11/20/24 – 3rd Review Comment Letter

John Berry
Berry Riddell
6750 E Camelback Rd Ste 100
Scottsdale, AZ 85251

RE: **2-ZN-2024**
Artessa
G0949 (Key Code)

Planning & Development Services has completed review of the above referenced development application. The following comments represent issues or deficiencies identified by the review team and are intended to provide you with guidance for compliance with city codes, policies, and guidelines.

Significant Zoning Ordinance or Scottsdale Revise Code Issues

The following code and ordinance related issues have been identified and must be addressed with the resubmittal. Addressing these items is critical to determining the application for public hearing and may affect staff's recommendation. Please address the following:

Water Resources, Rezaur Rahman, 480-312-5636, rrahman@scottsdaleaz.gov

1. Please see attached Sewer BOD redlines.
2. The 8" public sewer along Alma School Rd, from Dynamite Rd to south of Jomax Rd, has reached its max capacity including its allocation for Fiesta/Reata Ranch and does not have additional capacity for this rezoned property. Per DSPM Section 7-1.400 and SRC, the Developer must install, at their expense, all on-site and off-site sewer improvements necessary to serve their development:
    a. The Developer is required to up size Alma School Rd 8" sewer to 15-inch minimum from Dynamite Rd to South of Jomax Rd at their expense.
    b. However, upsizing the Alma School Rd sewer by the Developer may be waived and Water Resources will accept an in-lieu payment equivalent to the construction cost differential between a 12-inch and 15-inch sewer line for the entire stretch of Alma School Rd between Dynamite Blvd and Jomax Rd per DSPM Section 7-1.105. This in-lieu payment amount shall be used to augment the Alma School Rd sewer Infrastructure Improvement Plan (IIP) project fund for mitigating/addressing sewer conveyance/capacity issue.
    c. The in-lieu payment shall be paid prior to approval of the final plat per DSPM Section 7-1.105.
    d. Time of construction for Artessa must not precede the completion of City's Alma School sewer up sizing project.

Engineering, Eliana Hayes, 480-312-2757, ehayes@scottsdaleaz.gov

3. SRC 24 and DSPM 6+7: It appears that some type of enhanced surface covering is intended for the on-site circular drive aisle. This circular drive aisle will be encumbered by a water and sewer

facilities easement and will be used by solid waste truck for a 270 degree turning movement. Applicant will be required to either sign an indemnity agreement eliminating the city's liability for this enhanced surface covering or include such liability eliminating language as a note on a project final plat. Applicant to acknowledge accordingly.

4. 1st- SRC 48: Please provide city's approval of the existing parcel lines within proposed rezoning area.
   2nd- Response letter does not provide applicant's clear direction on land assemblage requirement for currently developed parcels resulting in 1 project parcel and one existing development parcel. Land assemblage is required prior to any permit issuance of this project. If this is not applicant's intent or understanding, applicant needs to provide an architect's signed and sealed analysis of appropriate minimum distance of existing buildings and property lines as part of this zoning case to demonstrate project's conformance with city code requirements, in this case, the building and land division codes, as project parcel is relying on existing developed parcel to meet their zoning requirements and hence a part of this project.
   3rd- **Response letter response states that the current parcel lines will need to stay in place but they do not address the need to verify that the existing property lines comply with building code requirements, specifically for the existing Wells Fargo building. Either redo this zoning application to remove the Wells Fargo parcel from it, in its entirety and related analysis, or provide an architect's signed and sealed letter to support their claim that existing property lines must remain in place and prior to zoning hearing determination, not a stipulation, else the zoning case approval will be reliant upon a code compliancy issue condition that may not be able to be met. Their response:**

d	We acknowledge that the parcel lines created through Maricopa County will need to be platted through the City process. Current property lines will need to remain in place with any future minor subdivision plat. Existing cross access easement is in place.
s	We will address with future subdivision plat.

   a. (+ SRC 31) 1st- Existing Wells Fargo eastern parcel line appears to be too close to its building canopy. Please provide an architect's signed and sealed building code analysis for existing parcel line placement else the property line should be shifted so that it is located 30' from the canopy edge.
      2nd- Not addressed.
      3rd- Not addressed. See related response above. Remove this parcel from case consideration or prove it is code compliant within this case for it remain included.
   b. 1st- As currently presented in case materials, all parcels within the rezoning boundary provide for unified and cohesive access, vehicular and non. Currently the parcels are all owned by the same entity, but the city cannot preclude their sales to different entities. Different entities may have different intents with their parcels. Please provide a proposed deed restriction or in perpetuity access agreement providing for the protection of shared drive aisles and sidewalks and their communal maintenance and financing thereof.
      2nd- Not addressed.
      3rd- Response letter states that there exists an existing cross access easement and provided a copy of, MCR 2001-0042312, which does provide for vehicular and utility cross access across all parcels in this shopping center, including subject parcel. This agreement however does not provide for pedestrian access as it is specific to vehicular – at least from my reading. A new agreement needs to be executed, specifically with all other parcels but Walgreens or Wells Fargo, providing for pedestrian access to accommodate project design. The Walgreens pedestrian access is not needed by the city, for this project, as the other pedestrian access connection to Dynamite can be

covered under new agreement. Please acknowledge the requirement for a new agreement accordingly or provide an existing one that covers pedestrian access or correct my interpretation of MCR 2001-0042312.

c. 1st- Platting of parcels will be a prerequisite of development permit issuance if the city did not approve the existing property lines; re response above. As a commercial project, a minor subdivision requires a case approval, which may be accomplished via the project's DR case with a submittal of proposed plat accordingly.
2nd- Not addressed.
3rd- Responses states they will plat, but only as the current property lines sit, see related issues described above.

Significant Policy Issues

The following policy related issues have been identified. Though these issues may not be as critical to determining the application for public hearing, they may affect staff's recommendation and should be addressed with the resubmittal. Please address the following:

Water Resources, Rezaur Rahman, 480-312-5636, rrahman@scottsdaleaz.gov

5. At present day, 8" sewer line does not have the capacity to accept additional sewer flows. Currently flowing at d/D = 0.7 which exceeds hydraulic design criteria per DSPM Section 7-1.404.
6. Adjacent commercial property to Artessa includes retail (11,460 SF), shopping (34,346 SF), bank (5,142 SF), and drug store (14,577 SF). The total space is 65,252 SF and produces a peak flow of 68 gpm per DSPM Figure 7-1.2.
7. Flows of 780 gpm from LS 47 and future Fiesta/Reata Ranch lift stations have been previously allocated to be discharged into Alma School Rd sewer. A 12" sewer with a slope of 0.52% and d/D = 0.65 per DSPM section 7-1.404 should be able to convey existing flows plus Reata/Fiesta Ranch flow of 879 gpm (=280+31+500+68). With Artessa flow of 177 gpm (total flow of 1,056 gpm), a 15" sewer would be required (W/min slope of 0.00224 @ d/D = 0.7).
8. The 8" public sewer along Alma School Rd has reached its max capacity. Conduct Sewer Flow Monitoring minimum at two locations per DSPM Section 7-1.202.E during Pre-plat case submittal. Coordinate with Water Resources for the location of sewer monitoring manholes.

Engineering, Eliana Hayes, 480-312-2757, ehayes@scottsdaleaz.gov

9. 1st- DSPM 2-1.309: REFUSE. Provide a refuse plan meeting all city refuse requirement given in DSPM 2-1.309.

   2nd- Not addressed properly. Understood regarding 67 units but the 2 double enclosure placements to not comply with the requirement to provide a one direction pick-up route through project. As proposed, the truck would have to go in one way, exit to commercial area, turn themselves around, and go back in the way they came out to pick up the other enclosure. 1 double enclosure housing a 4 cubic yard vertical compactor and a refuse container could suffice for this development, else relocate one of the enclosures so it can be picked up from the same direction as the other.

   3rd- Not addressed. Refuse plan does not demonstrate compliance for a 40' truck's 45' truck turning radius into and out of the proposed refuse enclosures, nor that the refuse truck does not need to back track to serve the multiple containers proposed.

