



Water and Wastewater Study
Combined

**WASTEWATER STUDY
FOR
SOUTH SCOTTSDALE**

November 5th, 2019



Prepared by:
CLOUSE ENGINEERING, INC.
JOB NO. 190303

**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 12/5/2019

See following page for comments and throughout report. Stipulations required. Address all comments in final BOD report.

11/27/19

18-ZN-2019
7/2/2020

Ordinance Issues:

1.Note to the Submitter/Developer, as per section 7-1.400.A of the DSPM, Developers may be required to install, at their expense, all on-site and off-site improvements, if required. Offsite implications.: 5foot diameter manhole on Hayden Rd sewer with coating or other corrosion protection, and drop connection if justified per depth. STIPULATION

Policy and Design Related Issues:

2.Call out new 5ft diameter manhole in Hayden Road. Will need to have drop connection if justified by depth. Will need to be coated for corrosion protection or constructed of inert materials (PVC or polymer concrete). DS&PM 7-1.405. STIPULATION

3.The "Project Description" narrative in the Wastewater BOD report is inadequate and lacks sufficient detail for the detailed review of the BOD per DSPM Section 7-1.201.

4.There is no description of the residential services per DSPM Section 7-1.201. Indicate in utility plan.

5.The Proposed Design Flows are incorrect - please revise per DSPM Section 7-1.403.

6.The Hydraulic Design is incorrect - please revise per DSPM Section 7-1.404. Slope needs to be 0.52%.

STIPULATION

Technical Corrections to be Resolved:

7.Please indicate the material type of the new 8-inch sewer line in the Wastewater BOD Report and the Sewer Map.

8.In the Wastewater BOD Report, please state the size and pipe material type for the house service laterals. Call out lateral connection 440-3 and show clean-outs in ROW.

9.In the "Wastewater Flow Calculations" section, please revise per DSPM Chapter 7. The population per household is = 2.5 people and the average daily flow is 100 gallons per capita per day.

10.In the "Sewer Line Sizing" section, please revise the maximum flow velocity per DSPM.

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

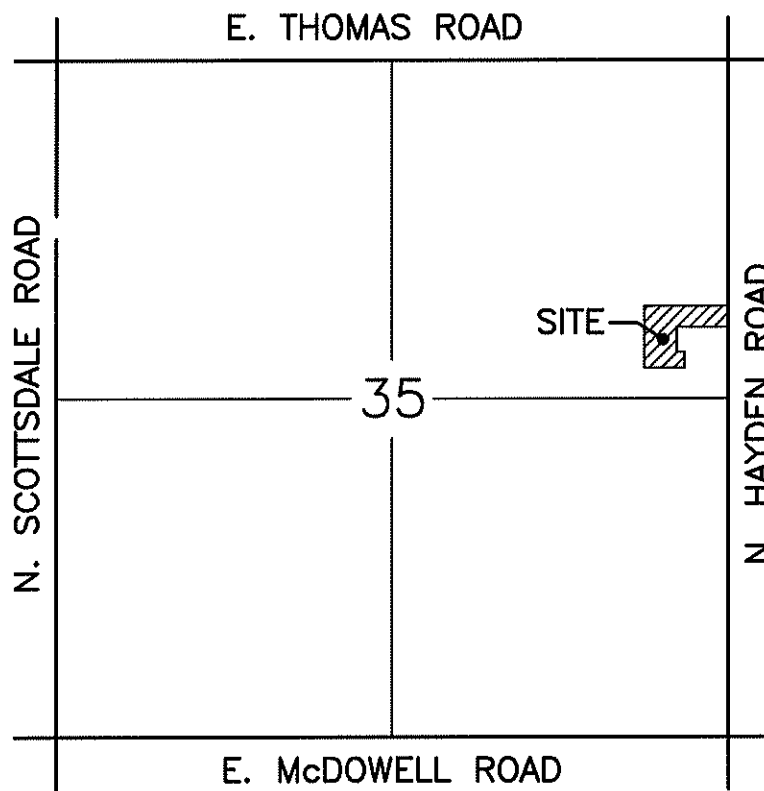
SOUTH SCOTTSDALE is a proposed single-family development located in south Scottsdale encompassing a total of 3.89-acres. At completion the site will consist of 27 single family home sites under the R-4 zoning category.

1.2 PURPOSE/SCOPE

The purpose of this study is to determine the onsite sanitary sewer facilities required to service the South Scottsdale development. Peak flows generated from the development will be calculated and the sanitary sewer line sizes required to drain the flow will also be calculated.

1.3 PROJECT LOCATION

The subject development is located within the City of Scottsdale. The site is located on the west side of Hayden Road approximately a ½ mile south of Thomas Road. Legally, SOUTH SCOTTSDALE lies in a portion of the N.E. ¼ of Section 35, T. 2 N., R 4 E., G. & S. R. B. & M., Maricopa County, Arizona. Figure 1.1 illustrates the site's location.



VICINITY MAP
SECTION 35, T. 2 N., R. 4 E.

2.0 WASTEWATER FLOW CALCULATIONS

2.1 Wastewater Routing

The sewer lines internal to the site will be 8-inch. The property will connect to an existing sewer main in Hayden Road to service the site.

