CITY OF SCOTTSDALE

Water and Wastewater Study
Combined

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 ldillon **DATE** 5/11/2020

Address comments below and herein on a final BOD. Conform to stipulations listed.

1) **Stipulation:** All onsite sewer and pool backwash to be routed to sewer running north and parallel to and east of N. 70th Street. (no waste flows to McDowell Rd sewer)

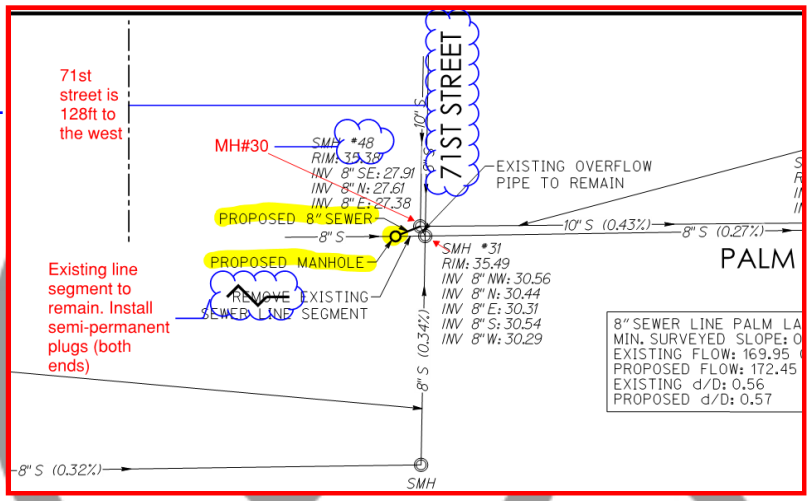
2) **Stipulation:** Offsite construction required. New manhole and line segment to be added on Palm Lane approx. 124ft east of 71st Street centerline. See figure to right and on Option 1 utility plan herein. Line segment shall be angled at a 45 degree angle to join manholes. Line segment approximate length will be 8ft. Rework receiving manhole base to accept re-routed flow. Plug both ends of existing line segment.

3) **Stipulation:** Pool backwash flows shall be equalized and limited to 50gpm peak into the 8" public sewer proposed. Use of a cartridge filter is not an acceptable solution to reducing/eliminating backwash flows. Refer to the page following this cover page for guidance on information that shall be provided in the subsequent design report and/or plans on how to properly equalize this flow.

4) All new connections to the public sewer shall be min 6-inch and be per MAG 440-3. Call out on utility plan.

3 engineering
planning civil engineering surveying

SOUTHDALE
Final Wastewater Basis of Design Report
3 engineering Job #: 1872
April 9, 2020



5-ZN-2020
4/16/2020

Water Resources Guidance on Equalizing Pool Backwash

Unless certified calculations are provided the instantaneous pool backwash flow rate to be assumed shall be 100gpm at a duration to be provided by your pool designer or MEP. A pool with a cartridge filter cannot be assumed. If equalization is required, the equalization tank should be sized for 3 to 4 consecutive pool backwash volumes (or as recommended by pool designer or MEP) and meter into the onsite or offsite sewer at a maximum allowable discharge rate of **50 gpm (specific to Southdale, 5-ZN-2020)**.

In the basis of design report provide:

1.Full calculations of the pool single backwash volume including size of pool and filter size.
2.Also include determination of equalization tank volume and dimensions and include location on site plan.
3.No piping shall be shown in BOD or on plans that allow direct connection of filter backwash waste to the onsite or offsite sewer system (must be sent to tank).
4.No connection other than the pressurized line from (or to) the pump shall leave the equalization tank in BOD or plans.
a.Exception: If the equalization tank is completely above ground the flow can be limited/automatically controlled by appropriately sizing the discharge piping for gravity discharge. In this case the average flow rate over the total time to drain the full tank must meet the maximum discharge rate. Complete sketch and hydraulic calculations showing this must be provided. In this case a discharge to a box style floor drain should be provided. Downstream connection requirements below still apply.
5.The backwash waste shall be discharged into a dedicated 4 or 6-inch lateral with no other sewer flows that connects to the mainline sewer. The top of the mainline sewer at the connection point shall be below the discharge invert of the p-trap.
6.All relevant details on the pool backwash management system should be submitted including (if applicable) pump design flow and head loss calcs and corresponding pump cut sheet and pump curve showing the operating point (pressure/flow) of the pump at or near the maximum allowable sewer discharge flow rate.

In design and plans:

1.All relevant design details, criteria and specification for this system shall be shown on the submitted and sealed plans and reviewed and approved by Water Resources.
2.Consideration should be given in final design to the equalization tank material and (if applicable) backwash waste metering pump with respect to the chlorine levels in the backwash flow and potential for rapid corrosion of concrete and metals. Plastic tanks and pump with plastic impeller and body pumps should be utilized (example Fibroc).
3.Secure and safe access to the backwash tank for periodic cleaning and/or pump removal/repair (if submersible type pump) should be provided.
4.Pump redundancy is at the discretion of the designer/owner however, controls, interlocks, or valves (e.g. 3-way valve) must prevent both pumps from discharging simultaneously and exceeding the maximum flow.
5.Discharging to the sewer must involve:
a.For pumped line: an above the ground gooseneck pipe section with combination air/vacuum release valve at the top (example ARI), this prevents any possible back up or siphoning back to the tank
b.For a pumped or a gravity line: a p-trap below grade and adjacent to the equalization tank to prevent migration of sewage or sewer gases back into the equalization tank. (or if/as plumbing code addresses such a configuration)
6.The backwash waste shall be discharged into a dedicated 4 or 6-inch lateral with no other sewer flows that connects to the mainline sewer. The top of the mainline sewer at the connection point shall be below the discharge invert of the p-trap.

3 engineering
planning civil engineering surveying

SOUTHDALE

FINAL WASTEWATER BASIS OF DESIGN REPORT

Prepared for:

Hawkins Companies LLC
4700 S. McClintock Drive #160
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Daniel G. Mann, P.E.

April 9, 2020

Submittal to:

City of Scottsdale
7447 E. Indian School Road, Suite 105
Scottsdale, AZ 85251

Prepared by:

3 engineering, L.L.C.
6370 E. Thomas Road, Suite #200
Scottsdale, Arizona 85251
Contact: Dan G. Mann, P.E.

Job Number 1872

5-ZN-2020
4/16/2020

3 engineering
planning civil engineering surveying

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Appendices

1. Introduction

The project site, Southdale, is located in the southeast quarter of Section 34, Township 2 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona within the City of Scottsdale. The project is located on the northeast corner of 70th Street and McDowell Road. The site is bounded on the north by an apartment complex, on the east by a commercial development, on the south by McDowell Road, and on the west by 70th Street. See Appendix A for a site map.

The existing zoning is C-3. The land is currently used as a commercial development. The General Plan shows the site as a Mixed-Use Neighborhood. The proposed zoning is PUD. The site is a proposed 267-unit apartment complex with office and retail space.

2. Design Documentation

The purpose of this Wastewater Basis of Design Report is to verify that the existing City of Scottsdale sewer system is able to accommodate demands generated by the proposed project, Southdale. FlowMaster V8i by Bentley was used to model and analyze the existing sewer system downstream of the site has capacity for the existing flow plus the flows generated from the proposed site. Modeling was performed in compliance with the City of Scottsdale design requirements.

The existing flow in the system was tested at two manholes in Palm Lane, downstream of the site. The tests were performed by RDH Environmental Services on 1/25/2020 through 2/2/2020. See results in Appendix B.

Demands for the proposed site were calculated using Section 7-1.403A of the City of Scottsdale 2018 Design Standards and Policies Manual. It is our opinion that this report is in accordance with the 2018 City of Scottsdale Design Standards and Policies Manual.

3. Existing Conditions

overflow goes to MH#30 (which is on the 10" line and then passes to MH#48)

The existing zoning is C-3. The existing land is a commercial development. See Appendix A for a site map. The site is surrounded by existing multi-family residential development and commercial development. There is an existing 8" V.C.P. sewer line in the apartment complex north of the site that will be utilized for the proposed development. This sewer flows north to an 8" V.C.P. sewer line in Palm Lane. City of Scottsdale Manhole #31 has an overflow pipe that is conveyed to Manhole #48, which outlets to a 10" sewer in Palm Lane. The 8" sewer in Palm Lane flows to an 8" V.C.P. sewer line, in Scottsdale Road, flowing south. The 10" sewer line in Palm lane flows to an 18" V.C.P. sewer line, in Scottsdale Road, flowing south. The 8" sewer line running through the apartment north of the site, the 8" and 10" sewer lines in Palm Lane and the 8" sewer line in Scottsdale Road will be analyzed to determine if they have capacity for the additional flow generated from the proposed project. See Appendix G for existing sewer layout.

