

# SEWER CAPACITY REPORT

## McDowell

NEC McDowell Road & Hayden Road  
Scottsdale, AZ 85257

### 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 Idillon

DATE 3/24/2022

Prepared For:



HOH Investment Group

11811 N. Tatum Blvd #1051

Phoenix, Az 85028

Prepared by:



Sustainability Engineering Group

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Scottsdale, AZ 85260

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Project Number: 210929

Submittal Date: December 1, 2021

Case No.: TBD

Plan Check No.: TDB



Address the comments below and herein within the final BOD in the DR case:

- 1) Sewer service connection with new public sewer as proposed with service line parallel to McDowell Rd is unacceptable. No service line bends within the ROW DS&PM 7-1.409. Refer option 1 or 2 shown on the utility plan. Water Resources strongly prefers option 1. Option 2 will only be allowed if option 1 is proven to be technically infeasible or a need for a new public sewer on E Almeria Rd can be proven.
- 2) DS&PM 7-1.405 D Manholes will be lined or coated when constructed on SS lines 15 inches in diameter or larger or in other design situations where corrosive conditions are anticipated. Such as at or after a drop connection.
- 3) Address comments on utility plan.

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## 1. INTRODUCTION

### 1.1 REPORT OBJECTIVE:

This Sanitary Sewer Capacity Report represents the sewer capacity analysis for a proposed fast food in Scottsdale, Arizona. The purpose of this report is to provide discussions and calculations defining the sewer system concepts necessary to comply with the requirements of the City of Scottsdale. Preparation of this report has been done in accordance with the City of Scottsdale Design Standards & Policies Manual (DS+PM) 2018.

### 1.2 SUMMARY OF PROPOSED DEVELOPMENT:

The project will consist of the construction of a fast-food restaurant (2,440 sf) with a parking area, drive thru and designated landscape.

### 1.3 PROJECT LOCATION:

The subject property consists of a parcel of land located in a portion of the Southwest Quarter of Section 36, Township 2 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona.

- Parcel ID: APN: 131-04-087H
- Address: 8010 E McDowell Road, Scottsdale 85257

Refer to **FIGURE 1 - Vicinity Map** for the project's location with respect to major cross streets.

## 2. DESIGN DOCUMENTATION

### 2.1 DESIGN COMPLIANCE:

The proposed sewer system is designed to meet design criteria of the City of Scottsdale ("the city") Water Resources Department, the Arizona Department of Environmental Quality ("ADEQ"), and Maricopa County Environmental Services Department ("MCESD").

## 3. EXISTING CONDITIONS

### 3.1. EXISTING LAND USE:

The parcel is zoned PNC.

### 3.2. EXISTING TOPOGRAPHY, VEGETATION AND LANDFORM FEATURES:

The parcel is fully developed as a parking lot with associated landscape. The topography of the site is mostly flat, generally slopes from west to east at approximately 1%.

Refer to **Figure 2** for an aerial of existing conditions.

### 3.3. EXISTING UTILITIES:

#### Sanitary Sewer:

Sanitary service for the parcel is provided by the City of Scottsdale. Existing sewer is provided as follows:

- A. An existing 15" VCP on McDowell Road

Refer to **Figure 3** for City of Scottsdale Water and Sewer QS 13-47.

## 4. PROPOSED CONDITIONS

### 4.1 PROPOSED SEWER SYSTEM:

A 6" service line serving the restaurant is proposed to connect to the existing 15" sewer line running along McDowell Road. A grease interceptor is proposed to treat kitchen wastewater prior to being directed to the public sanitary system. The grease interceptor will be connected with 4" pipes to the building and will connect downstream to the proposed 6" sewer service line.

Refer to **Appendix I** for the preliminary utility plan.

### 4.2 MAINTENANCE RESPONSIBILITIES:

The sewer service lines, and any necessary grease interceptors will be owned and maintained by the property owner.

## 5. SANITARY SYSTEM COMPUTATIONS

### 5.1. SEWER FLOW DEMANDS:

Design flow calculations for the on-site system are based on Figure 7-1.2: Average Day Sewer Demand in Gallons per Day & Peaking Factors by Land Use, from the City of Scottsdale Design Standards & Policies Manual 2018, which states that the average daily flow a restaurant is 1.2 gpd/sf. Refer to **Table 1** below.

