

PRELIMINARY WATER AND SEWER BASIS OF DESIGN REPORT

FINAL Basis of Design Report

- APPROVED
 APPROVED AS NOTED
 REVISE AND RESUBMIT



Disclaimer: If approved, the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY Levi Dillon

DATE 6/26/2023

MODUS SCOTTSDALE 6

7801 E San Miguel Ave.

COS Case #: 28-DR-2022

LDG PROJECT #2206207

Prepared for:

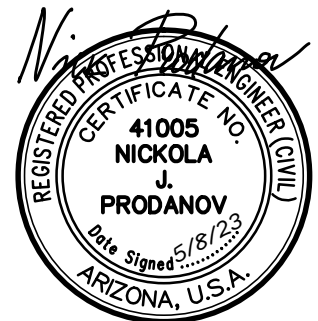
Modus Development
3219 E Camelback Rd, #291
Phoenix, Arizona 85018

Submitted to:

City of Scottsdale
Water Resources Department
7447 E Indian School Road, Suite #105
Scottsdale, Arizona 85251

Prepared by:

Land Development Group, LLC
8808 N Central Ave., Ste 288
Phoenix, Arizona 85020
Contact: Nick Prodanov, PE, PMP
P: 602 889 1984



Updated cover and utility figure included as just the first two pages appended here to the previous round 2 reviewed report. All other round 2 as-noted comments apply as noted on the previous cover herein.

May 8th, 2023

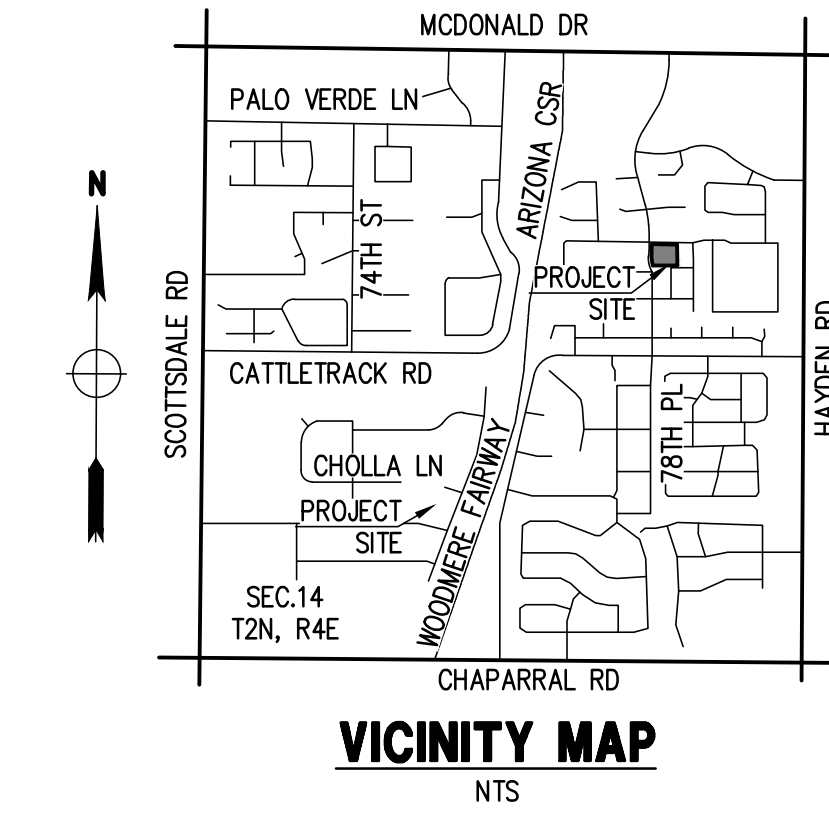
Figure updated per 5/8/23 submittal, approved final

PRELIMINARY WATER & SEWER PLAN

"MODUS SCOTTSDALE 6"

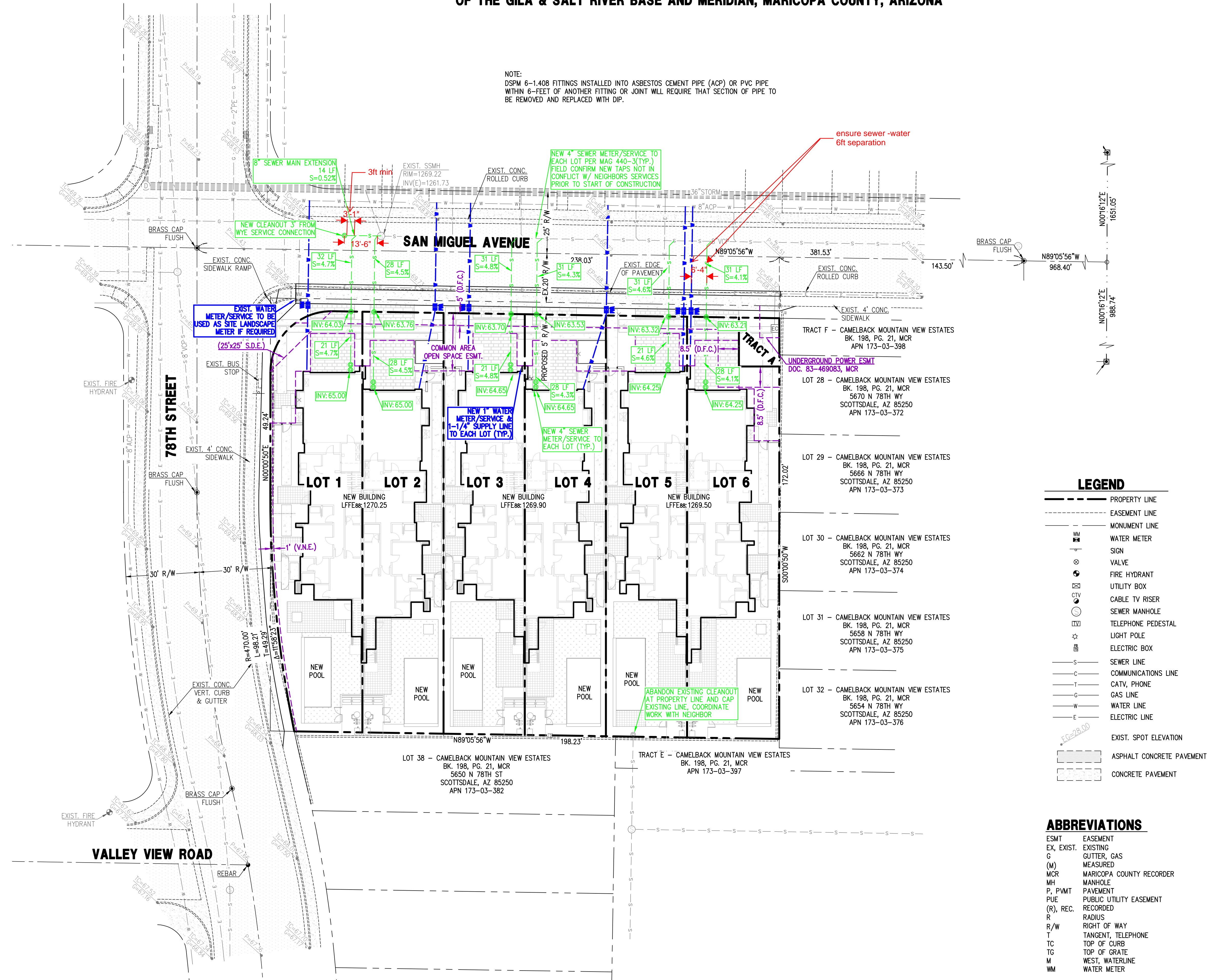
7801 E SAN MIGUEL AVE, SCOTTSDALE, AZ 85250

