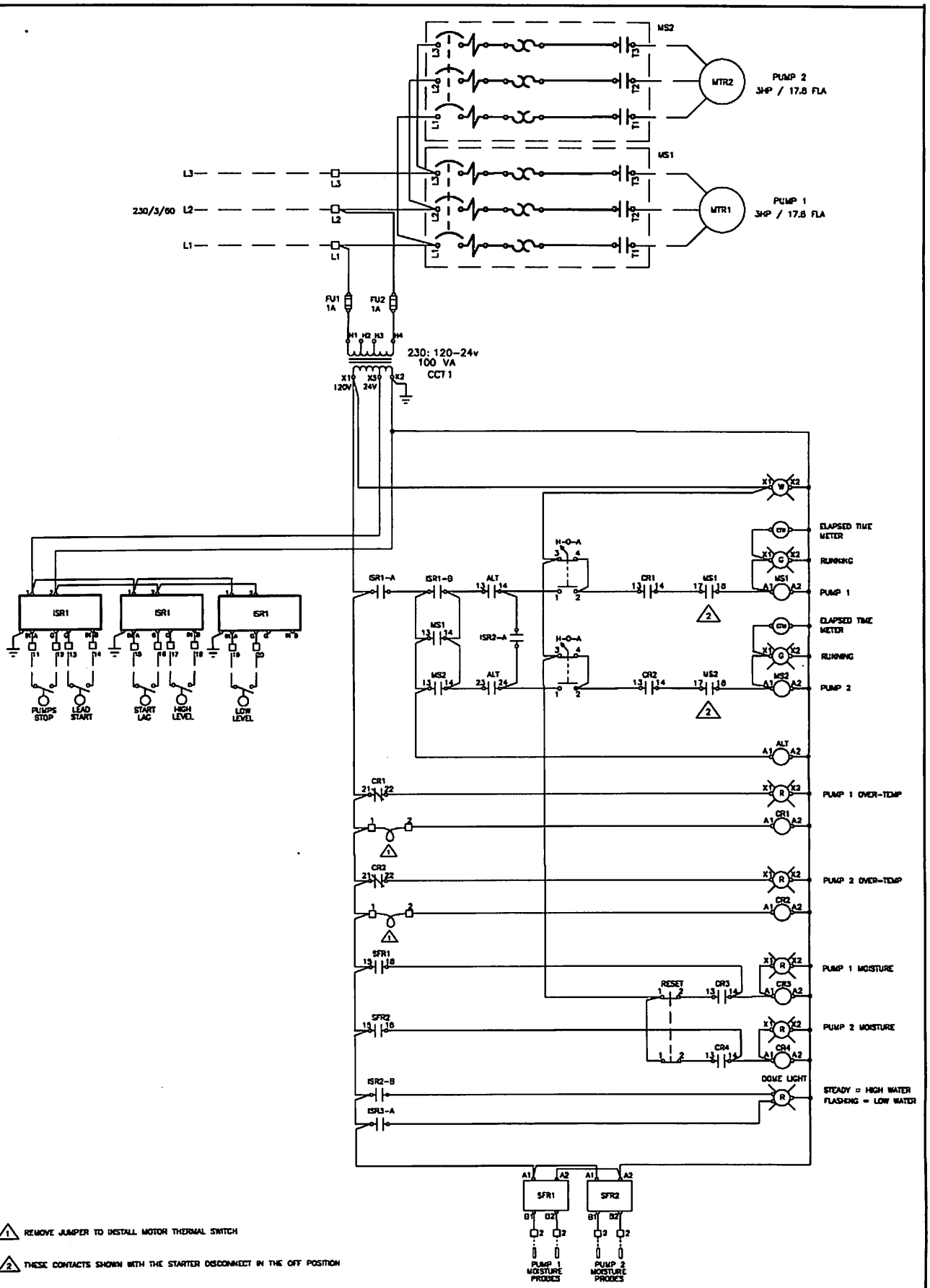
► Alarm contacts (for remote)

Motor Overload Indicators
► High Motor Temp Indicators
► Moisture Detection relays with indicators and reset PB

GSM alarm modem
Analog alarm modem

OTHER COMMENTS

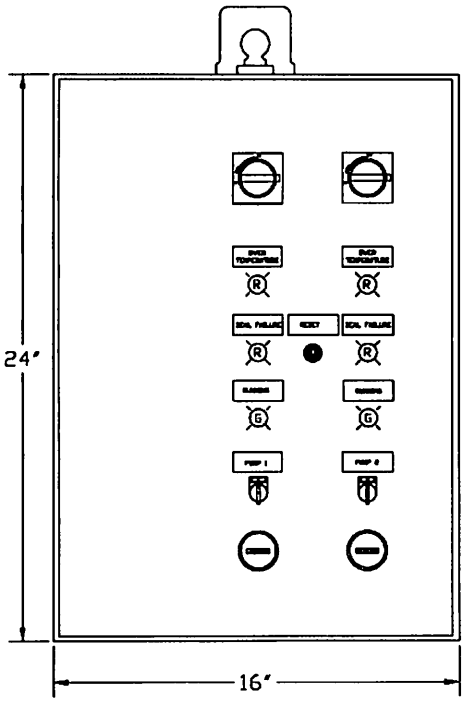
Includes low water alarm with visual indication only, auxiliary contact, and manual reset.



⚠1 REMOVE JUMPER TO INSTALL MOTOR THERMAL SWITCH

⚠2 THESE CONTACTS SHOWN WITH THE STARTER DISCONNECT IN THE OFF POSITION

CUSTOMER and PROJECT NAME	REV.	DESCRIPTION:	DATE:	BY:	DRAWN BY:	APPROVED BY:
Fluid Resource management, Inc. for City of Guadalupe Duplex Grinder Pump Station					TD	TED
					DATE: 5/20/05	SCALE: NONE
CUSTOMER PO:	FILE: Q05-126				DRAWING NO.: Q05-126	SHEET: 1 of 2



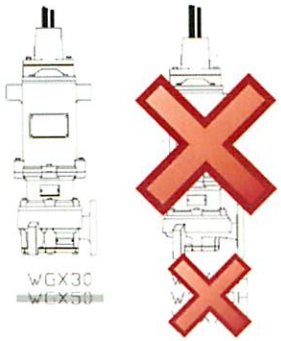
NEMA 4X STAINLESS STEEL ENCLOSURE
WITH "DEAD FRONT" INNER DOOR
MINIMUM 8" DEEP
INDICATORS AND OPERATORS ARE MOUNTED ON THE INNER DOOR
(INNER DOOR IS SHOWN ABOVE)

CUSTOMER and PROJECT NAME		REV.	DESCRIPTION:	DATE:	BY:	DRAWN BY:	APPROVED BY:
Fluid Resource Management, Inc. For City of Guadalupe Duplex Grinder Pump Station						TD	TED
						DATE: 5/20/05	SCALE: NONE
CUSTOMER PO:	FILE: Q05-126Z					DRAWING NO.: Q05-126	SHEET: 2 of 2

TYPICAL INSTALLATION

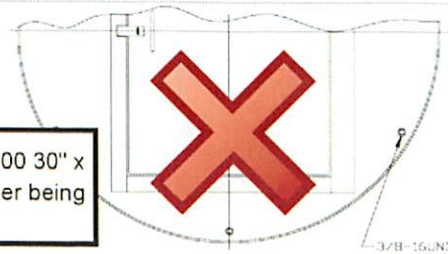
48" DUPLEX EXPLOSION PROOF
GRINDER PUMP PACKAGE
WITH REMOTE MOUNTED CONTROL PANEL

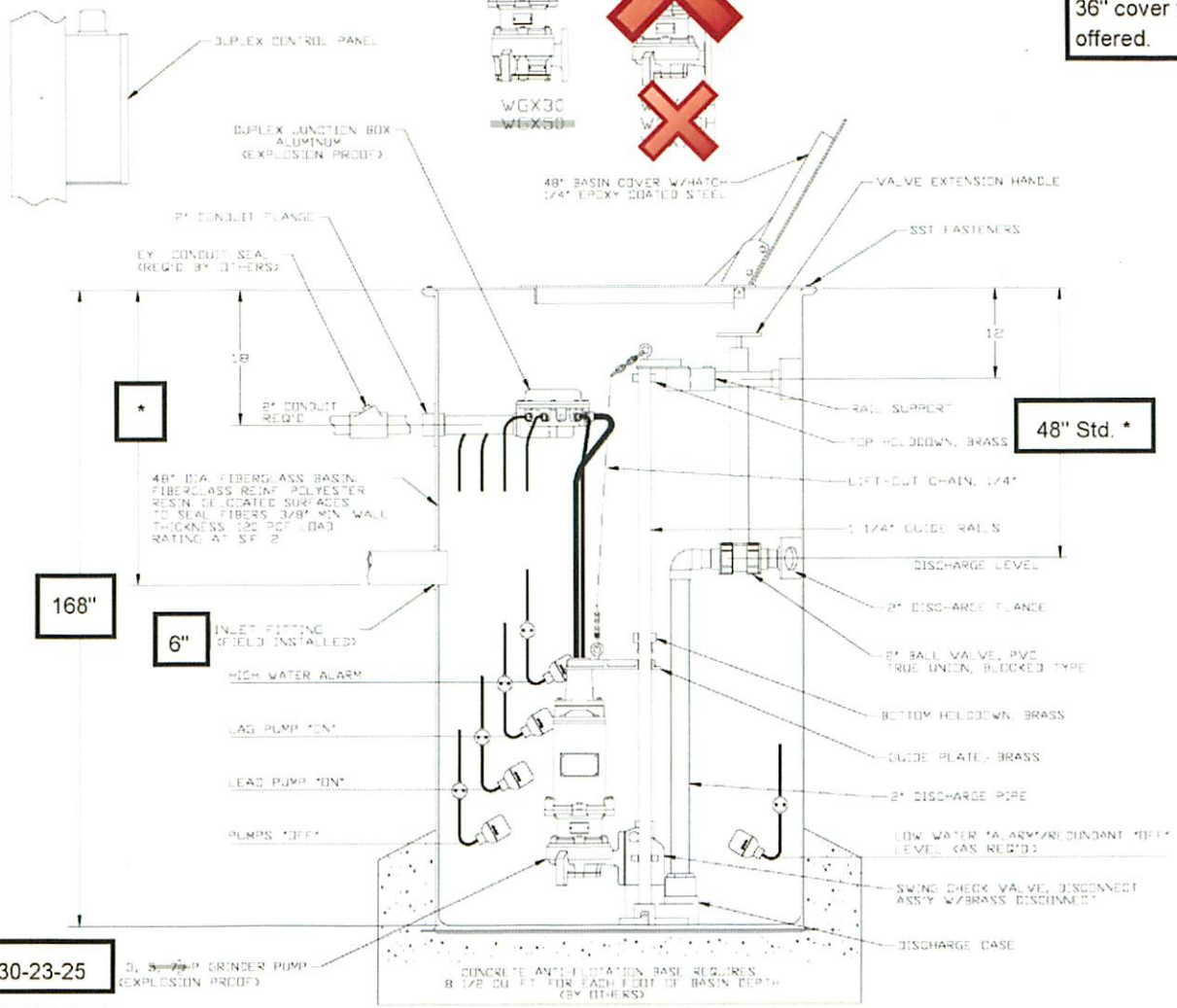
PUMP MODELS WGX30, ~~WGX50,~~
~~WGX30H, WGX50H, WGX75H~~