**Table 1: Sewer Demand Criteria.**

Land Use	Average Day Demand (gpd)	Unit	Design Peaking Factor
Restaurant	1.2	sq. ft.	6

## 5.2. DEMAND FACTORS:

Based on the above criteria, the following Table 2 is a summary of average daily and peak flows for this project:

**Table 2: Sewer Demand Calculations**

Land Use	Count	Unit	ADD per Unit (gpd)	Avg. Day Demand (gpm)	Peak Demand (gpm)
Restaurant	2,440	sq. ft.	1.2	2.03	12.18
Totals				2.03	12.18

## 5.3. SEWER CALCULATIONS

Proposed on-site 4" diameter sanitary sewer pipe will be designed with a minimum slope of 2.1% (n=0.013). With a design flow of 12.18 gpm, the pipe has a normal depth of 0.7 in and is 17.1% full with a velocity of 2.73 ft/s. At full flow capacity, the 4" pipe has a velocity of 4.88 ft/s.

Proposed on-site 6" diameter sanitary sewer pipe will be designed with a minimum slope of 5.00% (n=0.013). With a design flow of 12.18, the pipe has a normal depth of 0.6 in and is 10.4% full with a velocity of 2.63 ft/s. At full flow capacity, the 6" pipe has a velocity of 6.39 ft/s.

Refer to Flowmaster calculations in **APPENDIX I**.

## 6. SUMMARY

### 6.1 SUMMARY OF PROPOSED IMPROVEMENTS:

- The proposed wastewater improvement was designed based on the City of Scottsdale Design Standards & Policies Manual 2018.
- The on-site proposed private 4" sewer service line are adequate for the project flows.

### 6.2 PROJECT SCHEDULE:

The development is proposed to be constructed in a single phase.

## 7 SUPPORTING MAPS

### 7.1 SEWER IMPROVEMENT PLAN

Refer to **Appendix II** for Utility Plan.

## 8 REFERENCES

1. *COS Sewer Q-S MAP 13-47*
2. *City of Scottsdale Design Standards & Policies Manual, 2018 (Chapter 7 – Sewer)*