2.2 Wastewater Flow Calculations

The design criteria for the sewer line sizing were also extracted from the City of Scottsdale DS&PM Chapter 7. The design criteria used for calculating the peak wastewater flows is as follows:

- Population Per Household = 3.2 Persons/Home
- Average Daily Flow per Unit = 100 Gallons per Day per Unit
- Peaking Factor = 4

revise down per DS&PM values

Based on the above design criteria, Table 2.1 below provides the calculation for the peak daily wastewater flow generated from the site.

No. of Lots	Avg. Daily Flow (gpd)	Peaking Factor	Peak Day Flow (gpd)
27	8,640	4	34,560

Table 2.1 – Wastewater Flow Calculations

2.2 Sewer Line Sizing

The design criteria for the sewer line sizing were also extracted from the City of Scottsdale Design Manual. Manning's Formula is used to calculate the sewer line size required for the development. The design criteria is as follows:

- Mean Full Flow Velocity of Line = 2.5 ft/sec
- Maximum Velocity of Line = 9 ft/sec
- Manning's n Value = 0.013

Based on the above criteria and using Manning's formula, the required sewer line sizes based on the flow calculated in Table 2.1 are provided in Table 2.2 below.

Line Size (in)	Slope (ft/ft)	Capacity (gpd)	ADF (gpd)	PF	PDF (gpd)	% Capacity (PDF/Capacity @ 75%)	% Capacity (d/D)	Full Flow Velocity (ft/s)	Actual Velocity (ft/s)
8	0.0040	450,451.6	8,640	4	34,560	7.7	17.9	2.5	1.26

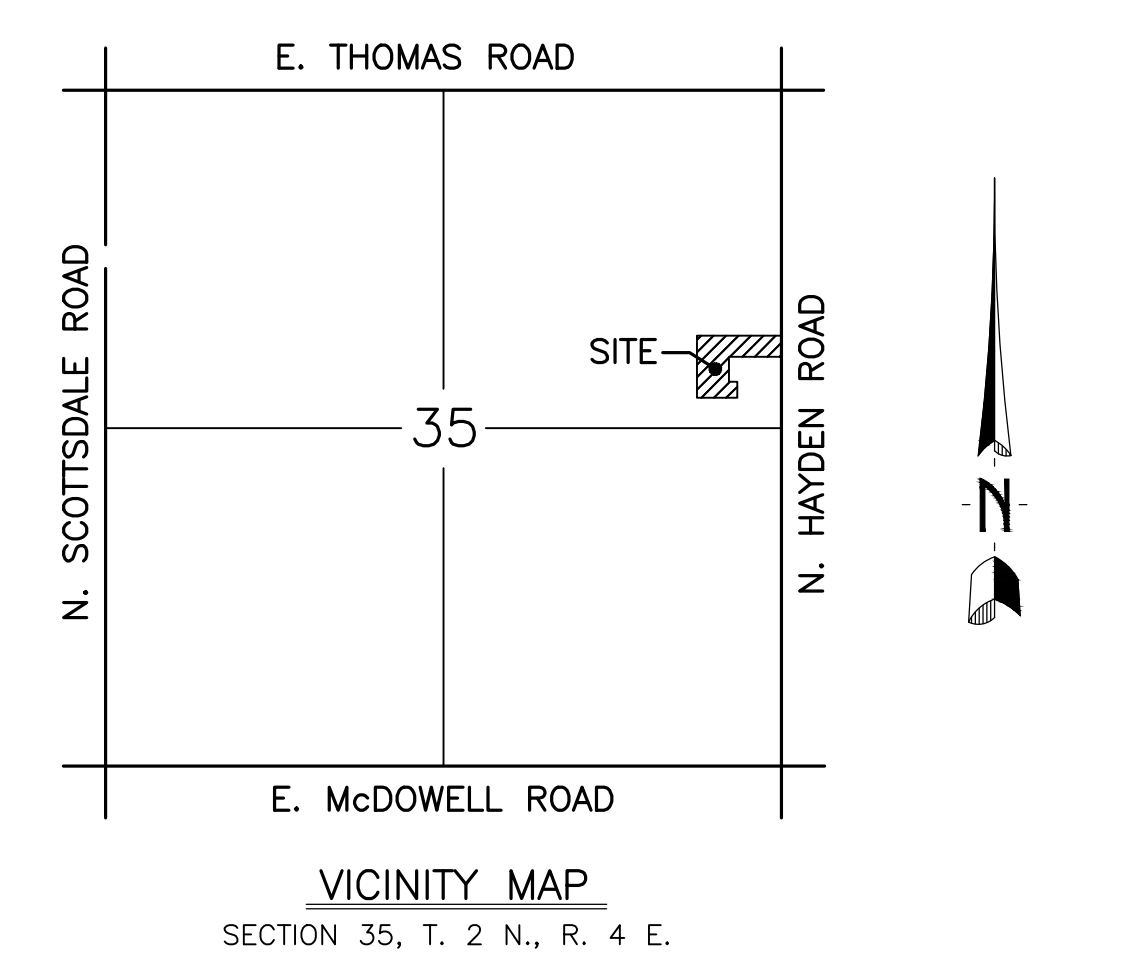
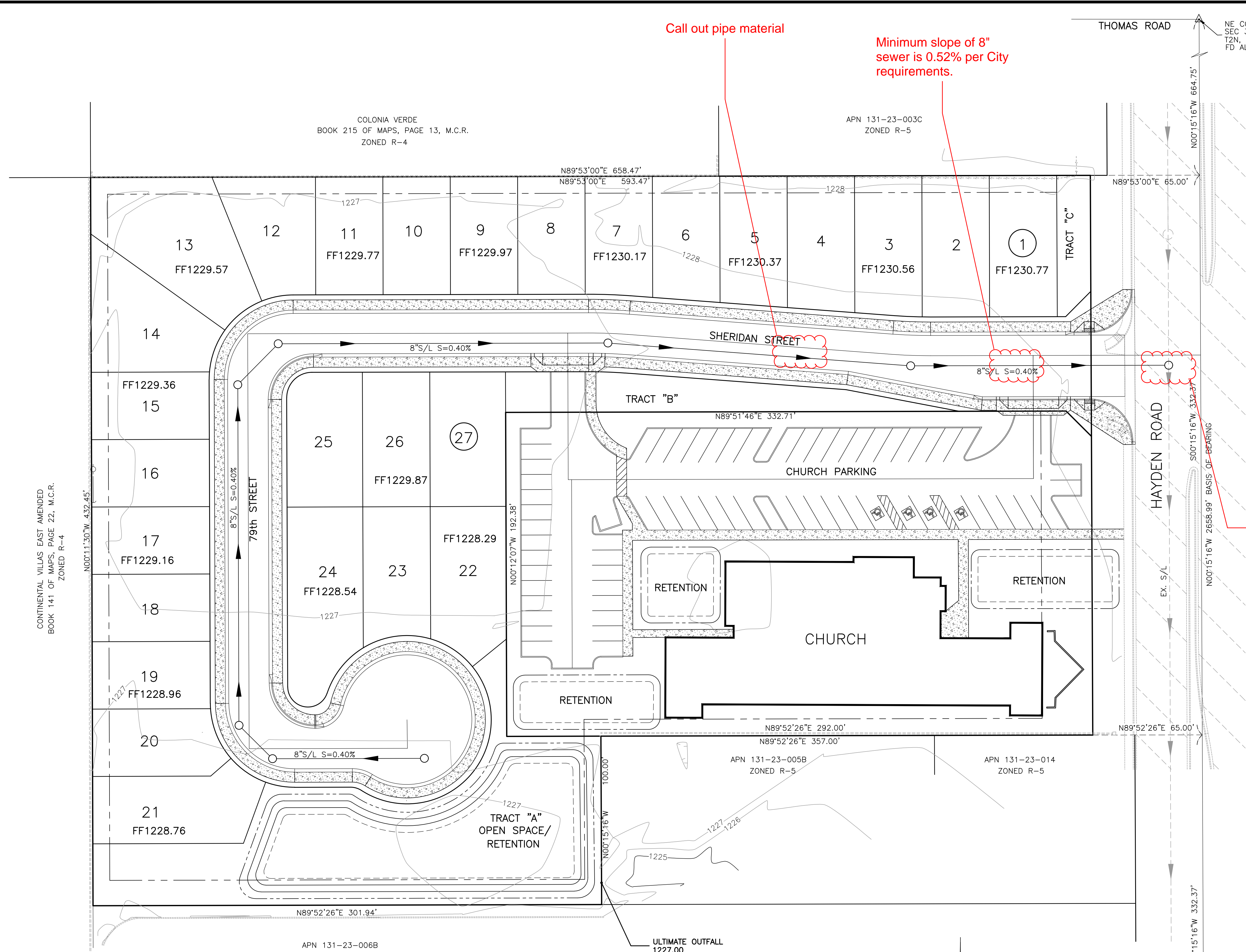
Table 2.2 – Sewerline Size Calculations