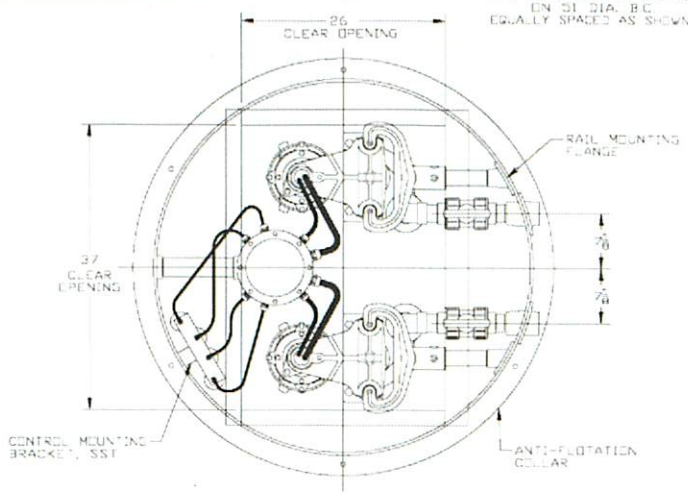


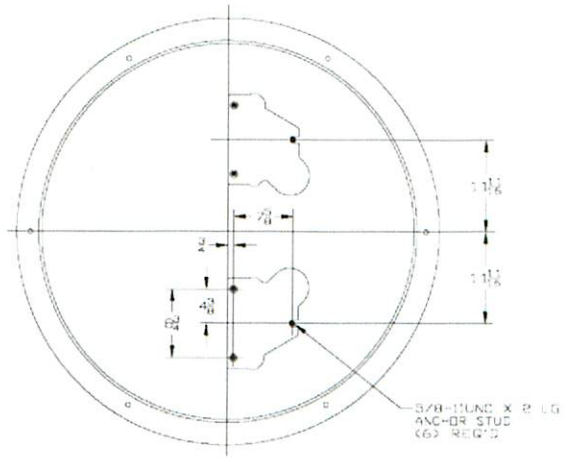
NOTE: 1) INTERMEDIATE RAIL SUPPORT REQUIRED FOR BASINS OVER 16 FEET.
2) ADDITIONAL TOP HOLDDOWN MUST BE USED FOR BASINS OVER 16 FEET.

See drawing for APS300 30" x 36" cover for actual cover being offered.









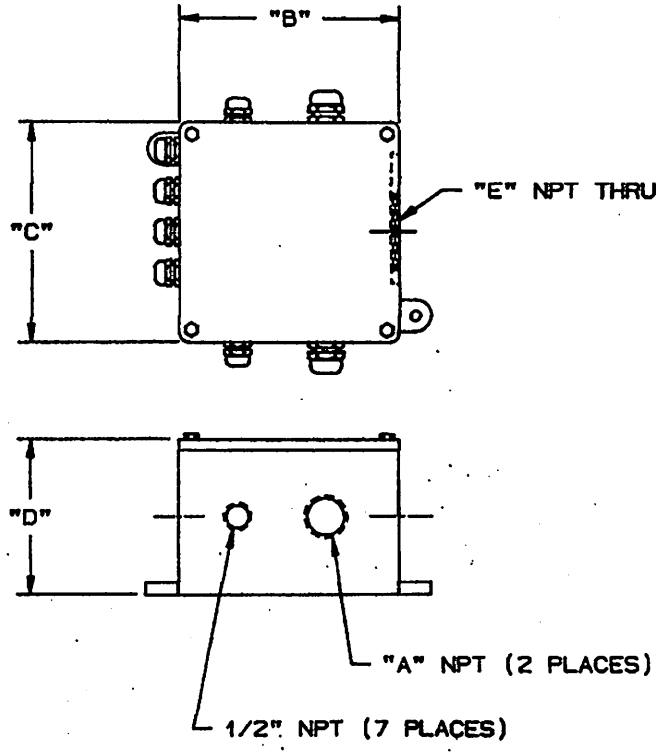
ES-22798 23 JAN 95

Inlet fitting for 6" pipe to be aluminum sleeve for link seal type seal.

* Location to be advised prior to fabrication.

Myers

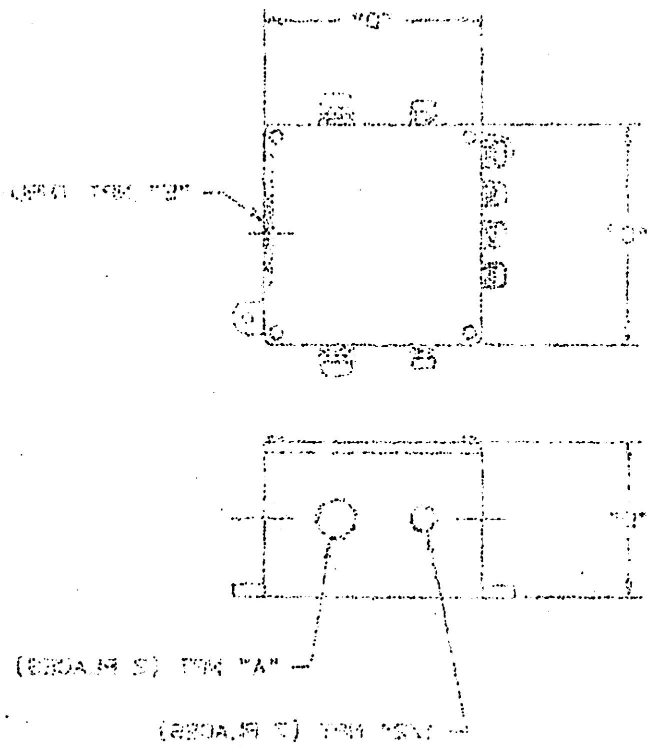
DUPLEX
CAST ALUMINUM JUNCTION BOX
(STANDARD & EXPLOSION PROOF)



MODEL NUMBER	"A"	"B"	"C"	"D"	"E"	RATING
JBD-144	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X
JBD-104	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X
JBD-84	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X
JBD-64	1 1/4"	8 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X
JBD-44	1 1/4"	8 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X
JBD-24	1 1/2"	10 1/2"	6 1/2"	4 1/2"	2 1/2"	NEMA 4X
JBD-04	1 1/2"	10 1/2"	6 1/2"	4 1/2"	2 1/2"	NEMA 4X
XJBD-144	1"	7"	7"	7"	2"	NEMA 7
XJBD-104	1"	7"	7"	7"	2"	NEMA 7
XJBD-84	1"	7"	7"	7"	2"	NEMA 7
XJBD-64	1 1/4"	7"	7"	7"	2"	NEMA 7
XJBD-44	1 1/4"	8"	8"	14 1/2"	2 1/2"	NEMA 7
XJBD-24	1 1/2"	8"	8"	14 1/2"	2 1/2"	NEMA 7
XJBD-04	1 1/2"	8"	8"	17 1/2"	2 1/2"	NEMA 7

ALL JUNCTION BOX PACKAGES INCLUDE ALL NECESSARY CORD GRIPS, PIPE PLUGS, WIRE NUTS, TAPE AND SEALANT

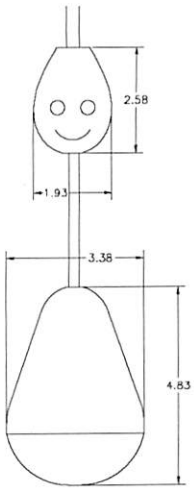
DUPLEX
CAST ALUMINUM JUNCTION BOX
(STANDARD & EXPLOSION PROOF)



MODEL NUMBER	"A"	"B"	"C"	"D"	"E"	RATING	
[illegible]30-441	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	ALL JUNCTION BOX PACKAGES INCLUDE ALL NECESSARY CORD GRIPS, PIPE PLUGS, WIRE NUTS, TAPE AND SEALANT
[illegible]30-134	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	
380-31	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	
380-61	1 1/4"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	
380-44	1 1/4"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	
380-24	1 1/2"	10 1/2"	6 1/2"	4 1/2"	2 1/2"	NEMA 4X	
380-04	1 1/2"	10 1/2"	6 1/2"	4 1/2"	2 1/2"	NEMA 4X	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
X380-104	1"	7"	7"	7"	2"	NEMA 7	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
X380-44	1 1/4"	7"	7"	7"	3"	NEMA 7	
X380-44	1 1/4"	8"	8"	14 1/2"	2 1/2"	NEMA 7	
X380-24	1 1/2"	8"	6"	11 1/2"	2 1/2"	NEMA 7	
X380-04	1 1/2"	8"	6"	12 1/2"	2 1/2"	NEMA 7	

Control Duty Mercury Narrow Angle Switch

c UL us LISTED



Designed for accurate liquid level control in many applications including sewage and wastewater environments. The float switch can be utilized to signify specific water levels or for direct alarm actuation.

NORMALLY OPEN (N/O) Four (4) each for start/stop/hi water alarm functions.

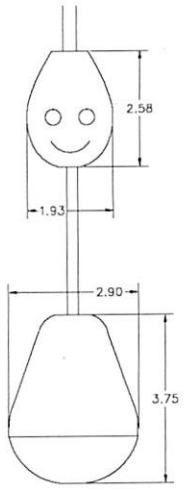
As the float rises 1" (5°) above horizontal, the contacts become closed and actuate (turn on) the switch. This float is generally used in pump down applications.

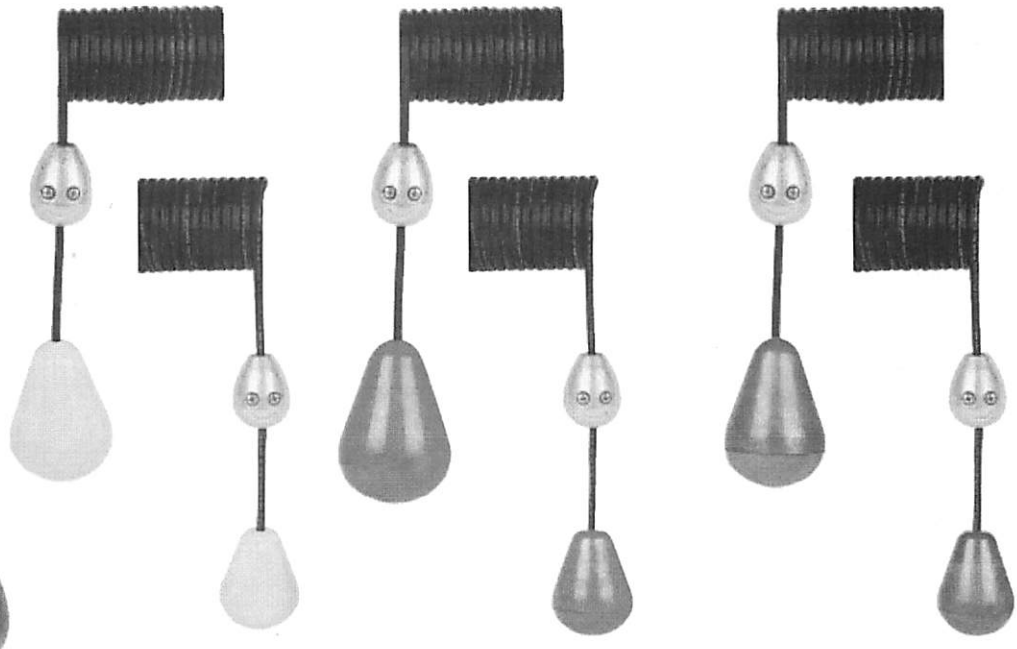
NORMALLY CLOSED (N/C) One (1) each for low water alarm function only.