4. Proposed Conditions

The project consists of a 267-unit apartment complex with 3,300 s.f. of office space and 1,100 s.f. of retail space on 3.83 acres. It is proposed that this project will tie into the existing 8" V.C.P. sewer line that runs through the apartment complex north of the site. See Preliminary Onsite Utility Plans in Appendix H.

The proposed site includes one pool. The assumed instantaneous backwash rate of the pool is 100 gpm. The pool backwash will be captured by an equalization tank that is to be sized for up to four consecutive backwashes. The tank will have a metered flow of 5 gpm that outlets to the proposed sewer system.

5. Computations

5.1. Proposed Site Demand Calculations

The following demand criteria from the City of Scottsdale 2018 Design Standards and Policies Manual (DSPM) were used in determining the system demands for the proposed site.

1. 269 proposed units
2. 3.83 acre site (70 du/ac)
3. 1.7 persons per unit (Per DSPM, multifamily density exceeding 22 du/ac)
4. 100 gallons per person per day (Per DSPM, residential)
5. Peaking factor = 4 (Per DSPM, residential)
6. 3,300 s.f. proposed Office Space
7. 0.4 gpd/s.f. (Per DPSM, Office)
8. 1,100 s.f. proposed Retail Space
9. 0.5 gpd/s.f. (Per DSPM, Commercial/Retail)
10. Peaking factor = 3 (Per DSPM, Commercial/Retail, Office)
11. 5 gallons per minute per pool for backwash (assume 1 pool)

not standard value previously commented on, d/D=0.8 w/ pool backwash of 100gpm will be checked

TABLE 1: ON-SITE SEWER DEMANDS	
Pool Backwash	5 gpm
Avg. daily demand w/ pool backwash	38.06 gpm
Design Flow Rate w/ pool backwash	135.93 gpm

peak w/ backwash = 230gpm

Residentail
Average daily demand: 269 units x 1.7 persons per unit x 100 gpd per person = 45,730 gpd
= 45,730 gpd/1440 mpd = 31.76 gpm

Peak flow rate = 4.0 x 45,730 gpd = 182,920 gpd
= 182,920 gpd/1440 mpd = 127.03 gpm

Office
Average daily demand: 3,300 s.f. x 0.4 gpd per s.f. = 1,320 gpd
= 1,320 gpd/1440 mpd = 0.92 gpm

Peak flow rate = 3.0 x 1,320 gpd = 3,960 gpd
= 3,960 gpd/1440 mpd = 2.75 gpm

Retail
Average daily demand: 1,100 s.f. x 0.5 gpd per s.f. = 550 gpd
= 550 gpd/1440 mpd = 0.38 gpm

Peak flow rate = 3.0 x 550 gpd = 1,650 gpd
= 1,650 gpd/1440 mpd = 1.15 gpm

Total
Average daily demand = 33.06 gpm
Peak flow rate = 130.93 gpm

5.2. Existing System Flows

The existing maximum flows for the sewer lines in Palm Lane determined by the flow test performed 1/25/2020 through 2/2/2020 are 13.172 gpm exiting manhole #48 east to the 10" sewer line in Palm Lane and 218.699 gpm exiting manhole #31 east to the 8" sewer line in Palm Lane. The data was logged in 5-minute intervals over 9 days, including two weekends. See Appendix B for flow test data and Appendix G for existing sewer layout.

Two legs contribute to manhole #31. The leg flowing from the south has 114 single family homes, 101 multi-family units, the Aire Townhome development and ultimately the proposed site. The leg flowing from the west has 349 single family homes, 114 multi-family units, and Tonalea elementary school with 500 students. The flows from the two legs are calculated below per the City of Scottsdale DSPM. See Appendix C for a map of the legs.

South Leg (Orange)
114 Single-family x 2.5 persons per unit x 100 gpd per person x 4.0 P.F. / 1440 = 79.16 gpm
Aire townhomes: 80 units x 2.5 persons per unit x 100 gpd per person x 4.0 P.F. / 1440 = 55 gpm
Aire townhomes pool backwash: 100 gpm
101 multi-family x 2.5 persons per unit x 100 gpd per person x 4.0 P.F. / 1440 = 70.12 gpm
Total Peak flow = 304.28 gpm

West Leg (Green)
349 Single-family x 2.5 persons per unit x 100 gpd per person x 4.0 P.F. / 1440 = 242.36 gpm
114 multi-family x 2.5 persons per unit x 100 gpd per person x 4.0 P.F. / 1440 = 79.16 gpm
Tonalea elementary: 50 gpd per student x 500 students x 6.0 P.F. / 1440 = 104.17 gpm
Total Peak flow = 425.69 gpm

The total calculated flow for this manhole is 729.97 gpm. The south leg accounts for 41.68% of the total flow and the west leg accounts for 58.32% of the total flow.

The proportion of the total flow for each leg is applied to the tested flow through manhole #31. From the observed test results, the south leg has a proportional flow of 91.15 gpm, and the west leg has a proportional flow of 127.54 gpm. The total flow is 218.69 gpm.

Analysis of the 8" V.C.P. sewer line in Scottsdale Road requires adding the peak flows from downstream buildings including: a chiropractor's office, Ace Hardware, Post Office, and Comerica Bank. The flows for the sites are calculated below per the City of Scottsdale DSPM.

Chiropractic: 2,135 sf x 0.4 gpd per sf x 3.0 P.F. / 1440 = 1.78 gpm
Ace Hardware: 20,175 sf x 0.5 gpd per sf x 3.0 P.F. / 1440 = 21.02 gpm
Post Office: 84,225 sf x 0.1 gpd per sf x 3.0 P.F. / 1440 = 17.55 gpm
Bank: 3,950 sf x 0.5 gpd per sf x 3.0 P.F. / 1440 = 4.11 gpm
Total Peak Flow = 44.46 gpm

5.3. Sewer System Analysis

FlowMaster V8i by Bentley Systems was used to model and analyze the existing sewer system for compliance with the C.O.S. design requirements. The sewer lines were modeled with a Manning's n coefficient of 0.013. The sewer rims and inverts were surveyed by 3 engineering on

02/13/20 and 03/16/20. See Figures 1 and 2 for a system layout. In addition to analyzing the 8" sewer running through the apartment site, two options for the system downstream are analyzed to address the 8" sewer line in Scottsdale Road which does not have sufficient capacity for the additional flows from the proposed site in the existing condition. The maximum allowable d/D for all pipes discussed is 0.75.

Existing Sewer Line in Apartment

The existing 8" sewer line running through the apartments north of the site was analyzed at the minimum surveyed slope of 0.27%. The existing flow is the 91.15 gpm from the south leg. The existing d/D is 0.39. See Appendix G for FlowMaster results of this pipe.

Existing Sewer Line in Apartment with Proposed Site

The existing 8" sewer line running through the apartments north of the site was analyzed at the minimum surveyed slope of 0.27%. The new flow includes the the 91.15 gpm from the south leg, plus the additional 135.93 gpm of flow from the proposed site for a total of 227.08 gpm. The proposed d/D is 0.68 in the existing line. See Appendix D for FlowMaster results of this pipe.

ok but max flow at d/D=0.80 is 276gpm. W/ pool bw flow peak flow is 321gpm (surcharge). Thus, pool backwash must be equalized and send to the sewer at a max rate of 50gpm.

Existing Sewer System in Palm Lane and Scottsdale Road

In the existing condition, Manhole #31 in Palm lane, receives the existing 91.15 gpm from the south leg and the 127.54 gpm from the west leg. There is an existing overflow pipe elevated 3" above the downstream pipe in manhole #31 that flows into manhole #48. The overflow pipe conveys a flow of 48.74 gpm to the 10" line in Palm Lane. The results of the existing system analysis are discussed below and FlowMaster Data is included in Appendix G.