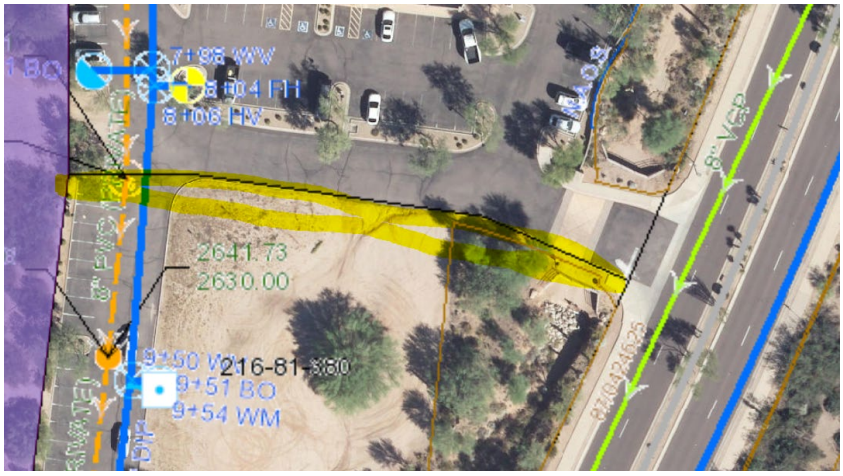
   a. **Please note that 90 dwelling units necessitates a 6 cubic yard minimum horizontal or vertical compactor. Please make sure to accommodate in refuse plan accordingly, specifically stating the compactor to be used to assure appropriate site space has been provided for it.**

b. **An emergency and services access easement along the refuse service route to and from city streets, crossing parcels boundaries, will be required. Update refuse plan accordingly.**

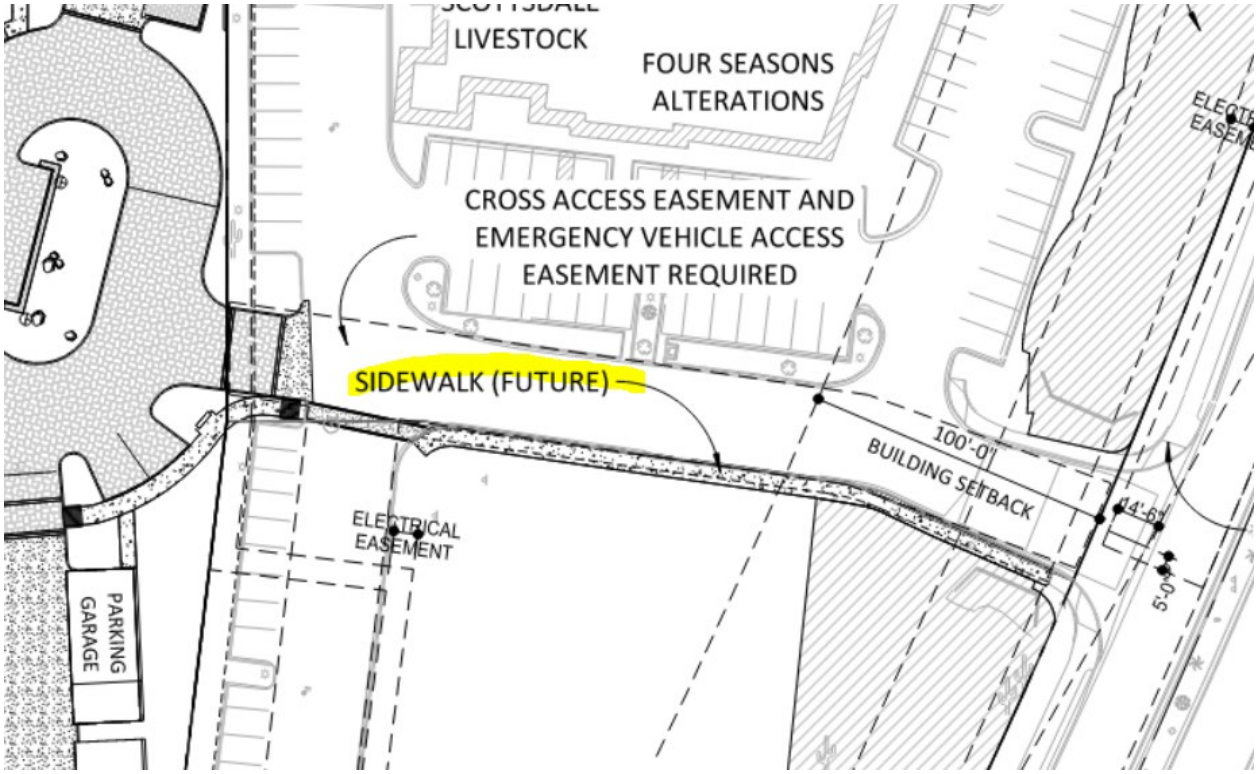
10. 1st- DSPM 2-1.310: A 6' wide accessible pedestrian route from the main entry of the development to each rezoning area abutting public street is required.

    2nd- Please add construction of 6' sidewalk to N Alma School as a scope of this project (currently not depicted within provided preliminary G+D). Missing sidewalk is located here, existing parking stalls in conflict with proposed sidewalk connection are to be modified to accommodate this pedestrian connection: Addressed.

    3rd-NO LONGER ADDRESSED.



This is not a sidewalk future. This is a sidewalk needed to provide with this project, update their site plan accordingly, SIDEWALK WITH THIS PROJECT:



11. 1st- DSPM 5-8.205: All non-ADA compliant pedestrian ramps abutting rezoning boundary are to be reconstructed by project. Update site plan accordingly – all existing driveway curb returns:

2nd- Not addressed. Insufficient to say to be done by others.
New ADA curb ramps at all driveways along Alma School Road completed by the city of Scottsdale on 8/13/2024. ADA curb ramps along Dynamite Boulevard are to be reconstructed per Greg Davies.
3rd- Transportation to determine if response of not needing to reconstruct Dynamite ADA curb ramps is acceptable.



12. 1st- DSPM 6-1.202 + 7-1.201: Preliminary Basis of Design Reports must be reviewed and accepted by the Water Resources Department prior to zoning approval. Update BODs accordingly.
    2nd- Not addressed.
    3rd- Not addressed.

Technical Issues

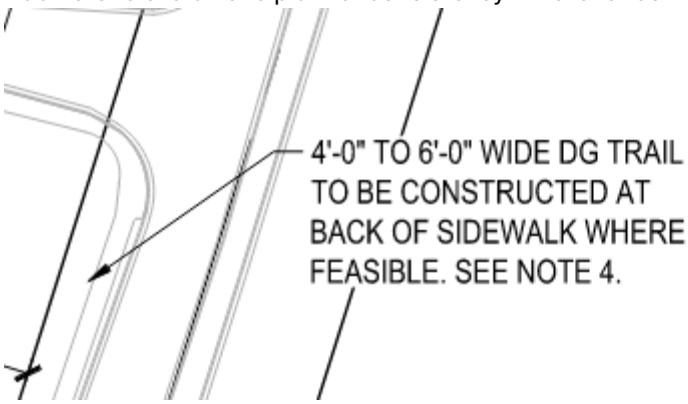
The following technical corrections have been identified. Though these items may not be critical to scheduling the case for public hearing, they may affect a decision on the construction plan submittal and should be addressed as soon as possible. Please address the following:

Water Resources, Rezaur Rahman, 480-312-5636, rrahman@scottsdaleaz.gov

13. Approximately 750-ft downstream of Artessa, here is additional wastewater inflow into existing 8" pipe at Alma School Rd.

Transportation, Stephanie Croker, 480-312-7802, scroker@scottsdaleaz.gov & Greg Davies, 480-312-7829, gdavies@scottsdaleaz.gov:

14. Add note to overall site plan for consistency. This is for both street frontages.



15. Revise the Circulation plan to show the existing 6' sidewalks along Dynamite and Alma School in green, for pedestrian circulation. Then next to the 6' sidewalks, note the 4' wide unpaved trail, for both street frontages, in purple. Right now, the circulation plan is showing incorrect colors and locations.

Planning, Katie Posler, 480 312 2703, kposler@scottsdaleaz.gov

16. Development Agreement and subdivision plan still needs to be resubmitted to address staff comments. Case 2-DA-2024.
17. The topography analysis was provided per requested via previous comments to determine the NAOS required for the entire development. However some things are still unclear. 1 – How was it determined that 6.10 acres of NAOS was required for the whole site? 2-The topography plan is only showing the requirement for residential lot, and that numbers differs from the NAOS plan, please explain.