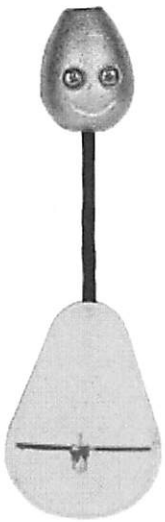
As the float rises 1" (5°) above horizontal, the contacts become open and actuate (turn off) the switch. This float is generally used in pump up applications.

SINGLE POLE, DOUBLE THROW (SPDT)

A variation of the N/O & N/C, this float switch can be wired to operate as either (but not both) a normally open or normally closed switch based on the user's need.







The float uses a steel tube mercury switch designed to operate under min/max temperatures of 32 -170° F, and has an electrical rating of 10 Amps @ 120 Vac, 3 Amps at 240 Vac.

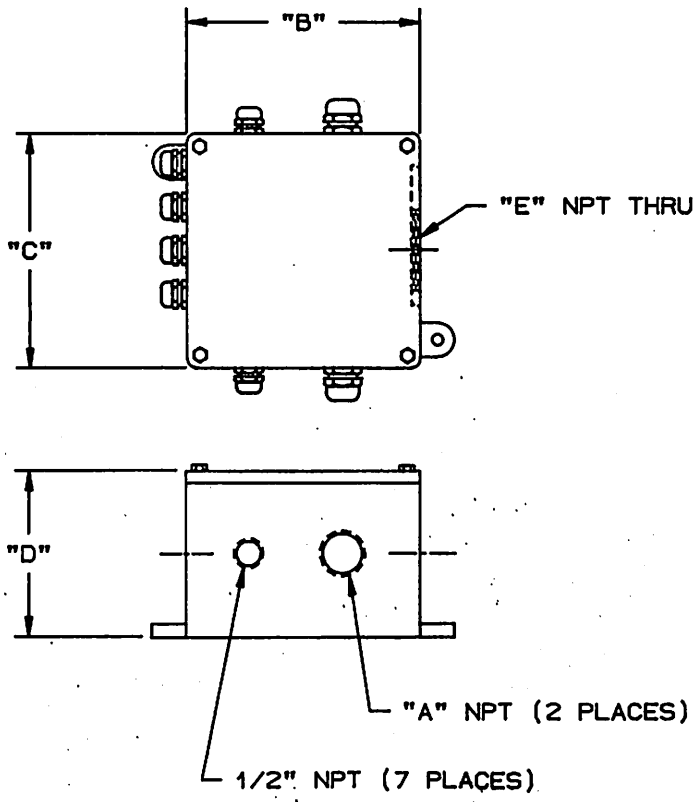
The power cord is a chlorinated polyethylene type SJOW-300Volt and 18/2 for N/O or N/C switch, or 18/3 for SPDT switch.

The float is constructed of a durable polypropylene outer shell and a solid polyurethane foam interior. It is tested and proven to be leak proof, shock proof, and impact resistant. For use with intrinsically safe circuits.

The cord weight is made of zinc plated cast iron @ 1.22 lbs. , the split weight design allows for easy adjustment, and a secure and permanent attachment to the cord.

Myers

DUPLEX
CAST ALUMINUM JUNCTION BOX
(STANDARD & EXPLOSION PROOF)



MODEL NUMBER	"A"	"B"	"C"	"D"	"E"	RATING	
JBD-144	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	
JBD-104	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	
JBD-84	1"	6 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	
JBD-64	1 1/4"	8 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	ALL JUNCTION BOX PACKAGES INCLUDE ALL NECESSARY CORD GRIPS, PIPE PLUGS, WIRE NUTS, TAPE AND SEALANT
JBD-44	1 1/4"	8 1/2"	6 1/2"	4 1/2"	2"	NEMA 4X	
JBD-24	1 1/2"	10 1/2"	6 1/2"	4 1/2"	2 1/2"	NEMA 4X	
JBD-04	1 1/2"	10 1/2"	6 1/2"	4 1/2"	2 1/2"	NEMA 4X	
XJBD-144	1"	7"	7"	7"	2"	NEMA 7	
XJBD-104	1"	7"	7"	7"	2"	NEMA 7	
XJBD-84	1"	7"	7"	7"	2"	NEMA 7	
XJBD-64	1 1/4"	7"	7"	7"	2"	NEMA 7	
XJBD-44	1 1/4"	8"	8"	14 1/2"	2 1/2"	NEMA 7	
XJBD-24	1 1/2"	8"	8"	14 1/2"	2 1/2"	NEMA 7	
XJBD-04	1 1/2"	8"	8"	17 1/2"	2 1/2"	NEMA 7	

Submersible Pump Submittal Data

Date: May 24, 2005

To: Fluid Resource Management, Inc.
624 Clarion Court
San Luis Obispo, CA 93401

Attention: Mr. Gary Ellison

Reference: City of Guadalupe

We Transmit Herewith Six (6) Sets as Follows:
Pump Model: WGX30-23-25, 3 HP @ 3450 RPM

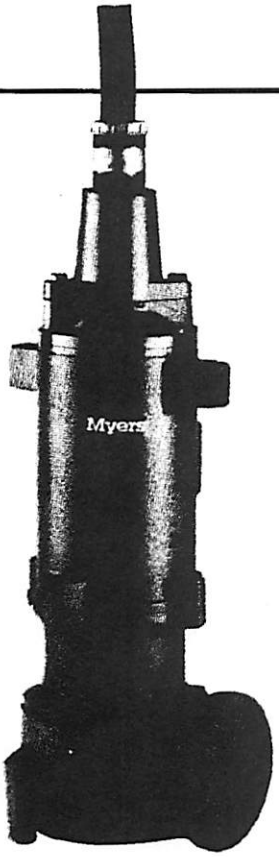
1) Pump Descriptive Data	__x__
2) Performance Curve, Conditions: 100 GPM @ 32 ' TDH	__x__
3) Pump Dimensional Outline	_____
4) Motor Electrical Data: 230 Volts, 3 Phase, 60 Hz	__x__
5) Control Schematic: _____ Simplex __x__ Duplex	__x__
6) Control Panel Dimensions: NEMA 4X FRP	__x__
7) Lift-Out Rail System	__x__
8) Arrangement Drawing	__x__
9) Access Cover	__x__
10) Parts List	_____
11) Installation & Operation	_____
12) Repair	_____
13) Accessories	__x__
14) Other items: _____	_____

__x__ Please forward to approving authority. Return one set for factory production release or revisions. **Note:** This order is on HOLD FOR APPROVAL pending return of approved submittal data.

_____ For record purposes only. Order has been released to production.

WG30-50 and WGX30-50

Standard (WG30-50) and
Explosion-proof (WGX30-50)
3-5 HP Submersible Grinder Pumps



(WGX30-50 only)

MYERS WG30-50 ARE RUGGED 3-5 HORSEPOWER SUBMERSIBLE CENTRIFUGAL GRINDER PUMPS DESIGNED FOR RESIDENTIAL, LIGHT COMMERCIAL, INDUSTRIAL OR MUNICIPAL APPLICATIONS. They are especially designed for grinder pump applications requiring higher flows at low to moderate heads. The WG30-50 feature a heavy-duty cutter mechanism and recessed impeller design to efficiently grind typical sewage solids into a fine slurry.

WG30-50 grinder pumps are available in standard and U.L. Listed explosion-proof (WGX30-50) construction for use in Class 1, Group D hazardous locations.

WG30-50 grinder pumps can be installed in a variety of packaged systems. Factory-assembled simplex or duplex packages with guide rail systems are available. Individual rail components are also available for installation in on-site concrete systems. F.E. Myers offers a complete line of submersible sump, sewage, effluent, grinder, non-clog wastewater pumps, controls, basins and accessories. For additional information, please contact your local Myers representative or the Myers Ashland, Ohio sales office at 419/289-1144.

ADVANTAGES BY DESIGN

IDEAL FOR USE IN LIFT STATIONS.

- Recessed impeller provides non-overloading high flow operating curve.

DURABLE MOTOR WILL DELIVER MANY YEARS OF RELIABLE SERVICE.

- Oil-filled motor for maximum heat dissipation and constant bearing lubrication.
- Recessed impeller reduces radial bearing loads; increases bearing life.
- High-torque capacitor start single phase or three phase motors for assured starting under heavy load.
- Seal leak probes and on-winding heat sensors warn of seal leak condition, and stop motor if motor over heats. Helps prevent costly motor damage.

THE WG30-50 IS DESIGNED FOR EASY MAINTENANCE.

- Shredding ring and grinder impeller are replaceable without dismantling pump or motor.

PRODUCT CAPABILITIES

Capacities To	185 GPM	693 LPM
Heads To	92 ft.	28.1 m
Liquids Handling	domestic raw sewage	
Intermittent Liquid Temp.	up to 140°F	up to 60°C
Winding Insulation Temp. (Class F)	311°F	155°C
Motor Electrical Data (Single phase motors are capacitor start type. Myers control panels or capacitor kits are required for proper operation and warranty.)	3450 RPM, 60 Hz ~~3-5 HP, 230V, 1 Ph~~ 3-5 HP, ~~200~~, 230, ~~460V~~, 3 Ph	
Std. Third Party Approvals Optional Approvals	CSA UL Class 1, Group D (WGX30-50 only) file E68118	
Acceptable pH Range	6-9	
Specific Gravity	.9-1.1	
Viscosity	28-35 SSU	
Discharge (Flange Dim.)	2-1/2 in.	63.5 mm
Min. Sump Dia. (Simplex) (Duplex)	36 in. 48 in.	91.4 cm 121.9 cm

NOTE: Consult factory for applications outside of these recommendations.

Construction Materials	
Motor Housing, Seal Housing Cord Cap and Volute Case	cast iron, Class 30 ASTM A48
Impeller	recessed, bronze
Power Cord	25 ft. SOW/SOW-A
Control Cord	25 ft. SOW/SOWA
Mechanical Seals Standard Optional	double tandem, carbon and ceramic ~~lower tungsten carbide~~
Pump, Motor Shaft	416 SST
Fasteners	300 Series SST
Shredding Ring and Grinder Impeller	440 SST, 58-60 Rockwell

WHERE INNOVATION MEETS TRADITION

ISO 9001 Registered Quality System

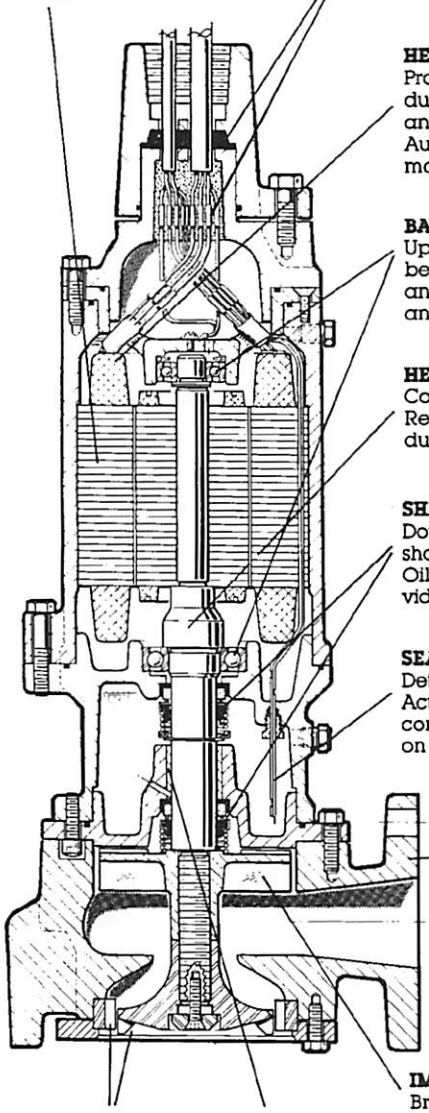
Myers®
Pentair Pump Group

WG30-50 and WGX30-50

Standard (WG30-50) and Explosion-proof (WGX30-50) 3-5 HP Submersible Grinder Pumps

STATOR
3450 RPM, 1 and 3 phase. Press fit for perfect alignment and best heat transfer. Oil-filled motor conducts heat and lubricates bearings.