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## *FIGURES*





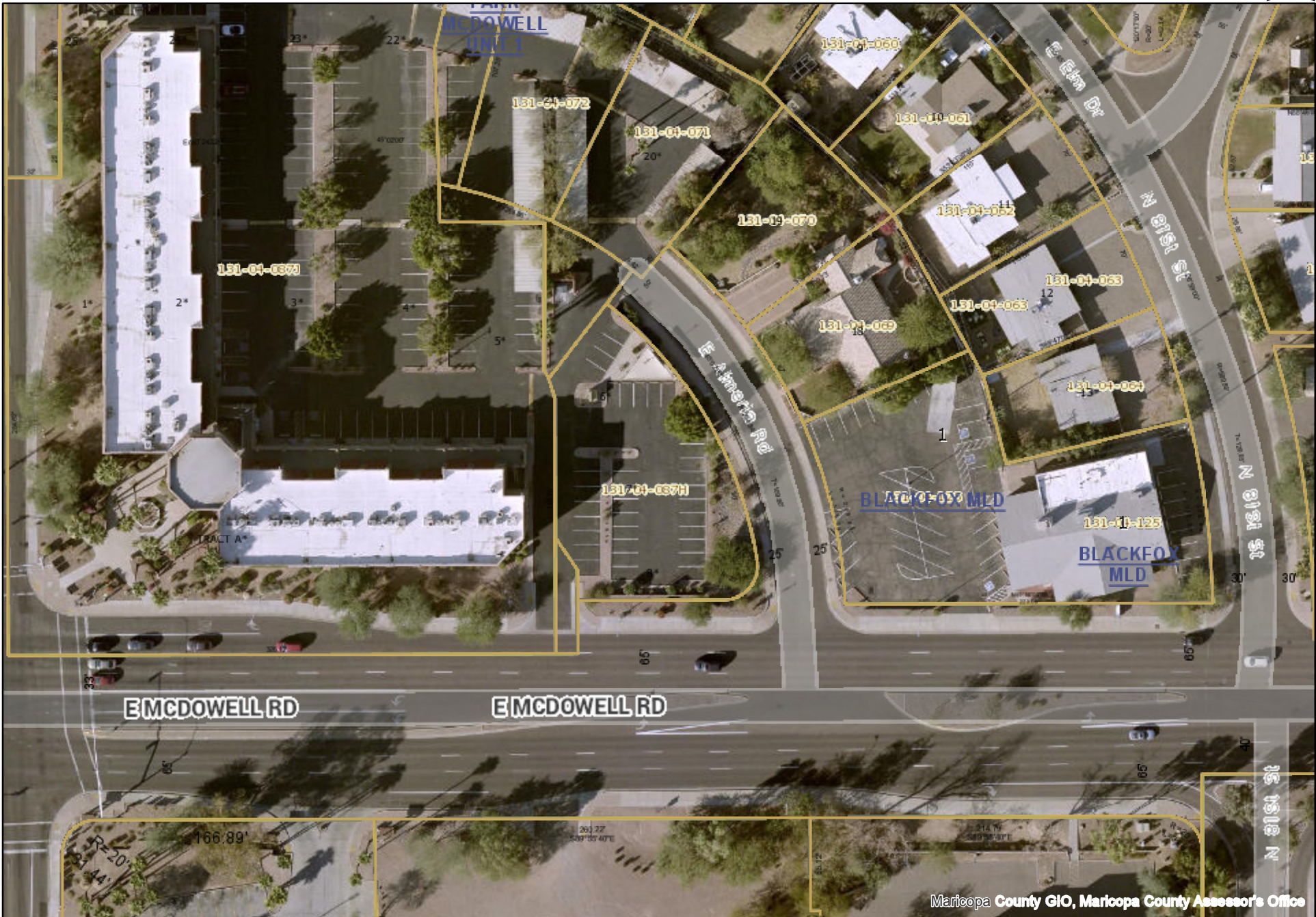


FIGURE 2. AERIAL





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# *APPENDIX I*

## *Calculations*

## Calculations for 4" PVC S=5% Full Flow Capacity

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.050 ft/ft
Normal Depth	4.0 in
Diameter	4.0 in
Discharge	190.99 gpm
Results	
Discharge	190.99 gpm
Normal Depth	4.0 in
Flow Area	0.1 ft <sup>2</sup>
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.0 in
Top Width	0.00 ft
Critical Depth	3.9 in
Percent Full	100.0 %
Critical Slope	0.044 ft/ft
Velocity	4.88 ft/s
Velocity Head	0.37 ft
Specific Energy	0.70 ft
Froude Number	(N/A)
Maximum Discharge	205.45 gpm
Discharge Full	190.99 gpm
Slope Full	0.050 ft/ft
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.0 in
Critical Depth	3.9 in
Channel Slope	0.050 ft/ft
Critical Slope	0.044 ft/ft

## Calculations for 4" PVC S=5%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.050 ft/ft
Diameter	4.0 in
Discharge	12.18 gpm
Results	
Normal Depth	0.7 in
Flow Area	0.0 ft <sup>2</sup>
Wetted Perimeter	0.3 ft
Hydraulic Radius	0.4 in
Top Width	0.25 ft
Critical Depth	1.1 in
Percent Full	17.1 %
Critical Slope	0.008 ft/ft
Velocity	2.73 ft/s
Velocity Head	0.12 ft
Specific Energy	0.17 ft
Froude Number	2.421
Maximum Discharge	205.45 gpm
Discharge Full	190.99 gpm
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	17.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.7 in
Critical Depth	1.1 in
Channel Slope	0.050 ft/ft
Critical Slope	0.008 ft/ft

## Calculations for 6" PVC S=5% Full Flow Capacity

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.050 ft/ft
Normal Depth	6.0 in
Diameter	6.0 in
Discharge	563.11 gpm
Results	
Discharge	563.11 gpm
Normal Depth	6.0 in
Flow Area	0.2 ft <sup>2</sup>
Wetted Perimeter	1.6 ft
Hydraulic Radius	1.5 in
Top Width	0.00 ft
Critical Depth	5.9 in
Percent Full	100.0 %
Critical Slope	0.044 ft/ft
Velocity	6.39 ft/s
Velocity Head	0.63 ft
Specific Energy	1.13 ft
Froude Number	(N/A)
Maximum Discharge	605.74 gpm
Discharge Full	563.11 gpm
Slope Full	0.050 ft/ft
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.0 in
Critical Depth	5.9 in
Channel Slope	0.050 ft/ft
Critical Slope	0.044 ft/ft