- The existing 10" sewer line in Palm Lane was analyzed at a minimum surveyed slope of 0.43%. The existing flow includes the 13.17 gpm from the flow test of manhole #48 plus the 48.74 gpm from the overflow pipe in manhole #31 for a total flow of 61.91 gpm. The existing d/D is 0.21.
- The existing 8" sewer line in Palm Lane was analyzed at a minimum surveyed slope of 0.27%. The existing flow includes the 169.95 gpm that bypasses the overflow pipe in manhole #31. The existing d/D is 0.56.
- The existing 8" sewer line in Scottsdale Road was analyzed at a minimum surveyed slope of 0.19%. The existing flow includes the 169.95 gpm from the 8" line in Palm Lane plus 44.46 gpm from the buildings along Scottsdale Road for a total flow of 214.41 gpm. The existing d/D is 0.75.

Select this option w/ pool backwash equalization

Existing Sewer System in Palm Lane and Scottsdale Road with Proposed Site

The proposed project generates 135.93 gpm of peak wastewater flow that is conveyed to manhole #31. In the existing configuration, the capacity of the 8" line in Scottsdale Road will be exceeded as its d/D is 0.75 before the additional flows. There are two proposed options to divert more of the flow into the 10" line in Palm lane, which has excess capacity. The two options are described below along with their respective results.

Option 1

This option proposes adding a manhole in the west leg (green) and therefore connect the leg directly into manhole #48. The 10" line in Palm Lane will now receive the entire 127.54 gpm from the West leg. Manhole #31 in Palm lane will receive the existing 91.15 gpm from the South leg plus the additional 135.93 gpm from the proposed site for a total flow of 227.08 gpm. There is an existing overflow pipe elevated 3" above the downstream pipe in manhole #31 that flows into manhole #48. The overflow pipe will remain unchanged in Option 1. In this configuration, the overflow pipe conveys 54.63 gpm of the 227.08 gpm to manhole #48.

#30

#30

#30

The results of this option are discussed below. FlowMaster Data is included in Appendix E and shown in Figure 1 on the following page.

- The 10" sewer line in Palm Lane was analyzed at a minimum surveyed slope of 0.43%. The proposed flow includes the 127.54 gpm from the west leg plus the 13.17 gpm from the flow test of manhole #48 plus the 54.63 gpm from the overflow pipe in manhole #31 for a total flow of 195.34 gpm. The proposed d/D is 0.38.
- The 8" sewer line in Palm Lane was analyzed at a minimum surveyed slope of 0.27%. The proposed flow includes the 172.45 gpm from the south leg and proposed site that bypasses the overflow pipe. The proposed d/D is 0.57.
- The 8" sewer line in Scottsdale Road was analyzed at a minimum surveyed slope of 0.19%. The proposed flow includes the 172.45 gpm from the 8" line in Palm Lane plus 44.46 gpm from the buildings along Scottsdale Road for a total flow of 216.91 gpm. The proposed d/D is 0.75.

Option 2

This option proposes lowering the invert of the overflow pipe in manhole #31 to match the invert of the existing downstream pipe and leave everything else in the existing condition. The overflow pipe is currently elevated 3" above the downstream pipe. With the inverts of the two pipes equal, the overflow pipe conveys 92.1% and the east pipe conveys 7.9% of any given flow entering the manhole. This is based on the difference of slopes in the pipes. The proposed flow entering manhole #31 is 371.98 gpm from the west leg, south leg, and the proposed site. The overflow pipe conveys 326.61 gpm to manhole #48 and the remaining 28.01 gpm is conveyed to the 8" line in Palm Lane. The results of this option are discussed below. FlowMaster Data is included in Appendix F and shown in Figure 2 on the following page.

- The 10" sewer line in Palm Lane was analyzed at a minimum surveyed slope of 0.43%. The proposed flow includes the 13.17 gpm from the flow test of manhole #48 plus the 326.61 gpm from the overflow pipe in manhole #31 for a total flow of 339.78 gpm. The proposed d/D is 0.52.
- The 8" sewer line in Palm Lane was analyzed at a minimum surveyed slope of 0.27%. The proposed flow only includes the remaining 28.01 gpm that bypasses the overflow pipe. The proposed d/D is 0.21.
- The 8" sewer line in Scottsdale Road was analyzed at a minimum surveyed slope of 0.19%. The proposed flow includes the 28.01 gpm from the 8" line in Palm Lane plus 44.46 gpm from the buildings along Scottsdale Road for a total flow of 72.47 gpm. The proposed d/D is 0.44.

6. ***Summary***

The Peak Flow for the proposed site is 135.93 gpm. The site ties into an existing 8" sewer line in the apartment complex north of the site that has an existing flow of 91.15 gpm. The pipe has a proposed d/D of 0.68 with the additional flow from the proposed site. In the existing configuration, the 8" sewer line in Scottsdale Road is at capacity and cannot handle additional flow from the proposed project. There are two proposed options that address the capacity issue for the 8" sewer line in Scottsdale Road. Option 1 proposes rerouting the west leg of the sewer to the 10" line in Palm Lane and not changing the overflow pipe. Option 2 proposes to only lower the invert of the overflow pipe to match the invert of the downstream pipe. Both options do not exceed the maximum d/D of 0.75 for the 8" line in Scottsdale Road. The City of Scottsdale will make the determination of which option is preferable.

71ST STREET

71st street is 128ft to the west

MH#30

SEWER THROUGH APARTMENT
MIN. SURVEYED SLOPE: 0.27%
EXISTING FLOW: 91.15 GPM
PROPOSED FLOW: 227.08 GPM
EXISTING d/D: 0.39
PROPOSED d/D: 0.68

SMH *48
RIM: 33.39
INV 8" SE: 27.91
INV 8" N: 27.61
INV 8" E: 27.38

PROPOSED 8" SEWER

PROPOSED MANHOLE

~~REMOVE~~ EXISTING SEWER LINE SEGMENT

Existing line segment to remain. Install semi-permanent plugs (both ends)

EXISTING OVERFLOW PIPE TO REMAIN

SMH *31
RIM: 35.49
INV 8" NW: 30.56
INV 8" N: 30.44
INV 8" E: 30.31
INV 8" S: 30.54
INV 8" W: 30.29

8" S (0.34%)

8" S (0.27%)

10" S (0.43%)

10" S (2.59%)

PALM LANE

10" SEWER LINE PALM LANE
MIN. SURVEYED SLOPE: 0.43%
EXISTING FLOW: 61.91 GPM
PROPOSED FLOW: 195.34 GPM
EXISTING d/D: 0.21
PROPOSED d/D: 0.43

8" SEWER LINE PALM LANE
MIN. SURVEYED SLOPE: 0.27%
EXISTING FLOW: 169.95 GPM
PROPOSED FLOW: 172.45 GPM
EXISTING d/D: 0.56
PROPOSED d/D: 0.57

SMH
RIM: 34.60
INV 8" W: 26.34
INV 8" E: 26.32

SMH
RIM: 32.80
INV 10" W: 20.14
INV 10" N: 19.07
INV 10" S: 19.05

SMH
RIM: 33.23
INV 8" W: 29.17
INV 8" N: 28.93
INV 8" S: 29.05

SMH
RIM: 36.21
INV 8" N: 31.00
INV 8" W: 31.00

SMH
RIM: 39.05
INV 8" E: 32.38
INV 8" W: 32.35

SMH
RIM: 40.86
INV 8" E: 33.37
INV 8" N: 33.66
INV 8" S: 33.46

8" S (0.34%)

8" S (0.32%)

8" S (0.34%)

SMH
RIM: 41.36
INV 8" N: 34.98
INV 8" S: 34.99

8" S (0.27%)

SMH
RIM: 40.74
INV 8" N: 36.07
INV 8" S: 36.17

8" S (1.41%)

SMH
RIM: 40.88
INV 8" N: 36.39
INV 8" W: 36.46

8" S (0.28%)

SMH
RIM: 43.86
INV 8" E: 37.29
INV 8" W: 37.32

PROPOSED CONNECTION POINT

PROPOSED SITE

SELECT THIS OPTION

8" SEWER LINE SCOTTSDALE RD.
MIN. SURVEYED SLOPE: 0.19%
EXISTING FLOW: 214.41 GPM
PROPOSED FLOW: 216.91 GPM
EXISTING d/D: 0.75
PROPOSED d/D: 0.75

SMH
RIM: 32.03
INV 8" N: 28.21
INV 8" S: 28.16

8" S (0.19%)

SCOTTSDALE ROAD

SMH
RIM: 31.24
INV 8" N: 27.30
INV 8" S: 27.30

8" S (0.22%)

SMH
RIM: 30.83
INV 8" N: 26.89
INV 8" S: 26.96

8" S (0.26%)

SMH
RIM: 30.17
INV 8" N: 26.54
INV 8" S: 26.55

DATE OF SURVEY:

ORIGINAL SURVEY DATE: 02/13/2020

ADDITIONAL SURVEY DATE: 03/16/2020
(FOR THE 6 MANHOLES IN SCOTTSDALE RD.)

