

Optima McDowell Mountain Village

Scottsdale, Arizona

PRELIMINARY WASTEWATER BASIS OF DESIGN REPORT



Michael L. Delmarter

EXP: 12/31/2023

SEPTEMBER 2022

Prepared By:

Kimley»»Horn

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1.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this Preliminary Wastewater Basis of Design Report for the proposed Optima McDowell Mountain Village, a multi-family development at the northeast corner of Scottsdale Road and Mayo Boulevard in Scottsdale, Arizona. This report will demonstrate that the proposed project conforms to the City of Scottsdale design requirements.

Optima McDowell Mountain Village, the “project”, encompasses approximately 15.637+/- net acres and 21.88 gross acres of currently undeveloped land with sparse desert vegetation. The proposed development will include (3) 10-story, and (3) 9-story standalone mix-use buildings, with 1,390 multi-family units total, and 36,000 SF of Commercial Space. In addition to the buildings there will be a two-level underground parking structure below the development. The Commercial space is further broken down as Restaurant = 11,515 SF, Office = 17,935 SF, Loading = 6,550 SF with the loading area located in the garage and a 3,000-gallon grease interceptor serving the restaurant space on the west side of the property near the garage entrance. In addition, each of the buildings will have a rooftop lap pool, 2 spas, and 2 cold plunges. All structures will adhere to fire codes and contain an approved sprinkler system. The Project will be developed in phases that will be determined during plan development.

The project lies within a portion of the Southwest Quarter of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. More specifically, the parcel is bounded by the Loop 101 Freeway to the north, vacant State Land to the east, a car dealership to the south, and Scottsdale Road to the west. The site generally slopes from the northeast to the southwest at approximately 1.5%. See **Appendix A** for the Vicinity Map.

2.0 WASTEWATER COLLECTION SYSTEM

2.1 INTENT AND SCOPE

The intent of this section is to evaluate the proposed sewer infrastructure and wastewater design flows for the development. As a result of this analysis, it will be determined if the sewer infrastructure is capable of supporting the proposed development in accordance with the City of Scottsdale Design Standards & Policies Manual (**Reference 1**).

2.2 SEWER INFRASTRUCTURE

An 8” PVC sewer main exists in Mayo Boulevard which extends approximately halfway across the project frontage with a lateral to the site at the end of the sewer run. This sewer is approximately twelve feet deep and flows to the west where it connects to a 15” sewer main in Scottsdale Road. According to the City of Scottsdale, the 15” sewer that the 8” ties into is at or near capacity and cannot accept flows from this project.

An alternate routing has been suggested by the City of Scottsdale to bypass the 15” sewer **and tie directly into a larger 18” main in Princess Drive approximately ½ mile south of the site.** In order to reach this manhole, a gravity sewer will be required to be extended east along the Mayo Boulevard alignment to the future Miller Road alignment. The sewer will then flow south along the Miller Road alignment to an intersection at Princess and then flow west until it reaches the 18” main. (See **Appendix E**). A conceptual design has been provided showing that the site can be sewer to the

lines

Infrastructure Improvement Plan funding may be utilized for a portion of the offsite improvements.

Princess Drive location. A separate Master Sewer design study will be prepared based on updating the current City of Scottsdale models and proposed offsite land uses to verify the sizing and design depth of the offsite **line**. In addition, the Master Study will determine the impact to the sewer capacity downstream of Princess Drive to the North Pumpback station. The developer will look to share the costs of the offsite portion of the line with the adjacent developers or look to put a reimbursement agreement in place.

There is currently a double box culvert under Mayo Boulevard near the southeast corner of the site that will dictate the depth of the sewer in Mayo Boulevard. Since the majority of the site will be covered by the underground parking garage, the sewer collection system will be installed adjacent to the structure within the City of Scottsdale owned tracts. Note: per the Special Warranty Deed and Reservation of Easements, MCR 2003-0589748, the parent parcel is allowed to install utilities within these areas. See **Appendix B** for the proposed onsite utility layout. The site will be served entirely by gravity sewer and **no sewer ejectors are anticipated**. Elevator shafts in the garage will be equipped with emergency pumps to handle incidental spills but are anticipated to provide negligible discharge to the sewer system.

The building sewer services will be split up between **5 connection points** to limit the amount of continuous run within the building sewer system. Two connection points are planned on the south side of the site and three located to the west of the site. The sewer line leaving the southeastern corner of the site will be aligned with the proposed box culvert and maintain 2' vertical clearance between the bottom of the box culvert and the top of the sewer. All other locations will maintain 6' minimum horizontal separation between the exterior edges of the sewer and water lines.

2.3 WASTEWATER DESIGN FLOWS

The wastewater demand for each building was determined based on the City of Scottsdale Design Standards and Policies Manual and are summarized in **Table 1**.

Table 1: Wastewater Demands

Building	Dwelling Units	Demand (gpd/du)	Average Daily Demand (gpm)	Peak Factor	Peak Demand (gpm)
Building 1	278	140	27.03	4.5	121.64
Building 2	238	140	23.14	4.5	104.13
Building 3	209	140	20.32	4.5	91.44
Building 4	211	140	20.51	4.5	92.30
Building 5	209	140	20.32	4.5	91.44
Building 6	245	140	23.82	4.5	107.19
Restaurant	11,515 SF	1.2/SF	9.60	6	57.58
Office	17,935 SF	0.4/SF	4.98	3	14.95
Pool/Spa/Cold Plunge	1 Pool. 2 spas/ 2 cold plunges/ bldg (30)	****N/A	0	N/A	0
Vertical Planter Boxes	24,833 LF of planter boxes	150 gal/lf/yr**	7.09	3.5	24.82
Grade Level Landscape	229,600 SF	2.2 gal/mo./sf***	11.53	3.5	40.36
Total			168.34		745.85

** Vertical Planter Boxes water use is based on meter readings at other Scottsdale Optima projects and are designed to drain to a rainwater harvesting system that will capture any drainage from the vertical planting system and reuse the captured drainage to irrigate grade level landscaping. However, the runoff will continue to be included in the sewer discharge rate should the developer choose not to capture the runoff.

Include backwash rate of 100 gpm per pool/spa.

For backwash sewer demand calculations, use 100 gpm per pool/spa divided by 2 (multiple features in complex) for both average and peak conditions.

*** Grade Level Landscape water use is based on actual meter readings at other Scottsdale Optima projects and excludes building area, hardscape and artificial turf areas.

**** ~~All water features will be equipped with cartridge filter systems. Sand Filters prohibited therefore no backwash discharge is anticipated and no surge tanks will be required. There are no cooling related discharge/blowdown wastewater demands. There are no evaporative cooling towers. The variable refrigerant flow system is air cooled and therefore does not generate any wastewater demand.~~

There are a total of five 8-inch sewer service connection to the proposed Optima site. Three of the connections are along the western boundary of the site and two are along the southern boundary. See Appendix G for the preliminary layout of the service connections for the proposed site. Table 2 below summarizes the total peak flow to each of the service connections. For preliminary design, the grade level landscape and vertical planter box demands are split evenly between all 6 buildings.

Update to include pool backwash demand.

Table 2: Peak Sewer Service Demand Breakdown

Service Number	Contributing Buildings	Building Flow (gpm)	Landscape and Vertical Planter Flow (gpm)	Total Flow (gpm)
Service 1 (Grease Interceptor)	Restaurant	57.58	0	57.58
Service 2 (Northwest)	Buildings 1 and 6	228.83	21.73	250.56
Service 3 (Southwest)	Building 2 and Office	119.08	10.86	129.94
Service 4 (South)	Building 3	91.44	10.86	102.30
Service 5 (Southeast)	Buildings 4 and 5	183.74	21.73	205.47

2.4 ANALYSIS

The sewer demands have been calculated per Figure 7-1.2 of the City of Scottsdale Design Policies & Standards Manual (2018). The City of Scottsdale requires the depth to diameter ratio for sewer mains less than 12" to be no less than 0.65 for the peak flow conditions. Additionally, the minimum velocity will be limited to the 2.5 feet per second and the maximum velocity will be limited to 10 feet per second at peak flow.

Backwash demand needs to be included.

As mentioned above, each of the 6 buildings will have a rooftop lap pool, 2 spas and a 2 cold plunges. Backwashing of these facilities will not be required and therefore not included in the sewer

Diameter of offsite gravity sewer in this BOD is preliminary and will be finalized during the development's wastewater master planning process.

discharge rates. All facilities will be equipped with cartridge filter systems and will not use DE or Sand Filters.

See **Appendix E** for the Off-site Sewer Routing Exhibit which shows the approximate layout for the sewer main all the way to Princess Boulevard. See **Appendix G** for the approximate flow in each of the sewer services as well as the resulting flow in each leg of the main. **Appendix D** shows the Sewer Capacity Calculations for 5 critical lines. They include the highest flow 8" service, the highest flow 12" main at 0.3% slope, the highest flow 12" main at 0.4% slope, the capacity of the 15" main at 0.4% slope, and the capacity of the 15" main at 0.94% slope.

plus pool backwash

At a peak scenario, a total of 745.85 GPM will be discharged from the development. Assuming that Buildings 4 and 5 sewer to the southeast corner of the property, the sewer main in Mayo Blvd upstream of the easternmost manhole will be subject to 540.38 GPM which has the capacity to convey the flows in a 12" pipe at 0.30%. Refer to **Appendix D** for the Sewer Capacity Calculations.