    Topography plan requirement:

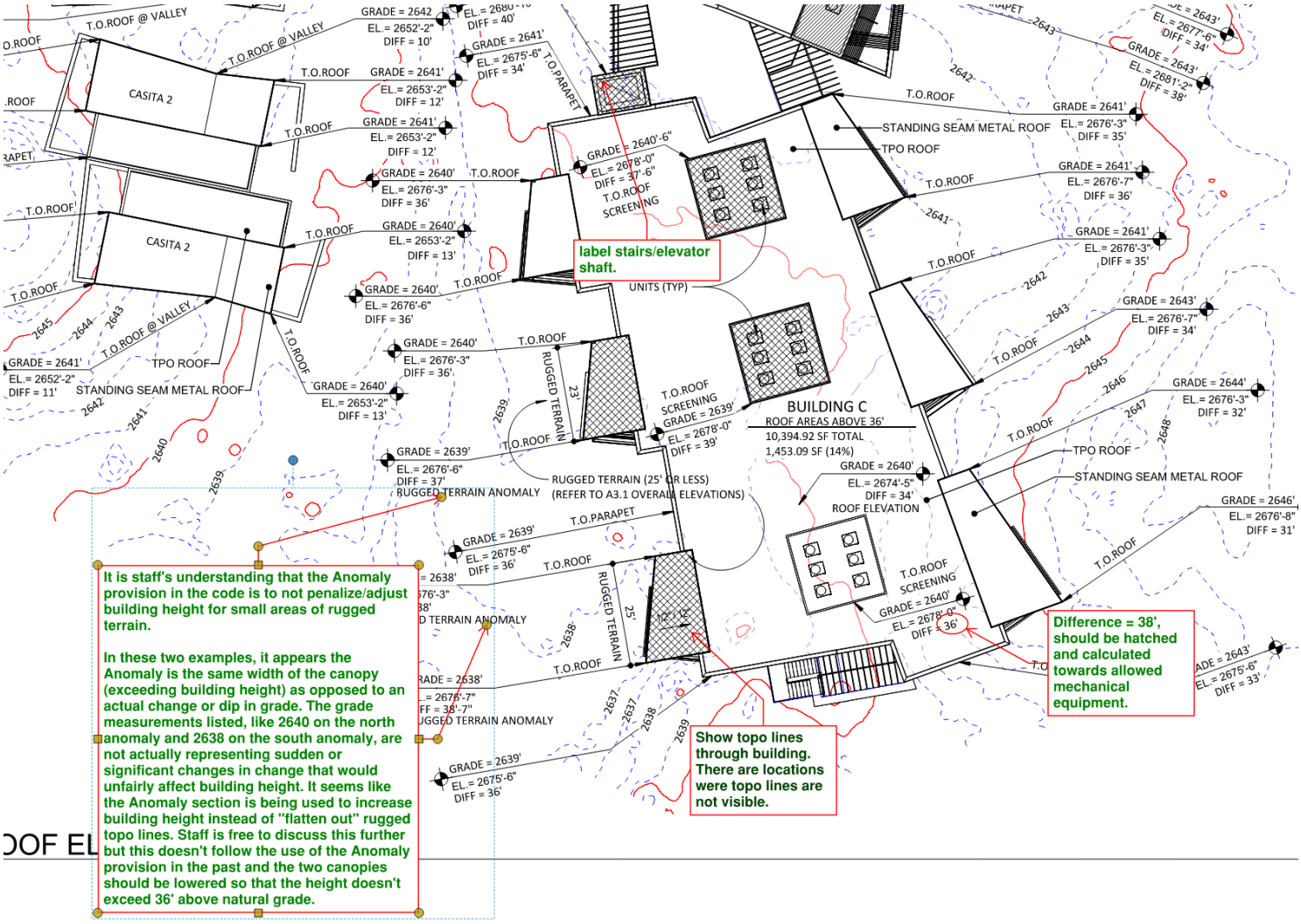
SLOPE CATEGORY	NAOS FACTOR	TOTAL SLOPE AREA (S.F.)	NOAS REQUIRED (S.F.)
0.0%–5.0%	25%	112,731	28,183
5.0%–10.0%	35%	60,066	15,017
10.0% <	45%	201,623	90,730
TOTAL		374,420	133,930

    NAOS plan requirement:

NAOS (TOTALS)

PARCEL	% SITE	SITE AREA	AREA REQ	NAOS PROVIDED
APN 216-81-379	28%	5.7 AC	1.70 AC	1.20 AC (52,421 SF)
APN 216-81-380	8%	1.61 AC	0.49 AC	0.66 AC (28,753 SF)
APN 216-81-381	43%	8.59 AC	2.62 AC	2.95 AC (128,616 SF)
APN 216-81-382	15%	2.92 AC	0.92 AC	0.98 AC (42,765 SF)
APN 216-81-383	6%	1.11 AC	0.37 AC	0.32 AC (14,258 SF)
TOTAL NAOS		19.94 AC	6.10 AC	6.12 AC (266,813 SF)

18. Please address the comments on the roof plan, below.



19. Please adjust the parking requirements on the overall site plan as shown below in green. The math for the required parking on the commercial parcels was off, and the required/provided parking for the multi-family parcel should list "See A1.1" and required as 115 and provided as 119 per the A1.1 site plan.

PARKING (TOTALS)	USE	SF / REQ	REQUIRED	PROVIDED
APN 216-81-379	OFFICE/RETAIL	45,806 SF / 350	131	177
APN 216-81-380	VACANT LOT	0 SF / 350	0	16
APN 216-81-381	MULTIFAMILY	SEE A1.1	115	119
APN 216-81-382	RETAIL	14,577 SF / 350	42	101
APN 216-81-383	BANK	5,142 SF / 350	15	33
TOTALS PROVIDED	MIXED USE		303	446

Please submit the revised application requirements and supplemental information identified in Attachment A. Once reviewed, staff will determine if the application is ready to be determined for a hearing, or if additional information is needed.

The Zoning Administrator may consider an application withdrawn if a resubmittal has not been received within 180 days of the date of this letter (Section 1.305. of the Zoning Ordinance).

If you have any questions, or need further assistance, contact case reviewer identified below.

Regards,
Katie Posler
Senior Planner

ATTACHMENT A
Resubmittal Checklist

Submit digitally at: https://eservices.scottsdaleaz.gov/bldgresources/Cases/DigitalLogin

All files shall be uploaded in PDF format. Application forms and other written documents or reports should be formatted to 8.5 x 11, and plans should be formatted to 11 X 17.

- Comment Response Letter – Provide responses to the issues identified in this letter
- Basis of Design Report (sewer)
- Site Plan Overall
- Site Plan Individual
- NAOS Plan
- Topography plan (for NAOS)
- Circulation Plan
- Roof Over Topography
- Color Building Elevations (for all buildings)
- Perspectives

PRELIMINARY SEWER REPORT

ARTESSA PINNACLE PEAK

SWC Dynamite Boulevard and Alma School Parkway

Scottsdale, Arizona 85262

Prepared For:

Lifestyle Communities, LLC.

1938 Lincoln Drive

Edina, MN 55436

952-228-7944

PRELIMINARY Basis of Design Report

☐ ACCEPTED

☐ ACCEPTED AS NOTED

☑ REVISE AND RESUBMIT

CITY OF SCOTTSDALE

SCOTTSDALE WATER

9379 E San Salvador Dr.
Scottsdale, AZ 85258

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 rrahman **DATE** 11/8/2024

Prepared by:

SEG

Sustainability Engineering Group
5240 N 16th Street, Suite 105
Phoenix, AZ 85014
480.588.7226 www.azSEG.com

Registered Professional Engineer (Civil)
CERTIFICATE NO.
45621
ALI SAMIH FAKIH
Date Signed 10/11/2024
ARIZONA, U.S.A.