BENCHMARK:

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION UNIQUE ID: 12052, BEING A 3" CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE, LOCATED AT THE INTERSECTION OF SCOTTSDALE ROAD & MCDOWELL ROAD

ELEVATION = 1230.474, (NAVD88).

SCALE: 1"= 60'

0' 30' 60' 120'

SOUTHDALE

7000 E. MCDOWELL ROAD, SCOTTSDALE, AZ 85257

FIGURE 1 - OPTION 1 VS. EXISTING SEWER LAYOUT

3engineering
civil engineering | surveying | planning

ENGINEER: D. MANN
DESIGNER: D. MANN
CAD TECH: K. MANN

3 ENGINEERING, LLC
6370 E. THOMAS ROAD
SUITE # 200
SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387
FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 04/09/20

PROJECT NO. 1872

SHEET NO. 1 of 1

C:\My SecurSync\Projects\1872_70th_St_McDowell_Apartments\Reports\Sewer Capacity\Option 1 Overall System Exhibit.dgn

5-ZN-2020
4/16/2020

SEWER THROUGH APARTMENT
MIN. SURVEYED SLOPE: 0.27%
EXISTING FLOW: 91.15 GPM
PROPOSED FLOW: 227.08 GPM
EXISTING d/D: 0.39
PROPOSED d/D: 0.68

71ST STREET

SMH *48
RIM: 35.38
INV 8" SE: 27.91
INV 8" N: 27.61
INV 8" E: 27.38

10" S
8" S

LOWER OVERFLOW PIPE
INVERT IN SMH #31
TO MATCH EAST PIPE

SMH #31
RIM: 35.49
INV 8" NW: 30.56
INV 8" N: 30.44
INV 8" E: 30.31
INV 8" S: 30.54
INV 8" W: 30.29

8" S (0.34%)

10" SEWER LINE PALM LANE
MIN. SURVEYED SLOPE: 0.43%
EXISTING FLOW: 61.91 GPM
PROPOSED FLOW: 339.78 GPM
EXISTING d/D: 0.21
PROPOSED d/D: 0.43

SMH
RIM: 34.60
INV 8" W: 26.34
INV 8" E: 26.32

10" S (0.43%)
8" S (0.27%)
10" S (2.59%)

PALM LANE

SMH
RIM: 32.80
INV 10" W: 20.14
INV 10" N: 19.07
INV 10" S: 19.05

SMH
RIM: 33.23
INV 8" W: 29.17
INV 8" N: 28.93
INV 8" S: 29.05

8" SEWER LINE PALM LANE
MIN. SURVEYED SLOPE: 0.27%
EXISTING FLOW: 169.95 GPM
PROPOSED FLOW: 28.01 GPM
EXISTING d/D: 0.56
PROPOSED d/D: 0.27

SMH
RIM: 40.86
INV 8" E: 33.37
INV 8" N: 33.66
INV 8" S: 33.46

8" S (0.34%)

SMH
RIM: 39.05
INV 8" E: 32.38
INV 8" W: 32.35

8" S (0.32%)

SMH
RIM: 36.21
INV 8" N: 31.00
INV 8" W: 31.00

8" S (0.34%)

SMH
RIM: 41.36
INV 8" N: 34.98
INV 8" S: 34.99

8" S (0.27%)

SMH
RIM: 40.74
INV 8" N: 36.07
INV 8" S: 36.17

8" S (1.41%)

SMH
RIM: 40.88
INV 8" N: 36.39
INV 8" W: 36.46

8" S (0.28%)

SMH
RIM: 43.86
INV 8" E: 37.29
INV 8" W: 37.32

PROPOSED SITE

PROPOSED CONNECTION POINT

DO NOT
SELECT THIS
OPTION

8" SEWER LINE SCOTTSDALE RD.
MIN. SURVEYED SLOPE: 0.19%
EXISTING FLOW: 214.41 GPM
PROPOSED FLOW: 72.47 GPM
EXISTING d/D: 0.75
PROPOSED d/D: 0.19

8" S (0.19%)

SMH
RIM: 32.03
INV 8" N: 28.21
INV 8" S: 28.16

SCOTTSDALE ROAD

8" S (0.19%)

SMH
RIM: 31.24
INV 8" N: 27.30
INV 8" S: 27.30

8" S (0.22%)

SMH
RIM: 30.83
INV 8" N: 26.89
INV 8" S: 26.96

8" S (0.26%)

SMH
RIM: 30.17
INV 8" N: 26.54
INV 8" S: 26.55

DATE OF SURVEY:

ORIGINAL SURVEY DATE: 02/13/2020

ADDITIONAL SURVEY DATE: 03/16/2020
(FOR THE 6 MANHOLES IN SCOTTSDALE RD.)

BENCHMARK:

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION UNIQUE ID: 12052, BEING A 3" CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE, LOCATED AT THE INTERSECTION OF SCOTTSDALE ROAD & MCDOWELL ROAD

ELEVATION = 1230.474, (NAVD88).

SCALE: 1"= 60'

0' 30' 60' 120'

SOUTHDALE

7000 E. MCDOWELL ROAD, SCOTTSDALE, AZ 85257

FIGURE 2 - OPTION 2 VS. EXISTING SEWER LAYOUT

3 engineering
civil engineering surveying planning

3 ENGINEERING, LLC
6370 E. THOMAS ROAD
SUITE # 200
SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387
FAX: (602) 490-3230
WWW.3ENGINEERING.COM

CAD TECH: R. HAMEN
DESIGNER: D. MANN
ENGINEER: D. MANN

DATE: 04/09/20

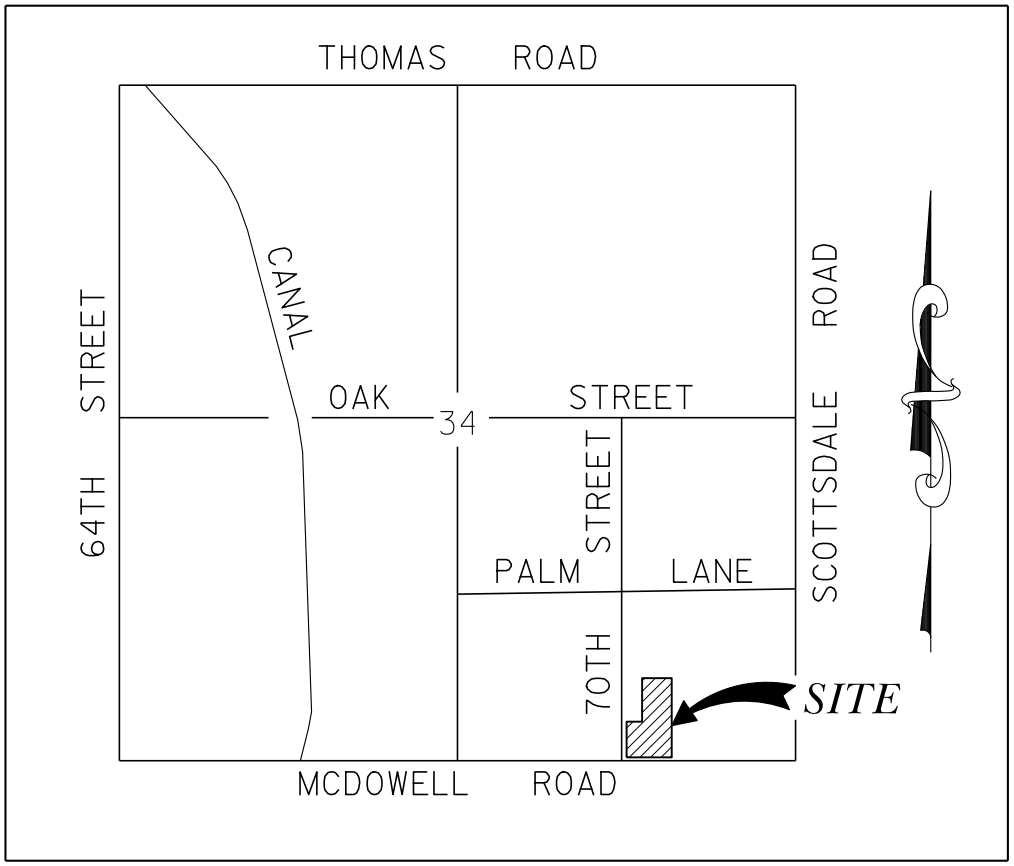
PROJECT NO.
1872

SHEET NO.
1 of 1

C:\My SecurSync\Projects\1872_70th_St_McDowell_Apartments\Reports\Sewer Capacity\Option 2 Overall System Exhibit.dgn

APPENDIX A

Vicinity Map



VICINITY MAP

N.T.S.