After the flows combine, the sewer line will steepen to 0.4% to allow for the offsite pipe to convey the flows generated onsite. After completion of the Master Wastewater study for the planning loads from the offsite properties, the offsite sewer can be upsized or steepened accordingly to account for all future development serving the Crossroads East area. Note: there is over 30 feet of elevation drop available from the intersection of Miller Road and Mayo Boulevard to the connection point at the Princess and therefore much flexibility to serve all future downstream land uses.

Refer to **Appendix D** for the results of the Wastewater Analysis and **Appendix B** for the Preliminary Utility Plan, **Appendix E** for the Offsite Sewer Routing Plan, and **Appendix G** for the Sewer Service Exhibit. Grease interceptor sizing is based on preliminary calculations supporting the 11,515 SF Restaurant space and are included in **Appendix F**.

3.0 CONCLUSION

This report concludes that the 8" service connections and the sewer main proposed adjacent to the Optima site is sized to accommodate the proposed flows generated by the Optima development. A new sewer main in Mayo Boulevard flowing east to the Miller Road alignment and then south to Princess Drive will be installed to serve this site and the adjacent State Land properties based on their future planned uses.

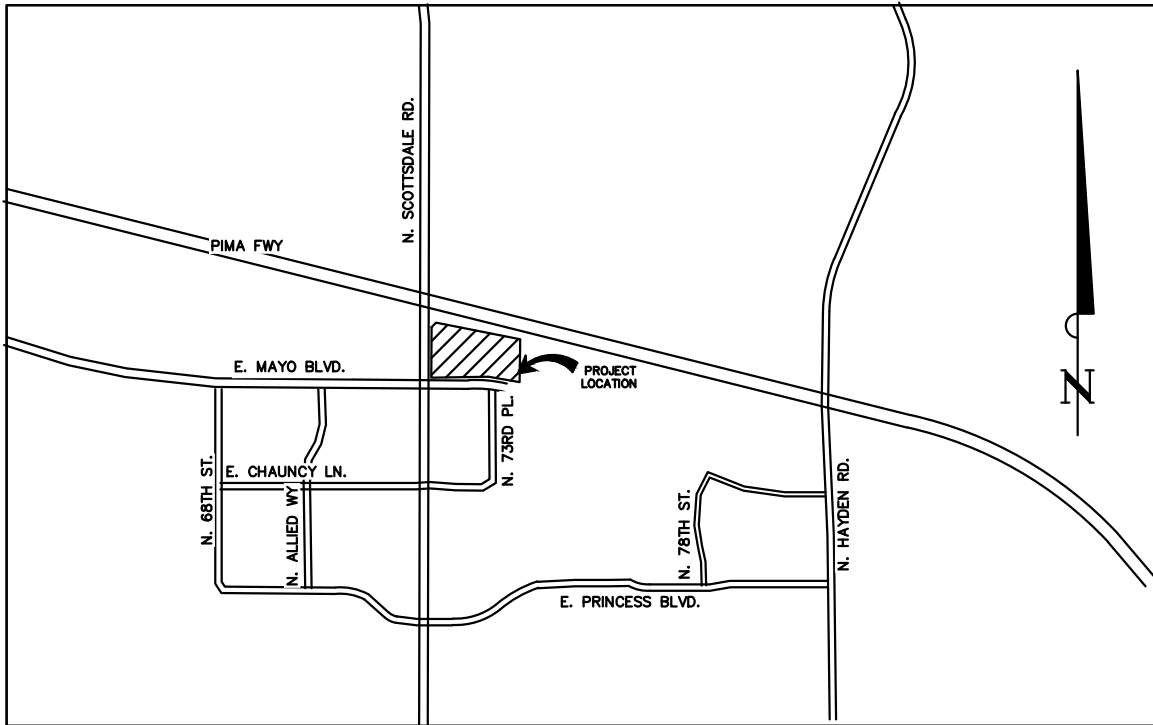
The impact of this development to sewer capacity downstream of Princess Drive to the North Pumpback Station will be determined by a separate Master Wastewater Study that will be prepared by the developer and included in a development master plan. It is anticipated that the city's current SWMM model will be updated using the demands in Section 2.3.

4.0 REFERENCES

1. City of Scottsdale, *Design Standards and Policies Manual*. 20

Appendices

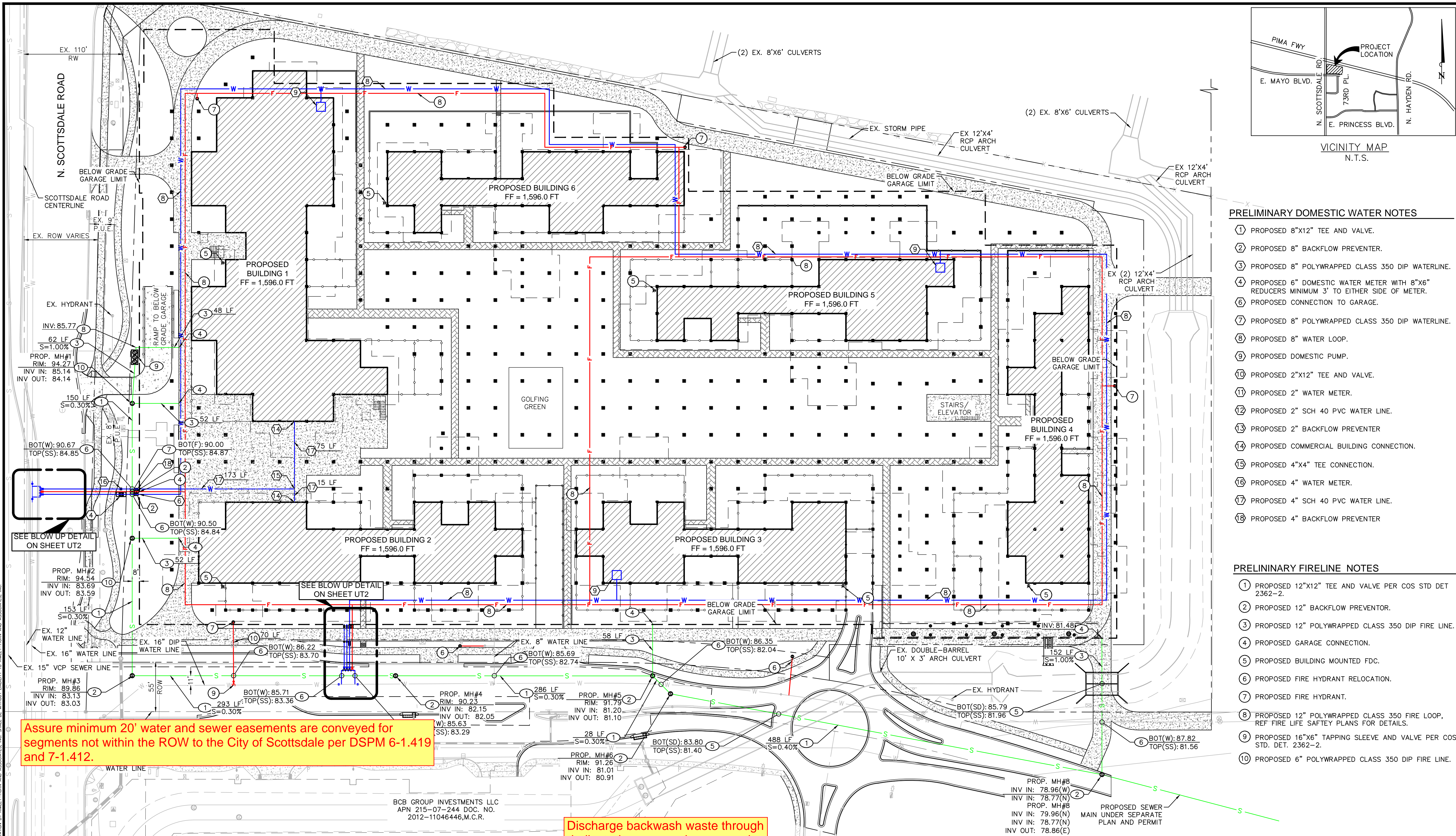
Appendix A: Vicinity Map



VICINITY MAP

N.T.S

Appendix B: Preliminary Utility Plan



PRELIMINARY DOMESTIC WATER NOTES

- ① PROPOSED 8"x12" TEE AND VALVE.
- ② PROPOSED 8" BACKFLOW PREVENTER.
- ③ PROPOSED 8" POLYWRAPPED CLASS 350 DIP WATERLINE.
- ④ PROPOSED 6" DOMESTIC WATER METER WITH 8"x6" REDUCERS MINIMUM 3' TO EITHER SIDE OF METER.
- ⑤ PROPOSED CONNECTION TO GARAGE.
- ⑥ PROPOSED 8" POLYWRAPPED CLASS 350 DIP WATERLINE.
- ⑦ PROPOSED 8" WATER LOOP.
- ⑧ PROPOSED DOMESTIC PUMP.
- ⑨ PROPOSED 2"x12" TEE AND VALVE.
- ⑩ PROPOSED 2" WATER METER.
- ⑪ PROPOSED 2" SCH 40 PVC WATER LINE.
- ⑫ PROPOSED 2" BACKFLOW PREVENTER
- ⑬ PROPOSED COMMERCIAL BUILDING CONNECTION.
- ⑭ PROPOSED 4"x4" TEE CONNECTION.
- ⑮ PROPOSED 4" WATER METER.
- ⑯ PROPOSED 4" SCH 40 PVC WATER LINE.
- ⑰ PROPOSED 4" BACKFLOW PREVENTER

PRELIMINARY FIRELINE NOTES

- ① PROPOSED 12"x12" TEE AND VALVE PER COS STD DET 2362-2.
- ② PROPOSED 12" BACKFLOW PREVENTOR.
- ③ PROPOSED 12" POLYWRAPPED CLASS 350 DIP FIRE LINE.
- ④ PROPOSED GARAGE CONNECTION.
- ⑤ PROPOSED BUILDING MOUNTED FDC.
- ⑥ PROPOSED FIRE HYDRANT RELOCATION.
- ⑦ PROPOSED FIRE HYDRANT.
- ⑧ PROPOSED 12" POLYWRAPPED CLASS 350 FIRE LOOP, REF FIRE LIFE SAFETY PLANS FOR DETAILS.
- ⑨ PROPOSED 16"x6" TAPPING SLEEVE AND VALVE PER COS STD. DET. 2362-2.
- ⑩ PROPOSED 6" POLYWRAPPED CLASS 350 DIP FIRE LINE.