CABLE ENTRY SYSTEM
Provides double seal protection. Cable jacket sealed by compression grommet. Individual wires sealed by epoxy potting.



HEAT SENSOR
Protects motor from burnout due to excessive heat from any overload condition. Automatically resets when motor has cooled.

BALL BEARINGS
Upper and lower ball bearings support shaft and rotor and take axial and radial loads.

HEAVY 416 SST SHAFT
Corrosion resistant. Reduces shaft deflection due to grinding loads.

SHAFT SEALS
Double tandem mechanical shaft seals protect motor. Oil-filled seal chamber provides continuous lubrication.

SEAL LEAK PROBES
Detect water in seal housing. Activates warning light in control panel. (Test resistor on UL Listed models.)

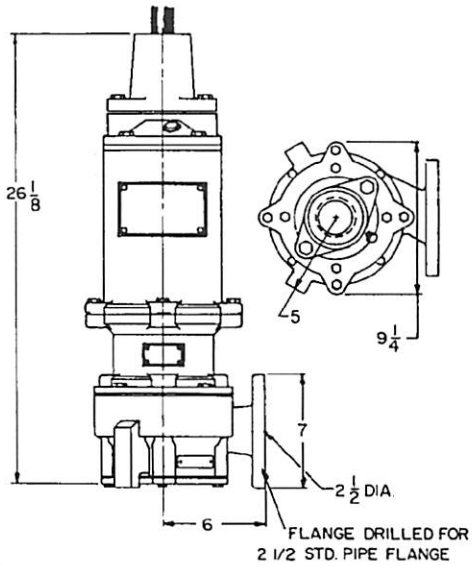
VOLUTE CASE
Cast iron; horizontal discharge. (Drilled for 2½" pipe flange.

IMPELLER
Bronze recessed impeller handles ground slurry without clogging or binding. Provides unobstructed flow passage. Reduces radial loads. Pumpout vanes help keep trash from seal; reduces pressure at seal faces.

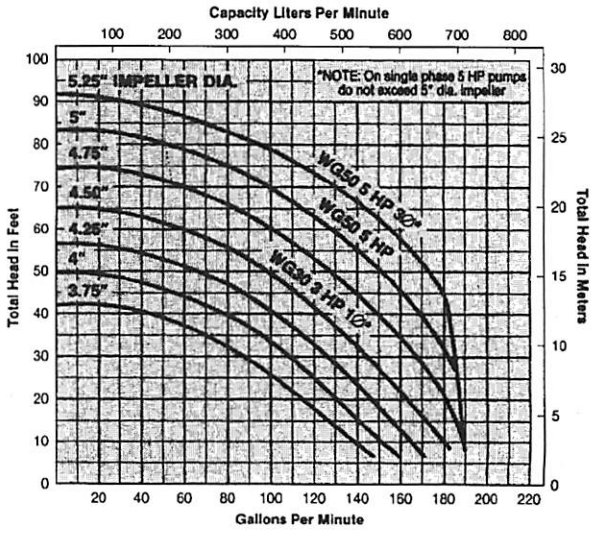
GRINDER ASSEMBLY
Grinder impeller and shredding ring are replaceable without dismantling pump. Constructed of 440 SST hardened to 56-60 Rockwell.

SLEEVE BEARING
Takes radial load; provides flame path. (UL listed pumps only.)

DIMENSIONS



PERFORMANCE CURVE



K3425 8/01
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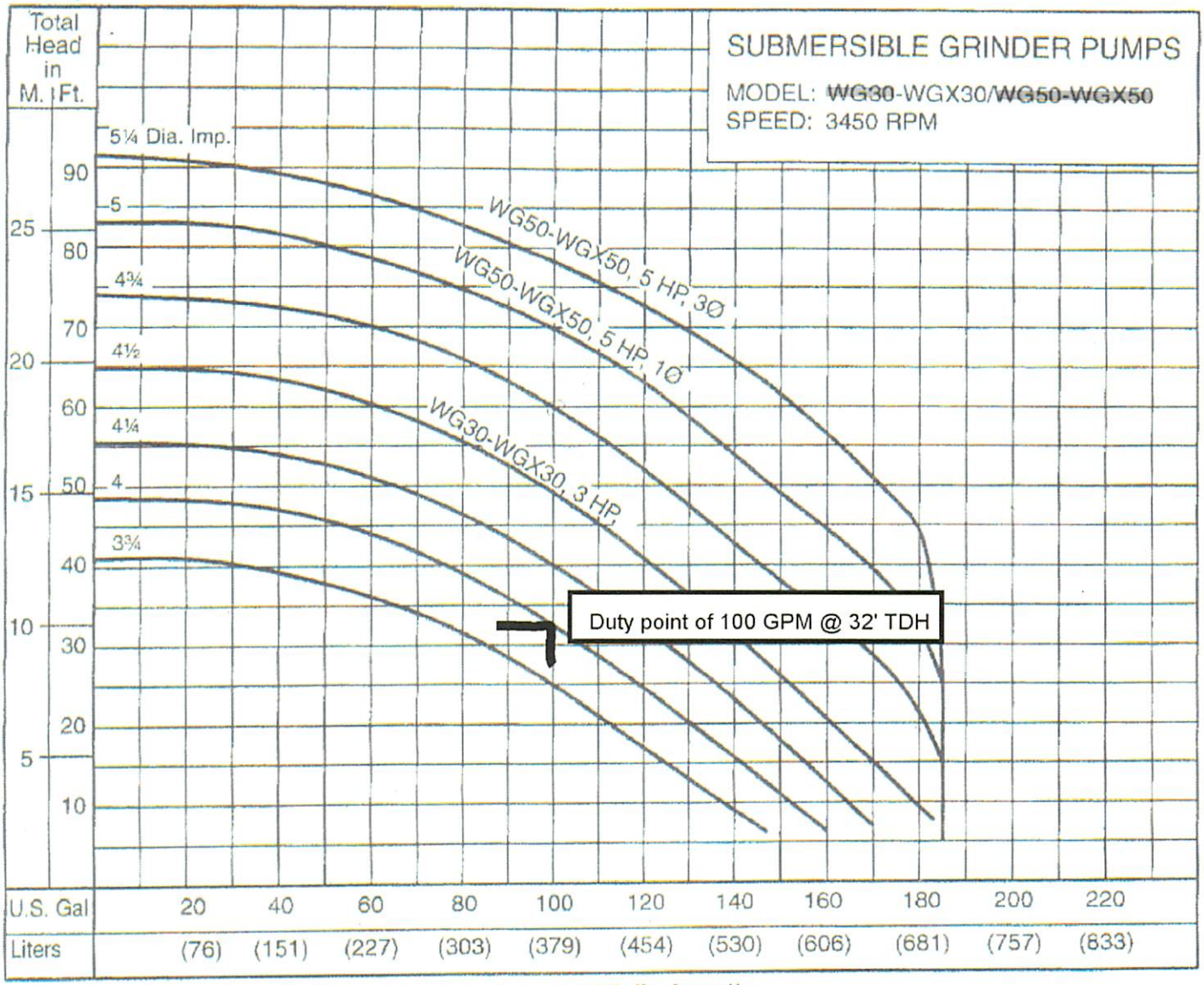
Myers®
Pentair Pump Group

F. E. Myers, 1101 Myers Parkway, Ashland, Ohio 44805-1969
419/289-1144, FAX: 419/289-6658, www.femyers.com
Myers (Canada), 269 Trillium Drive, Kitchener, Ontario N2G 4W5
519/748-5470, FAX: 519/748-2553

Pump Performance



NOTE: On single phase 5 HP pumps, do not exceed 5" dia. impeller.

Available Models		Motor Electrical Data										
Standard	Explosion Proof	HP	Volts	Phase	Hertz	Start Amps	Run Amps	Run KW	Start KVA	Run KVA	NEC Code Letter	Service Factor
WG30-21-25	WGX30-21-25	3	230	1	60	122	36	6.1	28.1	8.3	K	2.0
WG30-03-25	WGX30-03-25	3	200	3	60	80	20.5	6.1	31.1	7.1	J	2.0
WG30-23-25	WGX30-23-25	3	230	3	60	78	17.8	6.1	31.0	7.1	J	2.0
WG30-43-25	WGX30-43-25	3	460	3	60	39	8.9	6.1	31.0	7.1	J	2.0
WG50-21-25	WGX50-21-25	5	230	1	60	122	43	8.9	28.1	9.9	G	1.7
WG50-03-25	WGX50-03-25	5	200	3	60	90	28.5	8.9	31.1	9.0	N	1.7
WG50-23-25	WGX50-23-25	5	230	3	60	78	24.8	8.9	31.0	9.9	N	1.7
WG50-43-25	WGX50-43-25	5	460	3	60	39	12.4	8.9	31.0	9.9	N	1.7

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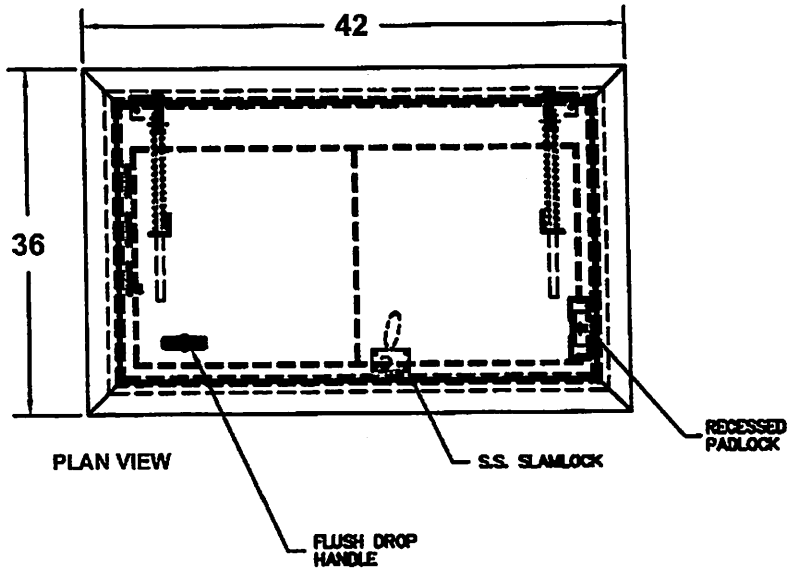
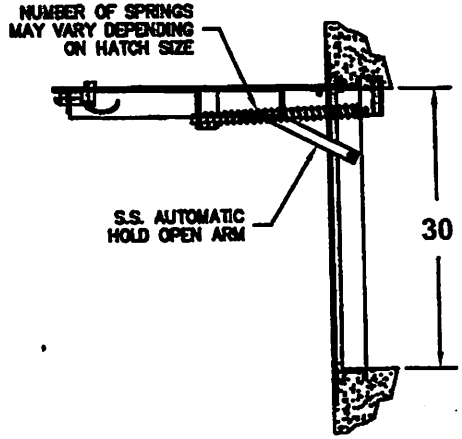
K3582 6/98