APPENDIX B

Flow Test Results

Flow Study for 3 Engineering Project: 726-PA-2019 (District at 7000 E. McDowell)

Dan Man
3 Engineering
9379 E. San Salvador Dr. Scottsdale, Arizona • 85258

SL727 RDH Flow Study, 2 sites in Scottsdale, AZ Friday, 1-25-20 to Sunday 2-2-20.

Equipment for Both Sites: Hach 901 Logger with Flo-Dar sensor**.**

The equipment was installed on 1-24-20 with confined space entry, pipe size confirmed, sensor calibrated and level depth confirmed to the flow level at that time.
Duration of monitoring: 9 days over 2 weekends.
Monitor: Flow (gpm), Level (in), and Velocity (fps)
Data logging: 5 minutes intervals (No averaged intervals)

Site 1: Manhole on Palm Lane just East of 71st Street and West of Scottsdale Rd.
Quarter section: 13-44
Manhole: #31
8" VCP
Flo-Dar sensor installed downstream on the 8" line (due to collecting data from 3 flows)
There was no buildup in the pipe.
All data is good with no sensor interference from debris.

Attached is the excel sheet showing all Level, Velocity and Flow using the Manning equation within the loggers. Below are the data summaries for Site 1:

3 Engineering MH31 Level (in.)			
Date	**Maximum**	**Minimum**	**Average**
1/25/2020	4.516	1.670	2.968
1/26/2020	4.467	1.670	3.077
1/27/2020	4.101	1.609	2.919
1/28/2020	4.346	1.664	2.973
1/29/2020	4.161	1.556	2.942
1/30/2020	4.448	1.822	3.107
1/31/2020	4.645	2.279	3.455
2/1/2020	4.650	2.459	3.585
2/2/2020	4.860	2.312	3.610

3 Engineering MH31 Velocity (fps)			
Date	**Maximum**	**Minimum**	**Average**
1/25/2020	2.048	1.024	1.623
1/26/2020	2.236	0.969	1.652
1/27/2020	2.242	0.968	1.663
1/28/2020	2.225	0.950	1.721
1/29/2020	2.206	0.991	1.663
1/30/2020	2.360	1.110	1.713
1/31/2020	2.466	1.344	1.920
2/1/2020	2.315	1.181	1.896
2/2/2020	2.340	1.194	1.869

Flow Study for 3 Engineering Project: 726-PA-2019 (District at 7000 E. McDowell)

3 Engineering MH31 Flow (gpm)			
Date	**Maximum**	**Minimum**	**Average**
1/25/2020	166.794	26.290	90.416
1/26/2020	185.594	23.660	97.869
1/27/2020	181.243	22.000	91.283
1/28/2020	177.327	22.400	96.150
1/29/2020	164.073	22.067	91.924
1/30/2020	186.510	30.502	101.115
1/31/2020	200.695	50.721	126.505
2/1/2020	218.699	52.181	130.384
2/2/2020	206.784	46.251	131.618

Period Summary		
Measures	**Value**	**Unit**
Max. Total Flow	314,900	gpd
Min. Total Flow	31,700	gpd
Avg. Total Flow	153,200	gpd
Total Flow	1,378,461.1	gal

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

Flow Study for 3 Engineering Project: 726-PA-2019 (District at 7000 E. McDowell)

Dan Man
3 Engineering
9379 E. San Salvador Dr. Scottsdale, Arizona • 85258

SL727 RDH Flow Study, 2 sites in Scottsdale, AZ Friday, 1-25-20 to Sunday 2-2-20.

Equipment for Both Sites: Hach 901 Logger with Flo-Dar sensor**.**

The equipment was installed on 1-24-20 with confined space entry, pipe size confirmed, sensor calibrated and level depth confirmed to the flow level at that time.
Duration of monitoring: 9 days over 2 weekends.
Monitor: Flow (gpm), Level (in), and Velocity (fps)
Data logging: 5 minutes intervals (No averaged intervals)

Site 2: Manhole on Palm Lane between 71st Street and Scottsdale Rd.
Quarter section: 13-44
Manhole: #48
10" VCP
Flo-Dar sensor installed upstream on the 10" line
There was no buildup in the pipe.
All data is good with no sensor interference from debris.

Attached is the excel sheet showing all Level, Velocity and Flow using the Manning equation within the loggers. Below are the data summaries for Site 2:

3 Engineering MH48 Level (in.)			
Date	**Maximum**	**Minimum**	**Average**
1/25/2020	0.559	0.156	0.317
1/26/2020	0.583	0.134	0.322
1/27/2020	0.505	0.199	0.340
1/28/2020	0.541	0.157	0.330
1/29/2020	0.524	0.151	0.310
1/30/2020	0.639	0.178	0.385
1/31/2020	0.681	0.257	0.392
2/1/2020	0.759	0.156	0.392
2/2/2020	0.718	0.168	0.419

3 Engineering MH48 Velocity (fps)			
Date	**Maximum**	**Minimum**	**Average**
1/25/2020	1.420	0.765	1.063
1/26/2020	1.554	0.697	1.058
1/27/2020	1.521	0.730	1.063
1/28/2020	1.521	0.659	1.087
1/29/2020	1.390	0.795	1.070
1/30/2020	1.506	0.813	1.118
1/31/2020	1.497	0.835	1.138
2/1/2020	1.641	0.780	1.169
2/2/2020	1.556	0.826	1.183

Flow Study for 3 Engineering Project: 726-PA-2019 (District at 7000 E. McDowell)

3 Engineering MH48 Flow (gpm)			
Date	**Maximum**	**Minimum**	**Average**
1/25/2020	6.251	0.759	2.591
1/26/2020	7.116	0.522	2.718
1/27/2020	6.533	0.860	2.831
1/28/2020	6.934	0.706	2.814
1/29/2020	6.403	0.655	2.557
1/30/2020	9.435	0.800	3.708
1/31/2020	10.650	1.475	3.765
2/1/2020	13.172	0.819	4.152
2/2/2020	11.721	0.774	4.619

Period Summary		
Measures	**Value**	**Unit**
Max. Total Flow	19,000	gpd
Min. Total Flow	800	gpd
Avg. Total Flow	4,800	gpd
Total Flow	42,833.1	gal

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

APPENDIX C

System Leg Exhibit

14-43

14-44

13-45

West Leg

South Leg

12-43

12-44

5-ZN-2020
4/16/2020

APPENDIX D

Apartment Segment FlowMaster Data

Worksheet for Apartment Segment: 8" Sewer min slope

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Diameter	8.00	in
Discharge	227.08	gpm

Results

Normal Depth	5.444	in
Flow Area	36.43	in²
Wetted Perimeter	1.29	ft
Hydraulic Radius	2.347	in
Top Width	0.62	ft
Critical Depth	0.33	ft
Percent Full	68.1	%
Critical Slope	0.00701	ft/ft
Velocity	2.00	ft/s
Velocity Head	0.06	ft
Specific Energy	0.52	ft
Froude Number	0.55	
Maximum Discharge	0.68	ft³/s
Discharge Full	0.63	ft³/s
Slope Full	0.00175	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	68.05	%
Downstream Velocity	Infinity	ft/s

Worksheet for Apartment Segment: 8" Sewer min slope

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.444	in
Critical Depth	0.33	ft
Channel Slope	0.27000	%
Critical Slope	0.00701	ft/ft