Based on Table 2.2, the sewer line size provided for the site has sufficient capacity to remove the wastewater flows generated on site.

must be 0.0052
ft/ft, revise calcs

3.0 REFERENCES

City of Scottsdale, Design Standards & Policies Manual – Chapter 7, 2018.



RESIDENTIAL SITE SUMMARY

EXISTING ZONING: R-5 & R1-7
 PROPOSED ZONING: R-4
 GROSS ACRES: 3.89 ACRES
 OPEN SPACE: 0.61 ACRES (15.7%)
 TOTAL NUMBER OF LOTS: 27
 TYPICAL LOT SIZE: 40' X 70'
 DENSITY: 6.94 LOTS/ACRE
 ASSESSOR PARCEL NO: 131-23-005A & A PORTION OF 131-23-008

BENCHMARK

CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE AT THE INTERSECTION OF HAYDEN ROAD AND OAK STREET. NAVD 88 DATUM, ELEVATION 1226.907

Clouse Engineering, Inc.
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 5010 E. Shea Blvd Suite 110 Scottsdale, AZ 85254
 Tel 602-395-9300 Fax 602-395-9310

CONTINENTAL VILLAS EAST AMENDED
 BOOK 141 OF MAPS, PAGE 22, M.C.R.
 ZONED R-4

COLONIA VERDE
 BOOK 215 OF MAPS, PAGE 13, M.C.R.
 ZONED R-4

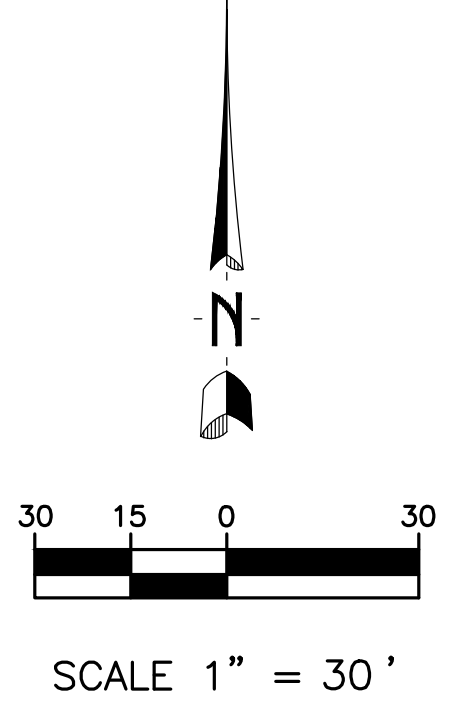
APN 131-23-003C
 ZONED R-5

APN 131-23-005B
 ZONED R-5

APN 131-23-014
 ZONED R-5

APN 131-23-006B
 ZONED R1-7

ULTIMATE OUTFALL
 1227.00



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Date
 11-4-19

As-Built

Job No.
 190303

1 OF 1

ARIZONA

PRELIMINARY SEWER MAP
 SOUTH SCOTTSDALE
 2340 N. HAYDEN ROAD

**WATER REPORT
FOR
SOUTH SCOTTSDALE**



November 4th, 2019

**CLOUSE ENGINEERING, INC.
JOB NO. 190303**

**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 12/5/2019

Please see following page and throughout for applicable comments. **Stipulations required.** Address all comments in final BOD submittal.

Ordinance Issues:

1.Note to the Submitter/Developer, as per section 6-1.000 of the DSPM, Developers may be required to install, at their expense, all on-site and off-site improvements, if required. Applicability: required offsite water line looping connection. STIPULATION REQUIRED

Policy and Design Related Issues:

- 2.The water line shall be looped. Refer to previous pre-app comments on 3/20/19 and comments in utility plan herein. DS&PM 6-1.402. STIPULATION REQUIRED
- 3.The 12" main on Hayden is a cast iron pipe (CIP) per City GIS. Removal of a minimum of 1 segment of CIP pipe and replacement with DIP pipe and a reducing tee and isolation valve(s) will be required. Coordination with the City to isolate this main would be required. STIPULATION REQUIRED
- 4.To perform the required system looping, removal of a minimum of 1 segment of existing 6" ACP pipe and replacement with DIP pipe and a reducing tee and isolation valve(s) will be required. Coordination with the City to isolate this main would be required. DS&PM 6-1.408 STIPULATION REQUIRED
- 5.Water sampling stations are generally required in all new residential subdivisions consisting of twenty or more platted lots. Developers shall contact the Water Quality Division prior to the preliminary plat submittal for a determination. Sampling stations are to be located within the right-of-way, a private street tract, or utility easement at mid- street, 3 feet behind the sidewalk, along a property line extension. Construction will be per COS Standard Detail No. 2349. Show possible location for station on preliminary utility plan herein. DS&PM 6-1.418 STIPULATION REQUIRED
- 6.The project "Introduction" in the Water BOD report is inadequate and lacks sufficient detail for the detailed review of the BOD per DSPM Section 6-1.201.
- 7.The Water BOD report must include Hydrant Flow and Residual Pressure Test results and graphs for the existing 12-inch diameter CIP water main in Hayden Road as per DSPM Sections 6-1.405 and 6-1.501. The Fire Hydrant Flow Test must include a Residual Pressure Test. Include in final BOD. STIPULATION REQUIRED
- 8.Confirm with hydrant flow test that necessary fire flow can be provided. Include information and statement in BOD that the required fire flow and pressure per DS&PM Ch6 can be achieved. 6-1.501 STIPULATION REQUIRED

Technical Corrections to be Resolved:

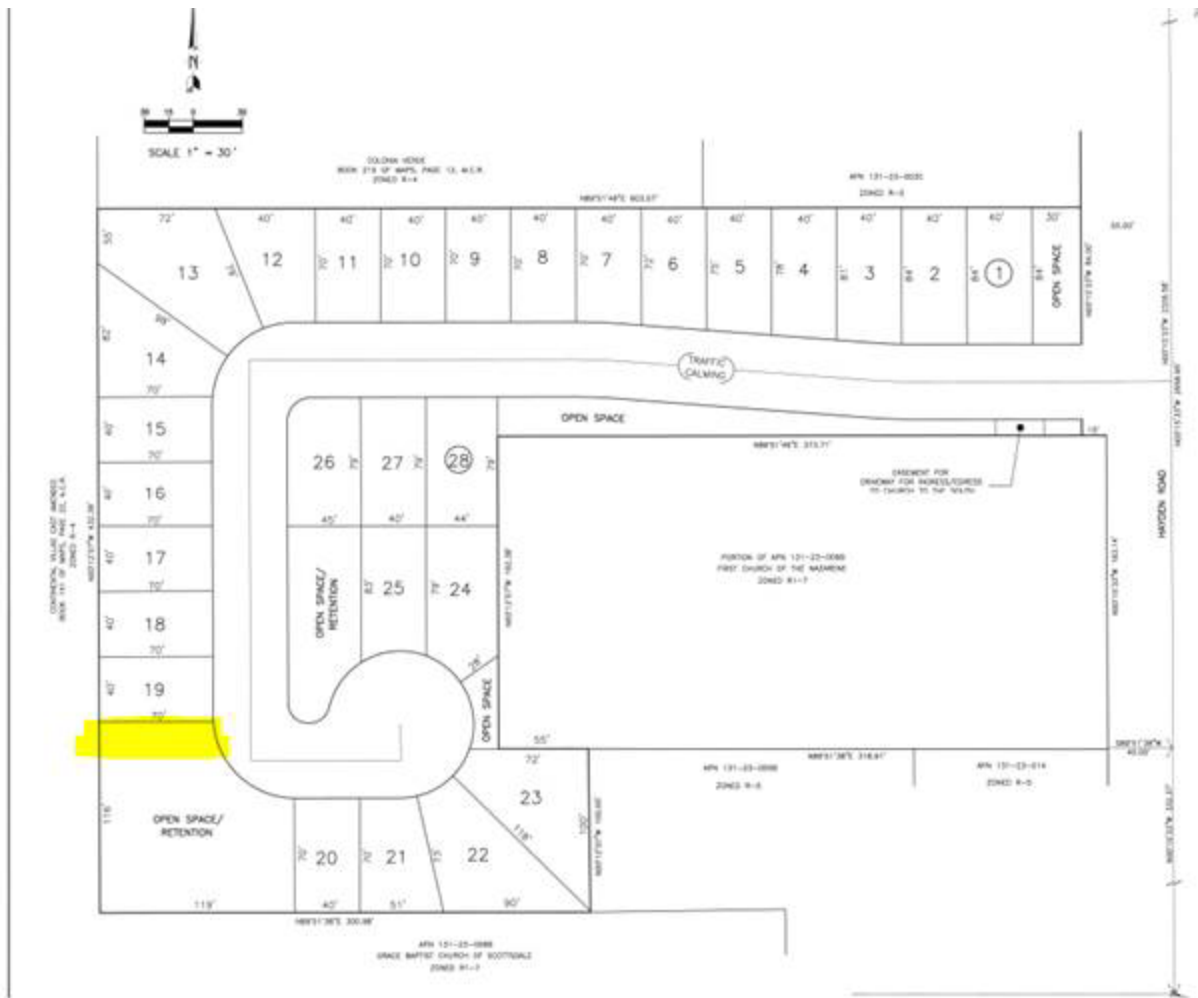
- 9.In the Water BOD report, please include a more descriptive narrative in the "Existing Water Distribution System" section.
- 10.Indicate proposed sewer main and sewer service line locations on the utility plan to evaluate conflicts with water pipelines and required separation (6ft clear).
- 11.What material type and pressure class is the proposed 8-inch water line? Call out on utility plan. City only accepts class 350 DIP, mortar lined, and PE bagged. STIPULATION REQUIRED
- 12.Water services shall be type K copper, minimum 1" diameter. Call out services and relevant info on utility plan. STIPULATION REQUIRED
- 13.Please indicate the location of the proposed water meter(s) on the Preliminary utility plan.
- 14.Please indicate the, location of isolation valves on the Preliminary utility plan.

Dillon, Levi

From: Dillon, Levi
Sent: Wednesday, March 20, 2019 12:19 PM
To: Barnes, Jeff; Hayes, Eliana; Stanek, Scott; Wilson, Doug; cbrown@arcadiacapitalllc.com
Cc: Jeff Giles; TRACY GLASS
Subject: RE: 213-PA-2019 RPI Hayden & Oak

Water Resources' preapplication feedback and direction:

1. Water and sewer basis of design reports (BODs) will be required. Refer to Chapters 6 & 7 of the 2018 DS&PM 2018 for BOD requirements.
2. Assuming that: a) R-5 zoning may be maintained on both parcels and one day developed as such? ; b) site plan proposed develops western edge of parcel
 - a. **Both the primary supply of water and sewer service shall be provided from Hayden Road**
3. **Sewer:** Existing manhole in Hayden Rd on 39" sewer interceptor may be accessible and deep enough for connection. If not possible to connect here a new manhole will need to be constructed on Hayden Rd to accept sewer flows.
4. **Water:** Water for domestic and fire protection is currently provided and anticipated to be provided from the 12" main in Hayden Rd.
 - a. Because the dead-end length of a new 6-inch line will be nearly 1,000 feet a connection/loop to the existing 6" ACP line near E Vernon Avenue alignment will be necessary (refer to **yellow highlighted portion** in screen shot below). This tee connection can be made on the western side of the property via the proposed open space/retention basin and connect to the 6" public main in Tract V. **Note the following:**
 - i. Minimum of 2 isolation valves needed on the new tee connection
 - ii. Min 16ft wide vehicle accessible i.e. flat, water line easement will be needed through the open space area (minimum 6ft offset from any parallel block wall). The easement and waterline cannot be located on a slope or in the retention basin.
 - iii. If necessary to cross the easement with a barrier an easily removable/replaceable metal fence or gate will be required to cross the water line easement area to provide access to the water line for future City maintenance. A block wall shall not be constructed across the easement.
 - iv. Trees may be located along the edge of the water line easement but not within 7 feet of the water line as measured to the trunk of the tree. Attention shall be given to the aggressive nature of vegetation roots to prevent plants that may be harmful to water lines.
 - v. If looping a new 6-inch line cannot supply adequate hydrant fire flow to the community as a result of required modeling/hydraulic calculations provided as part of the applicants BOD than a larger 8-inch water line may be required. In this case Water Resources will still require the line to be looped.