ANGLE FRAME, PEDESTRIAN LOADING, SINGLE DOOR - ALUMINUM



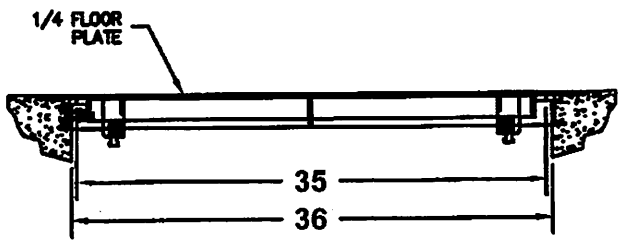
PLAN VIEW



SECTION VIEW
SIDE

NOTES:

Weight: 64 lbs. (approx. hatch base weight w/o options)
1: Nut Rail (Front)



SECTION VIEW
FRONT

NOTES:
1—MATERIAL: ALUMINUM
2—LOADING: 300 LBS. PER SQ. FT.
3—316 STAINLESS STEEL BOLTS, HINGES AND HOLD OPEN ARM

U.S.F. FABRICATION INC.
FLOOR ACCESS DOORS, GRATING AND MISC. METAL FABRICATION

APS300 30" x 36"
CLEAR OPENING: 27" x 35"

CD ID: 0	12	5/17/2005

APS_S

JAN 2014

PLANT PERFORMANCE

DATE	POND DO NO.1	POND DO NO.2	POND DO NO.3	POND DO NO.4	GEN HOURS NO.1	GEN HOURS NO.2	GULARTE STATION HOURS NO.1	GULARTE STATION HOURS NO.2	RECIRCULATION PUMPS HRS. #3	RECIRCULATION PUMPS HRS. #4	FLEX RATE HOURS SCREEN	FLEX RATE HOURS PRESS
1/1/2013					635.0	51.6	2478.7	2876.8			3154.5	890.4
1/2/2013					635.0	51.6	2470.7	2871.8			3161.8	891.8
1/3/2013					635.0	51.6	2472.5	2872.8			3187.5	892.8
1/4/2013					635.0	51.6	2473.5	2874.8			3166.7	916.5
1/5/2013					635.0	51.6	2475.2	2876.9			3191.5	918.8
1/6/2013					635.0	51.6	2475.7	2877.08			3194.1	919.4
1/7/2013					635.2	51.6	2476.7	2877.8			3203.3	930.8
1/8/2013					635.2	52.0	2477.2	2878.5			3208.7	922.3
1/9/2013					635.2	52.0	2478.0	2880.0			3212.8	924.2
1/10/2013					635.2	52.0	2479.0	2881.2			3217.7	925.5
1/11/2013					635.2	52.0	2480.3	2882.6			3222.4	926.9
1/12/2013					635.2	52.0	2480.8	2883.3			3226.6	928.2
1/13/2013					635.4	52.0	2481.1	2604.1			3231.0	929.9
1/14/2013					635.4	52.0	2482.7	2685.7			3236.1	931.5
1/15/2013					635.4	52.3	2483.6	2886.6			3242.3	933.0
1/16/2013					635.4	52.3	2484.3	2887.6			3247.4	934.4
1/17/2013					635.4	52.3	2485.3	2888.5			3252.1	935.8
1/18/2013					635.4	52.3	2486.0	2889.4			3257.1	937.3
1/19/2013					635.4	52.3	2487.1	2890.3			3262.1	938.2
1/20/2013					635.4	52.7	2488.0	2891.3			3267.6	940.3
1/21/2013					635.6	52.7	2488.7	2892.7			3272.5	941.6
1/22/2013					635.6	52.7	2489.5	2893.3			3277.1	943.1
1/23/2013					635.6	52.7	2490.1	2894.3			3277.6	943.6
1/24/2013					635.6	52.7	2491.2	2895.6			3282.7	944.6
1/25/2013					635.6	52.7	2492.6	2896.3			3287.6	946.0
1/26/2013					635.6	52.7	2493.6	2897.4			3291.2	947.4
1/27/2013					635.6	52.7	2493.9	2898.5			3296.6	948.7
1/28/2013					635.8	52.7	2494.1	2899.1			3298.1	950.2
1/29/2013					635.8	53.0	2495.4	2900.2			3306.1	951.4
1/30/2013					635.8	53.0	2496.2	2901.1			3311.5	952.8
1/31/2013					635.8	53.0	2497.1	2902.2			3316.9	954.0
AVERAGE												
MONTHLY HIGH												
MONTHLY LOW												

1	1858.68	195.78	9	1844.60	195.93	16.18 4943
2	1839.54	195.80	10	1845.39	195.93	17.1850.59
3	1840.88	195.84	11	1845.88	195.93	18 1851.21
4	1841.47	195.86	12	1846.69	195.93	19 1852.33
5	1842.48	195.93	13	1847.58	195.97	20.18 [illegible]83
6	1842.93	195.93	14	1848.37	195.97	21 1853.63
7	1843.01	195.93	15	1849.68	196.13	22 1854.33
8	1843.22	195.93				

196.14	23	1855.12	196.14
196.14	24	1856.08	196.14
196.14	25	1856.72	196.14
196.14	26	1857.71	196.14
196.14	27	1858.30	196.16
196.14	28	1859.10	196.16
196.14	29	1859.91	196.16
	30	1860.54	196.16
	31	1861.28	196.19

APPENDIX C

WASTE DISCHARGE REQUIREMENTS ORDER NO. R3-2005-0015

California Regional Water Quality Control Board
Central Coast Region

Alan C. Lloyd,Ph.D.
Agency Secretary

Internet Address: http://www.waterboards.ca.gov/centralcoast
895 Aerovista Place, Suite 101, San Luis Obispo, California 93401-7906
Phone (805) 549-3147 • FAX (805) 543-0397

Arnold Schwarzen
Governor

September 19, 2005

Carolyn Galloway-Cooper
Guadalupe City Administrator
918 Obispo Street
Guadalupe, CA 93434

Dear Ms. Galloway-Cooper:

ADOPTION OF REVISED WASTE DISCHARGE/RECYCLED WATER REQUIREMENTS FOR THE CITY OF GUADALUPE WASTEWATER FACILITY, SANTA BARBARA COUNTY

On September 9, 2005, the Regional Water Quality Control Board, Central Coast Region adopted Order No. R3-2005-0015, revised Waste Discharge/Recycled Water Requirements for the City of Guadalupe Wastewater Facility. A copy of Order No. R3-2005-0015 is enclosed and the Order is effective immediately. Please note that Standard Provisions and Reporting Requirements are incorporated as part of the Order, but not included in this transmittal. A copy of the Standard Provisions were provided with draft versions of this Order transmitted in April.

Order No. R3-2005-0015 includes revised effluent limitations for Biochemical Oxygen Demand and Total Suspended Solids, as described in the draft Order. Also, note that Order No. R3-2005-0015 includes provisions requiring development and submittal of the following:

1) Collection System Management Plan by September 9, 2006 (Provision E.7);
2) Salts Minimization Plan by January 30, 2006 (Provision E.8); and
3) Well Investigation Plan by November 9, 2005 (Provision E.9).

If you have questions, please call **Sorrel Marks at 805/549-3695** or Gerhardt Hubner at 805/542-4647.

Sincerely,

for Roger W. Briggs
Executive Officer

Enclosure: Order No. R3-2005-0015 with Attachments A-E

S:/wdr/wdr facilities/santa barbara co/Guadalupe/05-0015transmittal.ltr
Task: 126-01
File: City of Guadalupe

cs: (see IPL)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
895 Aerovista, Suite 101
San Luis Obispo, California 93401-7906

WASTE DISCHARGE/RECYCLED WATER REQUIREMENTS

ORDER NO. R3-2005-0015
(Waste Discharger Identification No. 3 420103001)

For

CITY OF GUADALUPE WASTEWATER FACILITY
Santa Barbara County

The California Regional Water Quality Control Board, Central Coast Region (hereafter Board), finds that:

PURPOSE OF ORDER

1. The purpose of the Order is to reissue new Waste Discharge and Recycled Water Requirements for the City of Guadalupe (hereafter Discharger). The Discharger submitted a report of waste discharge on November 18, 2004, for reauthorization to continue discharging treated municipal wastewater from the Discharger's upgraded wastewater facilities serving the City of Guadalupe, in Santa Barbara County. The purpose of the Discharger's Wastewater Facilities is to collect, treat, reuse and dispose of domestic and municipal wastewater.

FACILITY OWNER AND LOCATION

2. The Discharger's Wastewater Treatment Plant is located on property owned by the Discharger at 5125 West Main Street, Guadalupe (Latitude N 3457.738, Longitude W 12035.451), as shown on Attachment A, included as part of this Order.

FACILITY/SITE DESCRIPTION

3. **Treatment** - The wastewater treatment system consists of grit removal and biological treatment using aerated ponds (Swanson Advanced Integrated Pond System). Solids are anaerobically digested in cells at the bottom of the ponds, and ultimately disposed of at an approved biosolids disposal site. Biosolids disposal is expected to be infrequent based upon need (up to ten or more years between disposal events). The treatment plant design capacity is 1.0 million gallons per day (MGD), current flows average approximately 0.5 MGD. A diagram of the treatment processes is shown on Attachment B, included as part of this Order.

4. **Disposal and Reuse** - Treated municipal wastewater is discharged to approximately 71 acres of spray fields (irrigated pastures) adjacent to the Santa Maria River. Effluent is stored in a 40 acre pond adjacent to the treatment facility prior to disposal and during wet weather, when spray field use is limited. Effluent storage pond and disposal areas are depicted on Attachment A of this Order.

5. **Geology, Soils and Ground Water** – The vicinity of the discharge is characterized by fairly level topography consisting of sandy soils overlying poor quality shallow ground water. Depth to ground water ranges from two to eight feet below ground surface. Based upon monitoring data provided by the Discharger, the underlying shallow ground water includes the following characteristics:

Total Dissolved Solids	1600 mg/l
Sodium	260 mg/l

Chloride	270 mg/l
Nitrate (as N)	0.2 mg/l

6. **Watershed and Surface Waters** - The Santa Maria River flows in a westerly direction between the treatment plant and effluent storage pond on the south bank and the disposal spray fields on the north bank.

BASIN PLAN

7. The Water Quality Control Plan, Central Coast Basin (Basin Plan), was adopted by the Board on and approved on September 8, 1994. The Basin Plan incorporates statewide plans and policies by reference and contains a strategy for protecting beneficial uses of surface and ground waters in the vicinity of the discharge.

8. **Surface Water Beneficial Uses** - Present and anticipated beneficial uses of the Santa Maria River include:

   a. Municipal,
   b. Agricultural,
   c. Industrial Service Supply,
   d. Ground Water Recharge,
   e. Water Contact Recreation,
   f. Non-contact Water Recreation,
   g. Wildlife Habitat,
   h. Cold Fresh Water Habitat,
   i. Warm Fresh Water Habitat,
   j. Migration of Aquatic Organisms,
   k. Rare, Threatened or Endangered Species,
   l. Fresh Water Replenishment, and
   m. Commercial and Sport Fishing.

9. **Ground Water Beneficial Uses** - Present and anticipated beneficial uses of ground water in the vicinity of Guadalupe include:

   a. Municipal,
   b. Domestic,
   c. Agricultural and
   d. Industrial supply.

10. **Recycled Water** – Title 22, Division 4, Chapter 3 of the California Code of Regulations specifies State Department of Health Services' criteria for use of recycled water. Water Code section 13523 authorizes the Regional Board to issue reclamation requirements for water that is proposed to be reclaimed (recycled). The Regional Board has consulted with the State and County Health Departments regarding these reuse requirements. The State Department of Health Services (DHS) has evaluated the proposed project description and these waste discharge requirements and provided comments and recommendations, which have been incorporated into this Order. DHS has determined that this Order is consistent with DHS's requirements, recommendations and policies regarding use of recycled water and protection of water quality and public health.

