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Sewer System Analysis

[Project Name]

Application # [XX-XXX]

[Month Year]

Prepared for:

[Developer Name]

[Address 1]

[Address 2]

Prepared by:

[Consultant Name]

[Address 1]

[Address 2]

[Insert Licensed Engineer Stamp]

Table of Contents

[List of Tables 2](#_Toc138961118)

[Attachments 2](#_Toc138961119)

[Chapter 1 - Introduction 3](#_Toc138961120)

[Introduction 3](#_Toc138961121)

[Project Overview 3](#_Toc138961122)

[Purpose of Study 3](#_Toc138961123)

[Chapter 2 – Design Criteria 4](#_Toc138961124)

[Wastewater Flow Factors 4](#_Toc138961125)

[Design Criteria 5](#_Toc138961126)

[Chapter 3 – Projected Wastewater Flow 7](#_Toc138961127)

[Projected Wastewater Flow 7](#_Toc138961128)

[Chapter 4 – Existing Wastewater Facilities 8](#_Toc138961129)

[Existing Wastewater Facilities 8](#_Toc138961130)

[Chapter 5 – Wastewater System Analysis 9](#_Toc138961131)

[Hydraulic Modeling 9](#_Toc138961132)

[Wasterwater Analysis Summary 9](#_Toc138961133)

[Velocity 10](#_Toc138961134)

[Flow Depth Ratio 10](#_Toc138961135)

[Lift Station Capacity Evaluation 10](#_Toc138961136)

[Chapter 6 - Recommended Wastewater Facilities 11](#_Toc138961137)

[Wastewater System Improvements 11](#_Toc138961138)

[Lift Station Improvements 11](#_Toc138961139)

# List of Tables

**Table 2-1 Wastewater Flow Factors …………………………………….…………………………………………………….X**

**Table 2-2 Design Criteria……….……………………………………………………………………………………………………….X**

**Table 3-1 Projected Wasterwater FLOWS...……….……………………………………………………..…….…….…….X**

**Table 5-1 Summary of Wastewater Analysis ……………….……………………………………..…………………….X**

**Table 5-2 Lift Station Capacity Evaluation………………..….……………………………………..…………………….X**

# Attachments

ATTACHMENT A Location Map

ATTACHMENT B Site Plan

ATTACHMENT C Existing wastewater facility map

ATTACHMENT D HydrAulic Model analyis and node/pipe diagram

ATTACHMENT E Proposed wastewater facility map

ATTACHMENT f copy of evmwd master plan Existing lift station capacity

# Chapter 1 - Introduction

## Introduction

This report provides a sewer system analysis for the [Project Name] project in the Elsinore Valley Municipal Water District (EVMWD or District). This report will provide information concerning projected sewer flow generation, existing facilities, and recommended facilities associated with serving the project.

## Project Overview

[Describe the project location, project area, land use, residential lot EDU, and building area]. **Attachment A** depicts the project location and **Attachment B** is the preliminary site plan for the project.

## Purpose of Study

The project is located within the Elsinore Valley Municipal Water District for sewer service. The purpose of this report is to establish the sewer facilities that will be required for the development of the project.

# Chapter 2 – Design Criteria

This section represents the design criteria used to evaluate recommended sewer system improvements for the project. The criteria utilized in this study are in accordance with the District’s 2023 Design Standards.

## Wastewater Flow Factors

Table 2-1 presents the wastewater flow factors (WFF) used for projecting sewer generation for the project.

| Table 2-1 Wastewater Flow Factors | | |
| --- | --- | --- |
| Land Use Category | WFF  (gpd/unit) | Unit |
| Single Family Residential | 250 | Dwelling Units (DU) |
| Condominium/Townhome Residential | 150 | DU |
| Business Park | 500 | acre |
| General Commercial | 1,400 | acre |
| Limited Industrial | 500 | acre |
| Open Space - Recreation | 100 | acre |
| Public Institutional | 500 | acre |
| Hillside Residential | 500 | acre |
| Very Low Density Residential (0.1 – 0.5 DU/acre) | 300 | acre |
| Low Density Residential (0.5‑2 DU/acre) | 600 | acre |
| Low Medium Density Residential (2-4 DU/acre) | 900 | acre |
| Medium Density Residential (4-6 DU/acre) | 1,000 | acre |
| Medium High Density Residential (6-12 DU/acre) | 1,100 | acre |
| High Density Residential (12-24 DU/acre) | 2,100 | acre |
| Mixed Use (24 DU/acre maximum) | 8,400 | acre |

## Design Criteria

Table 2-2 presents the design criteria used for sizing of EVMWD facilities for the project.