## Calculations for 6" PVC S=5%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.050 ft/ft
Diameter	6.0 in
Discharge	12.80 gpm
Results	
Normal Depth	0.6 in
Flow Area	0.0 ft <sup>2</sup>
Wetted Perimeter	0.3 ft
Hydraulic Radius	0.4 in
Top Width	0.31 ft
Critical Depth	1.0 in
Percent Full	10.4 %
Critical Slope	0.008 ft/ft
Velocity	2.63 ft/s
Velocity Head	0.11 ft
Specific Energy	0.16 ft
Froude Number	2.459
Maximum Discharge	605.74 gpm
Discharge Full	563.11 gpm
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	10.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.6 in
Critical Depth	1.0 in
Channel Slope	0.050 ft/ft
Critical Slope	0.008 ft/ft



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# *APPENDIX II*

## *Utility Plan*

8280 E. Gelding Dr., Suite 101  
Scottsdale, AZ 85260



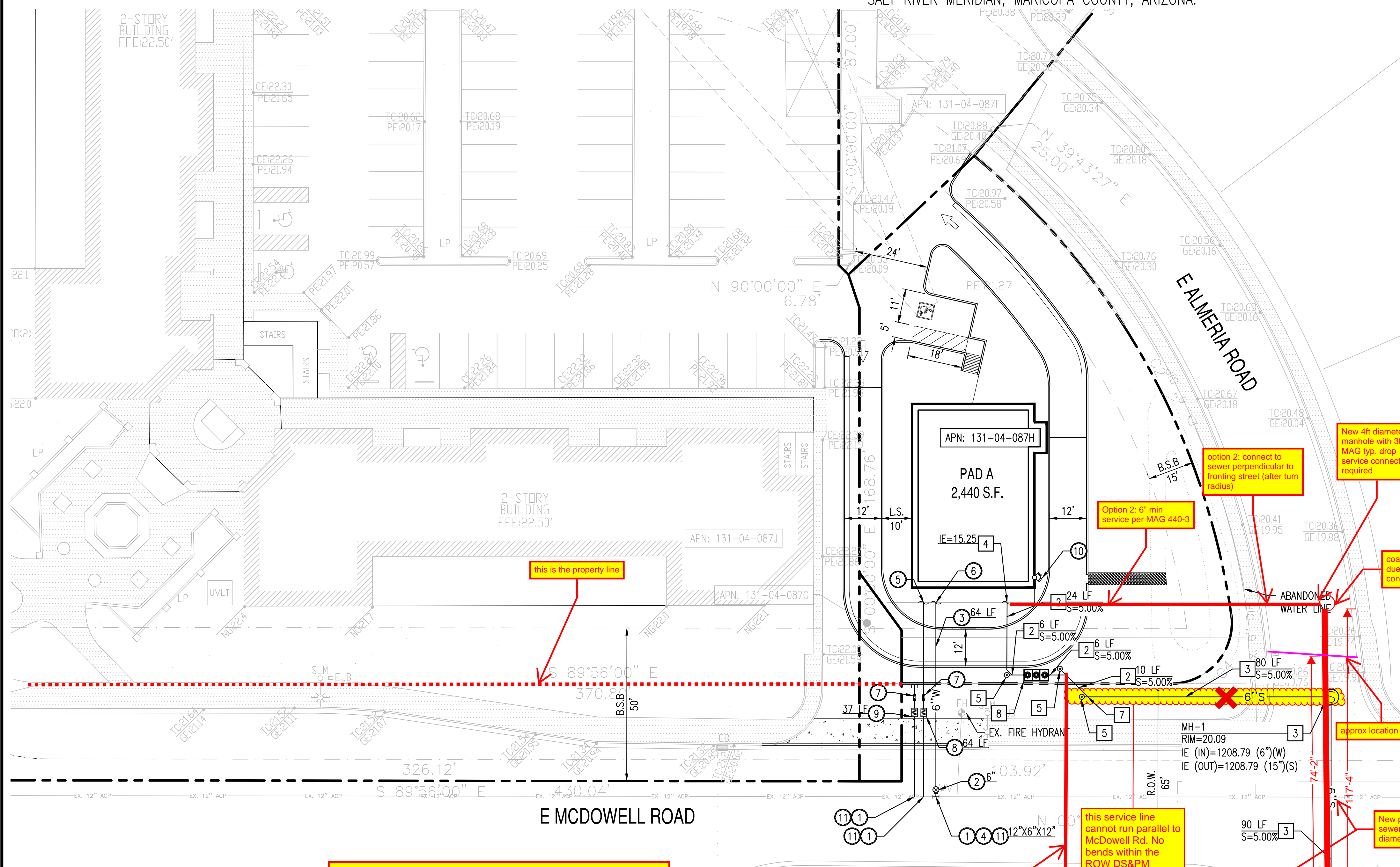
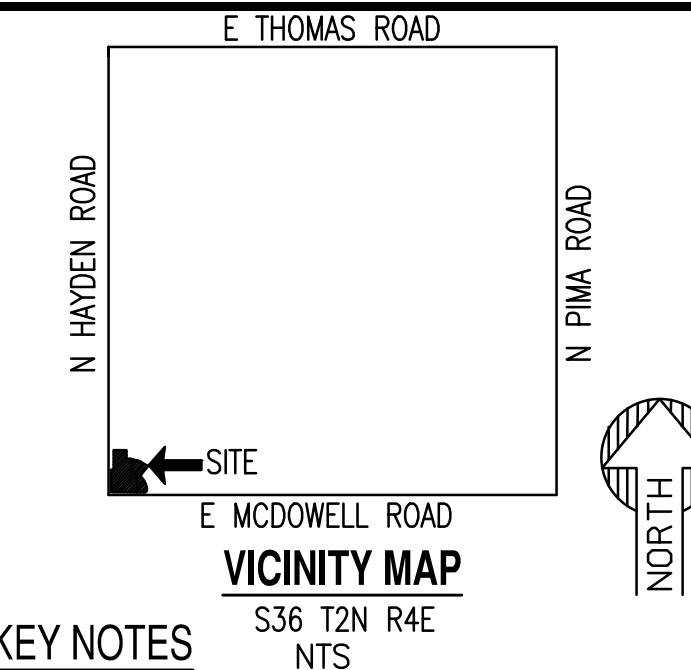
**CIVIL ENGINEER**  
 SUSTAINABILITY ENGINEERING GROUP  
 8280 E. GELDING DR., SUITE 101  
 SCOTTSDALE, ARIZONA 85260  
 PHONE: 480-588-7226  
 ATTN: ALI FAKIH  
 EMAIL: ALI@AZSEG.COM