EXPIRATION DATE: 12-31-2024

Project Number: 231106

1st Submittal Date: March 28, 2024 (REZONING)
2nd Submittal Date: July 16, 2024 (REZONING)
3rd Submittal Date: October 11, 2024 (REZONING)

CASE FILE #: 2-ZN-2024 **PLAN CHECK #: TBD**

Table of Contents

1. INTRODUCTION 1
2. BACKGROUND 1
2.1 Project Location 1
2.2 Existing Conditions 1
3. DESIGN CRITERIA 1
4. PROPOSED CONDITIONS 2
4.1 Private Sewer Design 2
4.2 On-site Wastewater Flows 3
4.3 Private Sewer Capacity 4
4.4 Off-site Sewer Capacity 5
5. CONCLUSIONS 6
6. REFERENCES 7

EXPIRATION DATE: 12-31-2024

LIST OF FIGURES:

FIGURE 1 - Vicinity Map
FIGURE 2 - Aerial map
FIGURE 3 - Sewer QS Maps

APPENDIX:

APPENDIX I - Preliminary Sewer Plan
APPENDIX II - Hydraulic Calculations
APPENDIX III - Alma School Parkway Sewer Monitoring

1. INTRODUCTION

This report is prepared for Lifestyle Communities, LLC as a part of the design for the Artessa Pinnacle Peak development project in Scottsdale, Arizona. The purpose of this report is to provide analysis and results for the proposed wastewater distribution system for the project site. This project consists of the construction of three 3-story multifamily residential buildings, a community center, including a pool, and 14 Casitas with a total of 68 DU and associated hardscape and utility improvements.

2. BACKGROUND

2.1 Project Location

The Artessa Pinnacle Peak development is approximately 8.6 acres located at the southwest corner of Dynamite Boulevard and Alma School Parkway. The site is located on Maricopa County Assessor Parcel Number (APN) 216-81-381 in the southeast quarter of Section 28, Township 5 North, Range 5 East and the northeast quarter Section 33, Township 5 North, Range 5 East. The property is currently undeveloped bounded by a residential development to the west, a commercial development to the north and east, and platted undeveloped property to the south.

See **Figure 1** for a Project Vicinity Map.

2.2 Existing Conditions

The site slopes from the north to the south at approximately 2.5% with an elevation difference of approximately 16 feet. An existing private 8-inch polyvinyl chloride (PVC) sewer main is located south and east of the site within Greythorn Drive, an access drive along the west side of the existing commercial development. This sewer main conveys wastewater south and east along Greythorn Drive to a manhole in Alma School Parkway. Refer to the Aerial map in **Figure 2** and the Sewer QS Maps in **Figure 3**.

3. DESIGN CRITERIA

The new sewer system design will be submitted to the City of Scottsdale and the Maricopa County Environmental Services Department for review and permitting. The new sewer system will be designed to meet the City of Scottsdale *Design Standards and Policies Manual* (DS&PM - 2018), Maricopa Association of Government's *Standard Specifications for Public Works Construction (2024 Revision)*, *Arizona Administrative Code Title 18*, and Arizona Department of Environmental Quality's *Bulletin 11*. Key design criteria include the following:

- All private sanitary sewer lines shall be extra strength vitrified clay pipe (VCP) or

PVC pipe material.

- The Manning's n-value of all pipes shall be 0.013.
- Minimum full flow velocity is 2.5 feet per second (fps).
- The maximum velocity shall be 10 feet per second at peak flow.
- The maximum d/D ratio is 0.65 for the onsite 8" gravity sewer lines.
- Sewer manholes shall be located at a maximum spacing of 500 feet.
- Manholes shall be 4 feet in diameter for manholes less than 10-feet deep. For manholes more than 10-feet deep the manhole shall be 5-feet in diameter.
- The maximum sewer cleanout spacing shall be 150 feet for 6-inch pipes or smaller.
- Sewer service pipes shall have a minimum diameter of 6 inches for commercial developments and 4" for individual residential units.
- No sanitary sewer lines shall be installed with less than 4 feet of cover over the top of the pipe.
- All sewers must maintain a 1-foot vertical clearance to dry utilities. Sewer mains below water mains shall maintain 1 to 2 feet of vertical separation with extra protection and with greater than 2 feet of separation require no protection. Sewer mains above water mains shall maintain a minimum of 2 feet of vertical separation and always require extra protection. Sewer service below water mains shall maintain 1-foot of vertical separation. Sewer services above water mains shall maintain a minimum of 1-foot of vertical separation and always require protection.
- All sewers must maintain 6 feet of horizontal clearance to dry utilities. When water mains and sewer mains run parallel to each other, a minimum of 9 feet of separation to pipe centerlines is required to maintain 6 feet of clearance at manholes.

4. PROPOSED CONDITIONS

4.1 Private Sewer Design

Wastewater system demands for the Artessa Pinnacle Peak development are calculated based on the specified design demands from the City of Scottsdale DS&PM.

The sewer main receiving flow from this project is private and is located within Greythorn Drive southeast of the site. That main ties into an existing public 8" VCP sewer main running within Alma School Parkway, east of the adjacent commercial development. Artessa and the adjacent commercial property are controlled by a common entity, so use of the private 8" sewer to Alma School is accepted. The owner will create entitlement documentation to assure continued joint use.

Two new 8-inch sewer mains will be installed throughout the site. One will be installed along the access drive running along the east side of the property and will serve the three multifamily buildings. Another will run behind the casitas on the west side of the project

site. These two mains will connect into a new manhole at the southeast corner of the site from which an 8-inch main will convey wastewater east to the connection point at the existing private manhole within Greythorn Drive. Sewer service lines for each of the new buildings will be discharged into the new onsite sewer main lines. The residential sewer service lines to the casitas will consist of 4" pipes at 2% minimum slope. Sewer service lines to the three multifamily buildings will consist of 6" pipes at 1.5% minimum slope.

Sewer cleanouts will be installed at each connection location. Sewer manholes are required at all changes of grade or changes in direction for the 8-inch onsite mains. Manholes will have a maximum allowable spacing distance of 500 feet. The onsite sewer mains will be private and will maintain a minimum slope of 1/16" per foot (0.52%) as required by the International Plumbing Code. All new sewer pipes with less than 10 feet cover will be polyvinyl chloride (PVC) SDR35. Pipes with cover greater than 10 feet will be polyvinyl chloride (PVC) SDR26. A preliminary utility plan for the project site is provided in **Appendix I** for reference.

4.2 On-site Wastewater Flows

Average day demand in gallons per day (GPD) and the design peaking factor were determined based on the values for "high density condominium" and "commercial/retail" per Figure 7-1.2 in the City of Scottsdale DS&PM. A summary of the site sewer demands for each of the proposed building types is shown in **Table 1.**

An outdoor pool is also proposed and will require a 100-gpm backwash flow. The proposed 8" pipe has sufficient capacity to discharge the peak 77.06 gpm flow (calculated in Table 1 below) plus the 100-gpm pool backwash. See **Table 2** below for the pipe capacity calculations.

Per the City of Scottsdale DS&PM

- The number of capita per du = 2.5, the demand is 100 gpd/capita
- The peaking factor = 4 times the average day demand
- The demand for multifamily residential is 140 gpd/unit
- The peaking factor = 4.5 times the average day demand
- The demand for commercial/retail is 0.5 per sq. ft.
- The peaking factor = 3 times the average day demand