| Table 2-2 Design Criteria | | |
| --- | --- | --- |
| Description | Value | Units |
| **Peaking Factor** |  |  |
| Peak Dry Weather Flow (PDWF) for Collector Sewer  (< 18-inch diameter) | 3.0 of Average Dry Weather Flow (ADWF) | gpd |
| Peak Dry Weather Flow (PDWF) for Trunk Sewer  (≥ 18-inch diameter) | 2.5 of ADWF | gpd |
| **Coefficient of Pipe Friction** |  |  |
| Manning “n” value | 0.013 | unitless |
| Hazen-William’s “C” factor | 120 | unitless |
| **Pipeline Velocity** |  |  |
| Minimum velocity for ADWF | 2 | fps |
| Maximum velocity for ADWF | 10 | fps |
| **Flow Depth Ratio (d/D)** |  |  |
| Proposed sewers that are less than 18 inches in diameter for PDWF | 0.50 | unitless |
| Proposed sewers that are greater than or equal to 18 inches in diameter for PDWF | 0.75 | unitless |
| Existing sewers under PDWF | 0.75 | unitless |
| Existing sewers under PWWF | 0.92 | unitless |
| **Manhole Friction Head Loss** |  |  |
| Average manhole friction head losses | 0.1 | feet |
| Peak manhole friction head losses | 0.5 | feet |
| **Lift Stations and Force Mains** |  |  |
| ADWF (existing conditions) minimum velocity | 3.0 | fps |
| Hazen-William’s “C” factor | 120 | unitless |
| Lift Station Peaking Factor | 3.0 of Average Dry Weather Flow (ADWF) | gpd |
| Minimum forcemain velocity with all pumps running | 4 | fps |
| Minimum forcemain velocity during normal operations | 2.5 | fps |
| Maximum force main velocity | 7 | fps |

# Chapter 3 – Projected Wastewater Flow

This chapter provides the projected wastewater flows and lift station pumping capacity requirements for the project based on the criteria presented in Chapter 2.

## Projected Wastewater Flow

**Table 3-1** presents the projected wastewater flow factor (WFD) for ADWF and PDWF.

| Table 3-1 Projected Wasterwater Flows | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Description/Land Use | Area (Acres) | EDU | WFD (gpd/unit) | Unit | ADWF  (gpd) | PDWF  (gpd) |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |

# Chapter 4 – Existing Wastewater Facilities

This chapter describes the existing wastewater facilities. **Attachment C** presents a map showing the boundaries of the project.

## Existing Wastewater Facilities

[Describe the existing wastewater facilities vicinity of the project, pipe size, lift station, and regional wastewater treatment plant.]

# Chapter 5 – Wastewater System Analysis

This chapter presents the recommended wastewater system improvements required to provide service to the project. An evaluation of distribution, storage, and pumping facilities is provided.

## Hydraulic Modeling

The analysis of the wastewater system and node diagram is provided in **Attachment D**. The results of this analysis indicate that the maximum d/D is X.XX under PDWF, which is below the maximum d/D criteria of 0.5. The velocities in this analysis range from X.XX fps to X.XX fps. The following analysis was conducted on the proposed gravity sewer mains.

1. Average Dry Weather Flow
2. Peak Dry Weather Flow

## Wastewater Analysis Summary

**Table 5-1** summarizes the wastewater analysis results.

| Table 5-1 Summary of Wastewater Analysis | | | | | |
| --- | --- | --- | --- | --- | --- |
| Description | Criteria Value | Units | Minimum Value | Maximum Value | Criteria Met  (Yes/No) |
| **Pipeline Velocity** |  |  |  |  |  |
| Minimum velocity | 2 | fps |  | N/A |  |
| Maximum velocity | 10 | fps | N/A |  |  |
| **Flow Depth Ratio (d/D)** |  |  |  |  |  |
| Proposed sewers that are less than 18 inches in diameter for PDWF | 0.50 | unitless |  |  |  |
| Proposed sewers that are greater than or equal to 18 inches in diameter for PDWF | 0.75 | unitless |  |  |  |

## Velocity

[Describe the system velocity. If the velocity criteria are not met, consider changing the pipe slope or size]

## Flow Depth Ratio

[Describe flow depth ratio (d/D). If the d/D is not met, consider increasing the pipe size or slope]

## Lift Station Capacity Evaluation

**Table 3-2** summarizes the lift station capacity evaluation.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 5-2 Lift Station Capacity Evaluation | | | | | |
| Lift Station | Existing Pumping Surplus1  [A] | Required Pumping Capacity  [B] | Available Pumping Capacity  [A – B] | Deficient | |
| (gpm) | (gpm) | (gpm) | (Yes/No) | |
|  |  |  |  |  | |
|  |  |  |  |  | |
| Note 1. Existing capacity surplus from Master Plan attached in Attachments F. | | | | | |

# Chapter 6 - Recommended Wastewater Facilities

This chapter presents the recommended wastewater system improvements required to provide service to the project. **Attachment E** presents the proposed wastewater facilities to be constructed for the project.

