

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 Idillon

DATE 4/25/2022

Address comments below and herein on the subsequent submitted improvement plans:

- 1) All new onsite sewer shall be private sewer as shown. DS&PM 7-1.414
- 2) As shown, 10" public sewer shall be private sewer designed per public standards as it is shared between Building A and B.
- 3) An ownership and maintenance agreement for the 10" sewer shall be required for the shared portion of private sewer.
- 4) The new public manhole on 15" sewer shall be coated per City standards.. DS&PM 7-1.405, D.
- 5) The new manhole on the existing 15" sewer shall be 5ft diameter. DS&PM 7-.1405, B
- 6) 10" sewer needs to connect the two new manholes on Fashion Square Drive near Scottsdale Rd. Don't rely on steep slope.
- 7) New manhole on E Fashion Square Drive not located on existing public sewer line shall be private. New manhole on existing public sewer shall be public manhole. Line connecting them shall be private.
- 8) Address any additional comments shown on utility plan.

Camelback Residential Wastewater Basis of Design Report

Atwell Job No. 21000702

37-DR-2021

Prepared for:

ZT Scottsdale Owner, LLC

2001 Summit Park Drive, Suite 300

Orlando, FL 32810

Prepared by:

Atwell, LLC

4700 E Southern Ave

Mesa, AZ 85206



March 2022



**CAMELBACK RESIDENTIAL
WASTEWATER BASIS OF DESIGN REPORT
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- A. Exhibits
- B. Proposed Wastewater Generation & Hydraulic Capacity Calculations
- C. Camelback Residential Utility Plan

EXHIBITS

- 1. Vicinity Map
- 2. City of Scottsdale Quarter Section Map 18-45 (Sewer)

No changes from round
2, ok.

1.0 INTRODUCTION

This preliminary basis of design report was completed under contract with ZT Scottsdale Owner, LLC, owner and developer of Camelback Residential. The proposed Camelback Residential project includes two mixed-use buildings, “Building A - “Hazel” and “Building B - “Azure”. Building A - “Hazel” consists of 362 residential dwelling units (Townhomes), a rooftop pool, 2,109 square feet of office space and 13,685 square feet of retail/restaurant space. It is unknown at this time what the ratio of retail-to-restaurant will be utilized; hence this is analyzed all as restaurant due to the higher demand and peaking factors required for this land use type. Building B - “Azure” consists of 170 residential dwelling units, a pool, and approximately 6,879 square feet of amenity area. Building B - “Azure” also contains an underground parking garage. The analysis presented in this Report encompasses both developments “Building A - “Hazel” and “Building B - “Azure”, though they are being submitted under separate permits. The two buildings will be constructed simultaneously, and no interim conditions are anticipated or evaluated.

The site is located approximately 600 feet to the northeast of the intersection of Scottsdale Road and Camelback Road in Section 23, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian (See Vicinity Map in Appendix A). The Project is located within the service area of the City of Scottsdale. The site is currently zoned D/RCO-2. There are existing sewer mains in Fashion Square, Coolidge Street, and Scottsdale Road that will be utilized to support the proposed development. See Appendix A Quarter Section map for the existing sewer line layout. The Camelback Residential project is located within what is considered the Downtown Core Area of the City of Scottsdale General Plan and it will reflect the plan’s vision, goals, and policies.

2.0 EXISTING WASTEWATER COLLECTION SYSTEM

There are two existing sewer lines within Scottsdale Road: one is a 15-inch sewer main of unknown material, located in the east half-street that flows in a southerly direction past the site and outfalls into the Camelback Road sewer system. The second sewer main is a 10” VCP sewer line located in the west half-street of Scottsdale Road which also flows south and outfalls into the Camelback Road sewer network. Additionally, there is an existing 8-inch PVC sewer line located within Coolidge Street and in the private street adjacent to the eastern property line of Camelback Residential, as illustrated on the City of Scottsdale Quarter Section map 18-45 provided in Appendix A.

A sewer flow test was conducted on the 15-inch sewer line, just downstream of the

proposed connection manhole. Sewer discharges were measured between 8-19-21 to 8-30-21, a peak flow was measured as 358.82 gpm. Sewer inverts were taken from the quarter section map and a slope of 0.0022ft/ft was calculated. Flowmaster was used to analyze this flow in the existing 15-inch pipe and the existing peak flows plus the proposed additional flows. Flowmaster reports are included in Appendix B.

3.0 PROPOSED WASTEWATER SYSTEM

The design of the proposed wastewater collection system will be based on Bulletin 11 (ADEQ) and the City of Scottsdale Design Standards & Policies Manual and sound engineering principles. The proposed wastewater collection system will be designed in accordance with the City of Scottsdale's design standards:

- High Density Residential average day generation is 140 gallons per capita per day with a peaking factor of 4.5. Residential density is assumed as 2.2 persons per unit.
- Retail average day generation is 0.5 gallons per day per sq. ft. with a peaking factor of 3.
- Restaurant average day generation is 1.2 gallons per day per sq. ft with a peaking factor of 6.
- Pool generation is 100 gpm or 100 gpm x 50% of total pools, whichever is higher.

All of the proposed sewer connections to the existing system are illustrated on the Proposed Water and Sewer Exhibit in Appendix C. The new buildings will be served by 6" sewer service connections along with 6", 8" and 10" PVC SDR-35 sewer main that will connect to the existing 15" public sewer main within the public sewer easement within Fashion Square Drive, near the intersection at Scottsdale Road. There are ten proposed sewer services for the site, nine for Building A - "Hazel" and one for Building B - "Azure". A total of five manholes and nine cleanouts are proposed for the Camelback Residential development.

