HUNTER
ENGINEERING

File Copy

CIVIL AND SURVEY

Basis of Design Report
Sanitary Sewer
For
Paseo De Las Flores
7300 Via Paseo Del Sur
Scottsdale, Arizona

EXPIRES: 9/30/18

Accepted by
Water Resources
Dougmann
5.25.16

January 2016

Prepared by:
Hunter Engineering, Inc.
10450 N. 74th Street, Suite 200
Scottsdale, AZ 85258

6
8-DR-2015
5/25/2016

BASIS OF DESIGN REPORT
SANITARY SEWER
FOR

PASEO DE LAS FLORES

7300 VIA PASEO DEL SUR
SCOTTSDALE, ARIZONA

PREPARED FOR

LGE CORPORATION
740 NORTH 52ND STREET, SUITE 200
PHOENIX, AZ 85018

PREPARED BY

JOSEPH BURKE, P.E.
HUNTER ENGINEERING, INC.
10450 N. 74th Street, SUITE 200
SCOTTSDALE, AZ 85258
(480) 991-3985

H.E. PROJECT NO.: LGEC202

TABLE OF CONTENTS

EXPIRES: 9/30/16

1.0 INTRODUCTION

This sewer report has been prepared under a contract from LGE Corporation developer of the Paseo De Las Flores project. The purpose of this report is to provide a sewer analysis, as required by the City of Scottsdale, to support this development. This report has been prepared according to the procedures detailed in Chapter 7 of the City of Scottsdale's Design Standards & Policies Manual dated January 2010.

The project is located at 7300 Via Paseo Del Sur south of the intersection of McCormick Pkwy and Hayden, within the City of Scottsdale, Maricopa County, Arizona. The parcel is bound by developed roads to the northwest and the west. Also there is a parcel to the northeast and the south. The site is specifically located within the northwest quarter of the southwest quarter of the northwest quarter of the southwest quarter of Section 1, Township 2 North, Range 4 East, of the Gila and Salt River Base and Meridian. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system.

The development is for restaurants, offices, and retail shops on approximately 2.65-acres of land. Improvements to be made on-site include two proposed buildings, at grade parking, detention basins, landscaping and utilities. Figure 2, in Appendix A, illustrates the site plan for the development.

2.0 EXISTING SITE CONDITIONS

The site is currently developed with an existing single-story stucco building that was used for church facilities with parking. The site is bordered by park area to the north, Paseo Del Sur roadway to the east, an apartment development to the south and Hayden Road to the west.

3.0 EXISTING SEWER COLLECTION SYSTEM

There is an existing 8-inch gravity sewer main in Paseo Del Sur Road that begins at a manhole approximately 100' north of this sites south boundary in the roadway. The invert of the sewer at this location is approximately 1281.0 which is approximately 10-ft deep. An 8-inch sewer service extends west from this manhole into the project site. According to blue stake field verification, the sewer service continues north to the existing building onsite. The diameter and slope of this existing service is unknown at this time. The diameter of the sewer will be determined in the field.

4.0 PROPOSED SANITARY SEWER SYSTEM

This development proposes to connect into the existing sewer service line onsite. The location of the existing sewer line is identified on the Conceptual Utility Plan located in the back

pocket of this report and discussed in Section 3.0 of this report. If it is determined that the diameter of the existing sewer is 6-inch or larger, the proposed sewer services for both proposed buildings will be connected into the existing 6-inch sewer. An approximate location of the connection is identified on the Conceptual Utility Plan. The remaining existing sewer service north of the connection shall be either abandoned in-place or removed. If it is determined that the existing sewer is smaller than 6", a new sewer service connection for both proposed buildings will be provided into the existing 8-inch sewer in Paseo Del Sur.

According to the calculations provided in Appendix B, Proposed Building A will have an estimated Average Daily Flow of 8,082 GPD and a Peak Hour Flow of 33.6 GPM. Proposed Building B will have an estimated Average Daily Flow of 11,927 GPD and a Peak Hour Flow of 33.3 GPM.

Wastewater flows were calculated in accordance with the City of Scottsdale Design Standards and Policy Manual (Reference 1). See the demand calculations in Appendix B.

All sanitary sewer pipe material for this project has been designated as PVC SDR-35. All fittings are to also be PVC.

Trenching and bedding details for this project are to be per MAG Standard Specifications Section 601. Trench width above the installed pipe may be as wide as necessary to properly brace/install the work. Bedding, backfill and compaction shall be installed per MAG Standard Specification 601.4.