Any questions or concerns please let me know.

Thanks,

Levi C. Dillon, P.E. | Sr. Water Resources Engineer



*"Water Sustainability through
Stewardship, Innovation and People"*

Contact Info

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Water Resources Administration
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Sending me an attachment over 5MB? Please use the link below:

<https://securemail.scottsdaleaz.gov/dropbox/ldillon@scottsdaleaz.gov>

-----Original Appointment-----

From: Current Planning Mtgs <CurrentPlanningMtgs@Scottsdaleaz.gov>

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APPENDIX

- Water Map



1.0 PROJECT DESCRIPTION

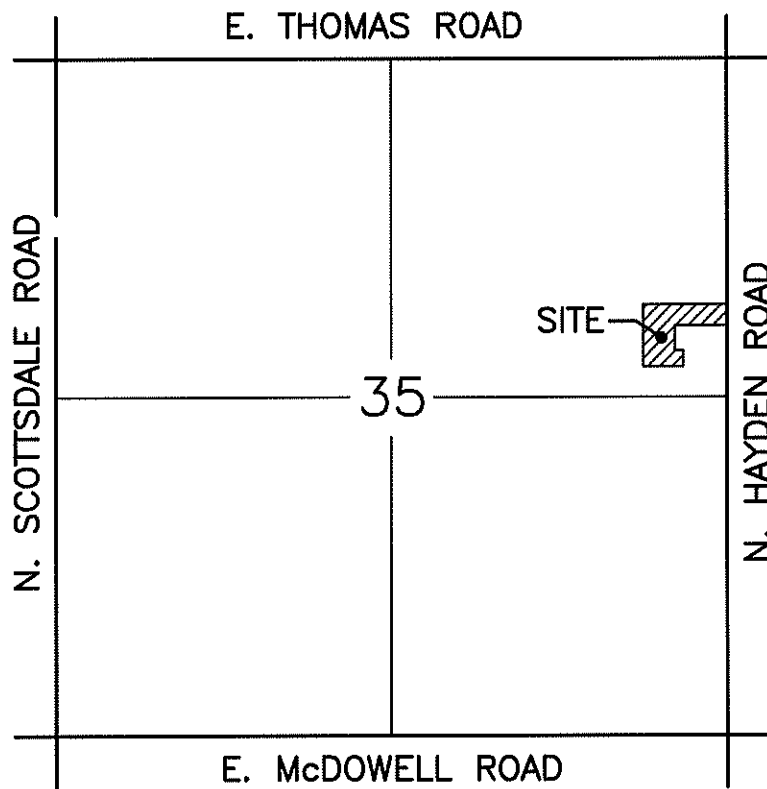
SOUTH SCOTTSDALE is a proposed single-family development located in south Scottsdale encompassing a total of 3.89-acres. At completion the site will consist of 27 single family home sites under the R-4 zoning category.

1.2 PURPOSE/SCOPE

The purpose of this study is to determine the onsite waterline requirements to service the SOUTH SCOTTSDALE development. Maximum flows required by the development will be calculated.

1.3 PROJECT LOCATION

The subject development is located within the City of Scottsdale. The site is located on the west side of Hayden Road approximately a ½ mile south of Thomas Road. Legally, SOUTH SCOTTSDALE lies in a portion of the N.E. ¼ of Section 35, T. 2 N., R 4 E., G. & S. R. B. & M., Maricopa County, Arizona. Figure 1.1 illustrates the site's location.



VICINITY MAP
SECTION 35, T. 2 N., R. 4 E.

2.0 EXISTING AND PROPOSED WATER DISTRIBUTION SYSTEMS

2.1 Existing Water Distribution System

The project site is located within the City of Scottsdale water distribution system within Zone 1 of the system. An existing 12" water main is located within Hayden Road immediately to the east of the site.

2.2 Proposed Water Distribution System

The project site will connect to the existing 12" water main to provide domestic, fire, and landscape water for the site. Water infrastructure improvements for the site will include an 8-inch waterline. Fire hydrant spacing is per the City of Scottsdale guidelines.

3.0 WATER DEMAND CALCULATIONS

3.1 Water Demand Calculations

The design criteria for calculating the water flows from the development is based upon the City of Scottsdale DS&PM Chapter 6. The design criteria used for calculating the maximum day water flows is as follows:

✓ Average Daily Flow Per Unit = 0.36 gpm ← $\frac{27}{4.46}$ acres = 6 units/acre