11. **Stormwater** - Federal Regulations for stormwater discharges were promulgated by the U.S. EPA on November 19, 1990. The regulations [40 Code of Federal Regulations (CFR) Parts 122, 123, and 124] require specific categories of industrial activities including Publicly Owned Treatment Works (municipal wastewater treatment facilities) with capacity in excess of one million gallons per day, which discharge stormwater to obtain a NPDES permit and to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to control pollutants in industrial stormwater discharges.

12. Stormwater flows from the wastewater treatment facility process areas are directed to the head works and commingled with wastewater thus becoming wastewater. These blended flows are treated through the facility, therefore no industrial stormwater is discharged and separate permitting is not needed.

MONITORING PROGRAM

13. Monitoring and Reporting Program (MRP) No. R3-2005-0015 is part of this Order. The MRP requires routine wastewater influent, effluent and receiving water (ground water) sampling and analysis to verify compliance with this Order. Monitoring reports are required monthly

and an annual summary report is required by January 30th of each year.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

14. These waste discharge requirements are for an existing facility and therefore are exempt from provisions of the California Environmental Quality Act in accordance with Section 15301 of the California Water Code.

GENERAL FINDINGS

15. Discharge of waste is a privilege, not a right, and authorization to discharge is conditional upon the discharge complying with provisions of Division 7 of the California Water Code and any more stringent effluent limitations necessary to implement water quality control plans, to protect beneficial uses, and to prevent nuisance. Compliance with this Order should assure this and mitigate for any potential adverse changes in water quality due to the discharge.

16. On April 22, 2005, the Board notified the Discharger and interested agencies and persons of its intent to consider adoption of waste discharge requirements for the discharge and has provided them with a copy of the proposed Order and an opportunity to submit written comments and scheduled a public hearing.

17. In a public hearing on **September 9, 2005**, the Board heard and considered all comments pertaining to the discharge, all evidence in the record, and the applicable law and found this Order consistent with the above findings.

IT IS HEREBY ORDERED, pursuant to authority in Section 13263, 13267 and 13523 of the California Water Code, that the City of Guadalupe, its agents, successors, and assigns, may discharge waste from the Guadalupe Wastewater Facility providing compliance is maintained with the following:

All technical and monitoring reports submitted pursuant to this Order are required pursuant to Section 13267 of the California Water Code. Failure to submit reports in accordance with schedules established by this Order or attachments to this Order, or failure to submit a report of sufficient technical quality to be acceptable to the Executive Officer, may subject the Discharger to enforcement action pursuant to Section 13268 of the California Water Code.

(Note: General order conditions, definitions and the method of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements," dated January 1984, referenced in paragraph E.2. of this Order.)

Throughout these requirements footnotes are listed to indicate the source of requirements specified. Requirement footnotes are as follows:

WC = Water Code
BP = Basin Plan
T22 = California Code of Regulations, Title 22, Recycled Water Criteria

Requirements without footnotes are based on staff's professional judgment.

A. PROHIBITIONS

1. Discharge to areas other than the wet weather storage pond and spray field disposal area depicted on Attachment A of this Order, is prohibited. [WC, T22]

2. Discharge to the spray fields when standing water is present or during rain events is prohibited.

3. Discharge of any wastes including overflow, bypass and runoff from transport, treatment or disposal systems to the Santa Maria River, adjacent drainage ways or adjacent properties is prohibited. [WC, T22]

4. Bypass of the treatment facilities and discharge of untreated or partially treated wastewater is prohibited. [WC, T22]

5. Discharge of wastewater within 150 feet of any well used for domestic supply or irrigation of food crops is prohibited. [T22]

B. DISCHARGE/RECYCLED WATER SPECIFICATIONS

1. Daily flow averaged over each month shall not exceed 0.96 million gallons (3,634 m^3).

2. Effluent discharged from the treatment ponds shall not exceed the following limitations:

Constituent	Units	Monthly (30-Day) Average	Daily Maximum
Settleable Solids	mL/L	0.2	0.5
BOD, 5-Day	mg/L	60	100
Suspended Solids	mg/L	60	100
Total Dissolved Solids	mg/L	1500	
Sodium	mg/L	230	
Chloride	mg/l	230	
pH	within the range 6.5 – 8.4[BP]		

3. Personnel involved in producing, transporting or using recycled water shall be informed of possible health hazards that may result from contact and use of recycled water.[T22]

7. Use of recycled water shall occur at a time and in a manner to prevent or minimize public contact with recycled water and to prevent ponding in irrigation areas.[T22]

8. Areas irrigated with recycled water shall be posted in English and Spanish to warn the public that recycled water is being used. Signs shall be no less than four inches high by eight inches wide and include the wording "RECYCLED WATER – DO NOT DRINK".[T22]

9. Recycled water valves shall be of a design to prevent public access.[T22]

10. Proper backflow and cross-connection protection for domestic water services and irrigation wells shall be provided.[T22]

11. Recycled water systems shall be properly labeled and regularly inspected to assure proper operation, absence of leaks, and absence of illegal connections.[T22]

C. RECEIVING WATER LIMITATIONS
(Ground Water Limitations)

(Receiving water quality is a result of many factors, some unrelated to the discharge. This order considers these factors and is designed to minimize the influence of the discharge to receiving waters.)

The discharge shall not cause:

1. Significant increase of mineral constituent concentrations in underlying ground water, as determined by comparison of samples collected from wells upgradient and downgradient from the discharge.[BP, WC]

2. Concentrations of chemicals and radionuclides in ground water to exceed limits set forth in Title 22, Chapter 15, Articles 4 and 5 of the California Code of Regulations.[BP, WC]

D. BIOSOLIDS SPECIFICATIONS

(Note: "Biosolids" refers to non-hazardous sewage sludge as defined in 40 CFR 503.9. Sewage sludge that is hazardous as defined in 40 CFR 261 must be disposed in accordance with RCRA. Sludge with PCB levels > 50 mg/kg must be disposed in accordance with 40 CFR 761.

1. All biosolids generated by the Discharger shall be used or disposed of in compliance with the applicable portions of:

   a. 40 CFR 503: for biosolids that are land applied, placed in surface disposal sites (dedicated land disposal sites or monofills), or incinerated;

   b. 40 CFR 258: for biosolids disposed in municipal solid waste landfills;

c. 40 CFR 257: for all biosolids use and disposal practices not covered under 40 CFR 258 or 503.

40 CFR 503 Subpart B (land application) applies to biosolids applied for the purpose of enhancing plant growth or for land reclamation. Section 503 Subpart C (surface disposal) applies to biosolids placed on the land for the purpose of disposal.

The Discharger is responsible for ensuring that all biosolids produced at its facility are used or disposed of in accordance with these rules, whether the discharger uses or disposes of the biosolids itself or transfers them to another party for further treatment, use, or disposal.

E. PROVISIONS

1. Dissolved oxygen concentration in treatment ponds shall be no less than 1 mg/L at the water surface.

2. Discharger shall comply with "Monitoring and Reporting Program No. R3-2005-0015" (included as Attachment C of this Order), as ordered by the Executive Officer.

3. Discharger shall comply with all items of the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements," dated January 1984.

4. Treatment and discharge shall not cause pollution or nuisance as defined in Section 13050 of the California Water Code.[WC]

5. Treatment, storage and disposal facilities shall be managed to exclude the public and posted to warn the public of the presence of wastewater.

6. Freeboard shall exceed two feet in all wastewater ponds unless ponds are specifically designed for a different freeboard.

7. The Discharger shall develop and implement a Wastewater Collection System Management Plan. The essential elements of the Wastewater Collection System Management Plan are described on Attachment D of this Order. All elements of the Management Plan outlined in Attachment D shall be clearly labeled and addressed by the Discharger. If any element is not appropriate or applicable to a Discharger's program, the program shall provide rationale for not including the element in the program. The Management Plan shall be submitted to the Executive Officer for approval by September 9, 2006. The Management Plan shall be reviewed and updated (as needed) annually. Summary of findings and changes resulting from annual review of the plan shall be included in the Annual Monitoring Report (due January 30th).

8. The Discharger shall develop and implement a salts minimization plan in order to minimize concentrations of salts in the discharge. The salts minimization plan shall be submitted with the annual summary report beginning in 2006, with annual reviews and progress summaries included thereafter.

9. The Discharger shall perform a ground water monitoring well investigation to identify and resolve apparent data inconsistencies associated with Well 7 and implement representative upgradient ground water monitoring well facilities. An investigation plan shall be submitted by November 9, 2005. A report of findings, corrective action plan and implementation schedule shall be submitted by January 30, 2006. Necessary improvements to ground water monitoring well facilities shall be completed by May 30, 2006.

9. Pursuant to Title 23, Division 3, Chapter 9, of the California Code of Regulations, the Discharger must submit a report to the Executive Officer, no later than **March 9, 2010,** addressing:

a. Whether there will be changes in the continuity, character, location or volume of the discharge; and,

b. Whether, in their opinion, there is any portion of the Order that is incorrect, obsolete or otherwise in need of revision.

I, Roger W. Briggs, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, Central Coast Region, on September 9, 2005.

for Roger Briggs, Executive Officer

September 9, 2005
Date

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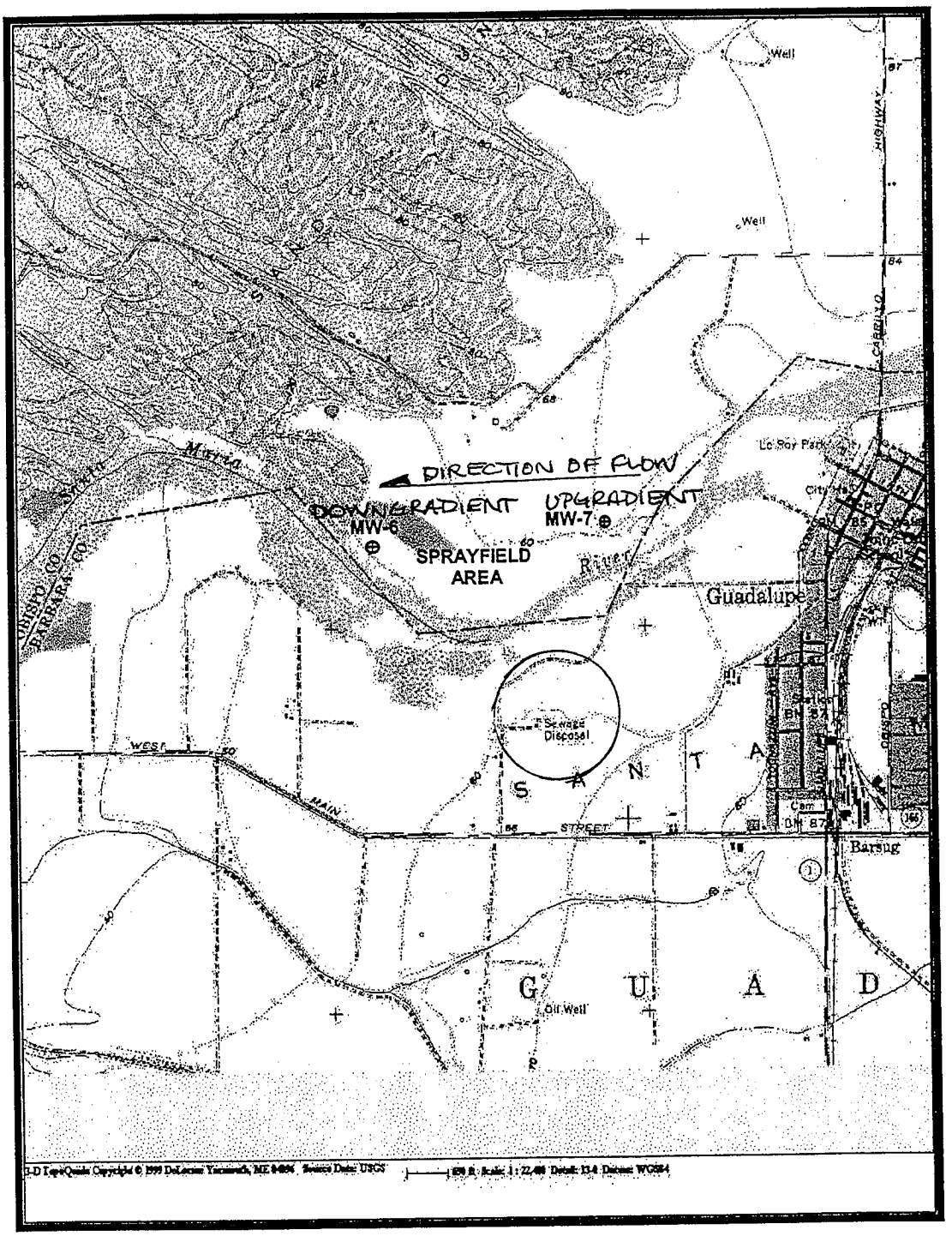
VICINITY MAP