PRELIMINARY SEWER NOTES

- ① PROPOSED 12" PVC SEWER MAIN, LENGTH PER PLAN.
- ② PROPOSED PUBLIC MANHOLE, INVERT PER PLAN.
- ③ PROPOSED 8" PVC SEWER SERVICE, LENGTH PER PLAN.
- ④ PROPOSED BUILDING CONNECTION.
- ⑤ SEWER/STORM DRAIN CROSSING.
- ⑥ SEWER/WATER MAIN CROSSING PER COS STD DET 2401.
- ⑦ SEWER/FIRE MAIN CROSSING PER COS STD DET 2401.
- ⑧ PROPOSED 8" SEWER WYE AND CLEANOUT, INVERT PER PLAN
- ⑨ PROPOSED GREASE INTERCEPTOR.
- ⑩ PROPOSED PRIVATE MANHOLE, INVERT PER PLAN.

LEGEND

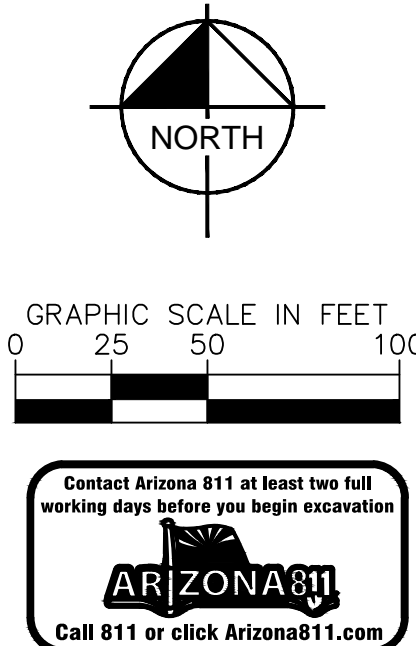
---	PROPERTY LINE
---	RIGHT OF WAY LINE
---	STREET CENTERLINE
---	EASEMENT LINE
S	EXISTING SANITARY SEWER MAIN
W	EXISTING PUBLIC WATER MAIN
---	EXISTING STORM DRAIN
W	PROPOSED WATER MAIN
F	PROPOSED FIRELINE
S	PROPOSED SEWER MAIN
⊙	EXISTING SANITARY SEWER MANHOLE
⊙	EXISTING FIRE HYDRANT

Assure minimum 20' water and sewer easements are conveyed for segments not within the ROW to the City of Scottsdale per DSPM 6-1.419 and 7-1.412.

Discharge backwash waste through dedicated sewer service connection laterals with no other sewer flows connecting to mainline sewer.

- UTILITY NOTES**
1. REFER TO CITY STANDARD AND DETAILS FOR TRENCHING, BEDDING, AND BACKFILL, AND TRENCH COMPACTION REQUIREMENTS.
 2. ALL FILL MATERIAL IS TO BE IN PLACE, AND COMPACTED BEFORE INSTALLATION OF PROPOSED UTILITIES.
 3. CONTRACTOR SHALL NOTIFY THE UTILITY AUTHORITIES INSPECTORS 72 HOURS BEFORE CONNECTING TO ANY EXISTING LINE.
 4. SANITARY SEWER PIPE SHALL BE AS FOLLOWS:
PRIVATE: PVC SDR 35 PER ASTM D 3034
 5. CONTRACTOR IS RESPONSIBLE FOR COMPLYING TO THE SPECIFICATIONS OF THE CITY OF SCOTTSDALE WITH REGARDS TO MATERIALS AND INSTALLATION OF THE WATER LINE AND WITH COS AND MAG REQUIREMENTS FOR UTILITY CROSSINGS.
 6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DEFLECT ELECTRIC, GAS CABLE, AND TELEPHONE CONDUIT AND PIPING AS REQUIRED TO AVOID UTILITY CONFLICTS.
 7. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
 8. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY PERMITS, INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CITY CODES AND/OR UTILITY SERVICE COMPANIES.
 9. CONTRACTOR SHALL COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS IN REGARDS TO TAPS, HYDRANTS, VALVES, ETC.
 10. CONTRACTOR IS RESPONSIBLE FOR PAVEMENT REPLACEMENT REQUIRED FOR ALL UTILITY INSTALLATIONS PER CITY OF SCOTTSDALE STANDARDS.
 11. WATER TIGHT CONNECTION SHALL BE MADE USING A RESILIENT CONNECTOR "SEAL BOOT" PER ASTM C-923.
 12. CONTRACTOR SHALL MAINTAIN A MINIMUM OF 4 FEET COVER ON ALL WATER LINES.
 13. ALL SANITARY SEWER AND WATER WORK DESIGNATED AS "PRIVATE" IN THIS SET OF PLANS SHALL BE INSTALLED BY A LICENSED PLUMBER.
 14. BACKFLOW PREVENTER AND VAULT FOR THE IRRIGATION TO BE PROVIDED BY THE GC.
 15. INSPECTION OF THE WATER PIPING CONNECTING THE METER TO THE BACKFLOW PREVENTER SHALL BE CONDUCTED BY A CITY BACKFLOW PREVENTION SPECIALIST PRIOR TO CLSM AND BACKFILL. DSPM 6-1.417.

BCB GROUP INVESTMENTS LLC
APN 215-07-244 DOC. NO.
2012-11046446, M.C.R.



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DRAWN BY: DJH
CHECKED BY: MLD
DATE: SEP. 2022

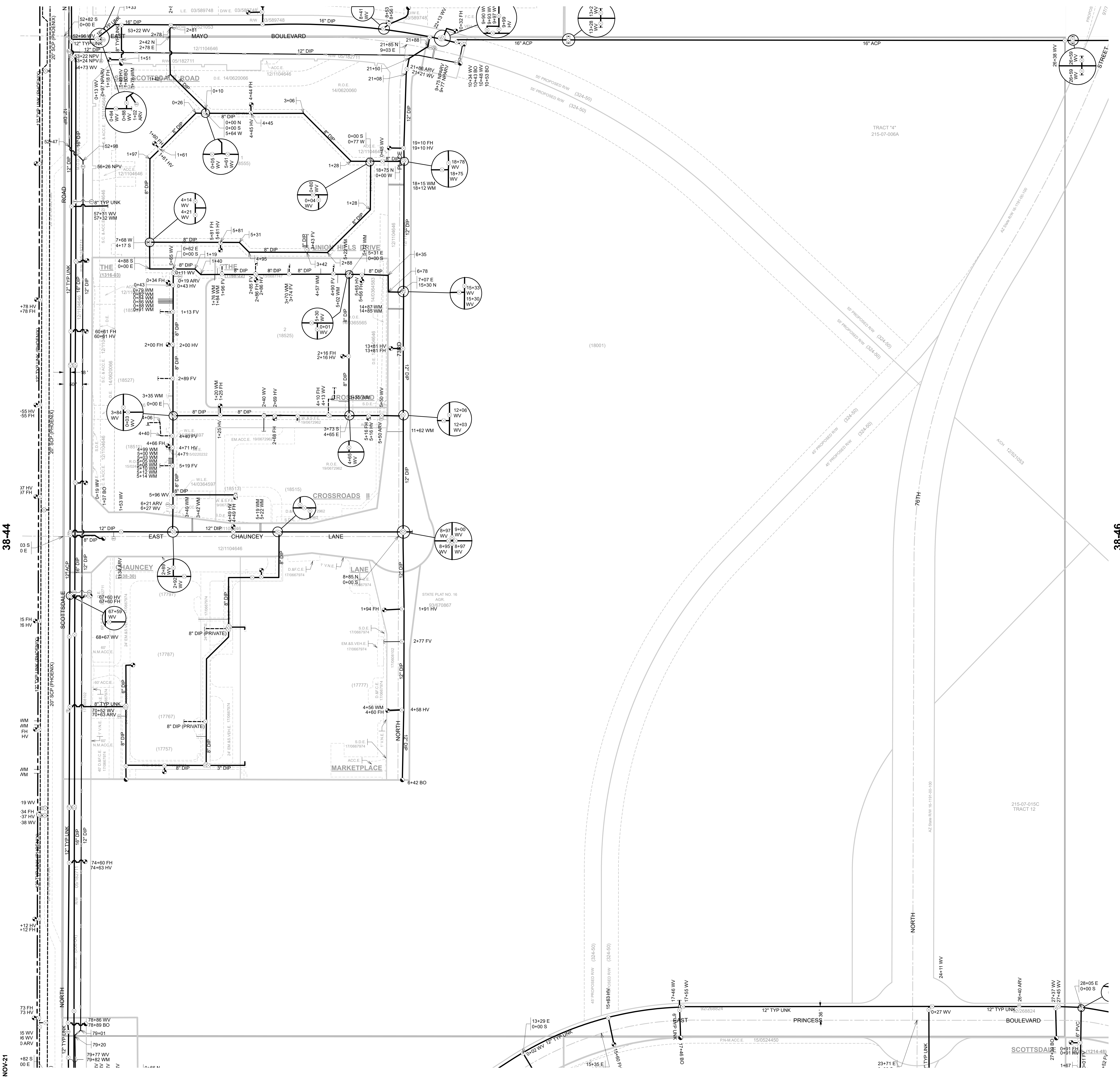
OPTIMA MCDOWELL MOUNTAIN VILLAGE
PRELIMINARY UTILITY PLAN
18777 N SCOTTSDALE RD.
SCOTTSDALE, ARIZONA 85255