4.0 HYDRAULIC MODEL

An Excel spreadsheet will be used to analyze the proposed estimated wastewater collection system for the average day and the peak day wastewater generation for the project site. The City of Scottsdale Design Standards & Policies Manual requires that wastewater pipes less than 12-inch or less in diameter must have a d/D ratio that does not exceed 0.65. Sewer pipes must also have a minimum full pipe velocity of 2.5 ft/s and less than 10 ft/s in the peak flow scenario.

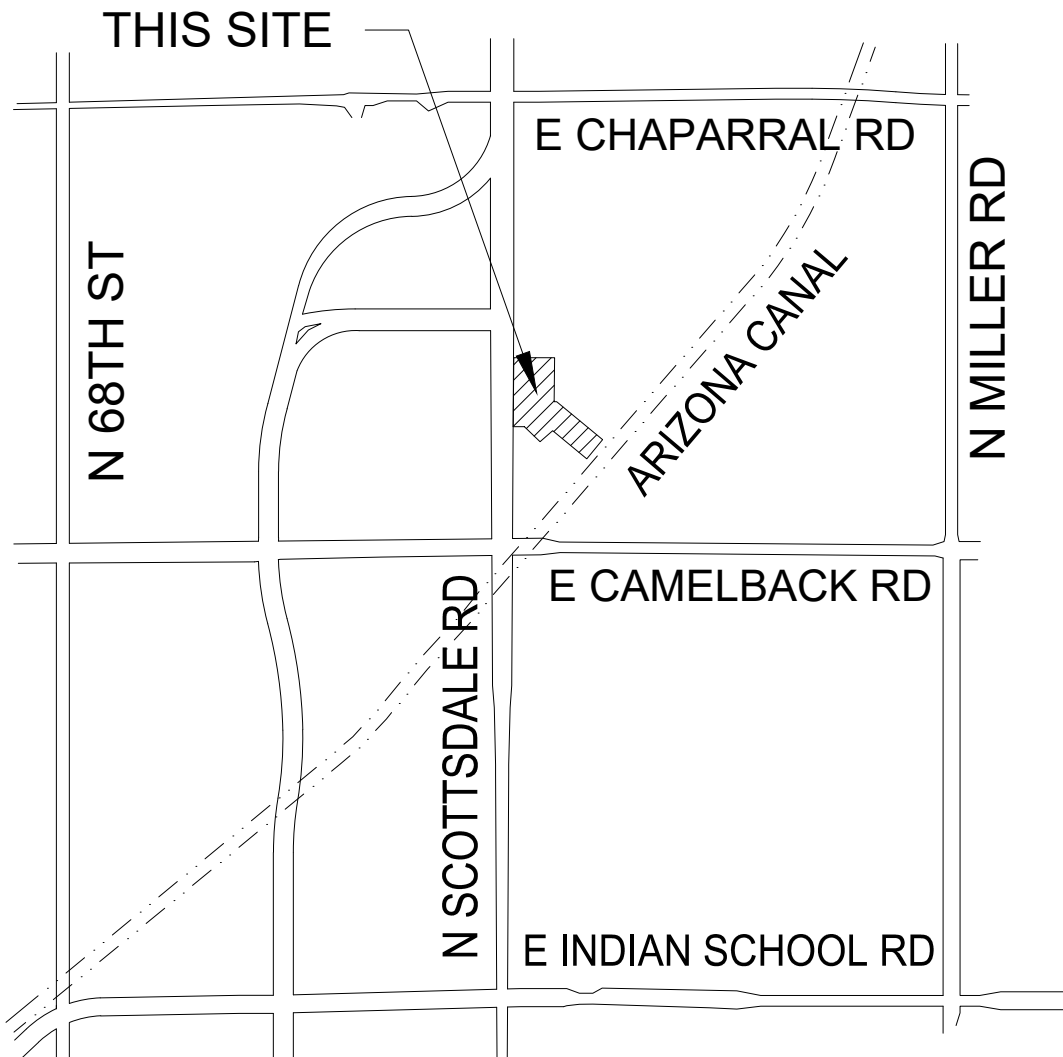
At this time, the exact flows discharging into the individual Building A - "Hazel" service lines has not been analyzed by the plumbing engineer. Until the analysis has been provided to Atwell, it will be assumed that the demand for all of Building A - "Hazel" will be split evenly between each of the four service lines (57.15gpm each), with the pool backwash flow (100gpm) being added into the furthest-upstream eastern service connection.

Flowmaster was used to calculate the capacity of two sewer mains for Building A - "Hazel", including a 6-inch main for the west side, and an 8-inch main for the east. A third analysis is provided for the combined Building A - "Hazel" and Building B - "Azure" flows within a 10-inch main. The calculation shows that an 8-inch sewer line will have the capacity to convey the Building A - "Hazel" eastern service lines, and a 6-inch sewer line has the capacity to convey flows for the western services. The main will transition from 8-inch to 10-inch at a proposed manhole within Fashion Square where Building B - "Azure" discharges into the proposed system. The resultant capacity and depth of flow in the 6-inch, 8-inch, and 10-inch lines meet the City's criteria.

5.0 CONCLUSION

The construction of the Camelback Residential project will require several connections to the City's existing sewer infrastructure as indicated in this report. The proposed wastewater collection system described in this report is designed in accordance with all City of Scottsdale design standards and policies and per Bulletin 11 (ADEQ). All improvements will be at the developer's cost.