**OWNER:**  
 HOH MCDOWELL LLC  
 11811 N. TATUM BLVD #1051  
 PHOENIX, ARIZONA 85028

**SURVEYOR**  
 AW LAND SURVEYING, LLC  
 P.O. BOX 2170  
 CHANDLER, ARIZONA 85244  
 PHONE: 480-244-7630  
 ATTN: DANIEL ARMUO

# MCDOWELL PRELIMINARY GRADING PLAN

8010 E MCDOWELL ROAD, SCOTTSDALE AZ 85257  
 A PORTION OF THE SOUTHWEST QUARTER OF SECTION 36, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND  
 SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA.



**PRELIMINARY WATER KEY NOTES**

- ① CONTRACTOR TO VERIFY SIZE AND LOCATION OF EXISTING WATER LINE PRIOR TO CONSTRUCTION.
- ② GATE VALVE WITH VALVE BOX AND COVER, SIZE PER PLAN.
- ③ 6" DUCTILE IRON PIPE. LENGTH PER PLAN.
- ④ CUT-IN TEE, SIZE PER PLAN.
- ⑤ DOMESTIC CONNECTION TO BUILDING.
- ⑥ FIRE CONNECTION TO BUILDING.
- ⑦ BACKFLOW PREVENTION, SIZE TO MATCH WATER METER SIZE.
- ⑧ 2" TYPE "K" COPPER DOMESTIC SERVICE CONNECTION. LENGTH PER PLAN.
- ⑨ 1" TYPE "K" COPPER IRRIGATION SERVICE CONNECTION. LENGTH PER PLAN.
- ⑩ FIRE DEPARTMENT CONNECTION.
- ⑪ CONNECTION TO EXISTING WATER LINE. REPLACE AT LEAST 3' OF ACP PIPE PER C.O.S. REQUIREMENTS.