FOR REVIEW ONLY
NOT FOR CONSTRUCTION PURPOSES
Kimley»Horn
ENGINEER - LICENSED
PE NO. 30888 DATE 09/23/22

PROJECT NO.
191007011
DRAWING NAME
UT1

1 OF 2

Appendix C: Quarter Section Map

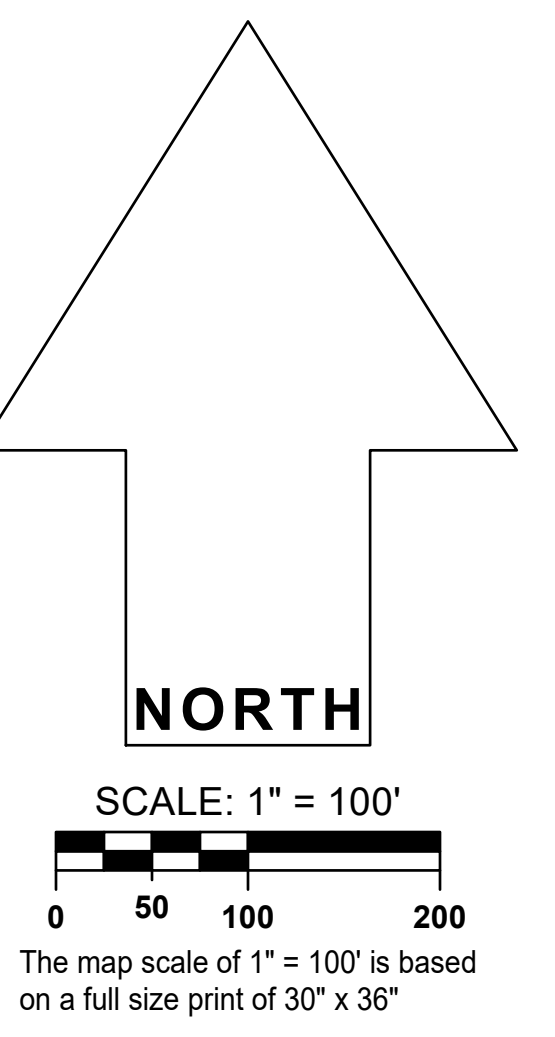
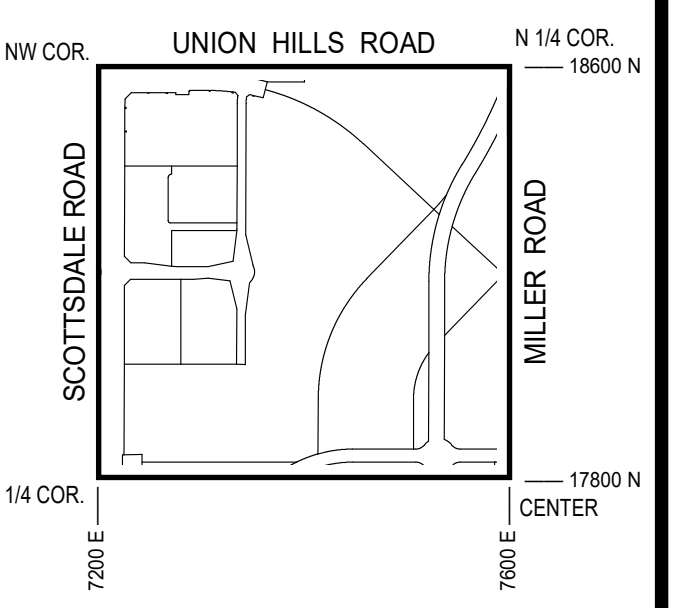


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LEGEND:

- Air Release Valve
- Non-potable Air Release Valve
- Blowoff
- Cap
- Cathodic Protection
- Fill Drain
- Fire Hydrant
- Non-GPS Point
- Pressure Reducing Valve
- Pump
- Reducer
- Sample Station
- Water Manhole
- Non-Potable Manhole
- Well
- Valve
- Non-potable Valve
- Vault
- Water Main
- Non-Potable Main
- Fire / Private Main
- Non-Scottsdale Main

VICINITY MAP



WATER
 QUARTER SECTION MAP
38-45
 NW 1/4 SEC. 35 T4N R4E

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











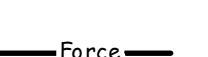
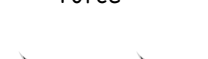
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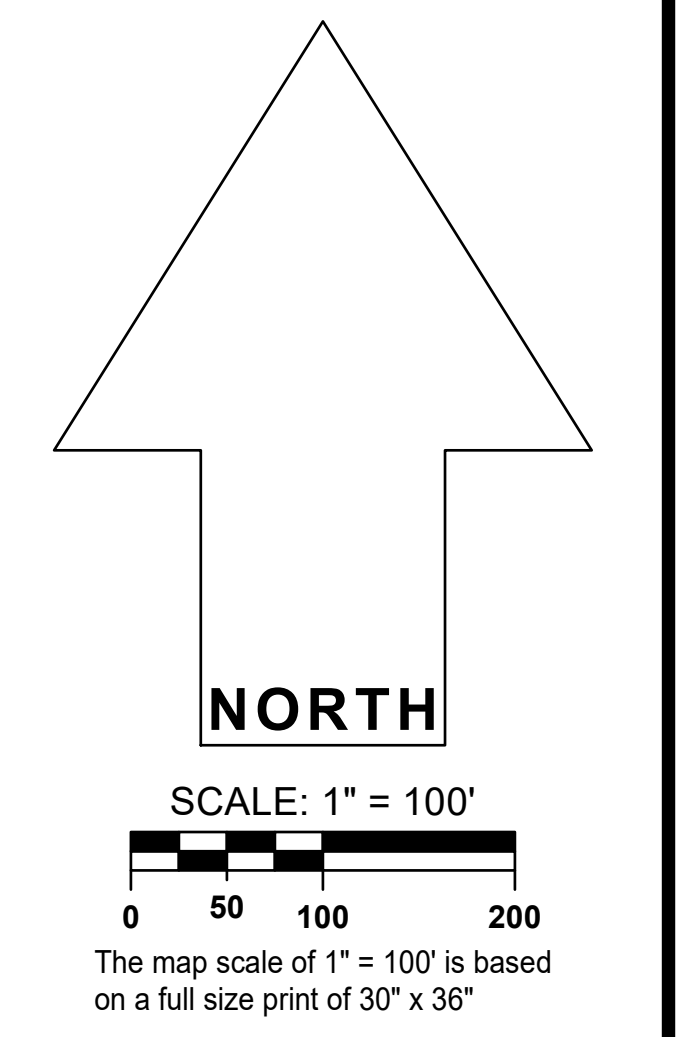
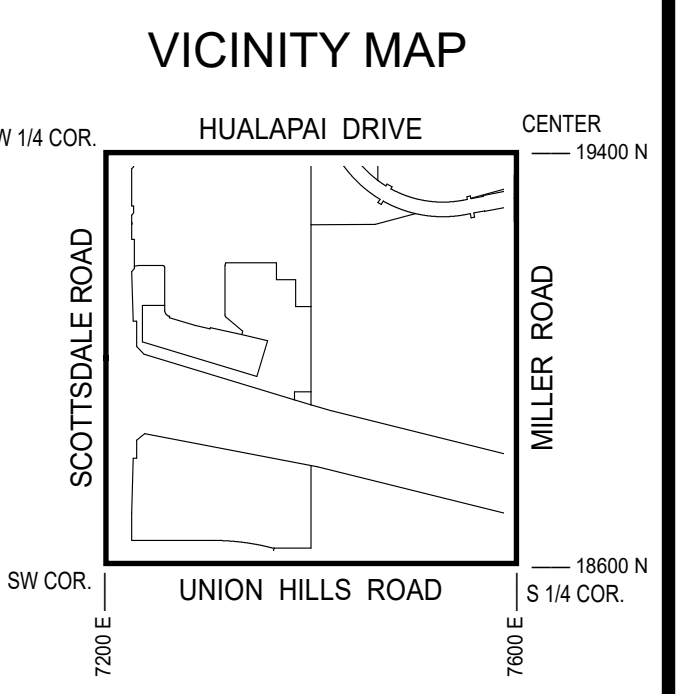
14-NOV-21