Cross Section for Apartment Segment: 8" Sewer min slope

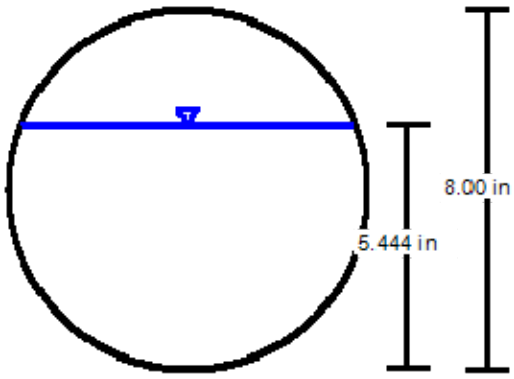
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Normal Depth	5.444	in
Diameter	8.00	in
Discharge	227.08	gpm

Cross Section Image

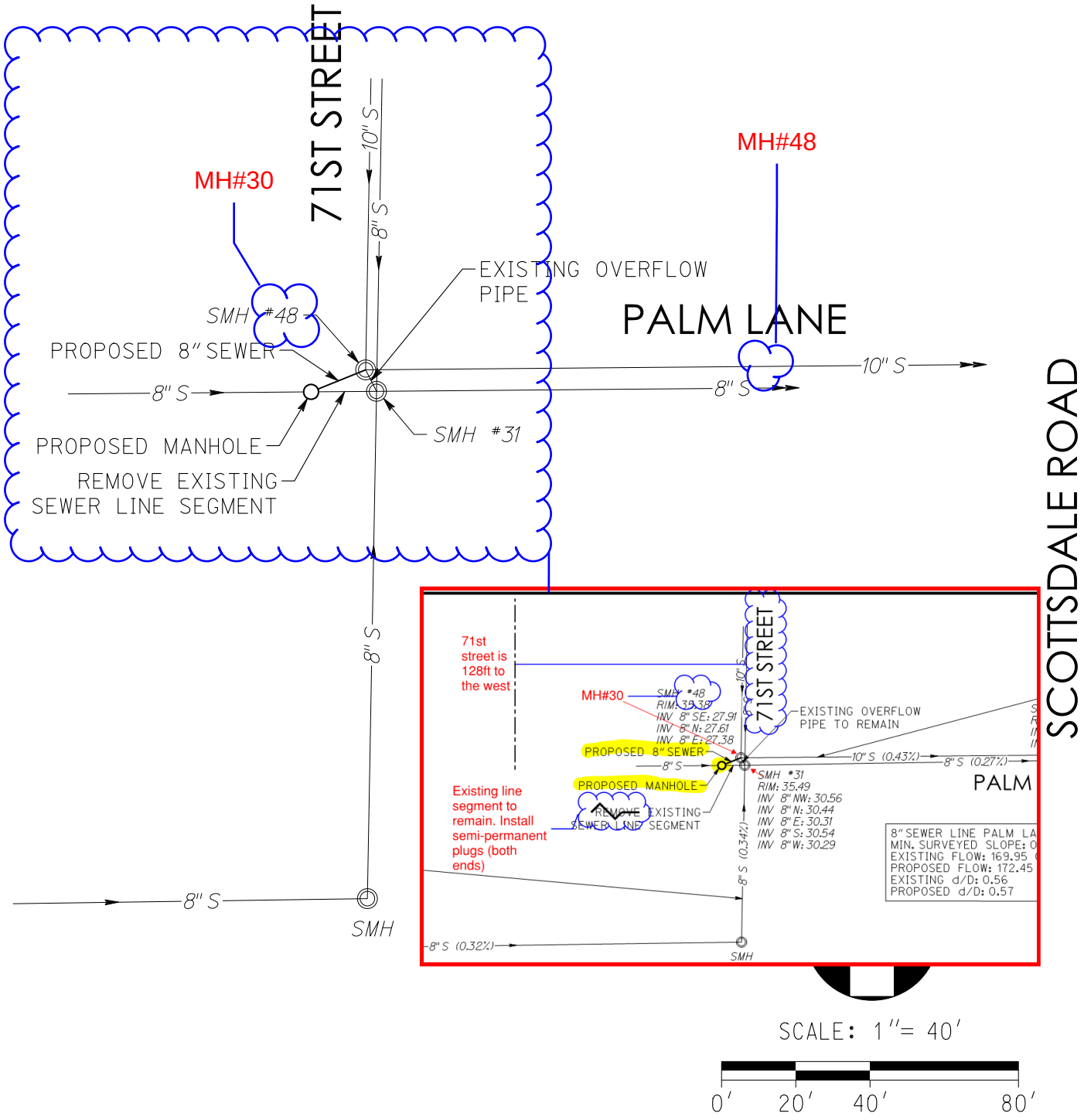


V: 1
H: 1

5-ZN-2020
4/16/2020

APPENDIX E

Option 1 FlowMaster Data



OPTION 1

SOUTHDALE

3 engineering
planning civil engineering surveying

3 ENGINEERING, LLC
6370 E. THOMAS ROAD, SUITE # 200 - SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387 - FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 04

PROJECT NO

5-ZN-2020
4/16/2020

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Worksheet for Option 1: 8" Sewer Palm Lane Overflow to Weir

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Diameter	8.00	in
Discharge	227.08	gpm

Results

Normal Depth	5.444	in
Flow Area	36.43	in²
Wetted Perimeter	1.29	ft
Hydraulic Radius	2.347	in
Top Width	0.62	ft
Critical Depth	0.33	ft
Percent Full	68.1	%
Critical Slope	0.00701	ft/ft
Velocity	2.00	ft/s
Velocity Head	0.06	ft
Specific Energy	0.52	ft
Froude Number	0.55	
Maximum Discharge	0.68	ft³/s
Discharge Full	0.63	ft³/s
Slope Full	0.00175	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	68.05	%
Downstream Velocity	Infinity	ft/s

Worksheet for Option 1: 8" Sewer Palm Lane Overflow to Weir

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.444	in
Critical Depth	0.33	ft
Channel Slope	0.27000	%
Critical Slope	0.00701	ft/ft

Cross Section for Option 1: 8" Sewer Palm Lane Overflow to Weir

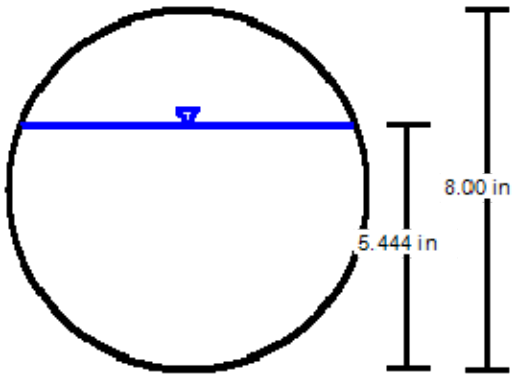
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Normal Depth	5.444	in
Diameter	8.00	in
Discharge	227.08	gpm

Cross Section Image



V: 1
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5-ZN-2020
4/16/2020

Worksheet for Option 1: 8" Sewer Palm Lane

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Diameter	8.00	in
Discharge	172.45	gpm

Results

Normal Depth	4.522	in
Flow Area	29.29	in²
Wetted Perimeter	1.13	ft
Hydraulic Radius	2.152	in
Top Width	0.66	ft
Critical Depth	0.29	ft
Percent Full	56.5	%
Critical Slope	0.00670	ft/ft
Velocity	1.89	ft/s
Velocity Head	0.06	ft
Specific Energy	0.43	ft
Froude Number	0.60	
Maximum Discharge	0.68	ft³/s
Discharge Full	0.63	ft³/s
Slope Full	0.00101	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	56.52	%
Downstream Velocity	Infinity	ft/s

5-ZN-2020
4/16/2020

Worksheet for Option 1: 8" Sewer Palm Lane

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.522	in
Critical Depth	0.29	ft
Channel Slope	0.27000	%
Critical Slope	0.00670	ft/ft

Cross Section for Option 1: 8" Sewer Palm Lane

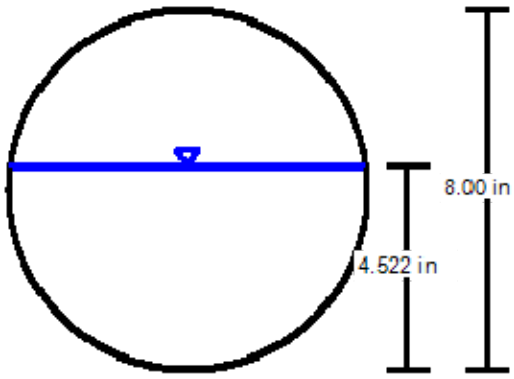
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Normal Depth	4.522	in
Diameter	8.00	in
Discharge	172.45	gpm