**PRELIMINARY SEWER KEY NOTES**

- 1 CONNECT TO EXISTING SEWER MANHOLE.
- 2 4" PVC SEWER LINE. LENGTH AND SLOPE PER PLAN.
- 3 6" PVC SEWER LINE. LENGTH AND SLOPE PER PLAN.
- 4 SEWER CONNECTION TO BUILDING.
- 5 INSTALL SEWER CLEANOUT
- 6 INSTALL SEWER MANHOLE
- 7 WYE CONNECTION
- 8 GREASE INTERCEPTOR

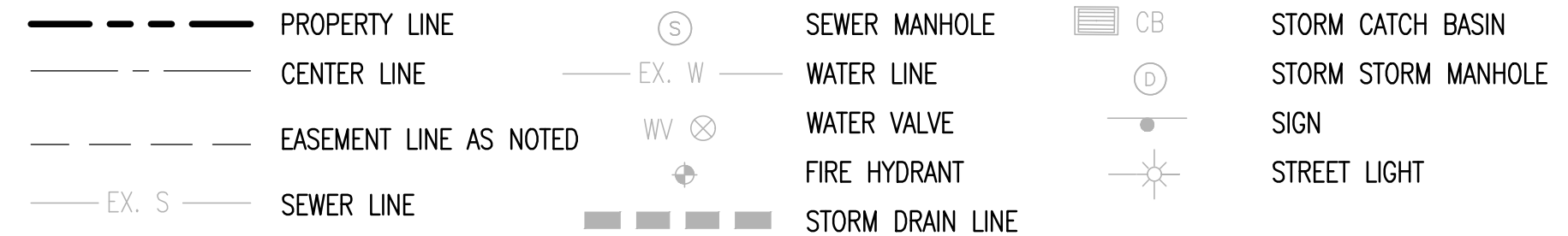
**C.O.S. GENERAL NOTES FOR PUBLIC WORKS CONSTRUCTION**

1. ALL CONSTRUCTION IN THE PUBLIC RIGHTS-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MAG UNIFORM STANDARD SPECIFICATIONS AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION AS AMENDED BY THE LATEST VERSION OF THE CITY OF SCOTTSDALE SUPPLEMENTAL STANDARD SPECIFICATIONS AND SUPPLEMENTAL STANDARD DETAILS. IF THERE IS A CONFLICT, THE CITY'S SUPPLEMENTAL STANDARD DETAILS WILL GOVERN.
2. THE CITY ONLY APPROVES THE SCOPE, NOT THE DETAIL, OF ENGINEERING DESIGNS; THEREFORE, IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE CITY.
3. THE APPROVAL OF PLANS IS VALID FOR SIX (6) MONTHS. IF A RIGHT-OF-WAY PERMIT FOR THE CONSTRUCTION HAS NOT BEEN ISSUED WITHIN SIX MONTHS, THE PLANS MUST BE RESUBMITTED TO THE CITY FOR REAPPROVAL.
4. A PUBLIC WORKS INSPECTOR WILL INSPECT ALL WORKS WITHIN THE CITY RIGHTS-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTION SERVICES 24 HOURS PRIOR TO BEGINNING CONSTRUCTION BY CALLING 480-312-5750.
5. WHENEVER EXCAVATION IS NECESSARY, CALL THE BLUE STAKE CENTER, 811, TWO WORKING DAYS BEFORE EXCAVATION BEGINS. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES IS IDENTIFIED FOR THE PROJECT.
6. RIGHT-OF-WAY PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES. A RIGHT-OF-WAY PERMIT WILL BE ISSUED BY THE CITY ONLY AFTER THE REGISTRANT HAS PAID A BASE FEE PLUS A FEE FOR INSPECTION SERVICES. COPIES OF ALL PERMITS MUST BE RETAINED ON-SITE AND BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE SUSPENSION OF ALL WORK UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
7. ALL EXCAVATION AND GRADING THAT IS NOT IN THE PUBLIC RIGHTS-OF-WAY OR NOT IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO APPENDIX J, GRADING, OF THE LATEST EDITION OF THE INTERNATIONAL BUILDING CODE. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE CITY FOR A FEE ESTABLISHED BY THE CITY.