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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 



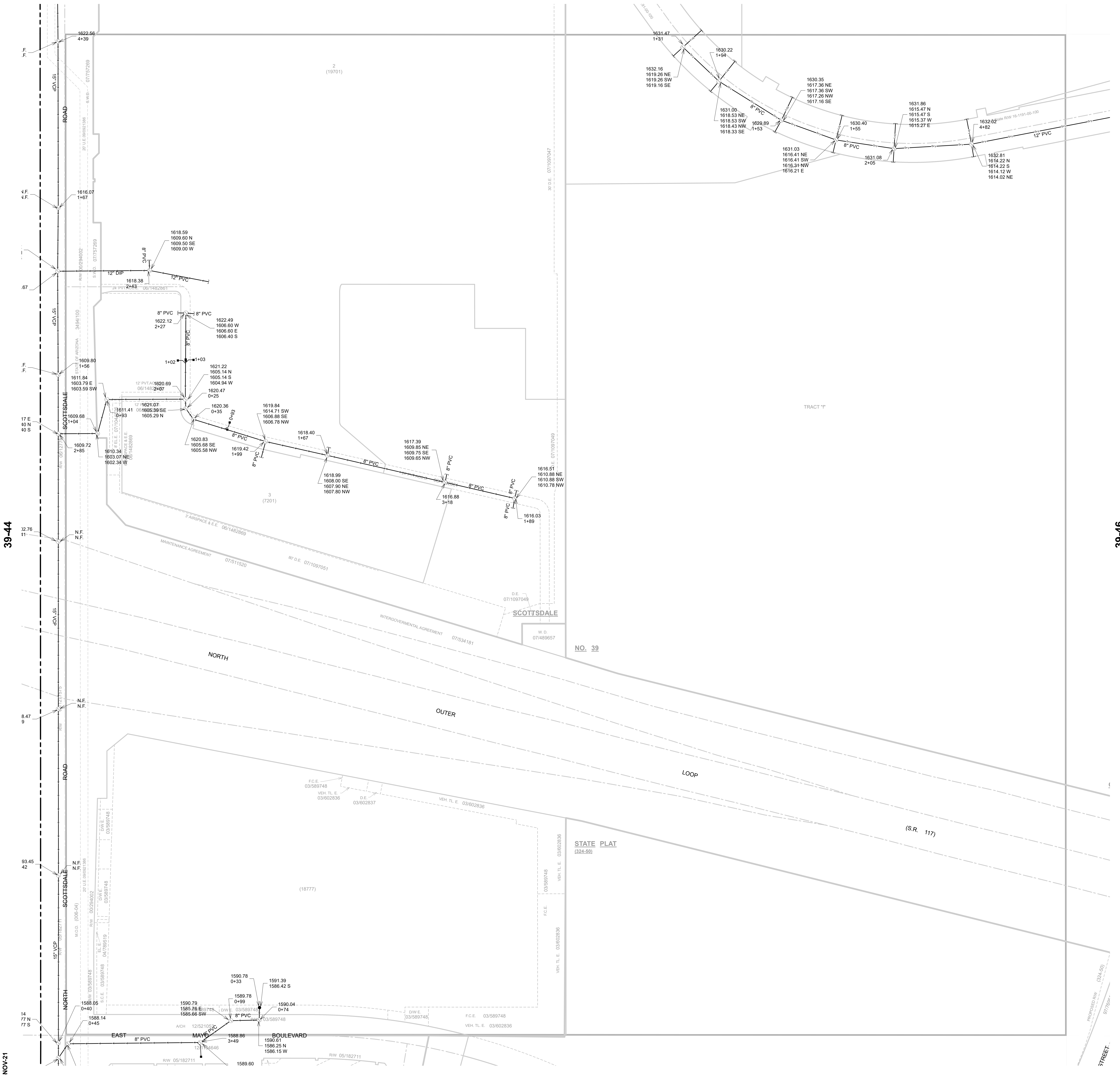
SEWER
QUARTER SECTION MAP
39-45
 SW 1/4 SEC. 26 T4N R4E

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

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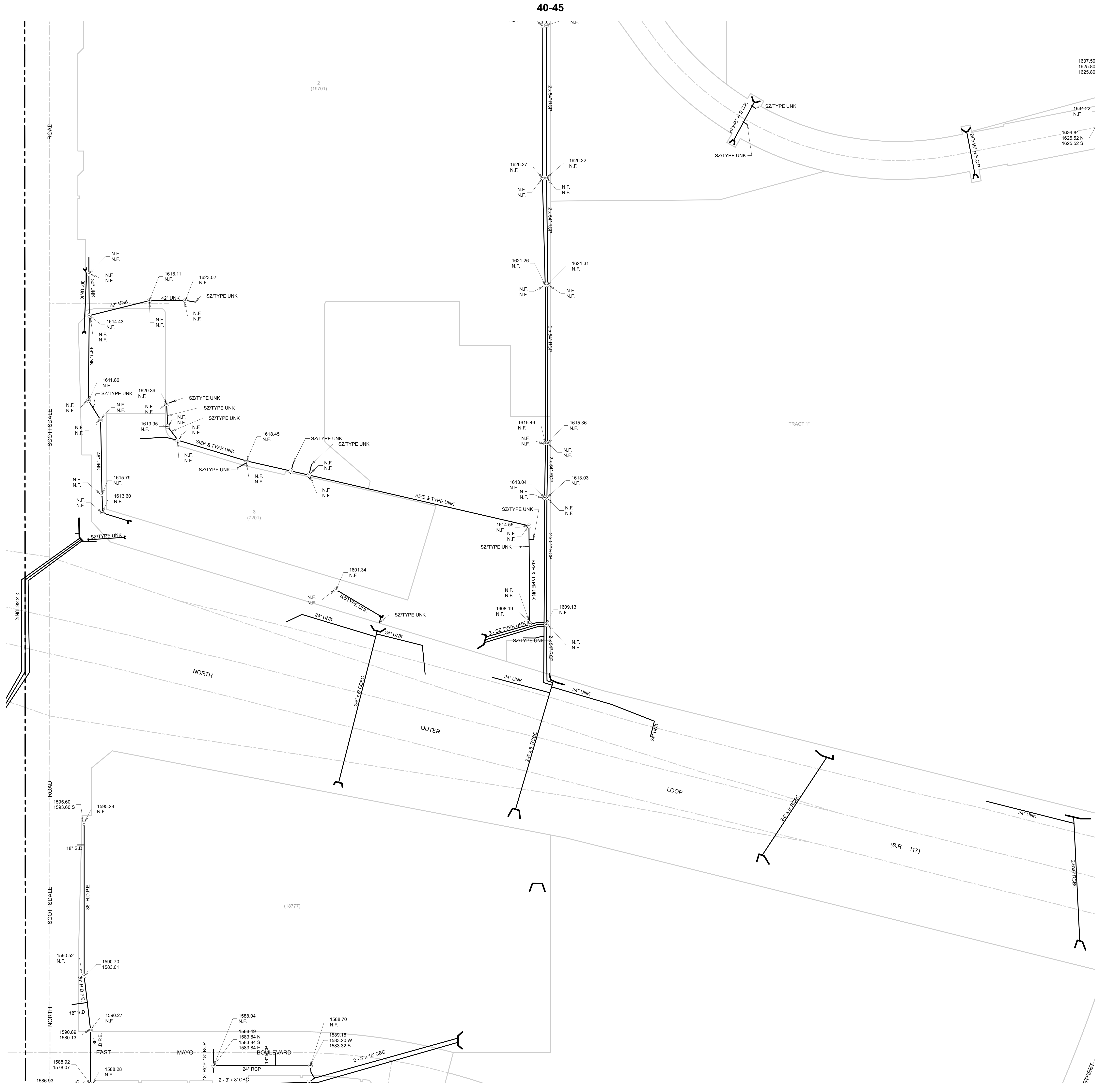
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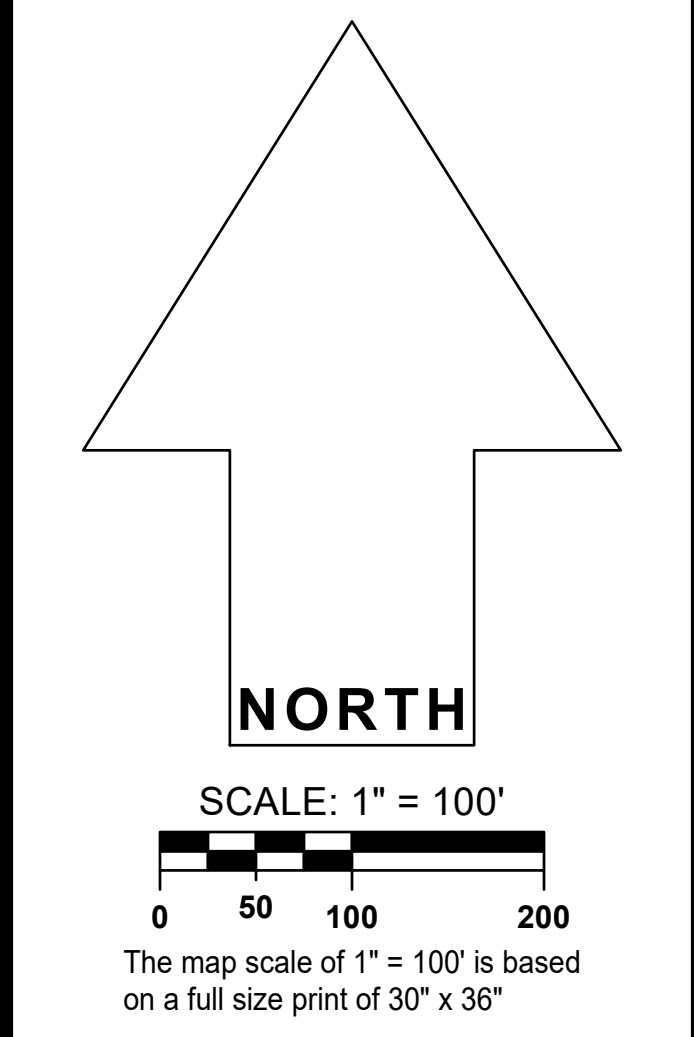
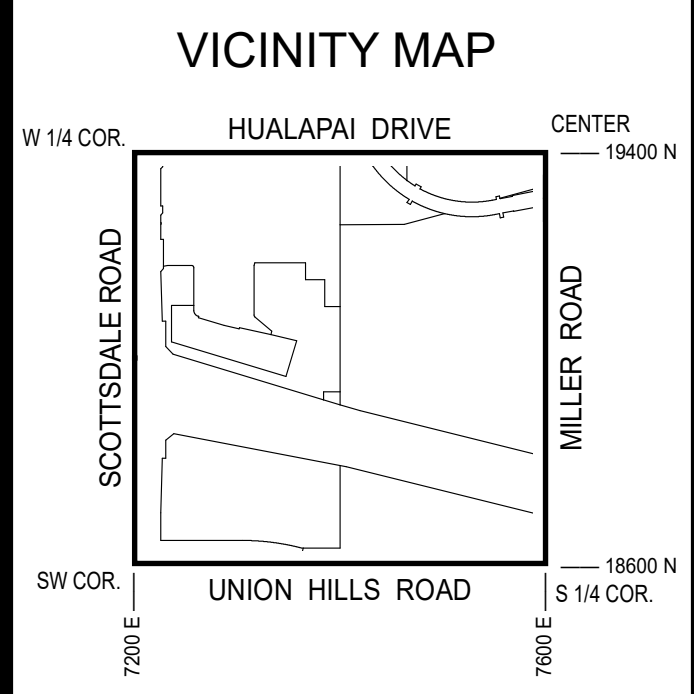
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1637.5C
 1625.8C
 1625.8C