APPENDIX A
EXHIBITS



NOT FOR CONSTRUCTION
NOT TO SCALE



ATWELL
866.860.4200 www.atwell-group.com

4700 E. SOUTHERN AVENUE
MESA, AZ 85206
480.218.8831













EXHIBIT 1
VICINITY MAP
ZOM BLUESKY

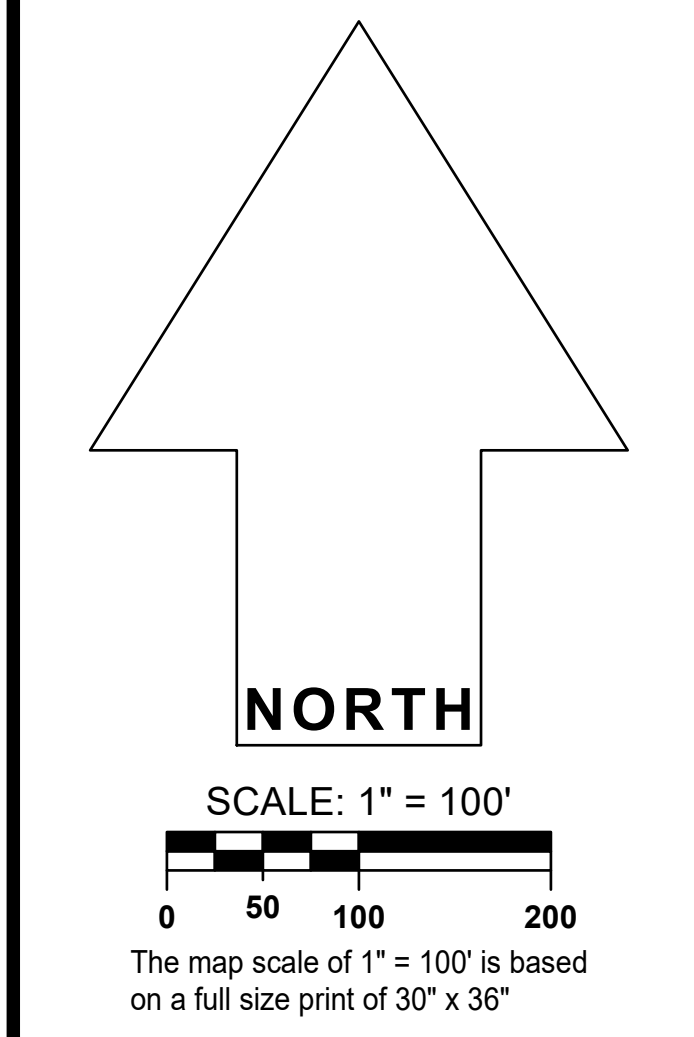
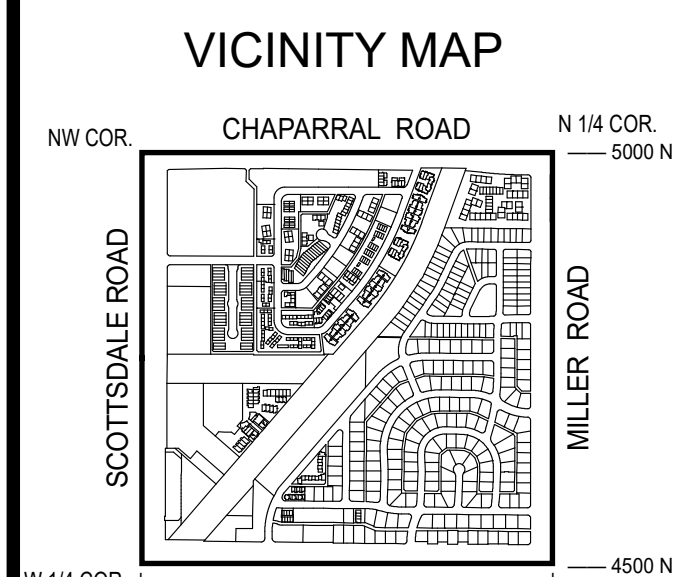
SCOTTSDALE, AZ

GENERAL NOTES:

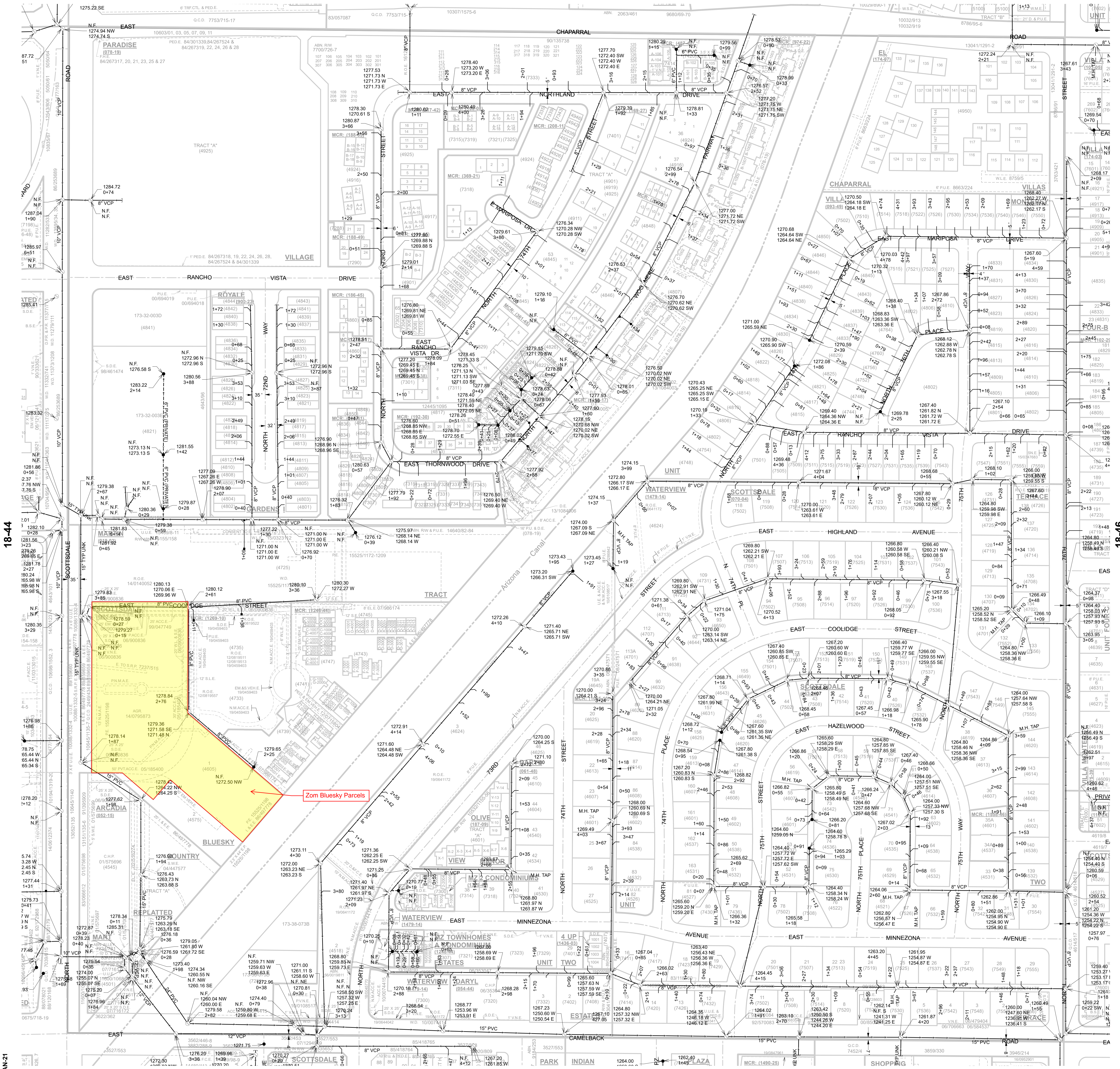
- THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
- THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. 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 
- Manhole 
- Non-GPS Point 
- Plug 
- Sewer Service Point 
- Sewer Tap Point 
- Sewer Valve 
- Treatment Plant 
- Sewer Main - Gravity 
- Sewer Main - Force 
- Sewer Main - Private 



SEWER
QUARTER SECTION MAP
18-45
 NW 1/4 SEC. 23 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

10-JAN-21

APPENDIX B
PROPOSED WASTEWATER GENERATION CALCULATIONS
PROPOSED HYDRAULIC CAPACITY CALCULATIONS

Camelback Residential

Proposed Wastewater Generation Calculations

Printed:
12/20/2021

Building	Land Use (1)	Area (ft ²)	Dwelling Units (DU)	Persons / DU (2)	Population / Equivalent Population (2)	Unit Wastewater Demand (GPD/DU) (1)	Average Daily Demand (GPD)	Peak Factor	Peak Demand (GPD) (1)/(2)
Building A	High Density Residential	341,081	362	2.2	796	140.0	50,680	4.5	228,060
	Office	2,109	-	-	-	0.4	844	3.0	2,531
	Retail/Restaurant	13,685	-	-	-	1.2	16,422	6.0	98,532
Building A Sub-Total (GPD)							67,946		329,123
Building A Sub-Total (gpm)							47.2		228.6
Building A Pool (4) (gpm)							100.0		100.0
Building A Total (gpm)							147.2		328.6
Building B	High Density Residential	228,968	170	2.2	374	140.0	23,800	4.5	107,100
	Lobby/Spa/Amenity Spaces	6,879	-	-	-	0.8	5,503	3.5	19,261
	Building B Sub-Total (GPD)							29,303	
Building B Sub-Total (gpm)							20.3		87.8
Building B Pool (4) (gpm)							100.0		100.0
Building B Total (gpm)							120.3		187.8
Combined Total Wastewater Flow (gpm)							267.5		516.3

(1) Average day sewer flow by land use per Figure 7-1.2 of the C.o.S. Design Standards & Policies Manual.

(2) Residential design flows per the City of Scottsdale Design Standards & Policies Manual.

(3) All proposed wastewater collection systems will be based on Bulletin 11 (ADEQ) and designed per the C.o.S. DS&PM.

(4) Pool generation is 100 gpm or 100 gpm x 50% of total pools, whichever is greater. There are two proposed pools, so a total of 100 gpm is used (50gpm/bldg).

DESIGN FLOWS

A. Residential

SS lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpcpd) and a peaking factor of 4.
 SS lines larger than 12 inches in diameter will be designed using 105 gpcpd and a peaking factor developed from "Harmon's Formula":
 $Q_{max} = Q_{avg} \times [1 + (14 / (4 + P1/2))]$
 P = Population / 1,000
 Residential densities are to assume 2.5 persons per dwelling unit. Multifamily densities exceeding 22 dwelling units per acre can assume 1.7 to 2.2 persons per unit.