LOCATED IN A PORTION OF THE THE NW 1/4 OF THE SE 1/4 OF THE NE 1/4 OF SECTION 14, T.2N, R.4E OF THE GILA & SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA



DATE: 05/08/23	DESIGNED BY: NP	CHECKED BY: NP
JOB: 2206207	DRAWN BY: DW	DATE: 05/08/23
VERSION: 1.2		
PLOT DATE: 05/08/23		

NOTE:
 DSPM 6-1.408 FITTINGS INSTALLED INTO ASBESTOS CEMENT PIPE (ACP) OR PVC PIPE WITHIN 6-FOOT OF ANOTHER FITTING OR JOINT WILL REQUIRE THAT SECTION OF PIPE TO BE REMOVED AND REPLACED WITH DIP.



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 3219 E CAMELBACK RD, #291
 PHOENIX, AZ 85018
 P: 602-421-2221
 CONTACT: ED GORMAN

ARCHITECT
 DREWETT WORKS ARCHITECTURE
 7144 E STETSON DR, STE. 204,
 SCOTTSDALE, AZ 85251
 P: 480-329-7504
 CONTACT: ROB BANACH

SITE DATA
 APN: 716-03-012E
 ADDRESS: 7801 E SAN MIGUEL AVE,
 SCOTTSDALE, AZ 85250
 LOT AREA: 35,332 S.F. (0.811 AC.) NET
 46,605 S.F. (1.070 AC.) GROSS
 OS #: 20-46

CIVIL ENGINEER
 LAND DEVELOPMENT GROUP
 8808 N CENTRAL AVE, SUITE 288
 PHOENIX, AZ 85020
 P: 602 889 1984
 CONTACT: NICK PRODANOV

BASIS OF BEARINGS
 THE BASIS OF BEARINGS FOR THIS SURVEY IS NORTH 00°16'12" EAST ALONG THE EAST LINE OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER MERIDIAN, ACCORDING TO BOOK 734 OF MAPS, PAGE 10, MARICOPA COUNTY RECORDS.

BENCHMARK
 CITY OF SCOTTSDALE BRASS CAP IN A HAND HOLE AT THE INTERSECTION OF HAYDEN ROAD AND MCDONALD DRIVE.
 MCDOT UNIQUE POINT ID: 3607
 POINT NAME (AS SURVEYED): 24550-1
 MCDOT PROJECT NAME: GDACS, PROJECT NO. 40069012
 MCDOT DETERMINATION STATUS: ACCEPTED
 ELEVATION=1265.90' (NAVD 88)
 I HEREBY CERTIFY THAT ALL ELEVATIONS PRESENTED ON THIS PLAN ARE BASED ON NAVD-1988 AND MEET THE FEMA BENCHMARK MAINTENANCE (BMM) CRITERIA.

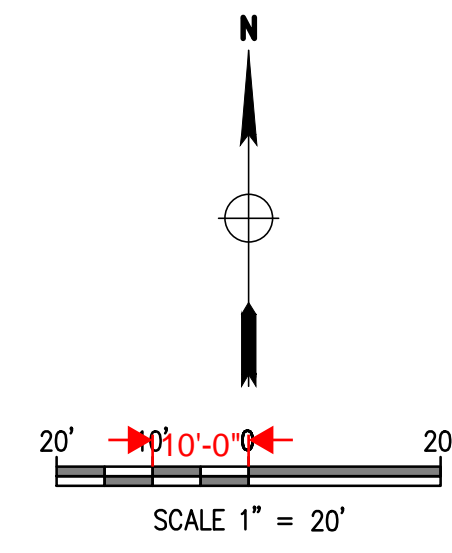
PARENT LEGAL DESCRIPTION
 THE NORTH 197 FEET OF THE WEST 208 FEET OF THAT PART OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA DESCRIBED AS FOLLOWS: BEGINNING AT THE EAST QUARTER CORNER OF SAID SECTION 14; RUN THENCE NORTH 0 DEGREES 28 MINUTES 52 SECONDS WEST 989.98 FEET; THENCE WEST 825 FEET TO THE TRUE POINT OF BEGINNING; THENCE SOUTH 0 DEGREES 28 MINUTES 52 SECONDS EAST 619.17 FEET; THENCE SOUTH 89 DEGREES 59 MINUTES 38 SECONDS WEST 495.17 FEET; THENCE NORTH 0 DEGREES 26 MINUTES 22 SECONDS WEST 619.11 FEET; THENCE EAST 494.59 FEET TO THE TRUE POINT OF BEGINNING; EXCEPT THE NORTH 20 FEET THEREOF.