LEGEND:

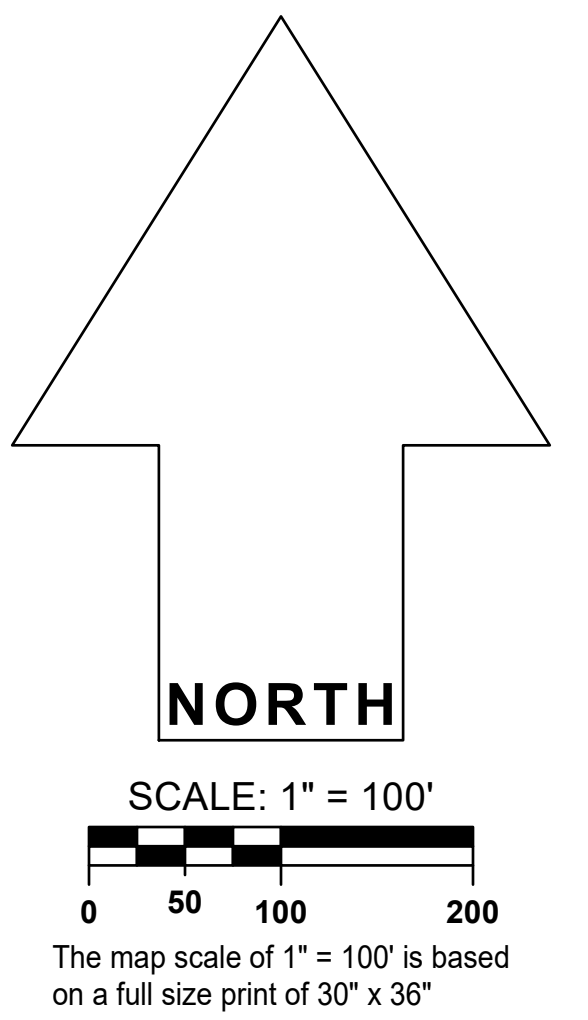
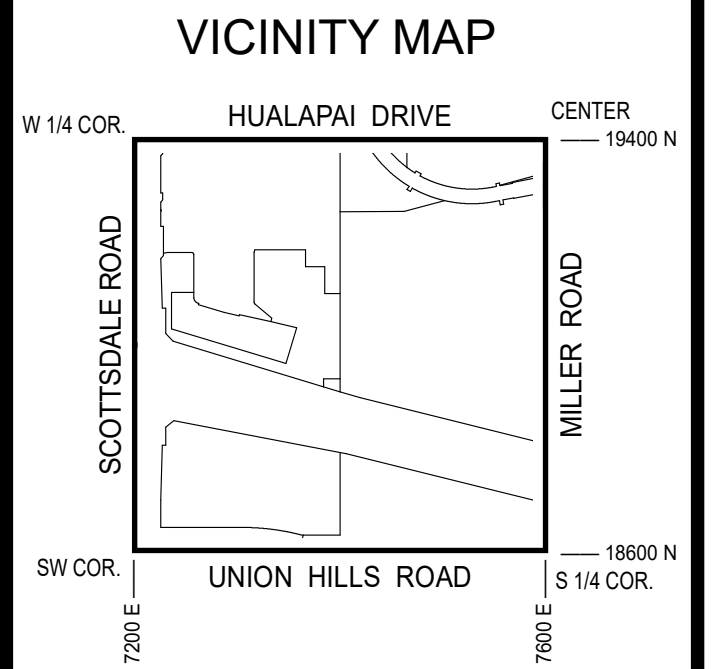


STORM WATER
 QUARTER SECTION MAP
39-45
 SW 1/4 SEC. 26 T4N R4E

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LEGEND:



LAND
 QUARTER SECTION MAP
39-45
 SW 1/4 SEC. 26 T4N R4E



39-44

39-46

N O T I C E
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 THE CITY OF SCOTTSDALE

14-NOV-21

Appendix D: Sewer Calcs

Worksheet for 8" PVC Max Slope

Project Description		
Friction Method	Manning Formula	
Solve For	Discharge	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.000 %	
Normal Depth	5.20 in	
Diameter	8.0 in	
Results		
Discharge	410.23 gpm	>250.56 gpm in Sewer Service 2 (Northwest)
Flow Area	0.2 ft ²	
Wetted Perimeter	1.3 ft	
Hydraulic Radius	2.31 in	
Top Width	0.64 ft	
Critical Depth	5.44 in	Verify adequate sewer service line capacity after adding pool backwash flows.
Percent Full	65.0 %	
Critical Slope	0.882 %	
Velocity	3.81 ft/s	
Velocity Head	0.23 ft	
Specific Energy	0.66 ft	
Froude Number	1.092	
Maximum Discharge	583.40 gpm	
Discharge Full	542.34 gpm	
Slope Full	0.572 %	
Flow Type	Supercritical	
GVF Input Data		
Downstream Depth	0.00 in	
Length	0.0 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	0.0 %	
Normal Depth Over Rise	65.0 %	
Downstream Velocity	Infinity ft/s	
Upstream Velocity	Infinity ft/s	
Normal Depth	5.20 in	
Critical Depth	5.44 in	
Channel Slope	1.000 %	
Critical Slope	0.882 %	

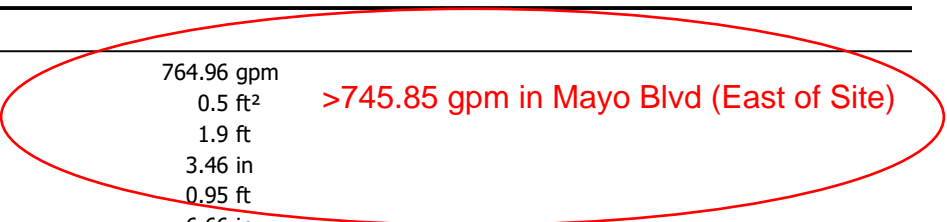
Worksheet for 12" PVC Min Slope

Project Description	
Friction Method	Manning Formula
Solve For	Discharge
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.300 %
Normal Depth	7.80 in
Diameter	12.0 in
Results	
Discharge	662.47 gpm >540.38 gpm in Mayo Blvd
Flow Area	0.5 ft ²
Wetted Perimeter	1.9 ft
Hydraulic Radius	3.46 in
Top Width	0.95 ft
Critical Depth	6.18 in
Percent Full	65.0 %
Critical Slope	0.621 %
Velocity	2.73 ft/s
Velocity Head	0.12 ft
Specific Energy	0.77 ft
Froude Number	0.640
Maximum Discharge	942.12 gpm
Discharge Full	875.81 gpm
Slope Full	0.172 %
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 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	0.0 %
Normal Depth Over Rise	65.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.80 in
Critical Depth	6.18 in
Channel Slope	0.300 %
Critical Slope	0.621 %

12" capacity will be exceeded after adding pool flows.