7-1.403

LAND USE	DEMAND (gpd)	DESIGN PEAKING FACTOR
Commercial/Retail	0.5 per sq. ft.	3
Office	0.4 per sq. ft.	3
Restaurant	1.2 per sq. ft.	6
High Density Condominium (Condo)	140 per unit	4.5
Resort Hotel (includes site amenities)	380 per room.	4.5
School: without cafeteria	30 per student	6
School: with cafeteria	50 per student	6
Cultural	0.1 per sq. ft.	3
Clubhouse for Subdivision	100 per patron x 2	4.5
Golf Course	patrons per du per day	
Fitness Center/ Spa/ Health club	0.8 per sq. ft.	3.5

FIGURE 7-1.2 AVERAGE DAY SEWER DEMAND IN GALLONS PER DAY & PEAKING FACTORS BY LAND USE

Worksheet for 6" Pipe, Min. Slope - West Side Bld. A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0110 ft/ft
Diameter	6.0 in
Discharge	127.00 gal/min
Results	
Normal Depth	2.9 in
Flow Area	0.1 ft ²
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.5 in
Top Width	0.50 ft
Critical Depth	3.2 in
Percent Full	48.9 %
Critical Slope	0.0080 ft/ft
Velocity	2.97 ft/s
Velocity Head	0.14 ft
Specific Energy	0.38 ft
Froude Number	1.199
Maximum Discharge	284.12 gal/min
Discharge Full	264.12 gal/min
Slope Full	0.0025 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	48.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.9 in
Critical Depth	3.2 in
Channel Slope	0.0110 ft/ft
Critical Slope	0.0080 ft/ft

Total Building A Sewer Flow = 328.6 gpm
 Without Pool Backwash (100) = 228.6 gpm

Avg. Sewer Flow Per Service (9 total) = (228.6/9)
 = 25.4 gpm

West Side Total Flow
 5 Services = (25.4 x 5)
 = **127.0 gpm**

only 4 shown on utility plan, 5th line shown on east-west 10" line

Worksheet for 10" with Combined Flows

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0055 ft/ft
Diameter	10.0 in
Discharge	516.30 gal/min
Results	
Normal Depth	6.2 in
Flow Area	0.4 ft ²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.8 in
Top Width	0.81 ft
Critical Depth	5.7 in
Percent Full	62.1 %
Critical Slope	0.0070 ft/ft
Velocity	3.23 ft/s
Velocity Head	0.16 ft
Specific Energy	0.68 ft
Froude Number	0.858
Maximum Discharge	784.47 gal/min
Discharge Full	729.26 gal/min
Slope Full	0.0028 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	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	6.2 in
Critical Depth	5.7 in
Channel Slope	0.0055 ft/ft
Critical Slope	0.0070 ft/ft

d/D = 0.621



Worksheet for Existing 15" with Existing Flows

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0022 ft/ft
Diameter	15.0 in
Discharge	358.82 gal/min
Results	
Normal Depth	5.3 in
Flow Area	0.4 ft ²
Wetted Perimeter	1.6 ft
Hydraulic Radius	2.9 in
Top Width	1.19 ft
Critical Depth	4.2 in
Percent Full	35.1 %
Critical Slope	0.0052 ft/ft
Velocity	2.08 ft/s
Velocity Head	0.07 ft
Specific Energy	0.51 ft
Froude Number	0.648
Maximum Discharge	1,462.79 gal/min
Discharge Full	1,359.84 gal/min
Slope Full	0.0002 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	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	5.3 in
Critical Depth	4.2 in
Channel Slope	0.0022 ft/ft
Critical Slope	0.0052 ft/ft

Worksheet for Existing 15" with Ex + Proposed Flows

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0022 ft/ft
Diameter	15.0 in
Discharge	725.32 gal/min ← ? source
Results	
Normal Depth	7.8 in
Flow Area	0.6 ft ²
Wetted Perimeter	2.0 ft
Hydraulic Radius	3.8 in
Top Width	1.25 ft
Critical Depth	6.0 in
Percent Full	52.0 %
Critical Slope	0.0053 ft/ft
Velocity	2.51 ft/s
Velocity Head	0.10 ft
Specific Energy	0.75 ft
Froude Number	0.616
Maximum Discharge	1,462.79 gal/min
Discharge Full	1,359.84 gal/min
Slope Full	0.0006 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	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	7.8 in
Critical Depth	6.0 in
Channel Slope	0.0022 ft/ft
Critical Slope	0.0053 ft/ft

d/D = 0.520



SL1204 RDH Flow Study Chipotle

Ramzi Georges

ZOM Living

7014 E Camelback Rd, Suite B100A, Scottsdale AZ 85251

SL1204 RDH Flow Study, 1 site in Scottsdale, AZ Thursday, 08-19-21 to Monday 08-30-21.

Equipment for Site: Hach 901 Logger with Flo-Dar Sensor (Area Velocity).

The equipment was installed on 8/19/21 with confined space entry, pipe size confirmed, sensor calibrated with 10-inch target and level depth confirmed to the flow level.

Duration of monitoring: 9-days including two weekends.