Max. Daily Flow = 2.0 x Average Daily Flow

Peak Hour Flow = 3.5 x Average Day Flow

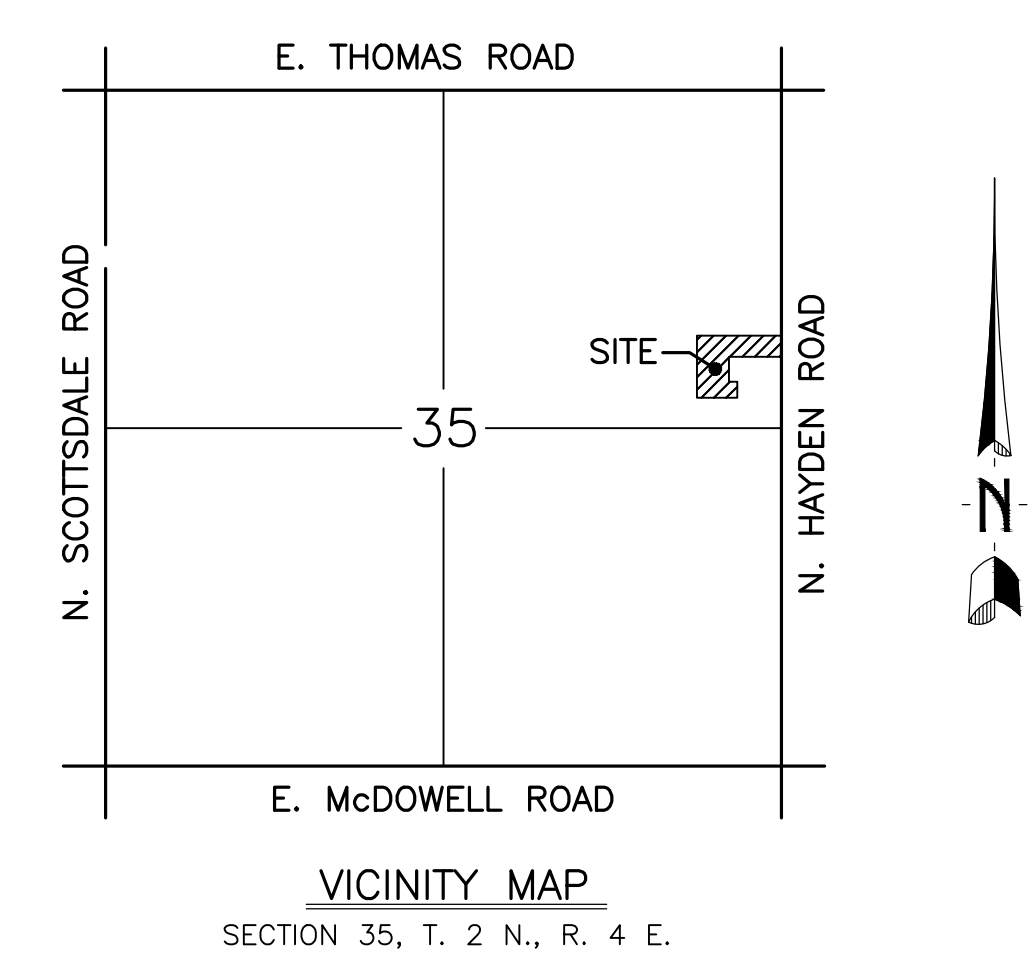
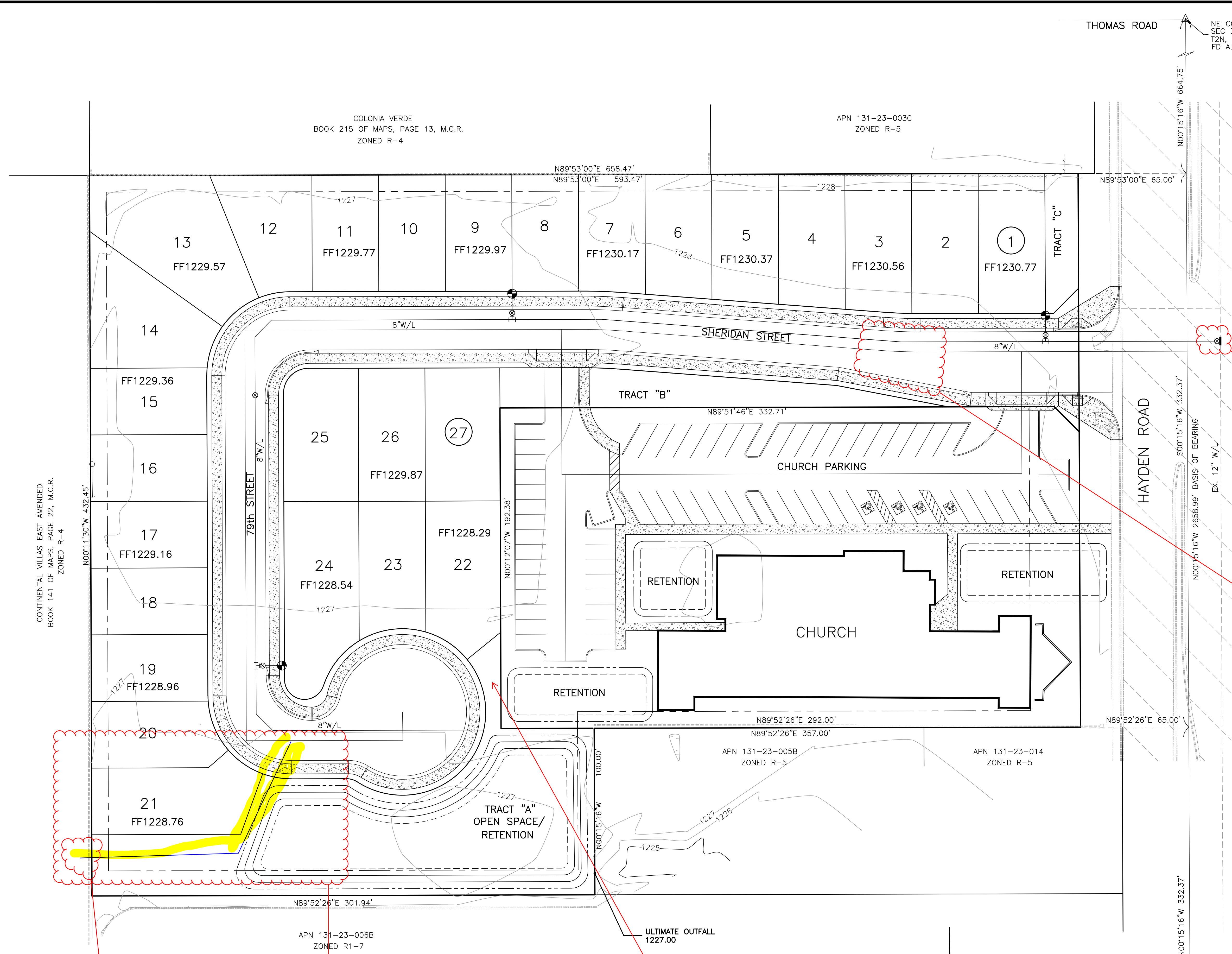
Fire Flow = 500-gpm with fully sprinkled buildings