Worksheet for 12" PVC Max Slope

Project Description	
Friction Method	Manning Formula
Solve For	Discharge
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.400 %
Normal Depth	7.80 in
Diameter	12.0 in
Results	
Discharge	764.96 gpm
Flow Area	0.5 ft ²
Wetted Perimeter	1.9 ft
Hydraulic Radius	3.46 in
Top Width	0.95 ft
Critical Depth	6.66 in
Percent Full	65.0 %
Critical Slope	0.647 %
Velocity	3.15 ft/s
Velocity Head	0.15 ft
Specific Energy	0.80 ft
Froude Number	0.739
Maximum Discharge	1,087.86 gpm
Discharge Full	1,011.30 gpm
Slope Full	0.229 %
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 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	0.0 %
Normal Depth Over Rise	65.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.80 in
Critical Depth	6.66 in
Channel Slope	0.400 %
Critical Slope	0.647 %



12" capacity will be exceeded after adding pool flows.

Worksheet for 15" PVC Min Slope

Project Description	
Friction Method	Manning Formula
Solve For	Discharge
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.400 %
Normal Depth	10.50 in
Diameter	15.0 in
Results	
Discharge	1,535.17 gpm
Flow Area	0.9 ft ²
Wetted Perimeter	2.5 ft
Hydraulic Radius	4.44 in
Top Width	1.15 ft
Critical Depth	8.95 in
Percent Full	70.0 %
Critical Slope	0.631 %
Velocity	3.73 ft/s
Velocity Head	0.22 ft
Specific Energy	1.09 ft
Froude Number	0.734
Maximum Discharge	1,972.43 gpm
Discharge Full	1,833.61 gpm
Slope Full	0.280 %
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 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	0.0 %
Normal Depth Over Rise	65.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.50 in
Critical Depth	8.95 in
Channel Slope	0.400 %
Critical Slope	0.631 %

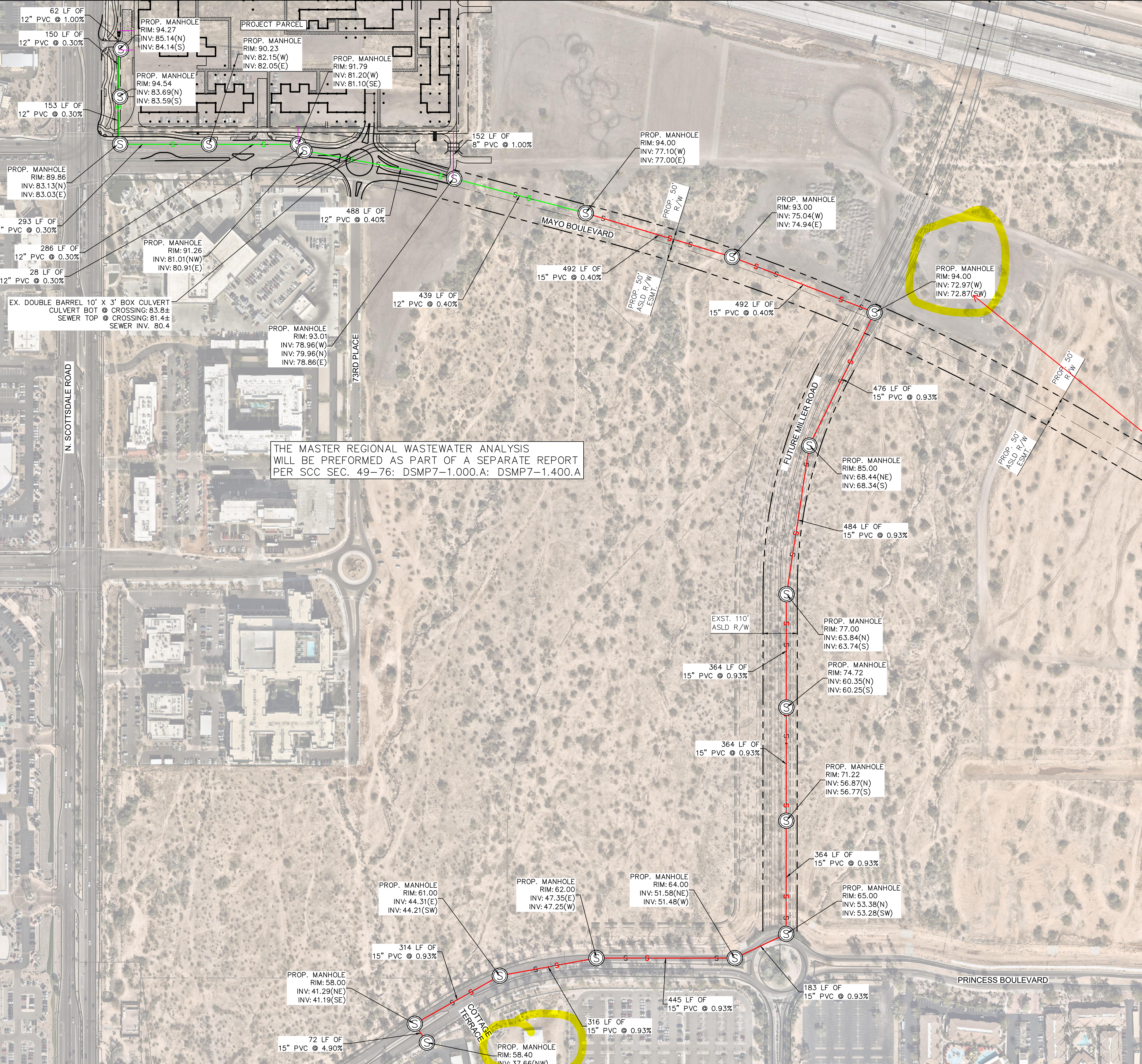
>745.85 gpm from Optima plus additional flow from Derito Property in Mayo Blvd

15" sewer capacity will be exceeded after adding pool flows.

Worksheet for 15" PVC Max Slope

Project Description		
Friction Method	Manning	
	Formula	
Solve For	Discharge	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.930 %	
Normal Depth	10.50 in	
Diameter	15.0 in	
Results		
Discharge	2,340.82 gpm	>745.85 gpm from Optima plus additional flow from Derito Property plus remainder of Crossroads East in Miller and Princess Drive
Flow Area	0.9 ft ²	
Wetted Perimeter	2.5 ft	
Hydraulic Radius	4.44 in	
Top Width	1.15 ft	
Critical Depth	11.12 in	
Percent Full	70.0 %	
Critical Slope	0.807 %	
Velocity	5.68 ft/s	
Velocity Head	0.50 ft	
Specific Energy	1.38 ft	
Froude Number	1.120	
Maximum Discharge	3,007.55 gpm	
Discharge Full	2,795.89 gpm	
Slope Full	0.652 %	
Flow Type	Supercritical	
GVF Input Data		
Downstream Depth	0.00 in	
Length	0.0 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	0.0 %	
Normal Depth Over Rise	70.0 %	
Downstream Velocity	Infinity ft/s	
Upstream Velocity	Infinity ft/s	
Normal Depth	10.50 in	
Critical Depth	11.12 in	
Channel Slope	0.930 %	
Critical Slope	0.807 %	

Appendix E: Offsite Sewer Exhibit



62 LF OF 12" PVC @ 1.00%

150 LF OF 12" PVC @ 0.30%

153 LF OF 12" PVC @ 0.30%

293 LF OF 12" PVC @ 0.30%

286 LF OF 12" PVC @ 0.30%

28 LF OF 12" PVC @ 0.30%

488 LF OF 12" PVC @ 0.40%

439 LF OF 12" PVC @ 0.40%

492 LF OF 15" PVC @ 0.40%

492 LF OF 15" PVC @ 0.40%

476 LF OF 15" PVC @ 0.93%

484 LF OF 15" PVC @ 0.93%

364 LF OF 15" PVC @ 0.93%

364 LF OF 15" PVC @ 0.93%

364 LF OF 15" PVC @ 0.93%

314 LF OF 15" PVC @ 0.93%

72 LF OF 15" PVC @ 4.90%

316 LF OF 15" PVC @ 0.93%

445 LF OF 15" PVC @ 0.93%

183 LF OF 15" PVC @ 0.93%

PROP. MANHOLE RIM: 89.86 INV: 83.13(N) INV: 83.03(E)

PROP. MANHOLE RIM: 91.26 INV: 81.01(NW) INV: 80.91(E)

PROP. MANHOLE RIM: 93.01 INV: 78.96(W) INV: 79.96(N) INV: 78.86(E)

PROP. MANHOLE RIM: 94.00 INV: 77.10(W) INV: 77.00(E)

PROP. MANHOLE RIM: 93.00 INV: 75.04(W) INV: 74.94(E)

PROP. MANHOLE RIM: 94.00 INV: 72.97(W) INV: 72.87(SW)