5.0 CONCLUSIONS

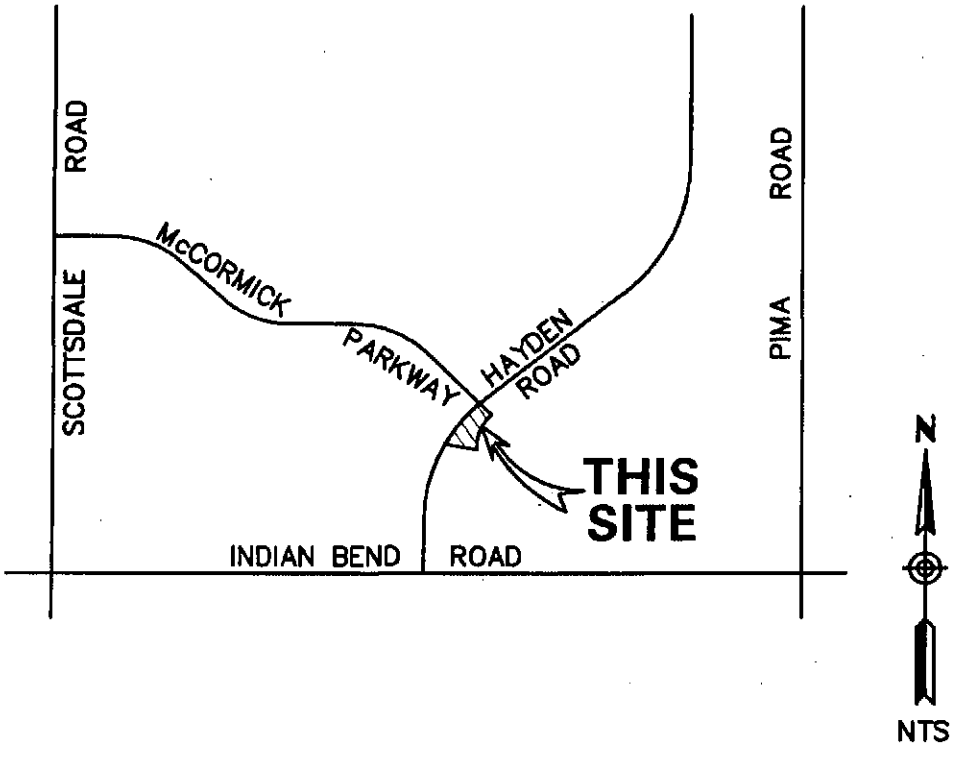
Based on the results of this study, it can be concluded that:

- The proposed sewer system is adequate to service the development.

6.0 REFERENCES

1) *City of Scottsdale Design Standards & Policies Manual*, January 2010.

APPENDIX A
FIGURES



VICINITY MAP
FIGURE 1

APPENDIX B
CALCULATIONS

Project: Paseo De Las Flores
Project No.: LGEC202
City: SCOTTSDALE, AZ
Date: 5/20/2016

PROJECTED MAXIMUM SANITARY SEWER LOADS

I.D.	Land Use	Building Area sq.ft.	Average Day Sewer Demands in Gallons Figure 7.1-2		Peaking Factor Figure 7.1-2	Average Daily Flow gpd	Average Daily Flow gpm	Peak Flow gpm
Building Area A	**Restaurant**	6,688	1.20	per sq.ft.	6	8,026	5.6	33.6
Building Area B	**Office**	**11,098**	0.40	per sq.ft.	3	4,439	3.1	9.3
	Retail	**6,815**	0.50	per sq.ft.	3	3,408	2.4	7.2
	Restaurant	**3,419**	1.20	per sq.ft.	6	4,103	2.8	16.8
	Sub-Total	**28,020**				**19,975**	**13.9**	**66.9**

4. The water line and sanitary sewer line will run parallel to each other, with 9 feet of separation to the pipes' centerline in order to maintain 6 feet of clearance at manholes.
5. Deflections in the sanitary sewer line shall be designed to nominal fitting angles within standard tolerances and will occur at the same locations where the water line is deflected.

See Section 6-1.302 for related water system criteria.

DESIGN FLOWS

7-1.403

A. Residential

Sanitary sewer lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpcpd) and a peaking factor of 4.

Sanitary sewer lines larger than 12 inches in diameter will be designed using 105 gpcpd and a peaking factor developed from "Harmon's Formula":

$$Q_{max} = Q_{avg}\,[1+14 / (4+P1/2)]$$

P = Population / 1,000

Residential densities are to assume 2.5 persons per dwelling unit, apartment or town home.

B. Commercial and Industrial

Wastewater flows for uses other than those listed below shall be based upon known regional or accepted engineering reference sources approved by the Water Resources Department.

AVERAGE DAY SEWER DEMANDS		
Land Use	**Demand**	**Peaking Factor**
Commercial/Retail	0.5 per sq. ft.	3
Office	0.4 per sq. ft.	3
Restaurant	1.2 per sq. ft.	6
High Density Condominium	140 per room	4.5
Resort Hotel (includes site amenities)	380 per room	4.5
School: without cafeteria	30 per student	6
School: with cafeteria	50 per student	6
Cultural	0.1 per sq. ft.	3

FIGURE 7.1-2 AVERAGE DAY SEWER DEMAND IN GALLONS

HYDRAULIC DESIGN

7-1.404

No public sanitary sewer lines will be less than 8 inches in diameter unless permission is received in writing from the Water Resources Department.

Sanitary sewer lines should be designed and constructed to give mean full flow velocities of not less than 2.5 fps, based upon Manning's Formula, using an "*n*" value of 0.013.

Conversely, to prevent abrasion and erosion of the pipe material, the maximum velocity will be limited to 10 fps at estimated peak flow. Where velocities exceed this maximum figure, the engineer will be required to submit a hydraulic analysis along with construction recommendations to the Water Resources Department for consideration. In no case will velocities greater than 15 fps be allowed.

Actual velocities will be analyzed under peak flow conditions for each reach of pipe.