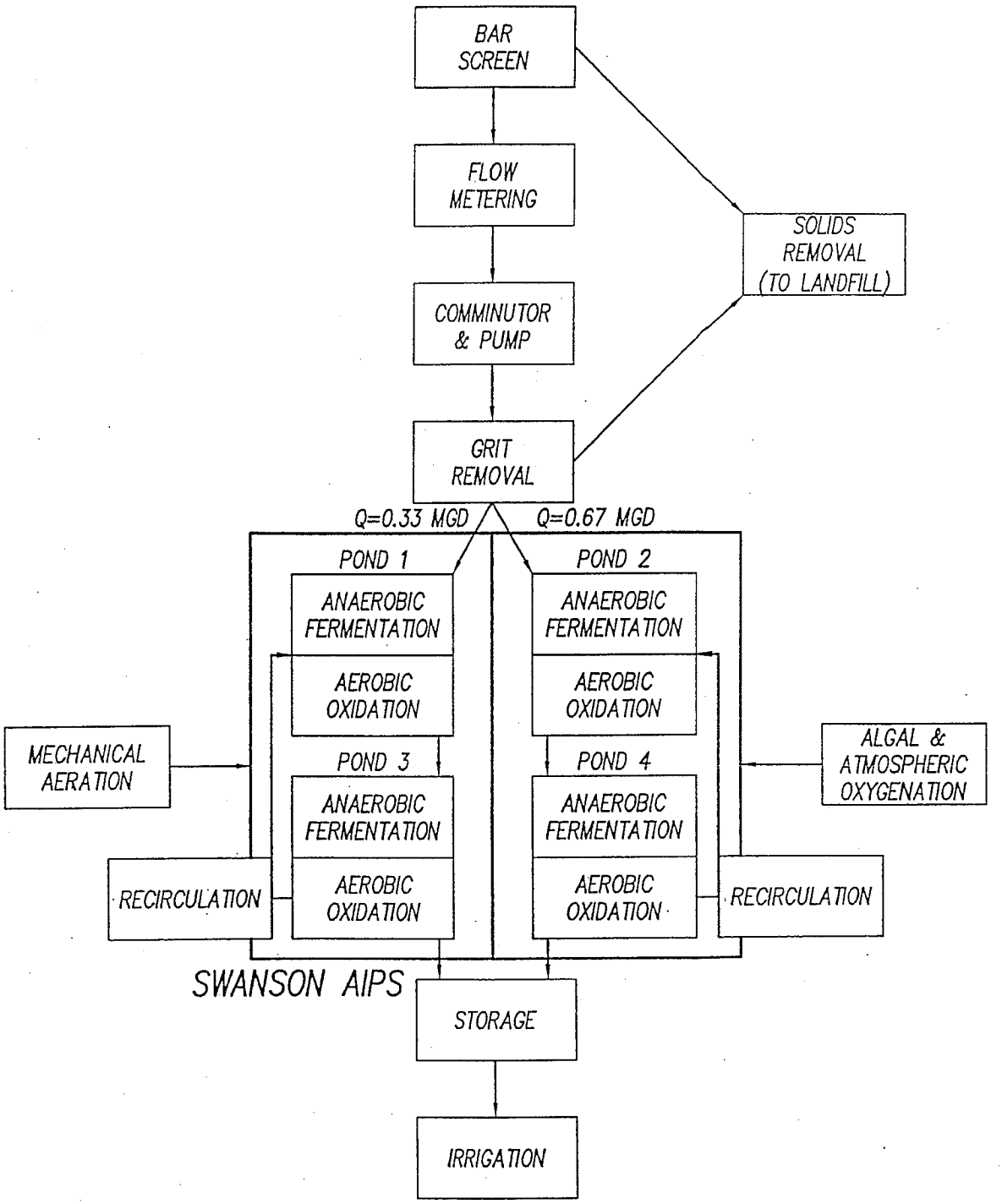
Guadalupe Spray Field
Santa Maria River
Guadalupe, California



Earth Systems Pacific

Project No. SL-09432-EH

Attachment A



SWANSON AIPS
PROCESS SCHEMATIC
GUADALUPE WWTP

Figure 3
AIPS Schematic

Attachment B

ATTACHMENT C

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COASTAL REGION

MONITORING AND REPORTING PROGRAM NO. R3-2005-0015
FOR
CITY OF GUADALUPE WASTEWATER FACILITY
SANTA BARBARA COUNTY

Influent Monitoring

Representative samples of the influent to the treatment plant shall be collected and analyzed as follows:

Constituent	Units	Type of Sample	Minimum Sampling and Analyzing Frequency
Flow Volume	MGD	metered	Daily
Maximum Daily Flow	MGD	calculated	Monthly
Suspended Solids	mg/L	24-hr. composite	Monthly
Biochemical Oxygen Demand, 5-day	mg/L	24-hr. composite	Monthly

Effluent Monitoring

Representative samples of the effluent after the last point of treatment shall be collected and analyzed as follows:

Constituent	Units	Type of Sample	Minimum Sampling and Analyzing Frequency
Settleable Solids	mL/L	Grab	Daily
Biochemical Oxygen Demand, 5-day	mg/L	24-hr. composite	Weekly
Suspended Solids	mg/L	24-hr. composite	Weekly
pH	mg/L	Grab	Weekly
Total Dissolved Solids	mg/L	Grab	Semi-annually (April & October)
Sodium	mg/L	Grab	" "
Chloride	mg/L	Grab	" "
Total Nitrogen (as N)	mg/L	Grab	" "
Freeboard in all ponds (treatment and holding ponds)	feet	measure	Weekly

Disposal Area Monitoring

The disposal/reuse areas shall be inspected daily for indications of actual or threatened overflow, seepage, surfacing or other problems. An inspection log shall be kept of the disposal areas conditions, observations, problems noted, and corrective actions taken. A summary of the log shall be included with each month's monitoring report.

Ground Water Monitoring

Representative samples of ground water from wells, located upgradient (previously identified by the City as Well No. 7, further characterization required in Provision E.9) and downgradient (previously identified by the City as Well No. 6) from the discharge/reuse area, shall be collected and analyzed as follows:

Constituent	Units	Type of Sample	Minimum Sampling and Analyzing Frequency
Depth to ground water	feet	measure	Annually (October)
Total Dissolved Solids	mg/L	Grab	" "
Sodium	mg/L	Grab	" "
Chloride	mg/L	Grab	" "
Total Nitrogen (as N) (all forms identified)	mg/L	Grab	" "
Sulfate	mg/L	Grab	" "
Boron	mg/L	Grab	" "

The results shall be submitted with the Annual Summary Report and include tabulated and narrative description of analytical results and water quality trends evident from the past five years' ground water monitoring results. Sample procedures and equipment used shall also be reported.

Biosolids Monitoring

Representative samples of biosolids removed from the facilities for disposal shall be collected and analyzed as follows:

Constituent	Units	Type of Sample	Minimum Sampling and Analyzing Frequency
Volume	Gallons or Cubic Yards	Grab	Annually or when disposal occurs (whichever is less frequent)
Moisture Content	percent	Grab	" " "
Total metals	mg/Kg	Grab	" " "

Reporting

Monthly monitoring reports shall be submitted to the Regional Board by the 30th day of each month following sampling. Reports shall summarize monitoring data, noncompliance, reasons for noncompliance, corrective action, disposal area monitoring, and any other significant events relating to compliance with Order No. R3-2005-0015. Copies of monitoring reports shall also be submitted to the Department of Health Services at 1180 Eugenia Place, Suite 200, Carpinteria, CA 93013. Annual summary reports shall be submitted in accordance with Standard Provision C.16. The annual summary report shall also include summary of progress and updates to the Discharger's salts minimization plan and summary of sewage overflow incidents as described below.

Spill Reporting

Reporting to the Regional Board

1. In accordance with Regional Board Sewage Spill Reporting Policy, sewage spills greater than 1,000 gallons and/or all sewage spills that enter a water body of the State, or occur where public contact is likely, regardless of the size, shall be reported to the Regional Board by telephone as soon as notification is possible and can be provided without substantially impeding cleanup or other emergency measures, and no later than 24 hours from the time that the Discharger has knowledge of the overflow.

2. Unless fully contained, overflows to storm drains tributary to Waters of the United States shall be reported as discharges to surface waters.

3. A written report of all relevant information shall be submitted to the Regional Board within five days of the spill, and shall include no less information than is required on the current spill reporting form (Attachment E), or equivalent, as approved by the Regional Board Executive Officer. Attachments to the report should be used as appropriate, and incidents requiring more time than the five-day period must be followed by periodic written status reports until issue closure. Photographs taken during the overflow incident and cleanup shall be submitted to the Regional Board in hard copy and electronic format. Copy of such reports shall also be provided to Santa Barbara County Health Department.

4. The Discharger shall sample all spills to surface waters to determine their effects on surface waters and submit the data to the Executive Officer within 30 days. Samples shall, at minimum, be analyzed for total and fecal coliform bacteria and enterococcus bacteria for spills to marine water, and fecal coliform bacteria for spills to fresh water. Sampling shall be conducted in the affected receiving water body upstream, at, and downstream of the overflow's point of entry, and as necessary to characterize the overflow's impact and to ensure adequate clean-up.

5. Spills under 1,000 gallons that do not enter a water body shall be reported to the Regional Board in writing and electronically (Excel spreadsheet preferred) within 30 days. Such reports shall include, at a minimum, a tabular summary of spill dates, locations, volumes, whether the spill discharged to surface waters (including conveyances thereto) or land, whether cleanup and/or disinfection was performed, the spill's cause, the number of spills at the location in the last three years, and weather conditions.

   This policy is subject to revision by the Executive Officer.

   Contact Information — Central Coast Regional Water Quality Control Board
   895 Aerovista Place, Suite 101
   San Luis Obispo, CA 93401-5411
   Phone: (805) 549-3147
   FAX: (805) 549-0397

6. The Discharger shall submit to the Regional Board annual summary reports of all overflows between January 1 and December 31 of the previous year. The report is **due January 30th of each year** and it shall **summarize** the following information for each overflow:

   a. Information requested in the Sewage Spill Report Form:
   b. How the overflow volume was estimated and/or calculated;
   c. Photograph(s) of spill, if taken;
   d. Where the spill entered any storm drain inlet or surface waters;
   e. Steps taken or planned to reduce, eliminate, and prevent recurrence of the overflow, and a schedule of major milestones for those steps;
   f. Steps taken or planned to mitigate the impact(s) of the overflow, and a schedule of major milestones for those steps;
   g. Any additional correspondence and follow-up reports, as necessary, to supplement the Sewage Spill Report Form and to provide detailed information on cause, response, adverse effects, corrective actions, preventative measures, or other information.