PROP. MANHOLE RIM: 85.00 INV: 68.44(NE) INV: 68.34(S)

PROP. MANHOLE RIM: 77.00 INV: 63.84(N) INV: 63.74(S)

PROP. MANHOLE RIM: 74.72 INV: 60.35(N) INV: 60.25(S)

PROP. MANHOLE RIM: 71.22 INV: 56.87(N) INV: 56.77(S)

PROP. MANHOLE RIM: 65.00 INV: 53.38(N) INV: 53.28(SW)

PROP. MANHOLE RIM: 61.00 INV: 44.31(E) INV: 44.21(SW)

PROP. MANHOLE RIM: 62.00 INV: 47.35(E) INV: 47.25(W)

PROP. MANHOLE RIM: 64.00 INV: 51.58(NE) INV: 51.48(W)

PROP. MANHOLE RIM: 58.00 INV: 41.29(NE) INV: 41.19(SE)

PROP. MANHOLE RIM: 58.40 INV: 37.66(NW)

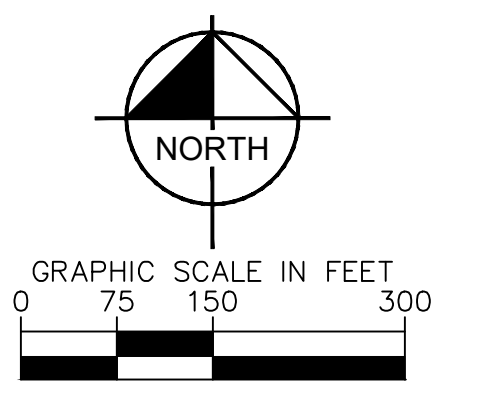
THE MASTER REGIONAL WASTEWATER ANALYSIS WILL BE PERFORMED AS PART OF A SEPARATE REPORT PER SCC SEC. 49-76: DSMP7-1.000.A: DSMP7-1.400.A

TOTAL SEWER LENGTH	
8-INCH PVC	308 LF
12-INCH PVC	1,834 LF
15-INCH PVC	4,366 LF

PROPOSED 8" SEWER LINE
 PROPOSED 12" SEWER LINE
 PROPOSED 15" SEWER LINE

Diameter of gravity sewer in this exhibit is preliminary and will be finalized during the development's wastewater master planning process.

Verify that the proposed invert elevation for this manhole corresponds with the invert for the segment of sewer already installed under the Loop 101, as the Miller Rd sewer will also convey some flow from north of the Loop 101.



PROPOSED SEWER INFRASTRUCTURE EXHIBIT



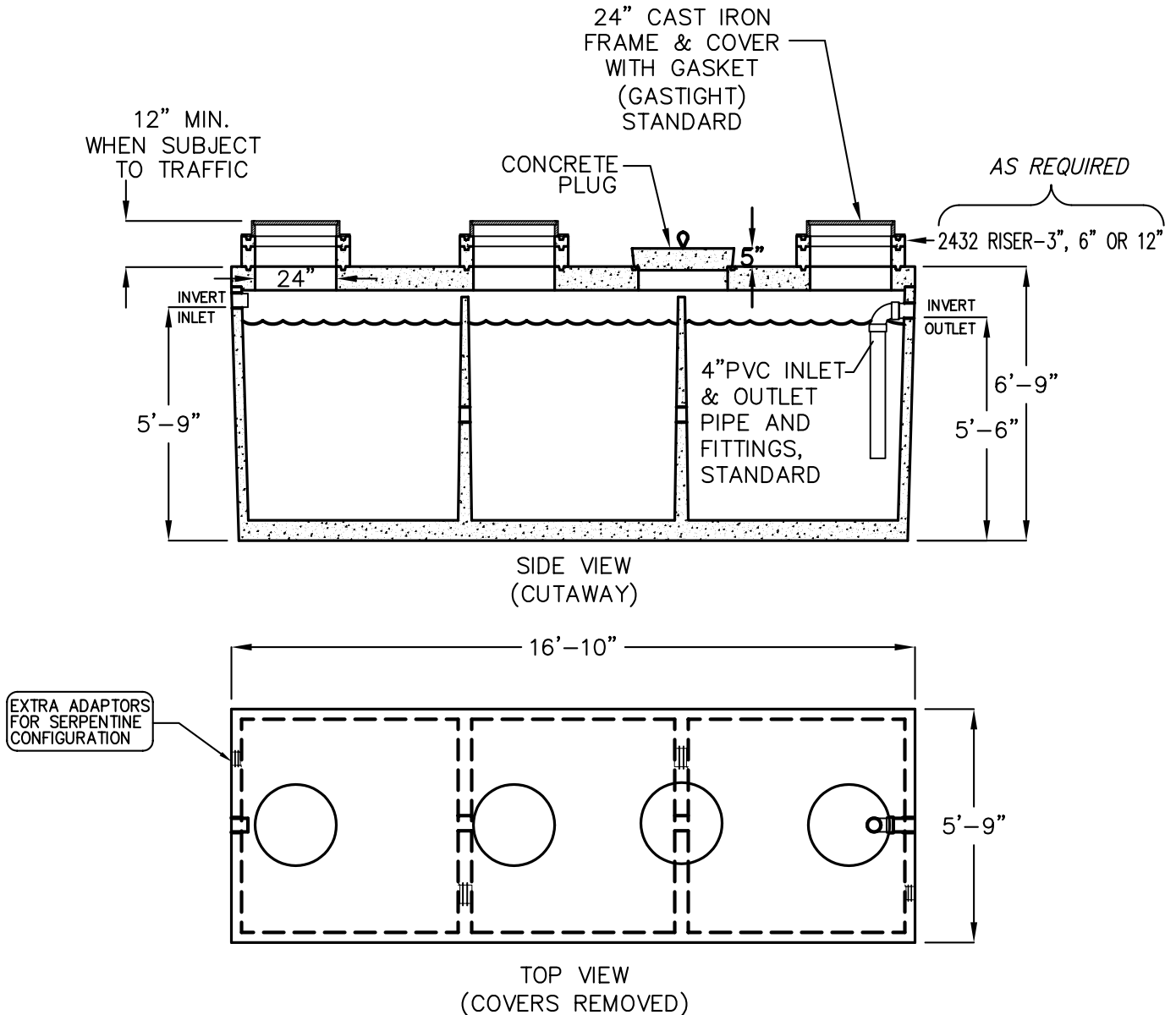
06/21/2022

Appendix F: Grease Interceptor Detail and Calculation Table

3000 GALLON CLARIFIER TANKS

MODEL CL3000

TRAFFIC RATED ACCEPTED BY UPC.



■ LIQUID CAPACITY: 3000 GALLONS

■ TANK DESIGNED FOR H-20 TRAFFIC WHEEL LOAD WITH DRY SOIL CONDITIONS (WATER TABLE BELOW TANK) EARTH COVER OVER TANK NOT TO EXCEED 4 FT.

■ SUITABLE NATIVE OR SUB-BASE SHALL BE PREPARED TO HANDLE ANTICIPATED LOADS. THE EXCAVATION SHALL BE BEDDED WITH SUITABLE GRANULAR MATERIAL AND SHALL BE COMPACTED TO 90% MAXIMUM DRY DENSITY, OR TO REQUIREMENTS OF THE PROJECT GEOTECHNICAL ENGINEER.

■ FOR COMPLETE DESIGN AND PRODUCT INFORMATION CONTACT JENSEN PRECAST.

MINIMUM EXCAVATION SIZE:
6'-9" X 17'-10" X DEPTH REQ'D.

THE DESIGN AND DETAIL OF THIS DRAWING ARE THE PROPERTY OF JENSEN PRECAST AND NOT TO BE USED EXCEPT IN CONNECTION WITH ITS OWN WORK. DESIGN AND INVENTION RIGHTS ARE RESERVED.

GREASE INTERCEPTOR SIZING CALCULATION

QTY	ITEM	DFU EA.	TOTALS
1	(101) MOP SINK	3	3
1	(118) HAND SINK	2	2
1	(118.1) PREP SINK	2	2
3	(151) FLOOR TROUGH	5	15
1	(200) PREP SINK	2	2
1	(208) PREP SINK	2	2
1	(208) PREP SINK	2	2
1	(222) DIPPER WELL	2	2
1	(319) FLOOR TROUGH	5	5
1	(343) FLOOR TROUGH	5	5
1	(400) FLOOR TROUGH	5	5
1	(404) PRE-RINSE	2	2
3	(406) HAND SINK	2	6
1	(408) DISHMACHINE	4	4
1	(413) 3-COMP SINK	6	6
1	(415) FLOOR TROUGH	5	5
1	(416) FLOOR TROUGH	5	5
1	(422) GLASS WASHER	3	3
1	(500) HAND SINK	2	2
1	(501) HAND SINK	2	2
1	(505) HAND SINK	2	2
1	(600) BEVERAGE COUNTER SINK	2	2
TOTAL DFU			84

TOTAL DFU 84
 X 3 GPM/FU

 252
 X 12 MIN. RETENTION TIME

 3132
 MIN. 3024 GALLON INTERCEPTOR
 REQUIRED.
 PROVIDE JENSEN PRECAST CL3000ECE-G
 3000 GALLON GREASE INTERCEPTOR

Appendix G: Sewer Service Exhibit