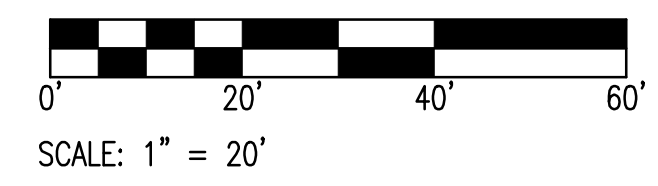
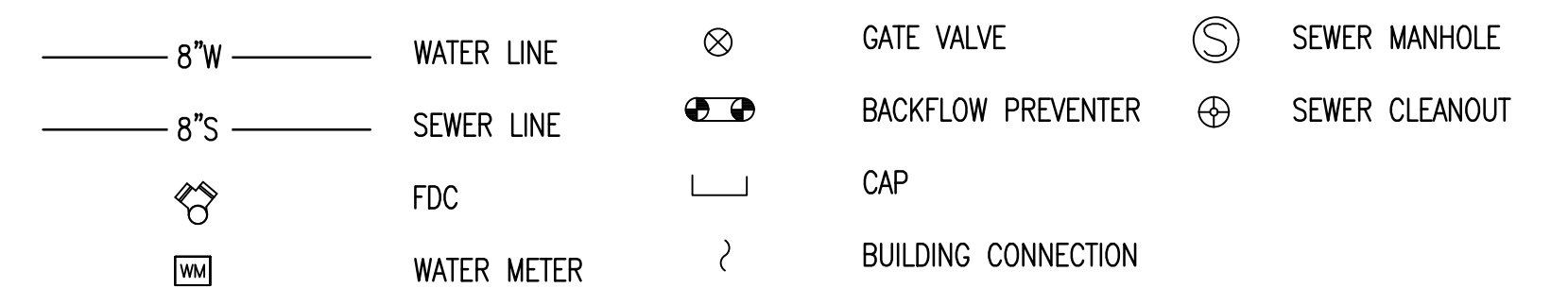


**Water Resources strongly prefers Option 1 since there is no apparent need for a new public sewer line on E Almeria Rd and it adds additional public infrastructure to maintain. Option 2 also seems like a costlier option. Option 2 will only be allowed if option 1 is proven to be technically infeasible or a need for a new public sewer on E Almeria Rd can be proven.**

**EXISTING LEGEND:**



**PROPOSED UTILITY LEGEND:**



**NOTE:**

1. EXISTING MANHOLES RIMS AND INVERTS HAVE BEEN SET BASED ON QUARTER SECTION MAP QS# 13-47, DATED 10/10/2021. ELEVATIONS TO BE VERIFIED IN FIELD.

PRELIMINARY  
 NOT FOR  
 CONSTRUCTION

SUSTAINABILITY  
 ENGINEERING  
 GROUP



8280 E. GELDING DRIVE SUITE 101, SCOTTSDALE, ARIZONA 85260  
 WWW.AZSEG.COM TEL. 480.588.7226 FAX. 480.259.3534



PROJECT  
 MCDOWELL

LOCATION  
 8010 E MCDOWELL  
 ROAD, SCOTTSDALE, AZ

DRAWN	JC	12/01/2021
DESIGNED	JC	12/01/2021
QC	SC	12/01/2021
FINAL QC		
PROJ. MGR.	AF	12/01/2021

DATE: 12/01/2021  
 ISSUED FOR: ZONING

REVISION NO.:	DATE:

SHEET TITLE:  
**PRELIMINARY  
 UTILITY PLAN**

LOCATION: Z:\SHARED\PROJECTS\HOH\SCOTTSDALE - 210929\11 CAD (SEG)\11.4 ENTITLEMENT-PLANNING\210929-C4.00.DWG  
 SAVED BY: JUANCARLOSCHACON DATE: 12/1/2021

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