Table 1. Sewer Demands

Building No.	Unit Type	Area (S.F)	Area (Acre)	No. of DU	Capita	Demand (GPD)	ADD Demand (GPD)	PDD (GPD)	PDD (GPM)
1 Multi-family	A	892	0.020477	3	7.5	140	1,050	4,725	3.28
	B	1,220	0.028007	9	22.5	140	3,150	14,175	9.84
	C	970	0.022268	3	7.5	140	1,050	4,725	3.28
	D	1,298	0.029798	3	7.5	140	1,050	4,725	3.28
	E	1,482	0.034022	3	7.5	140	1,050	4,725	3.28
	Total	24,906	0.571761	21	52.5		7,350	33,075	22.97
2 Multi-family	A	892	0.020477	4	10	140	1,400	6,300	4.37
	B	1,220	0.028007	4	10	140	1,400	6,300	4.37
	C	970	0.022268	2	5	140	700	3,150	2.19
	D	1,298	0.029798	2	5	140	700	3,150	2.19
	E	1,482	0.034022	2	5	140	700	3,150	2.19
	Amenity	9,000	0.206611	-	-	0.5	4,500	13,500	9.37
	Total	24,948	0.572725	14	35		9,400	35,550	24.69
3 Multi-family	B	1,220	0.028007	6	15	140	2,100	9,450	6.56
	C	970	0.022268	3	7.5	140	1,050	4,725	3.28
	D	1,298	0.029798	3	7.5	140	1,050	4,725	3.28
	E	1,482	0.034022	3	7.5	140	1,050	4,725	3.28
	F	1,640	0.037649	3	7.5	140	1,050	4,725	3.28
	Total	23,490	0.539254	18	45		6,300	28,350	19.69
4 Casita 2	B	976	0.022406	2	5	100	500	2,000	1.39
	Total	1,952	0.044812	2	5	100	500	2,000	1.39
5 Casita 1 & 2	A	870	0.019972	1	2.5	100	250	1,000	0.69
	B	976	0.022406	2	5	100	500	2,000	1.39
	Total	2,822	0.064784	3	7.5	100	750	3,000	2.08
6 Casita 2	B	976	0.022406	2	5	100	500	2,000	1.39
	Total	1,952	0.044812	2	5	100	500	2,000	1.39
7 Casita 2	B	976	0.022406	2	5	100	500	2,000	1.39
	Total	1,952	0.044812	2	5	100	500	2,000	1.39
8 Casita 1 & 2	A	870	0.019972	1	2.5	100	250	1,000	0.69
	B	976	0.022406	2	5	100	500	2,000	1.39
	Total	2,822	0.064784	3	7.5	100	750	3,000	2.08
9 Casita 2	B	976	0.022406	2	5	100	500	2,000	1.39
	Total	1,952	0.044812	2	5	100	500	2,000	1.39
Total		86,796	1.992554	67	167.5	Varies	26,550	110,975	77.06

4.3 Private Sewer Capacity

The proposed sewer system was analyzed using Manning's Equation for uniform flow in a pipe. A roughness coefficient of 0.013 was used for the calculations, based on the standard value for PVC pipe.

Equation 1 – Manning's Equation

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

Where: Q = Flowrate (cubic feet per second)
n = Roughness Coefficient (0.013)
A = Area of Flow (square feet)
R = Hydraulic Radius (feet)
S = Pipe Slope (feet per foot)

Given a minimum preliminary proposed slope of 0.52%, the proposed 8-inch sewer main accommodate flows up to 296 (GPM), at the maximum depth to diameter (d/D) ratio of 0.65, as prescribed in the DS&PM. A summary of the hydraulic capacity calculations and the corresponding demands and City requirements is provided in **Table 2.**

Table 2. Sewer Capacity

Pipe Size	Minimum Design Segment Slope [%]	Inside Pipe Diameter [in]	d/D= 0.65 Pipe Capacity [GPM]	System Peak Flow [GPM]	Velocity [fps]
8-inch	.52	8	296	177.1	2.7

Refer to **Appendix II** for the pipe system hydraulic calculations.

4.4 Off-site Sewer Capacity

This project's private sewer system outfalls to the Alma School 8" sewer at the southeast corner of the site at Greythorn Drive (refer to **Figure 3** for the City QS maps).

The peak flow including pool backwash from Artessa is 177.1. The flow from the adjacent commercial property is unknown, so at 11.3 commercial/retail acres, the flow is estimated at 1,500 gal/acre with a peaking factor of 3 equates to 35.3 gpm. The peak flow entering the 8" sewer at Alma School would be 213.6.

RDH Environmental Services completed sewer monitoring at a manhole along Alma School between Greythorn Drive and Dynamite Boulevard (refer to **Appendix III**) in May 2021. The maximum flow was measured at 30.6 gpm with a depth of 0.7 inches and a velocity of 4.4 fps.

177+68 = 245 gpm

This commercial site has following square footage:
Retail 11,460
Shopping: 34,346
Bank 5,142
Drug Store 14,577
Total:65,525 sq. ft
Per DSPM Fig. 7-1.2 Demand is 0.5 gpd per sq. ft.= 22.7 gpm
Peak flow = 68 gpm

Summary of offsite flows at Greythorn Dr. and Alma School manhole:

- 214 gpm from 8" private sewer
- 31 gpm from monitored manhole
- 280 gpm maximum from Golf Club LS #47
- 500 gpm from future Reata Ranch LS (time of construction presently unknown)

Total proposed flow in 8" Alma School: 525 gpm with Artessa and 1025 gpm when the Reata Ranch lift station is constructed.

245+31+280 = 556 gpm

556+500 = 1056 gpm

Flows of 780 gpm from LS 47 and future Fiesta/Reata Ranch lift stations have been previously allocated to be discharged into Alma School Rd sewer. A 12" sewer with a slope of 0.52% slope and d/D = 0.65 per DSPM section 7-1.404 should be able to convey present plus Reata/Fiesta Ranch flow of 879 gpm (=280+31+500+68). **With Artessa flow of 177 gpm (total flow of 1,056 gpm), a 15" sewer would be required (W/min slope of 0.00224 @ d/D = 0.7).**

Currently flowing at d/D = 0.7 which exceeds hydraulic design criteria per DSPM Section 7-1.404.

IIP

Note that the existing flow in the 8" Alma School line with LS #47 operating is 311 gpm (31 + 280). The flow rate exceeds the d/D = 0.65 capacity of the first 8" line segment in Alma School Road at 0.50% slope calculated at 290 gpm per **Appendix II.**

Scottsdale has a wastewater improvement CIP (TEMP2633-F) to upsize the Alma School Parkway 8" sewer line to 10" in years 2025/26 and 2026/27. The 10" sewer at 0.5% has a d/D=0.65 capacity of 526 gpm which will convey the Artessa project and LS#47. When the Reata Ranch LS is constructed the total 1025 gpm flow will require a 15" sewer.

The downstream sewer reach from Greythorn Drive appears to have an approximate slope of 2.2%. **Appendix II** shows the d/D = 0.65 capacity of this line at 609 gpm. The pipe appears to have a present capacity to serve Artessa prior to the construction of the Reata Ranch and Fiesta Ranch lift stations.

750' downstream, there is additional wastewater inflow into 8" pipe @ Alma School Rd.

Artessa acknowledges the Zoning Entitlements for future projects along East Rio Verde Drive and the associated pump stations that, when operational, will surcharge the Alma School Parkway line. Construction timing of Artessa and the Reata Ranch LS will dictate the Alma School sewer improvements. It is anticipated the City's 2025-2027 CIP timing for the roadway sewer improvements will coincide with the construction of Artessa and sufficient sewer capacity will be available to serve all entitled projects provided a 15" pipe is installed. It should be noted that the proposed 10" CIP sewer does not have sufficient capacity to serve Reata Ranch, the Golf Club and the monitored flow (31 + 280 + 500 = 811 gpm). The 10" sewer at a d/D=0.65 and 0.50% slope has a capacity of 526 gpm. A 12" sewer has a capacity of 855 gpm and a 15" sewer, 1,716 gpm.

Summary of offsite analysis: Artessa , the existing Dynamite sewer flow including LS#47 and future Reata Ranch and Fiesta Ranch will necessitate a 15" sewer. The proposed 10" CIP sewer needs to be a 12" if only accounting for the additional flow from LS #47. Artessa proposes to provide the City an in-lieu payment for the CIP cost differential between a 12" and 15" pipe between Alma School Parkway and Jomax Road. The CIP unit costs need to be bumped up approximately 30% to account for recent construction and material cost increases. With the in-lieu payment, Artessa is requesting Zoning approval with the understanding that the property will develop concurrently with the City's CIP construction.

5. CONCLUSIONS

The proposed private onsite private sewer system will accommodate the flows from the Artessa Pinnacle Peak development while adhering to City of Scottsdale design standards. The proposed 8-inch sewer mains will run throughout the site to provide service to the

Water Resources will accept an in-lieu payment equivalent to the construction cost differential between a 12" and 15" sewer line for the entire stretch along Alma School Rd between Dynamite Blvd and Jomax Rd per DSPM Section 7-1.105. This in-lieu payment amount shall be used to augment the Alma School Rd sewer IIP fund for mitigating sewer conveyance/capacity issue and shall be paid before approval of the final plat. Time of construction for Artessa must not precede the completion of City's Alma School sewer up sizing project.

proposed residential buildings and community center. This onsite sewer system will then discharge into the anticipated construction of a 15" sewer main in Alma School Parkway.