Cross Section Image



V: 1
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5-ZN-2020
4/16/2020

Worksheet for Option 1: 8" Sewer Scottsdale Road

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.19000	%
Diameter	8.00	in
Discharge	216.91	gpm

Results

Normal Depth	6.034	in
Flow Area	40.67	in²
Wetted Perimeter	1.40	ft
Hydraulic Radius	2.416	in
Top Width	0.57	ft
Critical Depth	0.33	ft
Percent Full	75.4	%
Critical Slope	0.00696	ft/ft
Velocity	1.71	ft/s
Velocity Head	0.05	ft
Specific Energy	0.55	ft
Froude Number	0.43	
Maximum Discharge	0.57	ft³/s
Discharge Full	0.53	ft³/s
Slope Full	0.00160	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	75.43	%
Downstream Velocity	Infinity	ft/s

5-ZN-2020
4/16/2020

Worksheet for Option 1: 8" Sewer Scottsdale Road

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	6.034	in
Critical Depth	0.33	ft
Channel Slope	0.19000	%
Critical Slope	0.00696	ft/ft

Cross Section for Option 1: 8" Sewer Scottsdale Road

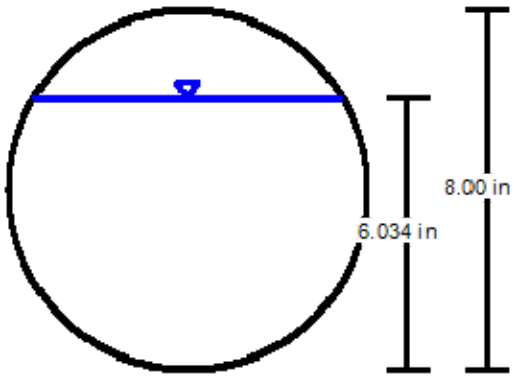
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.19000	%
Normal Depth	6.034	in
Diameter	8.00	in
Discharge	216.91	gpm

Cross Section Image



V: 1
H: 1

5-ZN-2020
4/16/2020

Worksheet for Option 1: 10" Sewer Palm

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.43000	%
Diameter	10.00	in
Discharge	195.34	gpm

Results

Normal Depth	3.775	in
Flow Area	27.14	in²
Wetted Perimeter	1.10	ft
Hydraulic Radius	2.051	in
Top Width	0.81	ft
Critical Depth	0.29	ft
Percent Full	37.7	%
Critical Slope	0.00600	ft/ft
Velocity	2.31	ft/s
Velocity Head	0.08	ft
Specific Energy	0.40	ft
Froude Number	0.84	
Maximum Discharge	1.55	ft³/s
Discharge Full	1.44	ft³/s
Slope Full	0.00039	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	37.75	%
Downstream Velocity	Infinity	ft/s

5-ZN-2020
4/16/2020

Worksheet for Option 1: 10" Sewer Palm

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.775	in
Critical Depth	0.29	ft
Channel Slope	0.43000	%
Critical Slope	0.00600	ft/ft

Cross Section for Option 1: 10" Sewer Palm

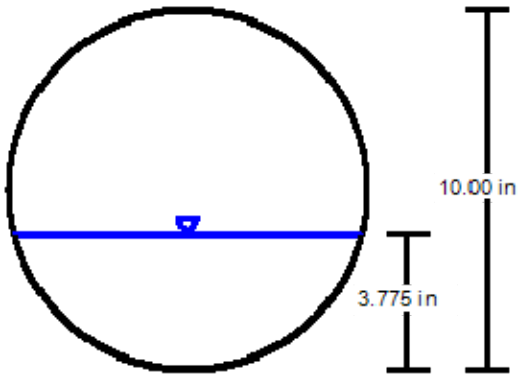
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.43000	%
Normal Depth	3.775	in
Diameter	10.00	in
Discharge	195.34	gpm

Cross Section Image



V: 1
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5-ZN-2020
4/16/2020

Worksheet for Option 1: Rectangular Weir Overflow NW

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	2.440	in
Crest Elevation	0.00	in
Tailwater Elevation	0.00	in
Weir Coefficient	3.00	US
Crest Length	5.31	in
Number Of Contractions	0	

Results

Discharge	54.63	gpm
Headwater Height Above Crest	0.20	ft
Tailwater Height Above Crest	0.00	ft
Flow Area	12.96	in²
Velocity	1.35	ft/s
Wetted Perimeter	0.85	ft
Top Width	0.44	ft

5-ZN-2020
4/16/2020

Cross Section for Option 1: Rectangular Weir Overflow NW

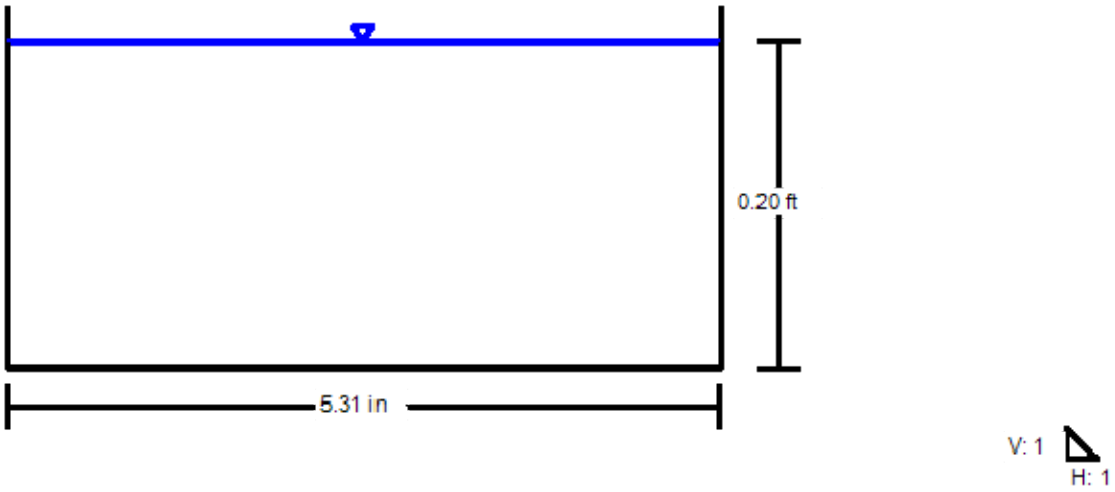
Project Description

Solve For	Discharge

Input Data

Discharge		54.63	gpm
Headwater Elevation		2.440	in
Crest Elevation		0.00	in
Tailwater Elevation		0.00	in
Weir Coefficient		3.00	US
Crest Length		5.31	in
Number Of Contractions	0		