## Wastewater System Improvements

[Describe the proposed pipe size. The minimum main size shall be 8-inch. Parallel mains may be required by the District to be installed to avoid connecting services to the truck sewers >= 18-inch in diameter and 10-inch pipe shall not be allowed]

## Lift Station Improvements

[Describe the improvements required to meet the lift station Capacity (if applicable)]. **Attachment F** from EVMWD’s master plans notes a surplus/deficit of XXX gpm capacity in the [Lift Station Name].

ATTACHMENT A

Location Map

ATTACHMENT B

Site Plan

ATTACHMENT C

Existing wastewater facility map

ATTACHMENT D

Hydraulic Model analyis and node/pipe diagram

ATTACHMENT E

Proposed wastewater facility map

ATTACHMENT F

copy of evmwd master plan Existing lift station capacity

Table 7.2 Lift Station and Force Main Evaluation

| Lift Station Name | Number of Pumps | PDWF (gpm) | PWWF (gpm) | Firm Capacity (gpm) | Surplus/ Deficit(1) | Force Main Deficient? |
| --- | --- | --- | --- | --- | --- | --- |
| A-1 | 2 | 3 | 35 | 255 | 220 | No |
| A-2 | 3 | 1,390 | 3,857 | 2,400 | ***-1,457*** | ***Yes*** |
| A-3 | 2 | 186 | 579 | 1,125 | 546 | No |
| A-4 | 2 | 428 | 1,359 | 1,780 | 421 | No |
| A-5 | 2 | 21 | 85 | N/A | N/A | No |
| Alberhill | 2 | 30 | 49 | N/A | N/A | No |
| B-1 | 3 | 2,684 | 3,648 | 2,800 | ***-848*** | No |
| B-2 | 3 | 1,970 | 3,369 | 2,400 | ***-969*** | ***Yes*** |
| B-3 | 2 | 353 | 1,351 | 1,400 | 49 | No |
| B-4 | 2 | 238 | 1,003 | 1,200 | 197 | No |
| B-5 | 2 | 94 | 621 | 1,000 | 379 | No |
| B-6 | 2 | 97 | 577 | 1,000 | 423 | No |
| B-7 | 2 | 103 | 452 | 650 | 198 | No |
| B-8 | 2 | 91 | 448 | 650 | 202 | No |
| B-9 | 2 | 58 | 432 | 350 | -82 | No |
| B-10 | 3 | 42 | 293 | 350 | 57 | No |
| Backbasin | 2 | 0 | 0 | N/A | N/A | No |
| Big Range | 2 | 61 | 177 | 335 | 158 | No |
| Bolo | 2 | 63 | 173 | 200 | 27 | No |
| Canyon Hills | 2 | 127 | 371 | N/A | N/A | No |
| Collier | 2 | 40 | 147 | 800 | 653 | No |
| Continental | 3 | 551 | 607 | 2,100 | 1,493 | No |
| Gray Fox | 3 | 385 | 629 | 1,396 | 767 | No |
| Greer Ranch | 2 | 131 | 303 | 350 | 47 | No |
| Horsethief | 2 | 62 | 108 | 200 | 92 | No |
| Lighthouse | 3 | 187 | 416 | 1,500 | 1,084 | No |
| McVicar(2) | 3 | 1,400 | 2,742 | 1,400 | ***-1,342*** | No |
| New Longhorn | 2 | 48 | 83 | 275 | 192 | No |
| Nichols | 2 | 42 | 129 | 285 | 156 | No |
| Roards Way | 2 | 98 | 244 | 1,000 | 756 | No |
| Serena | 2 | 10 | 19 | N/A | N/A | No |
| Staidum Villa | 2 | 14 | 185 | 120 | -65 | No |
| Summerly | 2 | 527 | 422 | N/A | N/A | No |
| Tuscany Hills | 2 | 76 | 128 | 1,000 | 872 | No |
| Vacation | 2 | 84 | 203 | 626 | 423 | No |
| Village Way | 3 | 232 | 529 | 2,060 | 1,531 | No |
| Washington | 2 | 168 | 506 | N/A | N/A | No |

1. Notes:

Abbreviations: gpm - gallons per minute; N/A - not applicable.

* 1. Capacity deficiencies highlighted in ***Bold Italic.***
  2. McVicar Lift Station operates at a rate lower than the design pumping rate.