Minimum Pressure = 50-psi (average day demand) & 30-psi (peak day demand w/ fire flow)

Based on the above design criteria, Table 3.1 below provide the calculations for the maximum daily water flow required by the site.

No. of Lots	Avg. Day Flow (gpm)	Max. Day Flow (gpm)	Peak Hour Flow (gpm)
27	9.72	19.44	34.02

Table 3.1 – Single-Family Water Calculations



RESIDENTIAL SITE SUMMARY

EXISTING ZONING: R-5 & R1-7
 PROPOSED ZONING: R-4
 GROSS ACRES: 3.89 ACRES
 OPEN SPACE: 0.61 ACRES (15.7%)
 TOTAL NUMBER OF LOTS: 27
 TYPICAL LOT SIZE: 40' X 70'
 DENSITY: 6.94 LOTS/ACRE
 ASSESSOR PARCEL NO: 131-23-005A & A PORTION OF 131-23-008

BENCHMARK

CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE AT THE INTERSECTION OF HAYDEN ROAD AND OAK STREET. NAVD 88 DATUM, ELEVATION 1226.907

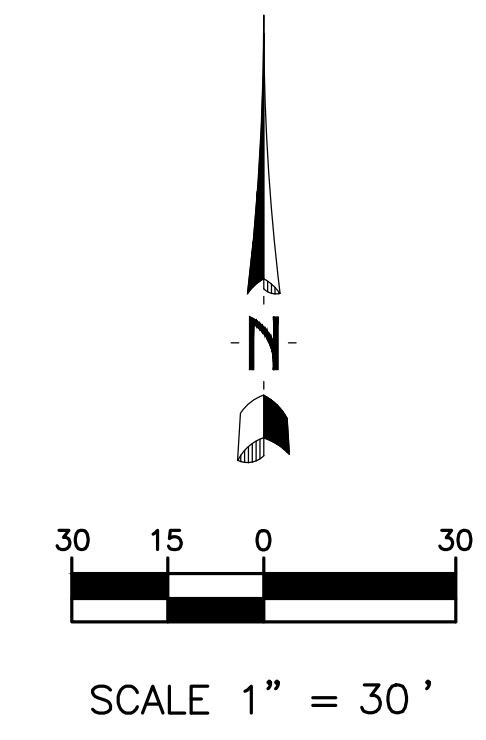
Indicate proposed sewer main and service line locations to evaluate conflicts with water pipelines and required separation (6ft clear)

This 12" main is a cast iron pipe (CIP) per City GIS. Removal of a minimum of 1 segment of CIP pipe and replacement with DIP pipe and a reducing tee and isolation valve(s) will be required. Coordination with the City to isolate this main would be required.

Removal of a minimum of 1 segment of existing 6" ACP pipe and replacement with DIP pipe and a reducing tee and isolation valve will be required. Coordination with the City to isolate this main would be required.

DS&PM 6-1.402 Loop the new 8" water line to connect to the existing alley 6" ACP line. Refer to preapp comments at front of document on details required

DS&PM 6-1.418 Water sampling stations are generally required in all new residential subdivisions consisting of twenty or more platted lots. Developers shall contact the Water Quality Division prior to the preliminary plat submittal for a determination. Sampling stations are to be located within the right-of-way, a private street tract, or utility easement at mid-street, 3 feet behind the sidewalk, along a property line extension. Construction will be per COS Standard Detail No. 2349.



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 CONTACT: CHRIS BROWN
 E-MAIL: cbrown@arcadiacapital.com
 PHONE: 602-478-0662

Date	11-4-19
As-Built	
Job No.	190303

Clouse Engineering, Inc.
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PRELIMINARY WATER MAP
SOUTH SCOTTSDALE
2340 N. HAYDEN ROAD

Revised