In summary:

- The existing reach of 8" pipe south of Alma School at 0.50% has a 290 gpm capacity.
- Existing development generating 30.5 gpm (monitored) plus LS #47 at 280 gpm results in 310 gpm requiring a 10" pipe along Alma School.
- Adding the 500 gpm flow from the Reata and Fiesta Ranch lift stations results in an 815 gpm flow requiring a 12" pipe along Alma School.
- Adding Artessa's peak 177 gpm flow, the adjacent 35 gpm flow, the monitored 31 gpm flow, LS #47's 280 gpm flow and Reata/Fiesta Ranch's 500 gpm flow results in a total flow of 1,023 gpm requiring a 15" pipe in Alma School.
- Artessa requests to negotiate an in-lieu payment to the City for the cost difference between a 12" and 15" sewer installation and agrees to time construction concurrent with the City's Alma School sewer upsizing project.

@d/D = 0.65.

68 gpm

1,056 gpm

for the entire stretch of Alma School Rd between Dynamite Blvd and Jomax Rd

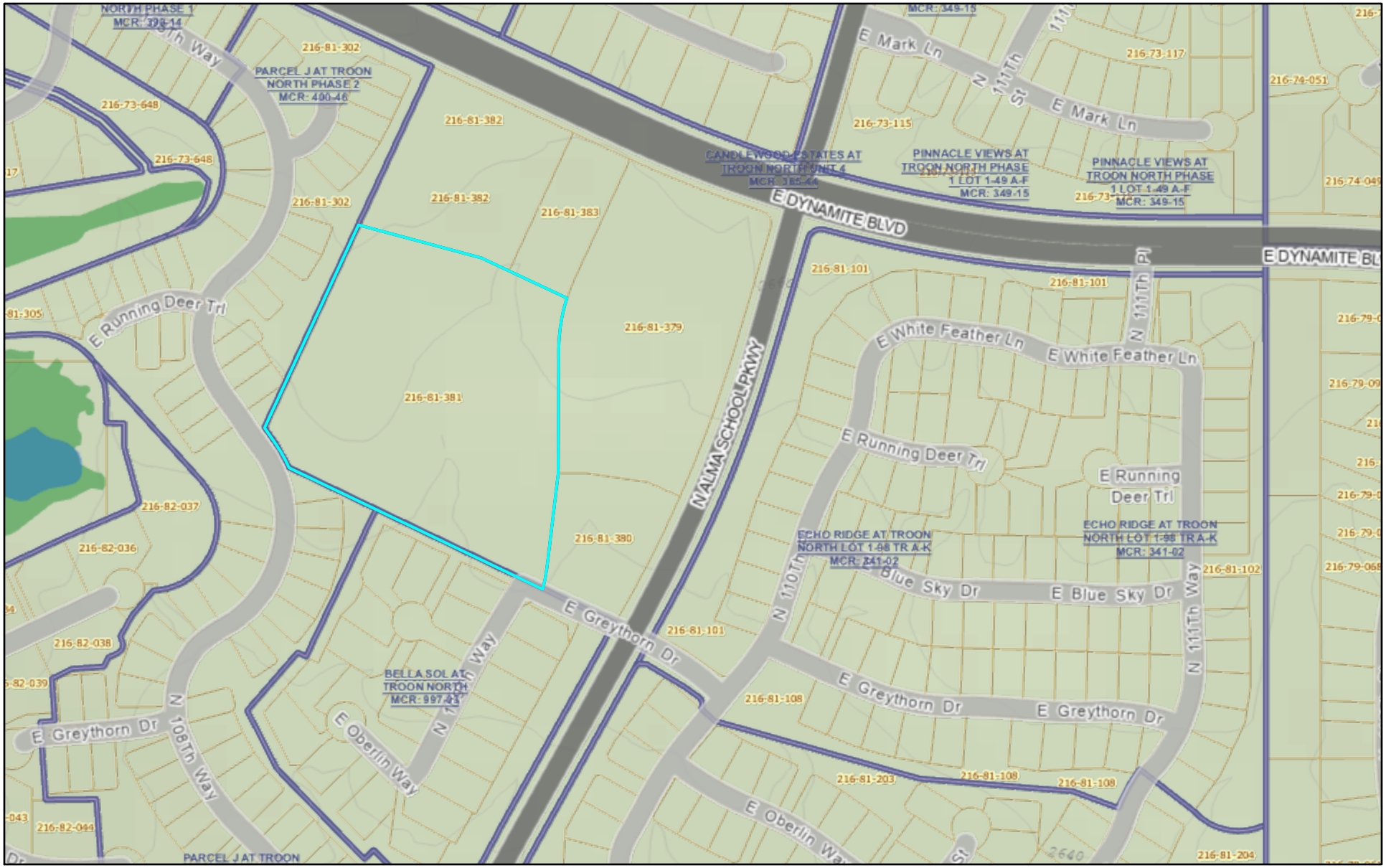
6. REFERENCES

1. City of Scottsdale. *Design Standards and Policies Manual*, 2018.
2. International Code Council. *International Plumbing Code,* 2018.
3. Maricopa Association of Governments. *Uniform Standard Details for Public Works Construction*, 2024.
4. *Arizona Administrative Code (AAC) Title 18,* September 2016.
5. *Arizona Department of Environmental Quality (ADEQ) Bulletin 11, July 19*

FIGURES

1. *Vicinity Map*
2. *Aerial Map*

Vicinity Map



December 11, 2023

FIGURE 1

1:4,514

0 0.03 0.06 0.12 mi

0 0.05 0.1 0.2 km

Maricopa County GIO, Maricopa County Assessor's Office

Aerial Map

December 11, 2023

FIGURE 2

1:4,514

0 0.03 0.06 0.12 mi

0 0.05 0.1 0.2 km

Maricopa County GIO, Maricopa County Assessor's Office

See next page

50-53

50-55

49-54

07-JAN-24

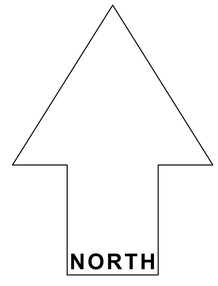
GENERAL NOTES:

- 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:

- Cleanout
- Lift Station (LS)
- Manhole
- Non-GPS Point
- Plug
- Sewer Service Point
- Sewer Tap Point
- Sewer Valve
- Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force (Force)
- Sewer Main - Private

VICINITY MAP



SCALE: 1" = 100'

0 50 100 200

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

SEWER

QUARTER SECTION MAP

50-54

NE 1/4 SEC. 33 T5N R5E

FIGURE 3

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

52-54

51-53

51-55

50-54

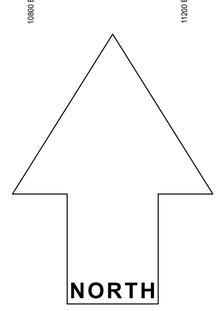
GENERAL NOTES:

- 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:

- Cleanout
- Lift Station (SLS)
- Manhole
- Non-GPS Point
- Plug
- Sewer Service Point
- Sewer Tap Point
- Sewer Valve
- Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force (Force)
- Sewer Main - Private

VICINITY MAP



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

SEWER

QUARTER SECTION MAP

51-54

SE 1/4 SEC. 28 T5N R5E

FIGURE 3

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

07-JAN-24

APPENDICIES

1. Preliminary Sewer Plan

2. Hydraulic Calculations

3. Alma School Sewer Monitoring

DEVELOPER
LIFESTYLE COMMUNITIES SW, LLC
4938 LINCOLN DRIVE
EDINA, MN 55436
PHONE: 952-228-7944
ATTN.: BEN LANDHAUSER
EMAIL: BEN@THISLIFESTYLE.COM

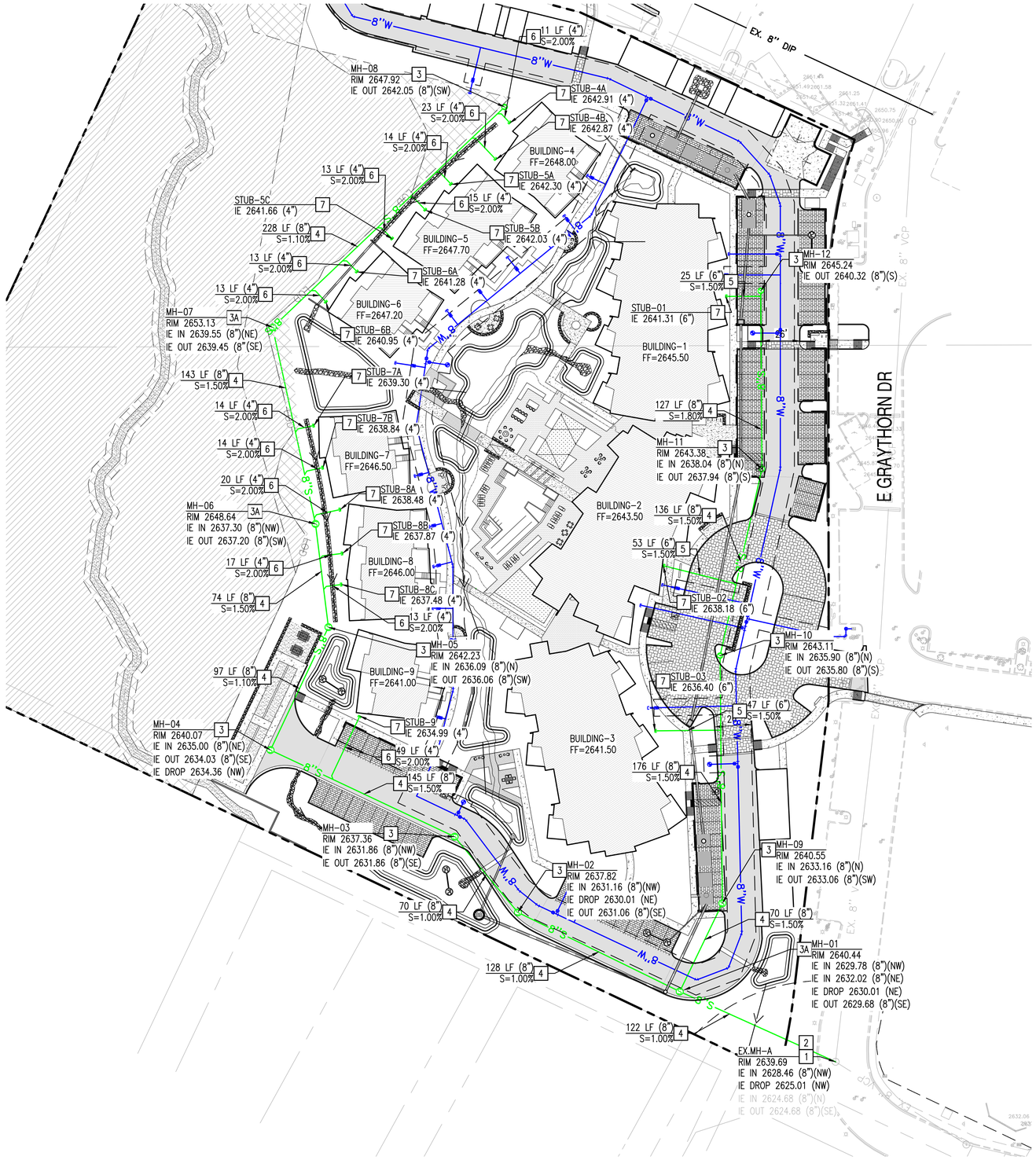
CIVIL ENGINEER
SUSTAINABILITY ENGINEERING GROUP
5240 N. 16TH STREET, SUITE 105
PHOENIX, ARIZONA 85016
PHONE: 480-237-2507
ATTN.: ALI FAKIH
EMAIL: ALI@AZSEG.COM

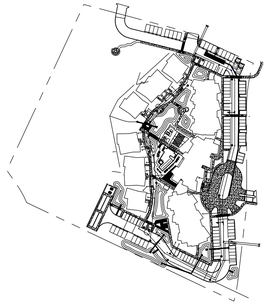
DESIGN ARCHITECT
ARCHITEKTON
464 S FARMER AVENUE, SUITE 101
TEMPE, ARIZONA 85281
PHONE: 480-894-4637
ATTN.: RYAN GRABE, AIA
EMAIL: RYANGRABE@ARCHITEKTON.COM

ARTESSA PINNACLE PEAK

PRELIMINARY OVERALL SEWER PLAN

SW CORNER OF DYNAMITE BOULEVARD AND ALMA SCHOOL ROAD, SCOTTSDALE, ARIZONA, 85296
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 5 NORTH, RANGE 5 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA.





KEY MAP
NTS

NORTH

PRELIMINARY PRIVATE SEWER NOTES

1. CONNECTION TO EXISTING SEWER MANHOLE.
2. PROPOSED DROP SEWER CONNECTION.
3. PROPOSED 4' PRECAST CONCRETE SEWER MANHOLE (PRIVATE)
3A. PROPOSED 5' PRECAST CONCRETE SEWER MANHOLE (PRIVATE)
4. 8" PVC SEWER LINE. LENGTH AND SLOPE PER PLAN.
5. 6" PVC SEWER LINE. LENGTH AND SLOPE PER PLAN.
6. 4" PVC SEWER LINE. LENGTH AND SLOPE PER PLAN.
7. SEWER CONNECTION TO BUILDING.

NOTES:

1. GRAVITY SEWER PIPES SHALL BE SDR-35 WHEN <10' DEEP, OTHERWISE SHALL BE SDR-26, MEETING THE REQUIREMENTS OF ASTM D3034.

NORTH

0' 40' 80' 120'

SCALE: 1" = 40'

EXISTING LEGEND:

PROPERTY LINE	SEWER LINE	STORM DRAIN LINE	SIGN
SECTION LINE	SEWER MANHOLE	STORM CATCH BASIN	STREET LIGHT
ROAD CENTERLINE	WATER LINE	STORM MANHOLE	TREE
EASEMENT LINE AS NOTED	WATER VALVE	GAS LINE	
	FIRE HYDRANT	FENCE	

PROPOSED UTILITY LEGEND:

PROPERTY LINE	FIRE HYDRANT	BUILDING CONNECTION	SEWER MANHOLE
EASEMENT LINE	FDC	BACK FLOW PREVENTER	
X"W WATER LINE	WATER METER	REDUCER	
X"S SEWER LINE	GATE VALVE	CAP	

NOT FOR CONSTRUCTION

SUSTAINABILITY ENGINEERING GROUP
SEG
5240 N. 16TH STREET SUITE 105, PHOENIX, ARIZONA 85016
WWW.AZSEG.COM TEL. 480.588.7226 FAX. 480.256.3534

lifestyle communities

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811 Call 811 or click Arizona811.com

PROJECT: ARTESSA PINNACLE PEAK
LOCATION: SWC DYNAMITE BOULEVARD AND ALMA SCHOOL ROAD, SCOTTSDALE, AZ

DRAWN	BCJC	10/11/2024
DESIGNED	BCJC	10/11/2024
CHECKED	SC	10/10/2024
FINAL QC		
PROJ. MGR.	AK	10/11/2024

DATE: 10/11/2024
ISSUED FOR: REZONING

REVISION NO.:	DATE:
1	
2	
3	
4	

JOB NO.: 231106

SHEET TITLE: **PRELIMINARY OVERALL SEWER PLAN**

PAGE NO.: 1 OF 1
SHEET NO.: **C4.30**

CASE #: 2-ZN-2024

Sewer Service 4" Sewer S=2.00% Full Flow Capacity

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.020 ft/ft
Normal Depth	4.0 in
Diameter	4.0 in
Discharge	120.79 gpm

Results	
Discharge	120.79 gpm
Normal Depth	4.0 in
Flow Area	0.1 ft²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.0 in
Top Width	0.00 ft
Critical Depth	3.5 in
Percent Full	100.0 %
Critical Slope	0.018 ft/ft
Velocity	3.08 ft/s
Velocity Head	0.15 ft
Specific Energy	0.48 ft
Froude Number	(N/A)
Maximum Discharge	129.94 gpm
Discharge Full	120.79 gpm
Slope Full	0.020 ft/ft
Flow Type	Subcritical