Monitor: Flow (gpm), Level (in), and Velocity (fps)

Data logging: 5 minutes intervals (No averaged intervals)

Manhole located off N Scottsdale Rd and E Fashion Square. Located in shopping center parking lot in front of Chipotle

60" Diameter, Rim to Invert: 150.00 inches

15" VCP pipe, flowing south

The pipe condition was intact and in good shape

Scum line of 0.00 inches

Flo-Dar installed pointing downstream in the 15" pipe channel, due to lateral upstream

1st Lateral Pipe: approximately 5.50 inches in diameter, located upstream from Northwest flowing south

2nd Lateral Pipe: approximately 5.50 inches in diameter, located upstream from Northeast flowing south

Flow data is valid having no missing, erroneous, or anomalies with 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

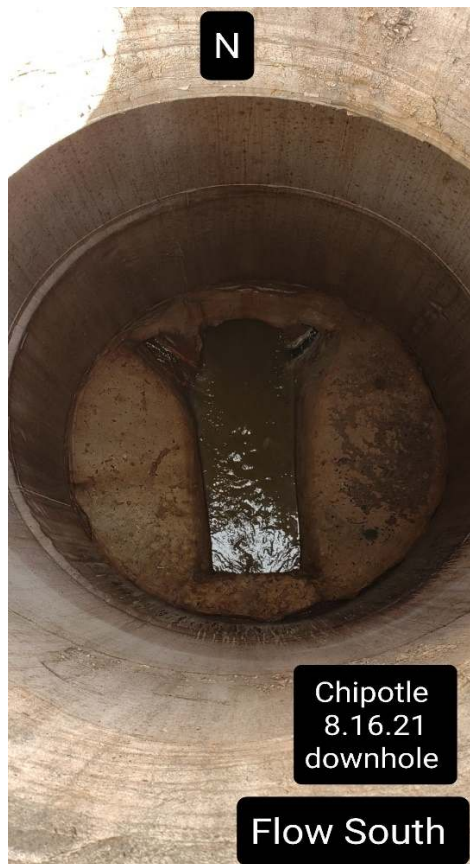
General Manager

gm@rdh-env.com



SL1204 RDH Flow Study Chipotle

Pictures:





SL1204 RDH Flow Study Chipotle

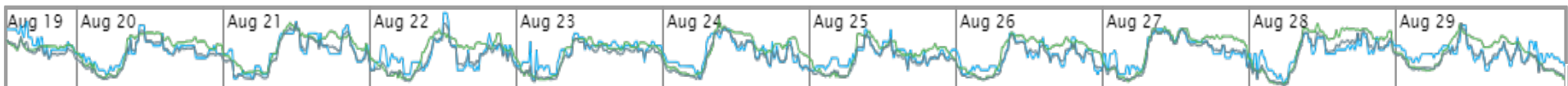
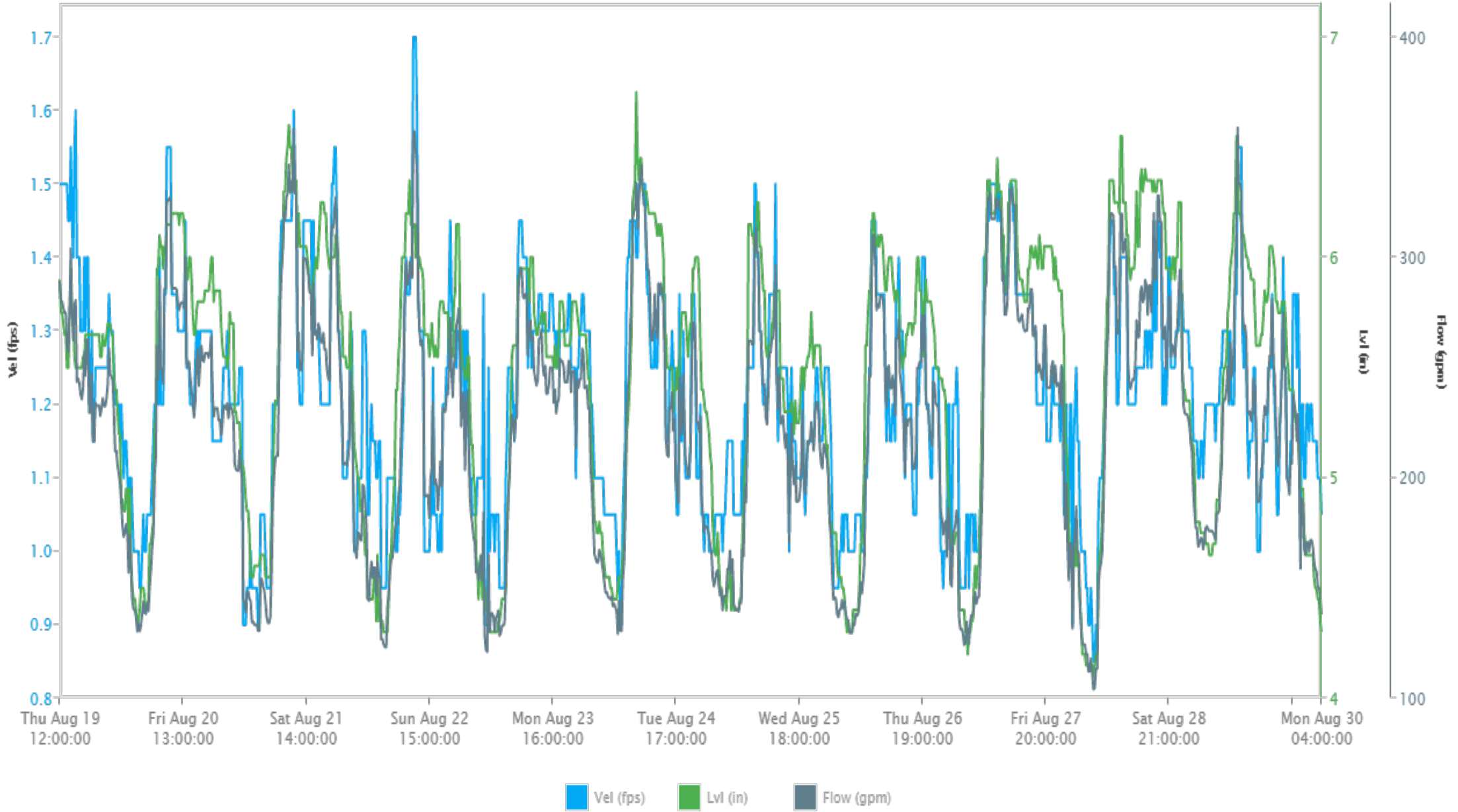
Period Summaries:

ZOM Chipotle Period Summary: Level				
Measures	Value	Unit	Date	Time
Max.	6.77	in.	Tuesday, August 24, 2021	9:00 AM
Min.	4.12	in.	Saturday, August 28, 2021	5:45 AM
Avg.	5.46	in.		

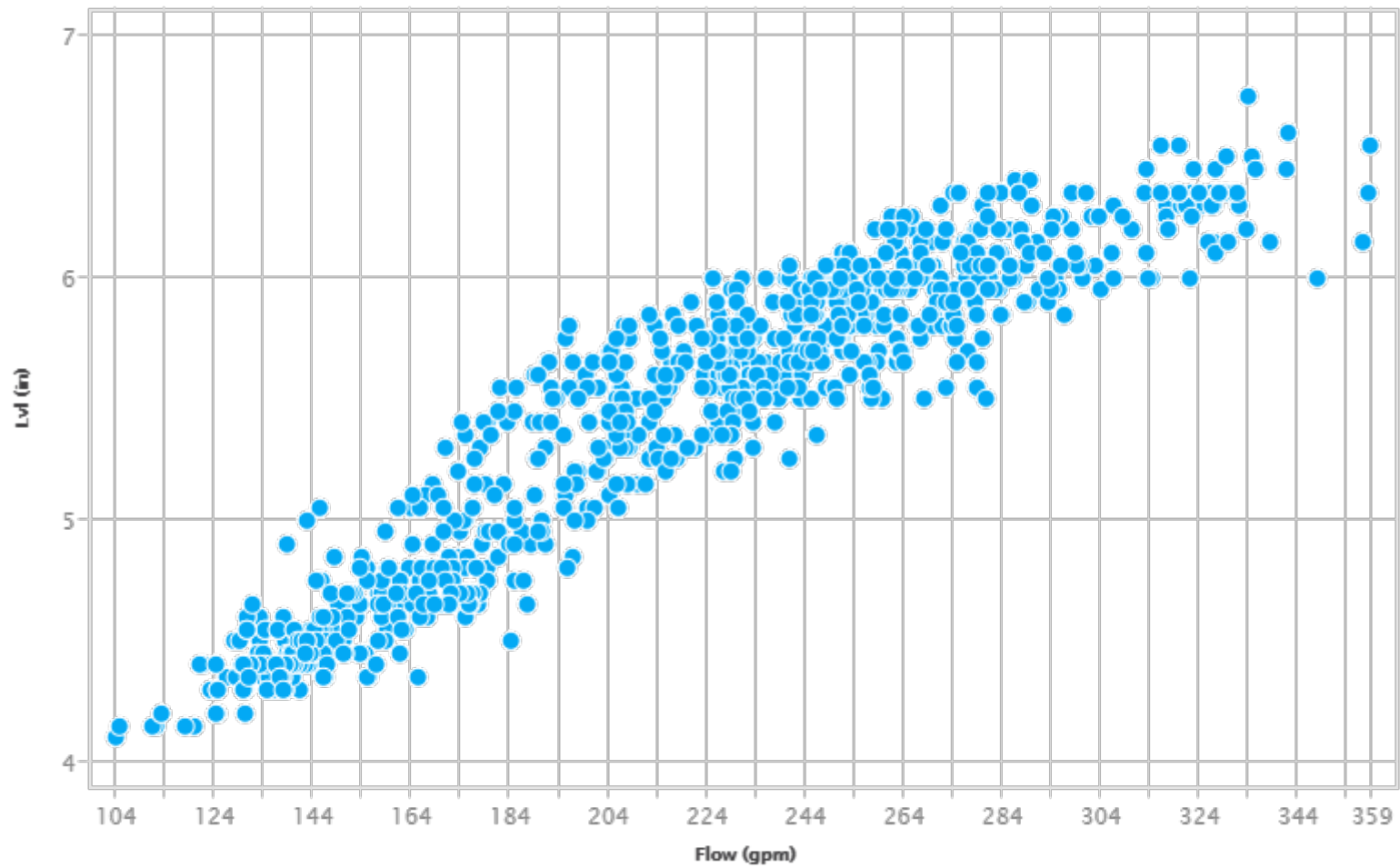
ZOM Chipotle Period Summary: Velocity				
Measures	Value	Unit	Date	Time
Max.	1.68	fps.	Sunday, August 22, 2021	11:45 AM
Min.	0.85	fps.	Saturday, August 28, 2021	5:45 AM
Avg.	1.21	fps.		