LEGEND

---	PROPERTY LINE
- - - -	EASEMENT LINE
—●—	MONUMENT LINE
⊕	WATER METER
⊙	SIGN
⊕	VALVE
⊕	FIRE HYDRANT
⊕	UTILITY BOX
⊕	CABLE TV RISER
⊕	SEWER MANHOLE
⊕	TELEPHONE PEDESTAL
⊕	LIGHT POLE
⊕	ELECTRIC BOX
—S—	SEWER LINE
—C—	COMMUNICATIONS LINE
—T—	CATV, PHONE
—G—	GAS LINE
—W—	WATER LINE
—E—	ELECTRIC LINE
⊕	EXIST. SPOT ELEVATION
▨	ASPHALT CONCRETE PAVEMENT
▩	CONCRETE PAVEMENT

ABBREVIATIONS

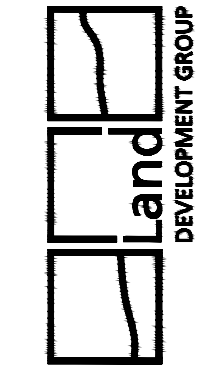
ESMT	EASEMENT
EX, EXIST.	EXISTING
G	GUTTER, GAS
(M)	MEASURED
MCR	MARICOPA COUNTY RECORDER
MH	MANHOLE
P, P/MT	PAVEMENT
PUE	PUBLIC UTILITY EASEMENT
(R), REC.	RECORDED
R	RADIUS
R/W	RIGHT OF WAY
T	TANGENT, TELEPHONE
TC	TOP OF CURB
TG	TOP OF GRATE
M	WEST, WATERLINE
WM	WATER METER



PRELIMINARY WATER & SEWER PLAN

"MODUS SCOTTSDALE 6"
 7801 E SAN MIGUEL AVE,
 SCOTTSDALE, AZ 85250

P. 602.889.1984 | F. 602.445.9482
 8808 N CENTRAL AVE, SUITE 288
 PHOENIX, AZ 85020
 PHOENIX @ LDENCG.COM



Contact Arizona 811 at least two full working days before you begin excavation

 Call 811 or click Arizona811.com



FINAL Basis of Design Report

- APPROVED
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BY Levi Dillon DATE 4/24/2023

PRELIMINARY

WATER AND SEWER BASIS OF DESIGN REPORT

Address comments below and herein within the submitted plans:

LDillon 6/26/23 note: addressed in 5/8/23 updated utility plan

- Sewer**
- 1) **STIPULATION:** Extend 8" sewer in San Miguel approximately 25 feet east of existing manhole and provide cleanout 3 feet east of proposed sewer service line connection. Service line must connect perpendicular to public sewer within ROW. DS&PM 7-1.409B
 - 2) Sewer services shall be per MAG 440-3 with cleanout located within the ROW. DS&PM 7-1.409B
 - 3) If not active or proposed to be used, remove or abandon the existing cleanout located on south edge of property (north end of 78th Place) and abandon sewer line by capping at the property line. Coordinate with Camelback Mountainview Estates. DS&PM 7-1.409
 - 4) Verify existing sewer connection locations and coordinate with proposed connections.
 - 5) Address comments within utility plan.

MODUS SCOTTSDALE 6

7801 E San Miguel Ave.

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LDG PROJECT #2206207

Prepared for:

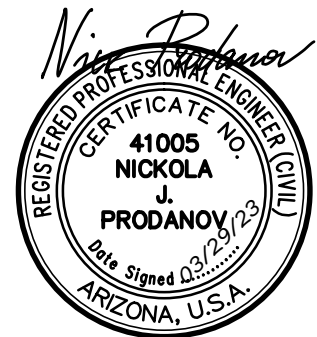
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March 29th, 2023

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March 29th, 2023

townhome
R-4

1. INTRODUCTION

This Preliminary Water and Sewer Basis of design report and related design have been developed in accordance with the current City of Scottsdale Design Standards & Policies Manual. It provides preliminary engineering analysis and assessment of the required water and sanitary sewer services for the proposed multifamily development.

The site is located at 7801 E San Miguel Avenue, Scottsdale, AZ 85250 (APN – 173-03-012E). It is fully developed with a single-family residence and accessory structure. Its total area is 0.845 acres. The property is bounded by San Miguel Avenue on the north, 78th Street on the west and multifamily development on the east and south. The parcel is located within the Scottsdale Q.S. 20-46. The subject property is currently not a part of a recorded subdivision. It is described as a portion of the NW ¼ of the SE ¼ of the NE ¼ Section 14, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to Appendix A-1 – Vicinity Map.

The proposed multifamily project will consist of three separate buildings on two levels, housing total of 6 dwelling units with total building area of 14,078 s.f. New driveways, landscape and site improvements are proposed for the surrounding area.

The site is located within the City of Scottsdale water and sewer service area. There is an existing 8" ACP water line that runs in San Miguel Avenue. Another 8" ACP connected to the 8" ACP at San Miguel Avenue runs in 78th Street. There is an existing 8" VCP sanitary sewer mains in both San Miguel Avenue and 78th Street. The nearest fire hydrant is located near the southwest corner of 78th Street and San Miguel Ave.

2. DOMESTIC WATER AND FIRE SUPPRESSION SYSTEM

Each residence of the Modus Scottsdale 6 will be serviced by a separate domestic water service tapped off the existing 8" water main located in San Miguel Avenue. Fire sprinklers for each residence will be fed off the domestic water service. All existing water services not used for the site will be required to be removed per the City of Scottsdale requirements. Six water meters are proposed for the six main lines connected to the 8" water main. Existing water meter located on site will be utilized for landscaping services.

The fire hydrant coverage for this site is provided by an existing fire hydrant located 60-feet from the northwesterly property corner at 78th Street. This hydrant is approximately 260-feet from the most remote portion of the buildings. Fire hydrant coverage around the building is in accordance with the City of Scottsdale Design Standards & Policies Manual requirements. Water demand calculations are provided in Appendix A-2.

3. SANITARY SEWER SYSTEM

New 4" service lines are proposed to serve the six buildings. They are connected to the 8" VCP main in San Miguel Avenue. The sewer services are sized per IPC based from the site. Minimum slope of 2% will be used for the 4" services.

We have calculated that the peak daily discharge from this development will be 104 gpm. In our opinion the portion of 12" public sewer line that this site discharges to has an adequate capacity.

We have also estimated the sewer discharge from the site using The City of Scottsdale Design Standards & Polices Manual. The average daily flow was estimated at 0.00495 cfs. The peak discharge was calculated by increasing the average daily flow by a factor of 4.5, which is a total of 0.0077 cfs. Using Manning's Equation, we calculated that the proposed 8-inch sewer line at a minimum of 0.5% have a velocity of 2.45 fps flowing full with a capacity of 0.86 cfs. Pool backwash shall be connected to the sanitary sewer system and not discharge to the storm drain system. For the purpose of the design we have assumed a pool backwash flow rate of 100 gpm (0.22 cfs). Actual backwash discharge rate shall not exceed 100 gpm. Backwash pump and pipe sizing will be done by the pool designer under separate permit for each unit. Refer to Sanitary Sewer System Design Calculations in Appendix A-4.

THIS IS AN
EXISTING 8" LINE.

BACKWASH FLOWS DO NOT
APPLY TO INDIVIDUALLY
OWNED SFR OR TOWNHOMES
WITH PRIVATE POOLS

4. REFERENCES

- City of Scottsdale Design Standards & Policies Manual.
- 2015 International Fire Code, Appendix B, Fire Flow Requirements for Buildings.

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name: Not Provided
Project Address: 7801 East San Miguel Avenue, Scottsdale, Arizona, 85250
Client Project No.: Not Provided
Arizona Flow Testing Project No.: 22503
Flow Test Permit No.: C69516
Date and time flow test conducted: July 21, 2022 at 7:30 AM
Data is current and reliable until: January 21, 2023
Conducted by: Floyd Vaughan– Arizona Flow Testing, LLC (480-250-8154)
Witnessed by: Ray Padilla –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **76.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **64.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **33.0 PSI**
(Measured in pounds per square inch)

Diffuser Orifice Diameter: One 4-inch Pollard Diffuser
(Measured in inches)

Coefficient of Diffuser 0.9

Flowing GPM: **2,468 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **5,671 GPM**

Data with 10% Safety Factor

Static Pressure: **68.4 PSI**
(Measured in pounds per square inch)

Residual Pressure: **56.4 PSI**
(Measured in pounds per square inch)

Distance between hydrants: Approx.: 470-Feet

Main size: Not Provided

Flowing GPM: **2,468 GPM**

GPM @ 20 PSI: **5,242 GPM**

@30 PSI THE RESULTING FLOW AVAILABLE WILL BE MORE THAN ADEQUATE TO OBTAIN 1,500GPM



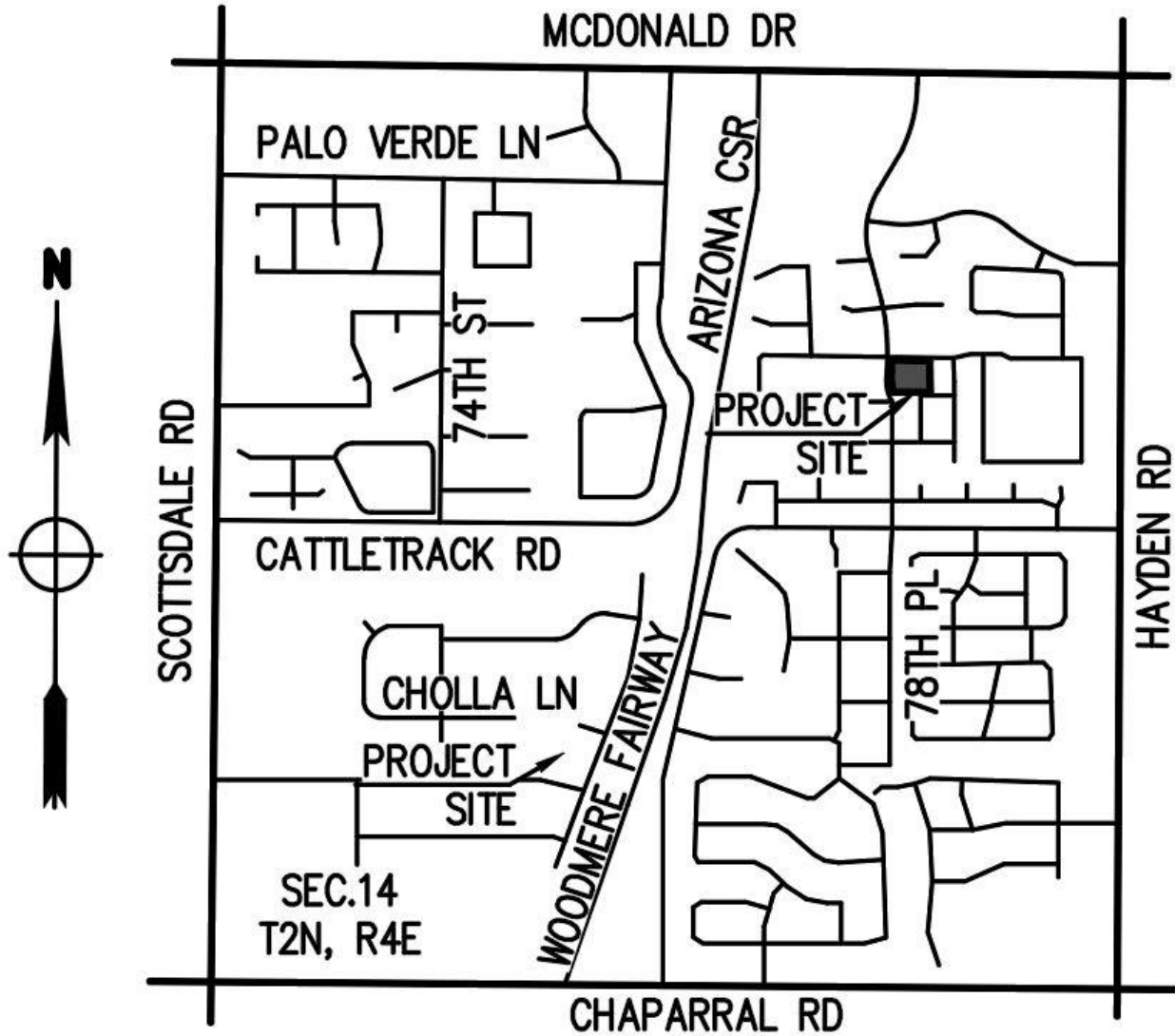
Flow Test Location

North ↑



APPENDIX A-1

Vicinity Map



APPENDIX A-2

Water System Design Calculations

RESIDENTIAL

USE MULTIPLIER FOR THE APPROPRIATE DENSITY FROM FIGURE 6-1.2. (248gpd/unit for 7.1 units per acre)

Number of units: 6
 Average day demand per dwelling unit: 185.3

Average day demand: $6 \times 185.3 = 1,112 \text{ gpd (0.77 gpm)}$

Maximum daily peaking factor: 2.0

Maximum daily demand per dwelling unit: 370.60 gpd

Maximum day demand: $6 \times 370.60 = 2,224 \text{ gpd (1.54 gpm)}$

INCORRECT PEAKING FACTOR DSPM 6-1.404.B.2 (should be 3.5)

Peak hour demand factor: 4.5
 Peak hour demand per dwelling unit: 833.85 gpd

Peak hour demand: $6 \times 833.85 = 5,003 \text{ gpd (3.47 gpm)}$ ✓

same as if correct values had been used, ok

FIRE FLOW DEMAND

Building Area = 14,078 sf, Construction Type = V-B, Required Fire Flow = 3,000 gpm

Per 2015 International Fire Code, Appendix B, Section B105.2, a 75% reduction in the fire flow can be approved if an approved automatic sprinkler system is installed. The resulting fire flow shall not be less than the required minimum of 1,500 gpm. We are using a fire flow of 1,500 gpm since the 75% reduction would result in a fire flow less than the minimum required fire flow.

Fire hydrant flow test shall be submitted with the fire sprinkler design.

TOTAL SITE DEMAND

Fire flow demand (see demand calculation above): 1,500 gpm

Peak hour demand + Fire Flow Demand $3.47 + 1,500 = 1,503.5 \text{ gpm}$

TO BE SUBMITTED WITH BOD. DSPM 6-1.201.A.2/PREAPP COMMENTS. APPENDED HEREIN BY WATER RESOURCES.

APPENDIX A-3

Sanitary Sewer System Design Calculations

Manning's Formula

8" Pipe Flowing Full

Capacity

$$Q = \frac{1.49}{n} * R^{\frac{2}{3}} * S^{\frac{1}{2}} * A$$

n = 0.013
R = 0.16667
A = 0.3490
S = 0.0050 ft/ft
Q = 0.86 cfs

Velocity

$$Q = \frac{1.49}{n} * R^{\frac{2}{3}} * S^{\frac{1}{2}}$$

n = 0.013
R = 0.16667
S = 0.0050 ft/ft
V = 2.45 fps

Manning's Formula

4" Pipe Flowing Full

Capacity

$$Q = \frac{1.49}{n} * R^{\frac{2}{3}} * S^{\frac{1}{2}} * A$$

n = 0.013
R = 0.083
A = 0.086
S = 0.020 ft/ft
Q = 0.262cfs

Velocity

$$Q = \frac{1.49}{n} * R^{\frac{2}{3}} * S^{\frac{1}{2}}$$

n = 0.013
R = 0.083
S = 0.020 ft/ft
V = 3.064 fps

FOR SFR, USE 100GPCPD
AND 2.5 PERSONS/DU
DSPM 7-1.403.A

Sewer Demand Calculations

Average daily flow

Number of Units:

Average day demand per dwelling unit:

Average day demand:

$$6 \times 200 = 1,200 \text{ gpd}$$

Total average daily flow:

$$1,200 \text{ gpd} = 0.00186 \text{ cfs}$$

Peak daily flow

$$0.00186 \text{ cfs} \times 4.5 = 0.00837 \text{ cfs or } 3.76 \text{ gpm}$$

PF=4
DSPM 7-1.403.A

NOT A RELEVANT AMOUNT
OF FLOW TO CAUSE
CONCERN WITH SEWER
CAPACITY

4" service lines are connected to the existing 8" public sewer main.

Capacity of 8" sewer line is **0.86 cfs** > Peak Demand of **0.00837 cfs**



Pool Backwash Flow Rate

100 gpm (0.22 cfs) assumed for preliminary purposes. Actual discharge and pipe sizing will be calculated at the time of final design.

NOT NEEDED ON
INDIVIDUAL
SFR/TOWNHOME
PRIVATE POOLS

Sewer Peak Daily Flow

$$3.76 \text{ gpm} + 100 \text{ gpm (pool)}$$

$$104 \text{ gpm or } 0.23 \text{ cfs}$$

Capacity of 8" sewer line is **0.86 cfs** > Peak Daily Flow of **0.25 cfs**

APPENDIX A-4

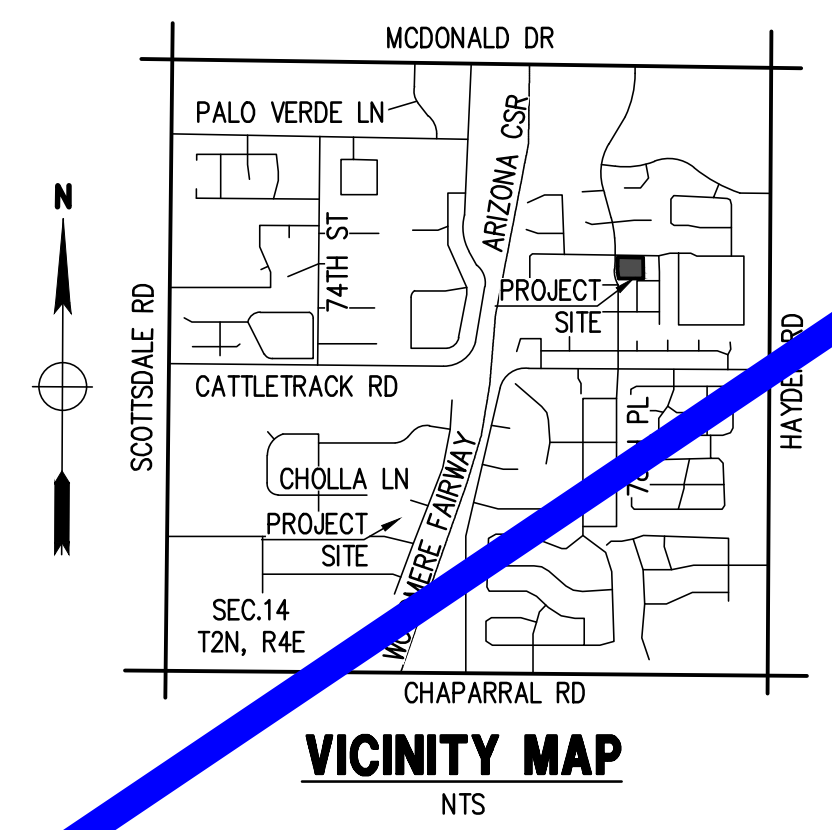
Preliminary Water & Sewer Plan

LDillon 6/26/23: Figure updated see page 2 of this PDF

PRELIMINARY WATER & SEWER PLAN

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BENCHMARK
PER DSPM SEC. 13-200.E BENCHMARK.
1. Elevation values shown on submittals are to be based on North America Vertical Datum 1988 (NAVD 1988) and meet the Federal Emergency Management Agency (FEMA) Benchmark Maintenance (BMM) criteria. See the criteria defined within the Coordinator's Manual of the National Flood Insurance Program Community Status System. Use the MCDOT benchmark system in accordance with the BMM criteria.

I HEREBY CERTIFY THAT ALL ELEVATIONS PRESENTED ON THIS PLAN ARE BASED ON NAVD-1988 AND MEET THE FEMA BENCHMARK MAINTENANCE (BMM) CRITERIA.

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Water Resources(WR):
Yes, sewer extension required, see round 1 approved as-noted. ADD COMMENTS AND STIPULATIONS

WR: only 7.5ft deep. confirm long service line and building drains at southern extent of properties can reach the public sewer.

Engineering Review By:
David Cue
Phone: (480) 312-2540
e-mail: dcue@scottsdaleaz.gov
Review Cycle: _2_ Date:04/24/2023

WR: conflict with driveway. Possible to shift connection point west?

WR: Sewer service to be per MAG 440-3

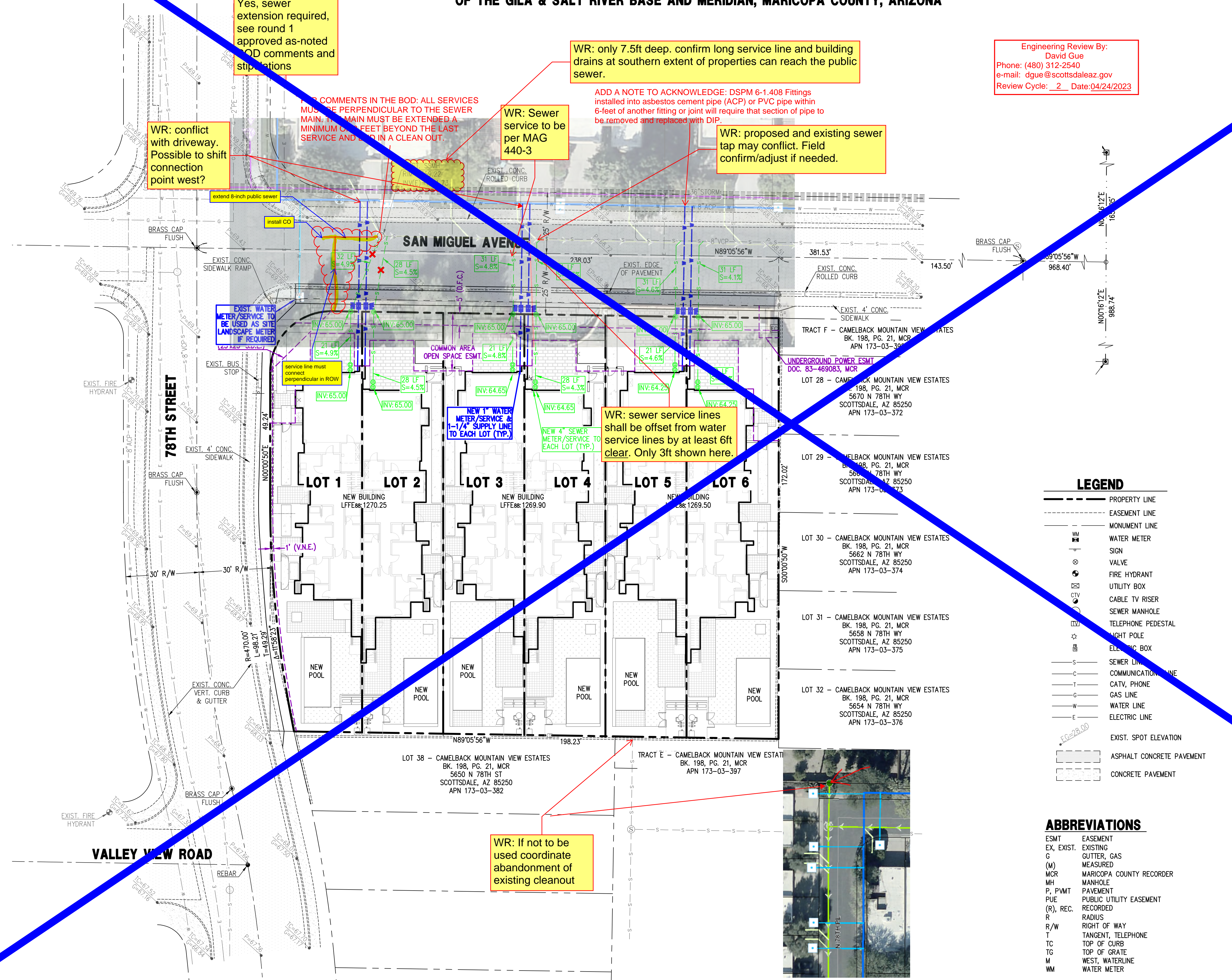
WR: proposed and existing sewer tap may conflict. Field confirm/adjust if needed.

ADD COMMENTS IN THE BOD: ALL SERVICES MUST BE PERPENDICULAR TO THE SEWER MAIN. THE MAIN MUST BE EXTENDED A MINIMUM OF 5 FEET BEYOND THE LAST SERVICE AND END IN A CLEAN OUT.

ADD A NOTE TO ACKNOWLEDGE: DSPM 6-1.408 Fittings installed into asbestos cement pipe (ACP) or PVC pipe within 6-feet of another fitting or joint will require that section of pipe to be removed and replaced with DIP.

WR: sewer service lines shall be offset from water service lines by at least 6ft clear. Only 3ft shown here.

WR: If not to be used coordinate abandonment of existing cleanout

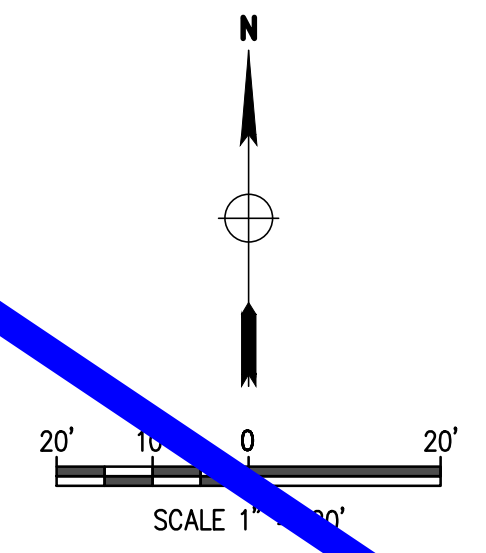


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⊕	EXIST. SPOT ELEVATION
---	ASPHALT CONCRETE PAVEMENT
---	CONCRETE PAVEMENT

ABBREVIATIONS

ESMT	EASEMENT
EX, EXIST.	EXISTING
G	GUTTER, GAS
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TC	TOP OF CURB
TG	TOP OF GRATE
M	WEST, WATERLINE
WM	WATER METER

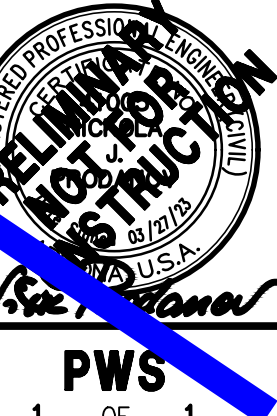


Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA 811
Call 811 or click Arizona811.com

PRELIMINARY WATER & SEWER PLAN

'MODUS SCOTTSDALE 6'
7801 E SAN MIGUEL AVE,
SCOTTSDALE, AZ 85250

P 602 889 1984 | F 602 445 9482
8808 N CENTRAL AVE, SUITE 288
PHOENIX, AZ 85020
PHOENIX @ LDENG.COM

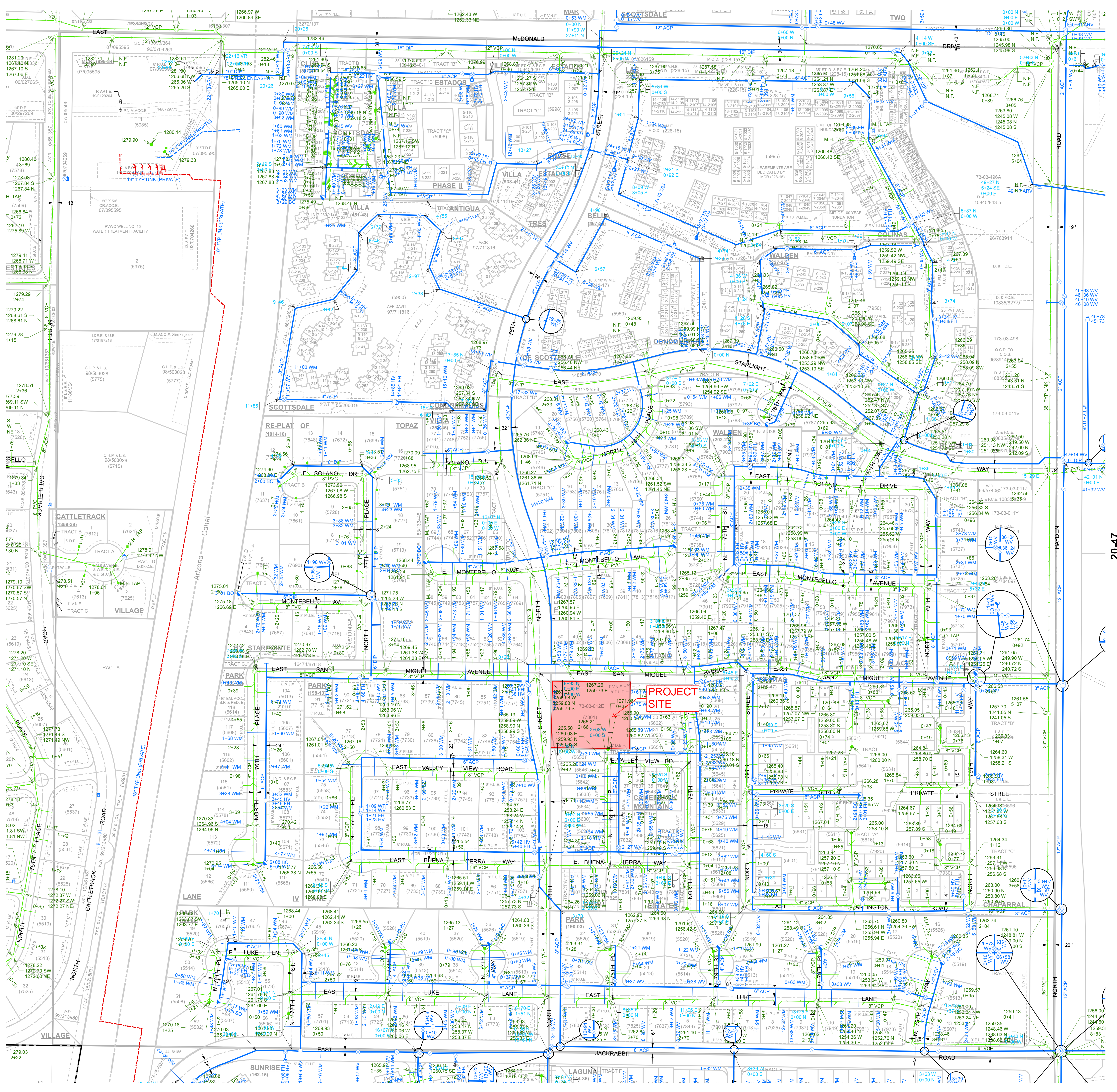


PWS
1 OF 1

28-DR-2022

APPENDIX A-5

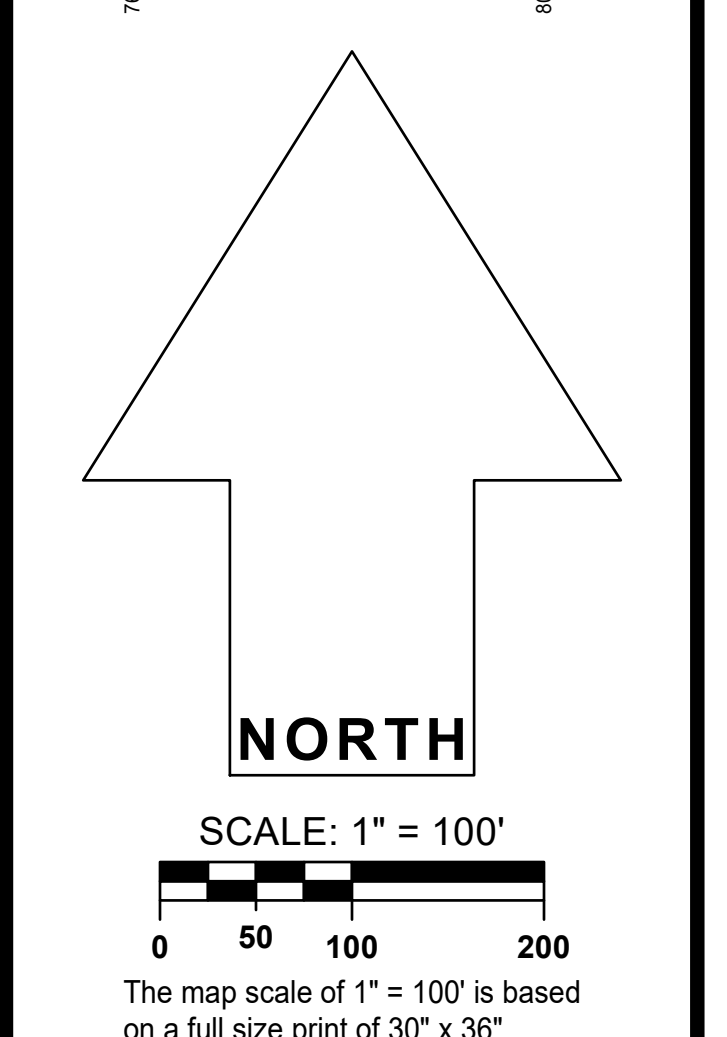
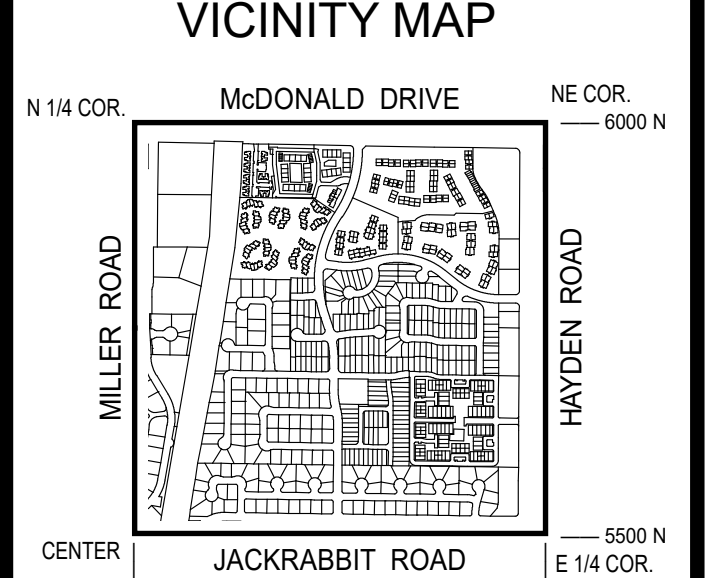
City of Scottsdale Water and Sewer Map



GENERAL NOTES:
 • THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
 • THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS 'CALCULATED' ON THE MAP.

LEGEND:

- Water Valve
- Non-potable Water Valve
- Fire Hydrant
- Water Blowoff
- Water Main Reducer
- Water Sample Station
- Water Air Release Valve
- Non-potable Water Air Release Valve
- Water Pressure Reducing Valve
- Water Vault
- Water Manhole
- Non-Potable Water Manhole
- Water Pump
- Water Main
- Non-Potable Water Main
- Fire Line
- Water Service
- Non-Scottsdale Water Main
- Sewer Manhole
- Sewer Cleanout
- Sewer Lift Station
- Sewer Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Non-Scottsdale Sewer Main
- Sewer Service



WATER & SEWER
 QUARTER SECTION MAP
20-46
 NE 1/4 SEC. 14 T2N R4E

NOTICE
 THIS DOCUMENT IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY. THE CITY OF SCOTTSDALE DOES NOT WARRANT ITS ACCURACY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION.
 THE CITY OF SCOTTSDALE