

**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 4/24/2023



PRELIMINARY

WATER AND SEWER BASIS OF DESIGN REPORT

Address comments below and herein within the submitted plans:

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.

Water

- 1) Where connecting new water services to the ACP main 3 segments of ACP main shall be replaced with DI pipe if certain conditions are met. Refer to DS&PM 6-1.408
- 2) Verify locations of existing water services to coordinate with new proposed services.
- 3) Coordinate routing of new service lines with driveways on north side of the street.
- 3) Proposed parallel water service lines and sewer service lines shall have a minimum clear separation of 6ft. DS&PM 7-1.402, D.
- 4) Address comments within utility plan.

MODUS SCOTTSDALE 6

7801 E San Miguel Ave.

COS Case #: 28-DR-2022

LDG PROJECT #2206207

Prepared for:

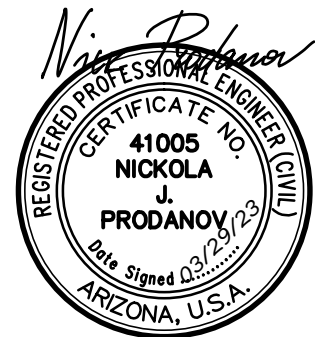
Modus Development
3219 E Camelback Rd, #291
Phoenix, Arizona 85018

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



March 29th, 2023

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March 29th, 2023

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 $\frac{1}{4}$ of the SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ 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 & Policies 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

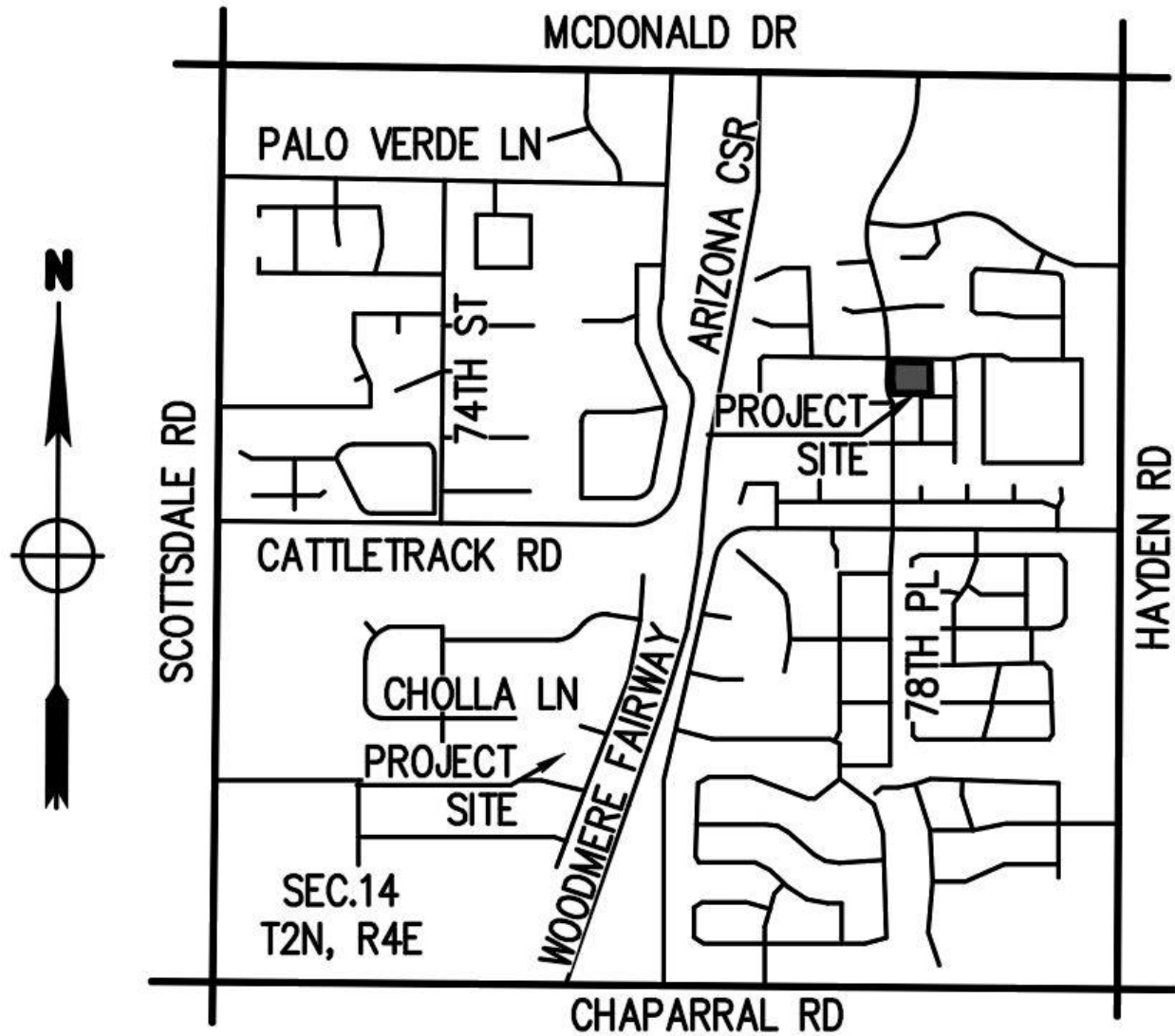
Flow Test Location

North ↑



APPENDIX A-1

Vicinity Map



APPENDIX A-2

Water System Design Calculations

RESIDENTIAL

Number of units:

Average day demand per dwelling unit:

Average day demand:

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

6

185.3

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

Maximum daily peaking factor:

2.0

Maximum daily demand per dwelling unit:

370.60 gpd

Maximum day demand:

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

Peak hour demand factor:

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

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

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

$$n = 0.013$$

$$R = 0.16667$$

$$A = 0.3490$$

$$S = 0.0050 \text{ ft/ft}$$

$$Q = 0.86 \text{ cfs}$$

Velocity

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

$$n = 0.013$$

$$R = 0.16667$$

$$S = 0.0050 \text{ ft/ft}$$

$$V = 2.45 \text{ fps}$$

Manning's Formula

4" Pipe Flowing Full

Capacity

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

$$n = 0.013$$

$$R = 0.083$$

$$A = 0.086$$

$$S = 0.020 \text{ ft/ft}$$

$$Q = 0.262 \text{ cfs}$$

Velocity

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

$$n = 0.013$$

$$R = 0.083$$

$$S = 0.020 \text{ ft/ft}$$

$$V = 3.064 \text{ fps}$$

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

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 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 gpm or 0.23 cfs

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

APPENDIX A-4

Preliminary Water & Sewer Plan

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

Water Resources(WR):
Yes, sewer
extension required,
see round 1
approved as-noted
BOD comments and
stipulations

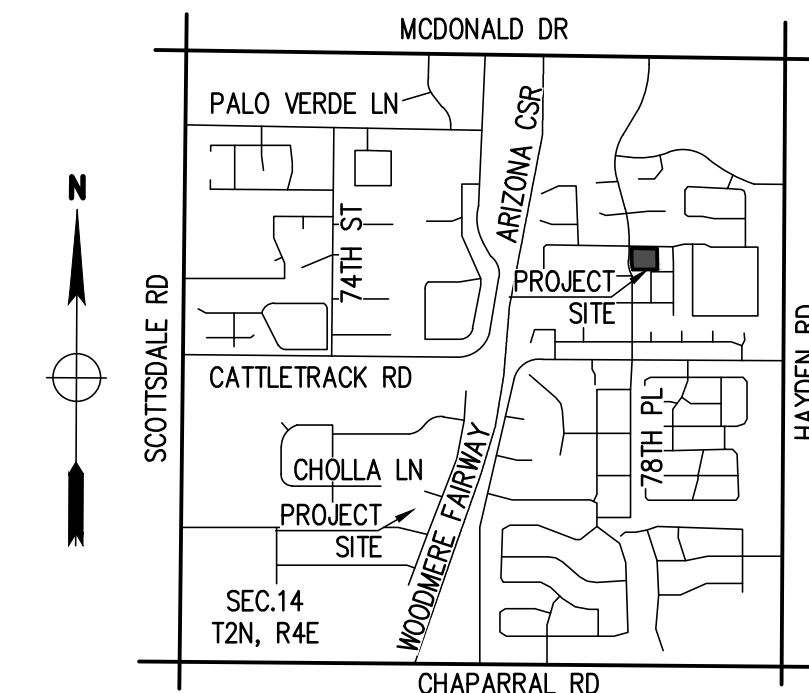
WR: only 7.5ft deep. confirm long service line and building
drains at southern extent of properties can reach the public
sewer.

WR: Sewer
service to be
per MAG
440-3

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

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



VICINITY MAP
NTS

DEVELOPER

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

ARCHITECT

DREWETT WORKS ARCHITECTURE
7144 E STELSON 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
QS #: 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 001°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

PER DSPM SEC. 1-3.200.E BENCHMARK. THE INTERSECTION OF
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 [Coordinators Manual of the National Flood
Insurance Program Community Rating 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.

PARENT LEGAL DESCRIPTION

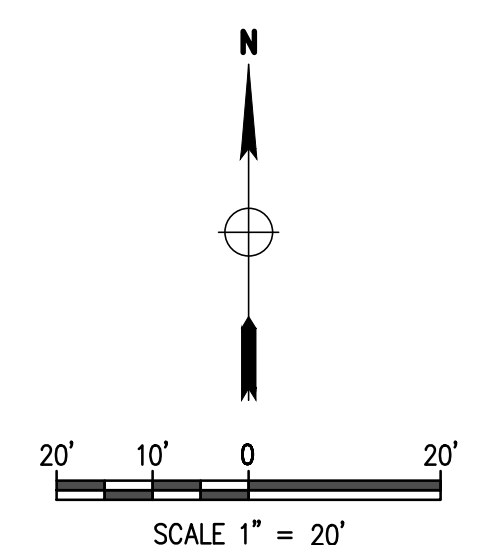
THE NORTH 197 FEET OF THE WEST 208 FEET OF THAT PART OF THE NORTHEAST
QUARTER OF SECTION 14, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT
RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA DESCRIBED AS FOLLOWS:
BEGINNING AT THE EAST QUARTER CORNER OF SAID SECTION 14;
RUN THENCE NORTH 0 DEGREES 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
⊙	FIRE HYDRANT
⊞	UTILITY BOX
⊚	CABLE TV RISER
⊛	SEWER MANHOLE
⊜	TELEPHONE PEDESTAL
⊝	LIGHT POLE
⊞	ELECTRIC BOX
---	SEWER LINE
---	COMMUNICATIONS LINE
---	CATV, PHONE
---	GAS LINE
---	WATER LINE
---	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, PWMT	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 @ LDENG.COM



PWS
1 OF 1

28-DR-2022

APPENDIX A-5

City of Scottsdale Water and Sewer Map

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.

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	

SCALE: 1" = 100'



0 50 100 200

The map scale of 1" = 100' is based on a full size print of 30" x 36"

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

CITY OF SCOTTSDALE  **SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS**
3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

N O T I C E

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