   The annual report shall include detailed evaluations of repetitive or chronically occurring circumstances, such as problematic collection system areas or common overflow causes, and the corrective actions taken to address such systematic problems.

   A statement certifying that there were no wastewater overflows for the last twelve months may be submitted (when appropriate) in lieu of the annual overflow report.

Reporting to the Governor's Office of Emergency Services

7. In accordance with the Governor's Office of Emergency Services (OES) 2002 Fact Sheet regarding the reporting of sewage releases (as revised or updated), the California Water Code, commencing with Section 13271, requires that a discharge of sewage into or onto State waters must be reported to OES.

   To report sewage releases of 1,000 gallons or more (currently the federal reportable quantity) to OES, **verbally notify the OES Warning Center at: (800) 852-7550, or (916) 845-8911.**

   The following fax number should be used *for follow-up information only*: (916) 262-1677. The reportable quantity is subject to revision by the State of California. OES reporting requirements for sewage releases and hazardous materials can be located on the OES Website @ www.oes.ca.gov in the California Hazardous Material Spill/Release Notification Guidance. The OES Hazardous Materials Unit staff is available for questions at (916) 845-8741.

   OES Reporting Exceptions: Notification to OES of an unauthorized discharge of sewage or hazardous substances is not required if: 1) the discharge to State waters is a result of a cleanup or emergency response by a public agency; 2) the discharge occurs on land only and does not affect State waters; or 3) the discharge is in compliance with applicable waste discharge requirements. These exceptions apply only to the Discharger's responsibility to report to OES, and do not alter the Regional Board's reporting policies or waste discharge requirements.

ORDERED BY Michael Thomas
for Roger Briggs, Executive Officer

September 9, 2005
Date

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ELEMENTS OF THE WASTEWATER COLLECTION SYSTEM MANAGEMENT PLAN

I. **Goals:** The goal of the Wastewater Collection System Management Plan is to prevent overflows and to provide a plan and schedule for implementation of measures to prevent overflows.

II. **Organization:** The Wastewater Collection System Management Plan must identify the following components:

A. Administrative and maintenance positions responsible for implementing measures in the Wastewater Collection System Management Plan program, including lines of authority by organization chart or similar document; and

B. The chain of communication for reporting overflows, from receipt of a complaint or other information, including the person responsible for reporting overflows to the Regional Water Quality Control Board, Santa Barbara County Health Departments and the State Office of Emergency Services (OES).

III. **Legal Authority:** The Wastewater Collection System Management Plan shall include legal authority, through sewer use ordinances, service agreements, or other legally binding procedures, to:

A. Control infiltration and connections from inflow sources, including satellite systems;

B. Require that sewers and connections be properly designed and constructed;

C. Ensure proper installation, testing, and inspection of new and rehabilitated sewers (such as new or rehabilitated collector sewers and new or rehabilitated service laterals);

D. Limit fats and greases and other debris that may cause blockages in the collection system; and

E. Implement the national pretreatment program authorities specified under 40 CFR 403.8(f)(1).

IV. **Measures and Activities:** In order to reduce overflows, the Wastewater Collection System Management Plan must address the elements listed below that are appropriate and applicable to the Discharger's system and identify the person or position in the organization responsible for each element.

A. Provide adequate operation and maintenance of facilities and equipment.

B. Maintain an up-to-date map of the collection system showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and storm water conveyance facilities.

C. Maintain relevant information to establish and prioritize appropriate Wastewater Collection System Management Plan activities (such as the immediate elimination of dry weather overflows or overflows into sensitive waters, such as public drinking water supplies and their source waters, swimming beaches and waters where swimming occurs, shellfish growing areas, waters within Federal, State, or local parks, and water containing threatened or endangered species or their habitats), and identify and illustrate trends in overflows, such as frequency and volume.

D. Routine preventive operation and maintenance activities by staff and contractors; including a system for scheduling regular maintenance and cleaning of the collection system with more frequent cleaning and maintenance targeted at known problem areas as well as a tracking system for work orders.

E. Identify and prioritize structural deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. This shall include a rehabilitation plan including schedules for the entire system. As with the preventative maintenance program, sewer rehabilitation and replacement is crucial for the prevention of spills. Among the provisions that should be specified in this section is the

need to direct rehabilitation and replacement of sewer pipes which are at risk of collapse or prone to more frequent blockages due to pipe defects. The program should also include regular visual and video inspection of sewer pipes and a system for assessing and ranking the condition of sewer pipes. Finally, the rehabilitation and replacement plan should include a financial plan that properly manages and protects the infrastructure assets.

F. Provide training on a regular basis for staff in collection system operations, maintenance, and monitoring, and determine if contractors' staffs are appropriately trained.

G. Provide equipment and replacement parts inventories, including identification of critical replacement parts.

H. Establish an implementation plan and schedule for a public education outreach program that promotes proper disposal of grease and fats.

I. Establish a plan for responding to overflows from private property that discharge to public right of ways and storm drains, to prevent discharges from overflows to surface waters and storm drains.

J. Develop a plan and a schedule for providing an analysis of alternative methods of disposal for grease and fats, and an implementation plan and a schedule for providing adequate disposal capacity for grease and fats generated within the sewer system service area.

K. Describefiscal resources necessary to ensure system operation, including fee structure, fiscal resources, actual and projected five-year budget expenses for staffing, operation, capital improvement projects, and reserves.

L. Describe staffing available to ensure system operation (identifying individuals and titles) including developing, implementing and revising the Program. Include an organizational chart, duties and training frequency.

V. **Design and Performance Provisions**

A. Develop and/or adopt design and construction standards and specifications for the installation of new sewer systems, pump stations, and other appurtenances; and for rehabilitation and repair of existing sewer systems; and

B. Develop and/or adopt procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances, and for rehabilitation and repair projects.

VI. **Monitoring, Measurement, and Program Modifications**

A. Monitor the implementation and, where appropriate, measure the effectiveness of each element of the Wastewater Collection System Management Plan;

B. Update program elements, as appropriate, based on monitoring or performance evaluations; and

C. Modify the Wastewater Collection System Management Plan program, as appropriate, to keep it updated and accurate and available for audit at all times.

VII. **Overflow Emergency Response Plan:** The Discharger shall develop and implement an Overflow Emergency Response Plan that identifies measures to protect public health and the environment. At a minimum, this plan should provide for the following actions.

A. Ensure proper notification procedures so that the primary responders are informed of all overflows in a timely manner (to the greatest extent possible).

B. Ensure that all overflows are appropriately responded to, including ensuring that reports of overflows are immediately dispatched to appropriate personnel for investigation and appropriate response.

C. Ensure immediate notification of health agencies and other impacted entities (e.g., water suppliers) of all overflows. The plan should provide for the reporting of overflows to the Regional Board, Santa Barbara County Health Department and the State Office of Emergency Services (OES) in accordance with each agency's policy. The Wastewater Collection System Management Plan should identify the public health agency and other officials who will receive immediate notification.

D. Ensure that appropriate staff and contractor personnel are aware of and follow the plan and are appropriately trained.

E. Provide emergency operations, such as traffic and crowd control, and other necessary emergency response.

F. Take all reasonable steps to contain sewage, prevent sewage discharges to surface waters, and minimize or correct any adverse impact on the environment resulting from the overflows, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

G. Develop and implement a plan for the use of portable aerators where complete recovery of the sanitary sewer overflows is not practicable and where severe oxygen depletion in existing surface waters is expected.

H. Develop and implement a plan to respond in a timely manner to spills and other emergencies. Collection system staff should be able to respond to a sewage spill in less than an hour from the first call. The Discharger should be capable of meeting this response time day or night, every day of the week. The Discharger must own or have ready access to spill and emergency response equipment such as vacuum trucks, hydroflushers, pumps, temporary bypass hoses, and portable generators of adequate number and capacity to operate pump stations.

I. Describe offsite and onsite alarm systems, response times, and methods for detecting spills from the system,

VIII. **Source Control Program:** Prepare and implement a grease, fat, and oil source control program to reduce the amount of these substances discharged to the sewer collection system. This plan shall include the legal authority to prohibit discharges to the system and identify measures to prevent overflows caused by fat, oil, and grease blockages of sewers. The elements of an effective grease control program may include requirements to install grease removal devices (such as traps or, preferably, interceptors), design standards for the removal devices, maintenance requirements, Best Management Practices (BMP) requirements, record keeping, and reporting requirements. An effective grease control program must also include authority to inspect grease producing facilities, enforcement authorities, and sufficient staff to inspect and enforce the grease ordinance.

A. The grease control program shall identify sections of the sewer system subject to grease blockages and establish a cleaning maintenance schedule for each section; and

B. The program shall develop and implement source control measures, for all sources of grease and fats discharged to the sewer system, for each section identified in (A) above.

IX. **System Evaluation and Capacity Assurance Plan:** Prepare and implement a capital improvement plan that will provide hydraulic capacity of key sewer system elements under peak flow conditions. At a minimum, the plan must include:

A. **System Evaluation** - Evaluate current capacity of the collection system including diversions of urban runoff to the sewer system and those portions of the collection system which are experiencing or

contributing to an overflow discharge caused by hydraulic deficiency. The evaluation must provide estimates of peak flows (including flows from overflows that escape from the system) associated with conditions similar to those causing overflow events, estimates of the capacity of key system components, hydraulic deficiencies (including components of the system with limiting capacity), and the major sources that contribute to the peak flows associated with overflow events;

B. **Capacity Enhancement Measures** - Establish a short- and long-term capital improvement program to address deficiencies including prioritization, alternatives analysis, schedules, diversions of urban runoff to the sewer system during dry weather periods, and control of infiltration and inflow during both wet weather events and dry weather periods; and

C. **Plan Updates** - At a minimum, the plan must be updated annually to describe any significant change in proposed actions and/or implementation schedules. The updates should include available information on the performance of measures that have been implemented.

X. **Annual Program Updates:** As part of the Collection System Management Plan, the Discharger shall conduct an internal audit, appropriate to the size of the system and the number of overflows, and submit a report of such audit (in conjunction with the annual report specified in the MRP), evaluating the Collection System Management Plan and its compliance with this subsection, including its deficiencies and steps to correct them.

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California Regional Water Quality Control Board, Central Coast Region

SEWAGE OVERFLOW REPORT

(Include all available details (use attachments as needed) – submit follow-up written reports as necessary)

Reporting Party		Phone	
Discharger		Phone	
Address		City	

Date Of Overflow		Time Overflow Began		Time Overflow Stopped	
Location/Address of Overflow Origin					
Volume Of Overflow (Gallons)		Path Of Overflow			
Waterbody/Bodies Affected					
Cause Of Overflow (grease, roots, vandalism, pump station failure, etc.)					

Action Taken To Stop Overflow			
Time Cleanup Began		Time Cleanup Complete	
Discussion Of Cleanup			
Were Public Health Warnings Posted, And If So, Where?		Number Of Overflows In Same Location In Last Three Years	
Discussion Of Measures Taken To Prevent Overflows At This Location			

Agencies Notified (Please Check)		County Env. Health		Office of Emergency Services		Fish and Game		County Board Of Supervisors	Other (List)

SIGNATURE / TITLE		DATE	