ZOM Chipotle Period Summary: Flow				
Measures	Value	Unit	Date	Time
Max.	358.82	gpm	Sunday, August 29, 2021	11:00 AM
Min.	104.06	gpm	Saturday, August 28, 2021	5:45 AM
Avg.	222.88	gpm		
Total	3,423,489.50	gal		

RDH Environmental Chipotle

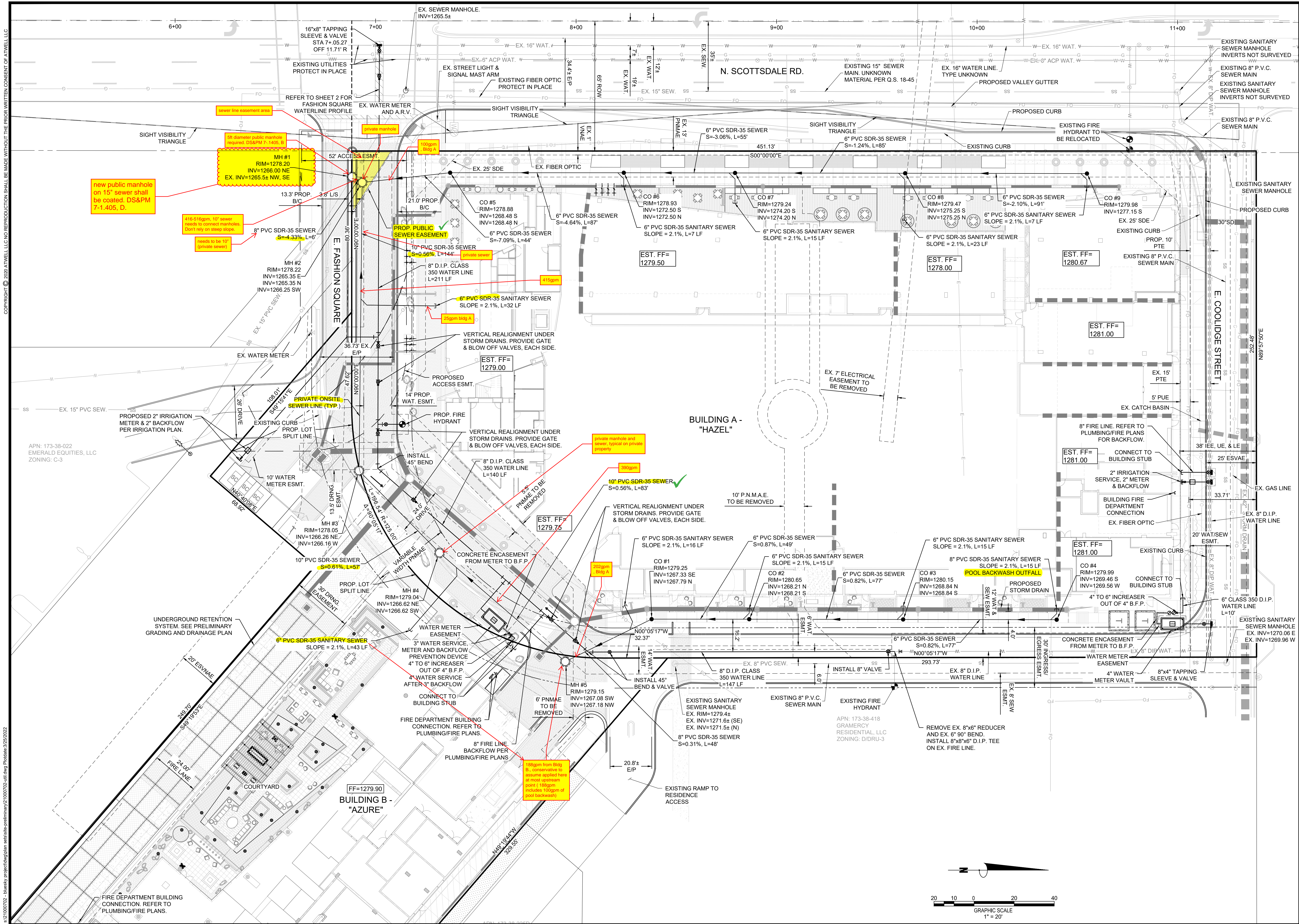


RDH Environmental Chipotle



Flow (gpm) vs Lvl (in)

APPENDIX C
CAMELBACK RESIDENTIAL UTILITY PLAN



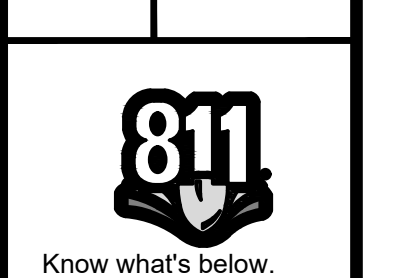
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 APN: 173-38-022 EMERALD EQUITIES, LLC ZONING: C-3
 APN: 173-38-418 GRAMERCY RESIDENTIAL LLC ZONING: D/DRU-3
 s:\21000702 - business project\dwg\plan area\utility-preliminary\21000702-util.dwg Plotdate: 3/25/2022

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE: CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK OF PERSONS ENGAGED IN THE WORK OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.



PRELIMINARY UTILITY PLAN
 PRELIMINARY IMPROVEMENT PLAN
CAMELBACK RESIDENTIAL
 SCOTTSDALE, ARIZONA



REVISIONS:

NO.	DATE	DESCRIPTION



PM.	BH
DR.	TLC
JOB NO.	21000702
FILE NO.	21000702-UTIL

SHEET NO.
05 OF 06
 C.O.S. PRE-APP NO.: 44-PA-2016 C.O.S. PLAN NO.:

