

PRELIMINARY Basis of Design Report

- ACCEPTED
- ACCEPTED AS NOTED
- REVISE AND RESUBMIT



Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.

For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY apritchard

DATE 7/25/2022

GOLD DUST APARTMENTS

Preliminary Sewer Basis of Design Report

1122028

Prepared For: ESG Architecture & Design

June 17, 2022



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Preliminary Sewer Basis of Design Report

10050 N Scottsdale Road, Paradise Valley, AZ

1122028

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June 17, 2022

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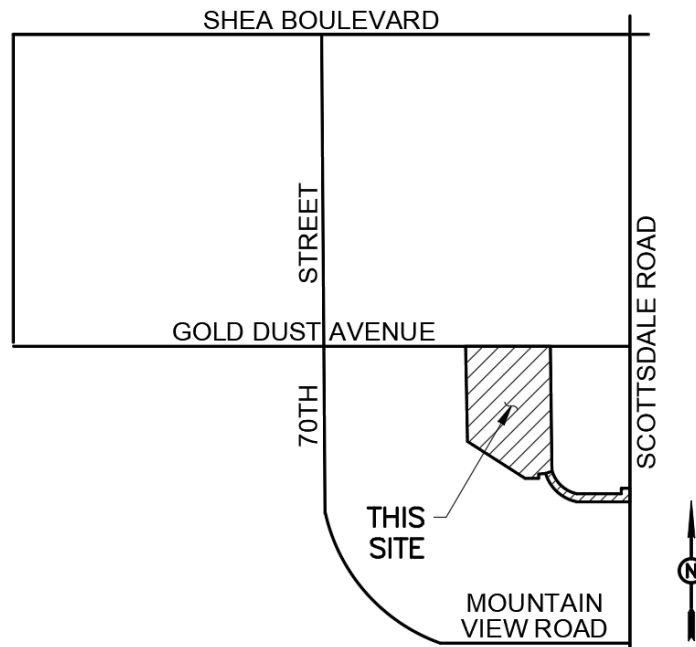


C. Shannon Mauck

1. INTRODUCTION

This report presents a preliminary sewer basis of design for the City of Scottsdale as a part of the Gold Dust Apartments project. The purpose of this report is to provide analysis and results for the existing and proposed sewer system at the site. The Gold Dust Apartments site is approximately 4.8 acres and fully developed one story commercial development that will be demolished. The Gold Dust Apartments project includes the design of a new mixed-use building, associated utilities, and hardscape improvements.

The project is located at the intersection of Gold Dust Ave. and Scottsdale Road, in the northeast quadrant of Township 3 North, Range 4 East, Section 27. This site is bounded by two existing buildings to the east, residential apartments to the west, Acacia Dr to the south, and Gold Dust Ave to the north. This site has an Assessor's Parcel Number (APN) of 175-56-002H. See **Figure 1** for a location map.



OVERALL DEVELOPMENT
NOT TO SCALE

Figure 1 - VICINITY MAP

2. EXISTING CONDITIONS

The site is located within the City of Scottsdale's service area for wastewater. There is an 8-inch PVC sewer service that runs through the east side existing parking lot. This 8-inch PVC sewer service is connected to the 24-inch public gravity sewer main that runs through Scottsdale Road.

3. DESIGN CRITERIA

The sewer lines serving the site will be designed to meet Maricopa Association of Governments (MAG) and the Arizona Administration Code (AAC) standards and details. Additionally, the following criteria per the City of Scottsdale (*DS&PM*) will be met:

- No public sewer lines will be less than 8" in diameter.
- The Manning's "n" value of all pipes shall be 0.013.
- Sanitary sewer lines are to be VCP, PVC, or DIP.
- Sewer lines shall be designed and constructed to give mean full flow velocities equal to or greater than 2.5 feet per second.
- Pipes shall have a maximum d/D ratio of 0.65 for gravity sewer lines 12" in diameter and less in the ultimate peak flow condition. For gravity sewer lines greater than 12" in diameter shall not exceed a d/D ratio of 0.70.
- Sewer manholes shall be located at a maximum spacing of 500 feet for sewer pipes between 8" to 15" and 600 feet for sewer pipes between 18"-30" in diameter.
- Manholes shall be 4-feet in diameter for manholes less than 10-feet deep or connecting to lines less than 15" in diameter. For manholes more than 10-feet deep or the line is greater than 15", the manhole shall be 5-feet in diameter.
- The maximum sewer cleanout spacing shall be 150 feet for 6" pipes or smaller.
- No sanitary sewer lines shall be installed with less than 4-feet over cover over the top of the pipe.

4. DESIGN METHODOLOGY

4.1 SEWER DESIGN

The City of Scottsdale (*DS&PM*) specified the design demand for a high-density condominium uses classifications as 140 gallons per day (GPD) per unit. The high-density condominium demand was used as an apartment demand was not provided. The maximum design peaking factor for a high-density condominium is 4.5 per the DS&PM. The proposed building also provides 5,000 square feet of office space. The demand in gpd for an office space is .4 per square foot. The peaking factor for the office land use is 3.0. The mixed-use building is also providing 2,500 square feet of a fitness/yoga center. The demand in gpd for a fitness center/spa/health club is .8 per square foot. The peaking factor for the fitness/yoga land use is 3.5. The mixed-use building is also providing a pool that will have a backwash rate of 50 gallons per minute for 5 minutes each week. The peaking factor used for the pool was 5 as there is a possibility that all 5 minutes could be backwashed in one day.

The Average Day Flow for the facility was calculated with **Equation 1 below**.

Equation 1 – AVERAGE DAY FLOW

$$Q_{Avg} = \frac{\# \text{ units}}{1} * \frac{\# \text{ gal}}{\text{unit}} * \frac{1 \text{ day}}{24 \text{ hrs}} * \frac{1 \text{ hr}}{60 \text{ min}}$$

The Peak Day Flow was calculated with **Equation 2 below**.

Equation 2 – PEAK DAY FLOW

$$Q_{peak} = Q_{Avg} * (PHF) = Q_{Avg} * 4.5$$

Equation 3 – CONVERSION TO CFS

$$Q_{peak}(CFS) = 370.16 * \left(\frac{1 \text{ ft}^3}{7.48 \text{ gal}} \right) * \left(\frac{1 \text{ min}}{60 \text{ sec}} \right) = 0.82 \text{ CFS}$$

Refer to **Table 1** for sewer demand calculations.

Table 1- DEMAND ALLOCATION SUMMARY

Facility	Number of Units	GPD	Average Day Demand		Peak Day Demand	
			GPD	GPM	GPD	GPM
Apartments	254	140	35,560	24.69	160,020	111.13
Office	5,000	0.4	2,000	1.39	6,000	4.17
Yoga	2,500	0.8	2,000	1.39	7,000	4.86
Pool				250		250

5. RESULTS

To ensure that the proposed sewer line is designed and constructed to give mean full flow velocities equal to or greater than 2.5 feet per second and less than 10 feet per second, HydraFlow Express was used to determine the results of the proposed 6-inch sewer service line. The d/D ratio could not surpass .65 when using a pipe less than 12 inches in diameter. The diameter of the pipe used to show that the d/D ratio is not surpassed, was the 6-inch sewer service line that will serve as the sewer connection to the building. The d/D ratio was found to be 0.50. Refer to **Appendix A** for HydraFlow Express results.

6. PROPOSED CONDTIONS

As part of the proposed site improvements, there will be a new 6” sewer service line that will serve the new mixed-use building. This new 6” sewer service line connects to the existing manhole between the CVS and California Kitchen. See **Appendix B** for reference on location of the connection of the existing and new sewer service line.

7. CONCLUSIONS

New sewer services will support the sewer demands set by the City of Scottsdale.

8. REFERENCES

City of Scottsdale, *Design Standards and Policies Manual*. 2018.

Maricopa Association of Governments. *Uniform Standard Details for Public Works Construction*. 2021.

Appendix A – SEWER DEMAND CALCULATIONS

Channel Report Sewer At Peak Flow

6-Inch Sewer Demand Results

Circular

Diameter (ft) = 0.50

Invert Elev (ft) = 100.00

Slope (%) = 9.25

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 0.82

Highlighted

Depth (ft) = 0.25

Q (cfs) = 0.820

Area (sqft) = 0.10

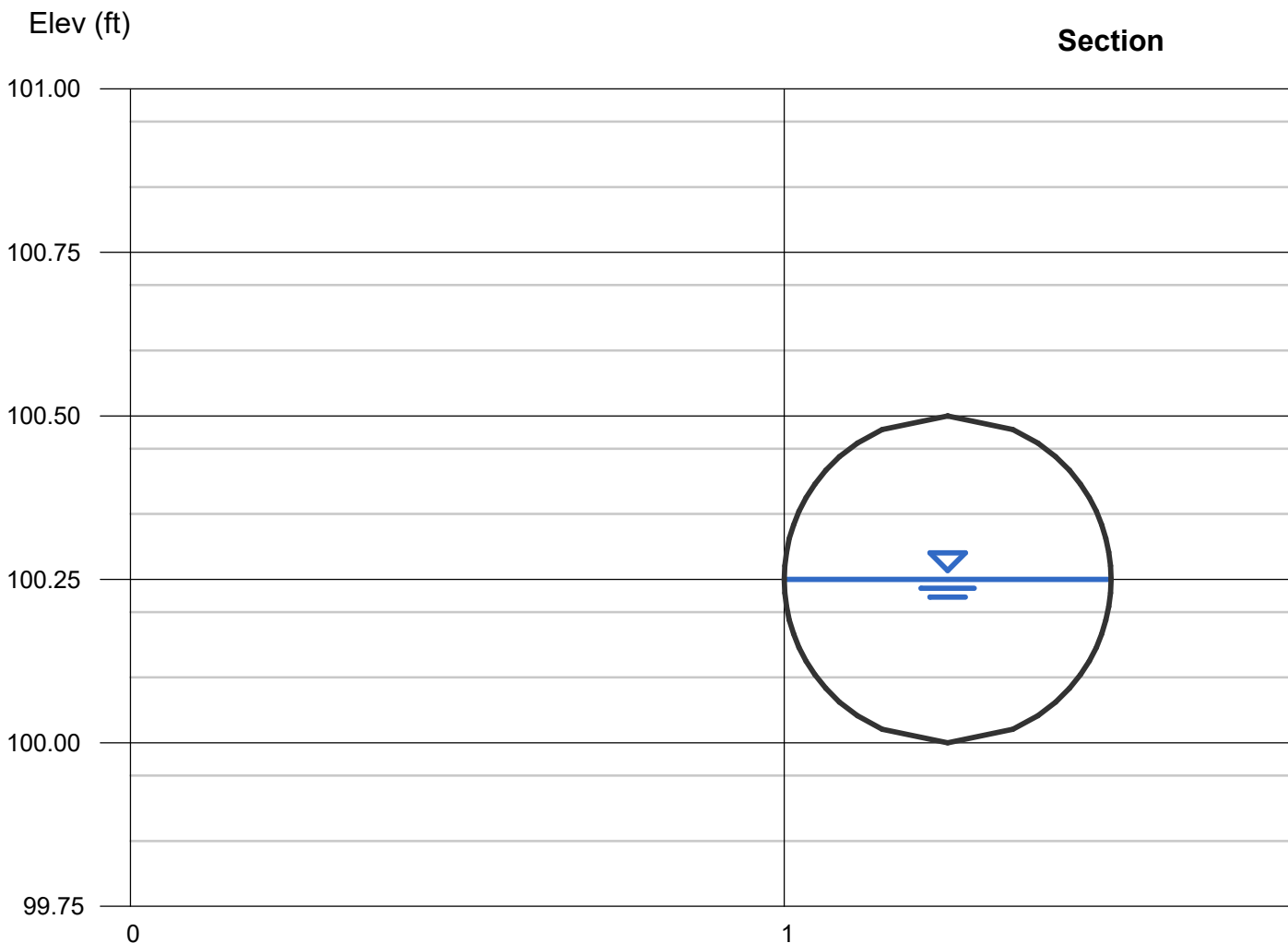
Velocity (ft/s) = 8.31

Wetted Perim (ft) = 0.79

Crit Depth, Yc (ft) = 0.45

Top Width (ft) = 0.50

EGL (ft) = 1.32



Appendix B – UTILITY EXHIBIT



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www.esgarch.com

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed architect under the laws of the State of Arizona

Signature _____
Typed or Printed Name _____
License # _____ Date _____



**REZONING & GPA
SUBMITTAL
3/29/2022**

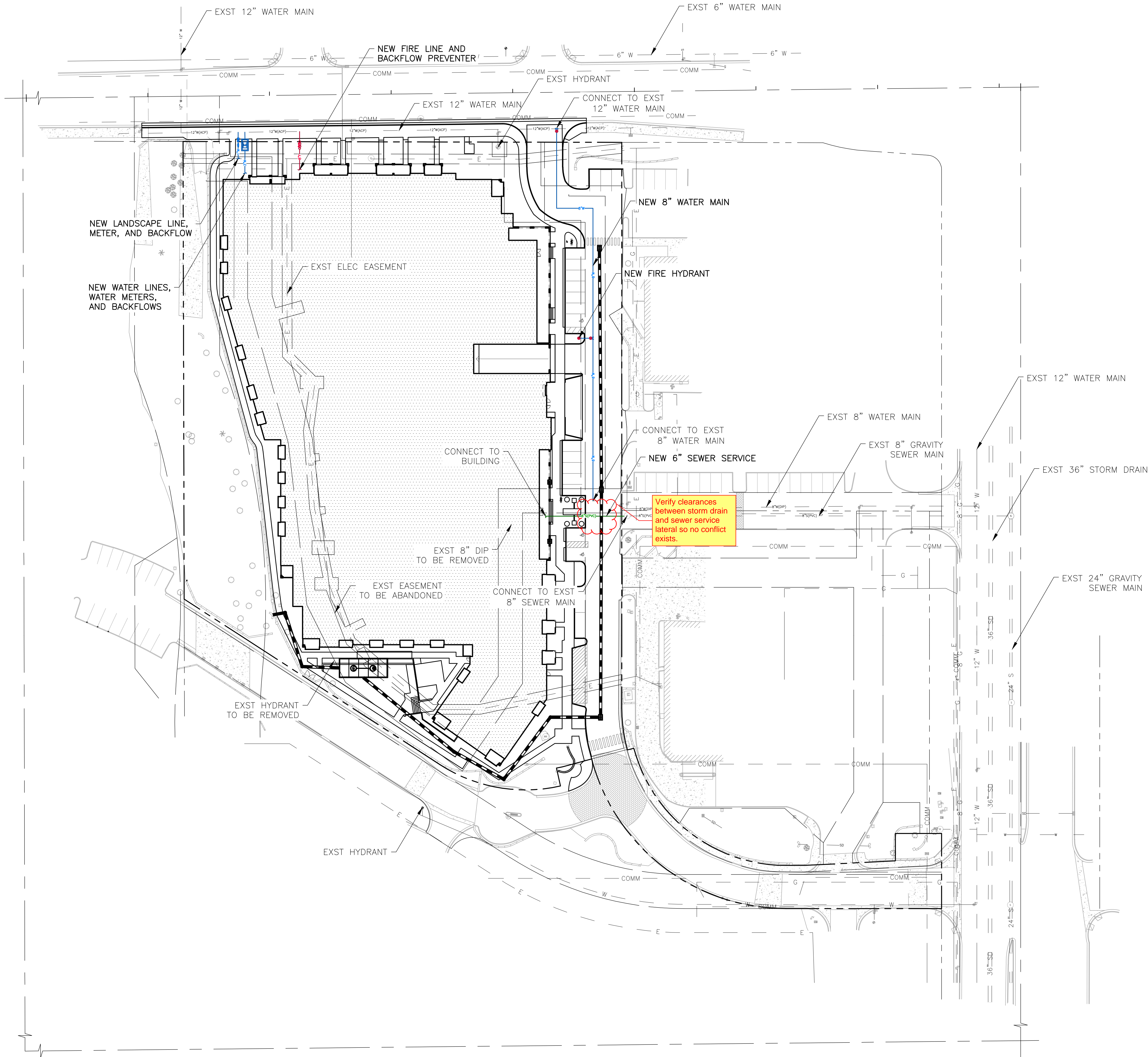
ORIGINAL ISSUE:
REVISIONS
No. Description Date

221564
PROJECT NUMBER
DRAWN BY _____ CHECKED BY _____

KEY PLAN

Gold Dust Ave &
Scottsdale Rd

Utility Exhibit
1.0



Verify clearances between storm drain and sewer service lateral so no conflict exists.

NOTE:
1. ALL UTILITY CROSSINGS WILL REQUIREMENTS WILL BE MET PER THE STANDARDS SET FORTH BY THE CITY OF SCOTTSDALE.