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	3.5 in
Channel Slope	0.020 ft/ft
Critical Slope	0.018 ft/ft

APPENDIX II

6" Sewer Service S=1.50% Full Flow Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01500	ft/ft
Normal Depth	6.00	in
Diameter	6.0	in
Discharge	308.4	gpm

Results

Discharge	308.4	gpm
Normal Depth	6.00	in
Flow Area	0.20	ft²
Wetted Perimeter	1.57	ft
Hydraulic Radius	1.50	in
Top Width	0.0	in
Critical Depth	5.02	in
Percent Full	100.0	%
Critical Slope	0.01446	ft/ft
Velocity	3.50	ft/s
Velocity Head	0.19	ft
Specific Energy	0.69	ft
Froude Number	0.00	
Maximum Discharge	331.8	gpm
Discharge Full	308.4	gal/min
Slope Full	0.01500	ft/ft
Flow Type	SubCritical	

APPENDIX II

8" Sewer S=0.52% d/D=0.65

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00520	ft/ft
Normal Depth	5.20	in
Diameter	8.0	in

Results

Discharge	295.8	gpm
Flow Area	0.24	ft²
Wetted Perimeter	1.25	ft
Hydraulic Radius	2.31	in
Top Width	7.9	in
Critical Depth	4.59	in
Percent Full	65.0	%
Critical Slope	0.00757	ft/ft
Velocity	2.74	ft/s
Velocity Head	0.12	ft
Specific Energy	0.55	ft
Froude Number	0.79	
Maximum Discharge	420.7	gpm
Discharge Full	391.1	gal/min
Slope Full	0.00298	ft/ft
Flow Type	SubCritical	

APPENDIX II

Off-Site 8" Sewer S=0.50% d/D=0.65

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	5.20	in
Diameter	8.0	in

Results

Discharge	290.1	gpm
Flow Area	0.24	ft²
Wetted Perimeter	1.25	ft
Hydraulic Radius	2.31	in
Top Width	7.6	in
Critical Depth	4.55	in
Percent Full	65.0	%
Critical Slope	0.00751	ft/ft
Velocity	2.69	ft/s
Velocity Head	0.11	ft
Specific Energy	0.55	ft
Froude Number	0.77	
Maximum Discharge	412.5	gpm
Discharge Full	383.5	gal/min
Slope Full	0.00286	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.00	%
Downstream Velocity	Infinity	ft/s

Off-site 10" Sewer S=0.50% d/D=0.65

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	6.50	in
Diameter	10.0	in

Results

Discharge	525.9	gpm
Flow Area	0.38	ft²
Wetted Perimeter	1.56	ft
Hydraulic Radius	2.88	in
Top Width	9.5	in
Critical Depth	5.79	in
Percent Full	65.0	%
Critical Slope	0.00707	ft/ft
Velocity	3.12	ft/s
Velocity Head	0.15	ft
Specific Energy	0.69	ft
Froude Number	0.80	
Maximum Discharge	748.0	gpm
Discharge Full	695.3	gal/min
Slope Full	0.00286	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.00	%
Downstream Velocity	Infinity	ft/s

Off-site 12" Sewer S=0.50% d/D=0.65

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	7.80	in
Diameter	12.0	in

Results

Discharge	855.2	gpm
Flow Area	0.54	ft²
Wetted Perimeter	1.88	ft
Hydraulic Radius	3.46	in
Top Width	11.4	in
Critical Depth	7.06	in
Percent Full	65.0	%
Critical Slope	0.00673	ft/ft
Velocity	3.53	ft/s
Velocity Head	0.19	ft
Specific Energy	0.84	ft
Froude Number	0.83	
Maximum Discharge	1216.3	gpm
Discharge Full	1130.7	gal/min
Slope Full	0.00286	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.00	%
Downstream Velocity	Infinity	ft/s

Off-Site 15" Sewer S=0.50% d/D=0.7

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	10.50	in
Diameter	15.0	in

Results

Discharge	1716.4	gpm
Flow Area	0.92	ft²
Wetted Perimeter	2.48	ft
Hydraulic Radius	4.44	in
Top Width	13.7	in
Critical Depth	9.49	in
Percent Full	70.0	%
Critical Slope	0.00663	ft/ft
Velocity	4.17	ft/s
Velocity Head	0.27	ft
Specific Energy	1.14	ft
Froude Number	0.82	
Maximum Discharge	2205.2	gpm
Discharge Full	2050.0	gal/min
Slope Full	0.00350	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	70.00	%
Downstream Velocity	Infinity	ft/s

Alma School Parkway Sewer North of Jomax Road

8" Sewer S=2.20% d/D=0.65

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02200	ft/ft
Normal Depth	5.20	in
Diameter	8.0	in

Results

Discharge	608.5	gpm
Flow Area	0.24	ft²
Wetted Perimeter	1.25	ft
Hydraulic Radius	2.31	in
Top Width	7.6	in
Critical Depth	6.59	in
Percent Full	65.0	%
Critical Slope	0.01249	ft/ft
Velocity	5.64	ft/s
Velocity Head	0.50	ft
Specific Energy	0.93	ft
Froude Number	1.62	
Maximum Discharge	865.3	gpm
Discharge Full	804.4	gal/min
Slope Full	0.01259	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.00	%
Downstream Velocity	Infinity	ft/s

APPENDIX II

SL1110 RDH Flow Study Fiesta Ranch 1

Jason Burm
Kimley-Horn
1001 W. Southern Ave., Suite 131 Mesa AZ 85210

SL1110 RDH Flow Study, 1 site in Scottsdale, AZ Friday, 05-21-21 to Tuesday 06-01-21.

Equipment for Site: Hach 901 Logger with Flo-Dar Sensor (Area Velocity)**.**
The equipment was installed on 05/21/21 with confined space entry, pipe size confirmed, sensor calibrated with 6-inch target and level depth confirmed to the flow level.
Duration of monitoring: 9-days including 2 weekends.
Monitor: Flow (gpm), Level (in), and Velocity (fps)
Data logging: 5 minutes intervals (No averaged intervals)

Location #1 located on Alma School Parkway in between Greythorn Dr and Dynamite Blvd
60" Diameter, Rim to Invert: 118.50 inches
8" VCP pipe, flowing South
No Lateral(s)
The pipe condition was intact and reasonably clean
Scum line of 1.25 inches
Flo-Dar installed pointing upstream in the 8" pipe channel

Flow data is valid based on low flow and velocity with no missing data.

Attached is a summary showing Level, Velocity and Flow, and raw data in Excel, logged at 5-minute intervals, during the monitoring period.

RDH Environmental Services
Theresa Hayes
General Manager
gm@rdh-env.com

Note: Sewer flow monitoring data taken from Master Wastewater Plan for Fiesta Ranch (1-MP-2021) prepared by Kimley-Horn and Associates sealed 02/10/2022.

APPENDIX III

SL1110 RDH Flow Study Fiesta Ranch 1

Pictures:

APPENDIX III

SL1110 RDH Flow Study Fiesta Ranch 1

Period Summaries:

Fiesta Ranch 1 Period Summary: Flow				
Measures	**Value**	**Unit**	**Date**	**Time**
Max.	30.62	gpm	Saturday, May 22, 2021	8:05 AM
Min.	0.00	gpm	Saturday, May 22, 2021	1:45 AM
Avg.	5.48	gpm		
Total	84,194.52	gal		

Fiesta Ranch 1 Period Summary: Level				
Measures	**Value**	**Unit**	**Date**	**Time**
Max.	0.71	in.	Saturday, May 22, 2021	8:00 AM
Min.	0.03	in.	Monday, May 31, 2021	2:15 AM
Avg.	0.26	in.		

Fiesta Ranch 1 Period Summary: Velocity				
Measures	**Value**	**Unit**	**Date**	**Time**
Max.	4.43	fps.	Saturday, May 22, 2021	8:05 AM
Min.	0.00	fps.	Saturday, May 22, 2021	1:45 AM
Avg.	2.93	fps.		

Data begins at 08:00am on May 21st and ends at 12:00am on June 1st.

APPENDIX III