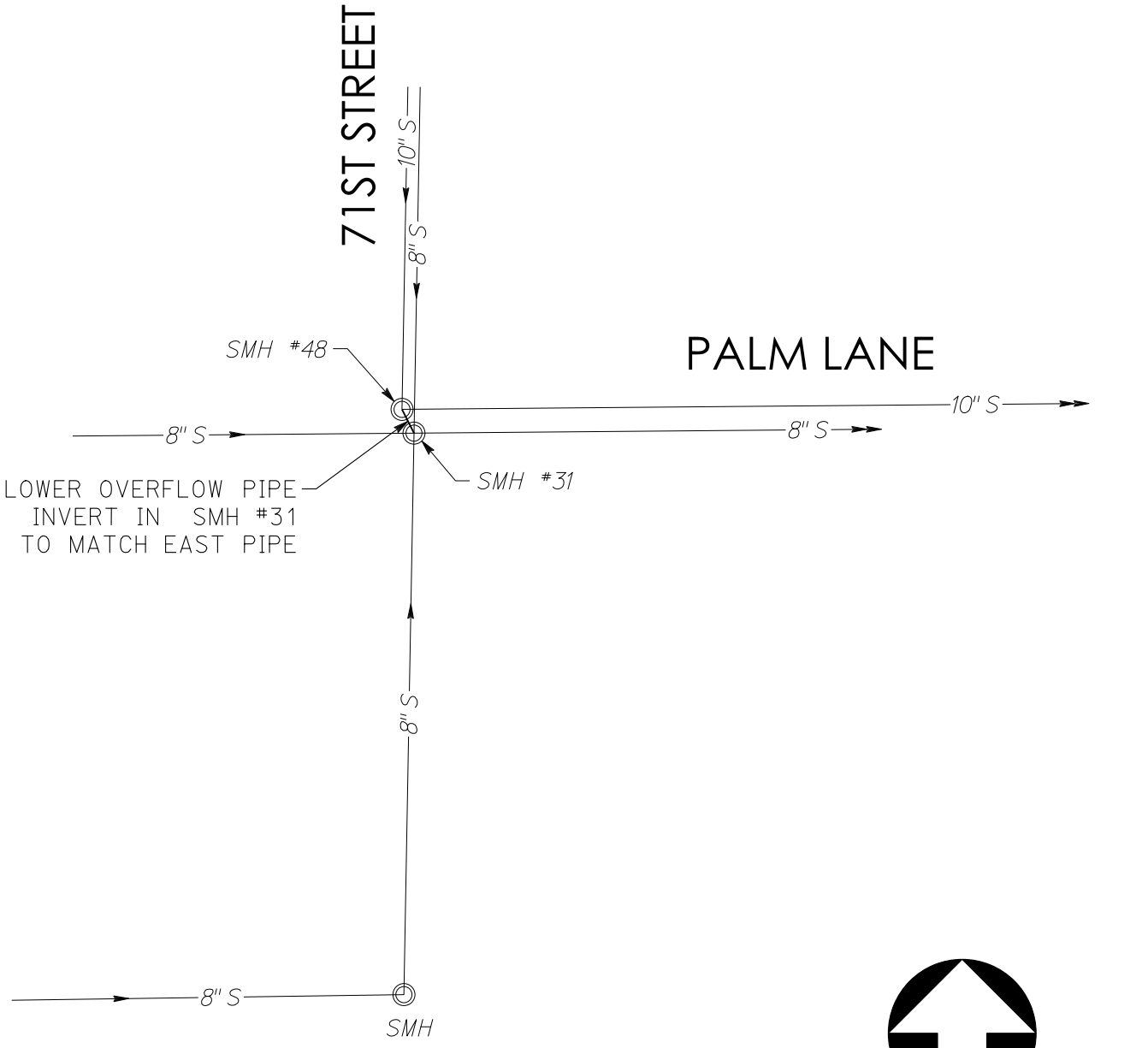
Cross Section Image



5-ZN-2020
4/16/2020

APPENDIX F

Option 2 FlowMaster Data



SCALE: 1"= 40'

0' 20' 40' 80'

OPTION 2

SOUTHDALE

3 engineering
planning civil engineering surveying

3 ENGINEERING, LLC
6370 E. THOMAS ROAD, SUITE # 200 - SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387 - FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 04

PROJECT NO

5-ZN-2020
4/16/2020

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Worksheet for Option 2: 8" Sewer Overflow Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	37.00000	%
Diameter	8.00	in
Discharge	326.61	gpm

Results

Normal Depth	1.700	in
Flow Area	7.80	in²
Wetted Perimeter	0.64	ft
Hydraulic Radius	1.018	in
Top Width	0.55	ft
Critical Depth	0.40	ft
Percent Full	21.2	%
Critical Slope	0.00786	ft/ft
Velocity	13.43	ft/s
Velocity Head	2.80	ft
Specific Energy	2.94	ft
Froude Number	7.51	
Maximum Discharge	7.91	ft³/s
Discharge Full	7.35	ft³/s
Slope Full	0.00363	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	21.25	%
Downstream Velocity	Infinity	ft/s

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Worksheet for Option 2: 8" Sewer Overflow Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.700	in
Critical Depth	0.40	ft
Channel Slope	37.00000	%
Critical Slope	0.00786	ft/ft

Cross Section for Option 2: 8" Sewer Overflow Pipe

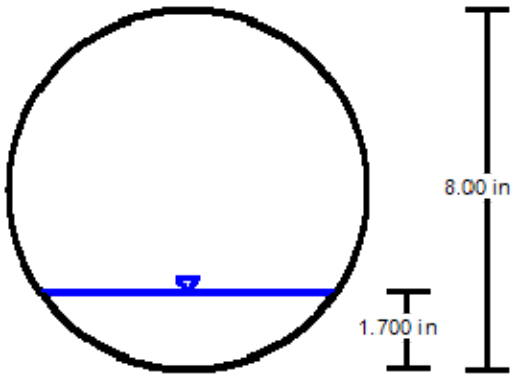
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	37.00000	%
Normal Depth	1.700	in
Diameter	8.00	in
Discharge	326.61	gpm

Cross Section Image



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Worksheet for Option 2: 8" Sewer Palm Lane

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Diameter	8.00	in
Discharge	28.01	gpm

Results

Normal Depth	1.703	in
Flow Area	7.82	in²
Wetted Perimeter	0.64	ft
Hydraulic Radius	1.020	in
Top Width	0.55	ft
Critical Depth	0.11	ft
Percent Full	21.3	%
Critical Slope	0.00675	ft/ft
Velocity	1.15	ft/s
Velocity Head	0.02	ft
Specific Energy	0.16	ft
Froude Number	0.64	
Maximum Discharge	0.68	ft³/s
Discharge Full	0.63	ft³/s
Slope Full	0.00003	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	21.29	%
Downstream Velocity	Infinity	ft/s

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Worksheet for Option 2: 8" Sewer Palm Lane

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.703	in
Critical Depth	0.11	ft
Channel Slope	0.27000	%
Critical Slope	0.00675	ft/ft

Cross Section for Option 2: 8" Sewer Palm Lane

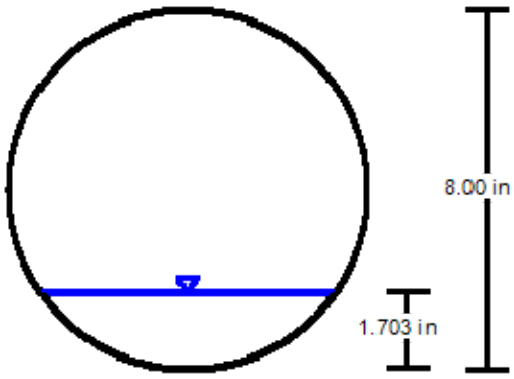
Project Description

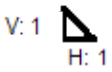
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Normal Depth	1.703	in
Diameter	8.00	in
Discharge	28.01	gpm

Cross Section Image





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Worksheet for Option 2: 8" Sewer Scottsdale Road

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.11400	%
Diameter	8.00	in
Discharge	72.47	gpm

Results

Normal Depth	3.496	in
Flow Area	21.11	in²
Wetted Perimeter	0.96	ft
Hydraulic Radius	1.827	in
Top Width	0.66	ft
Critical Depth	0.18	ft
Percent Full	43.7	%
Critical Slope	0.00646	ft/ft
Velocity	1.10	ft/s
Velocity Head	0.02	ft
Specific Energy	0.31	ft
Froude Number	0.41	
Maximum Discharge	0.44	ft³/s
Discharge Full	0.41	ft³/s
Slope Full	0.00018	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	43.70	%
Downstream Velocity	Infinity	ft/s

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Worksheet for Option 2: 8" Sewer Scottsdale Road

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.496	in
Critical Depth	0.18	ft
Channel Slope	0.11400	%
Critical Slope	0.00646	ft/ft

Cross Section for Option 2: 8" Sewer Scottsdale Road

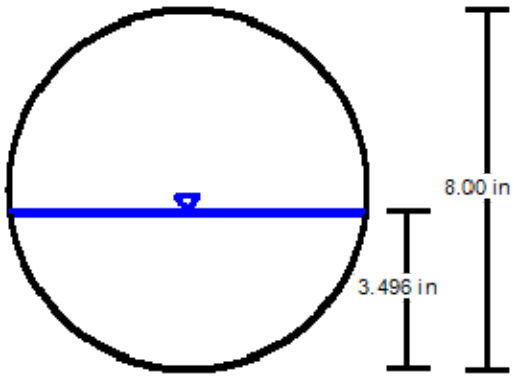
Project Description

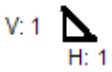
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.11400	%
Normal Depth	3.496	in
Diameter	8.00	in
Discharge	72.47	gpm

Cross Section Image





5-ZN-2020
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Worksheet for Option 2: 10" Sewer Palm

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.43000	%
Diameter	10.00	in
Discharge	339.78	gpm

Results

Normal Depth	5.159	in
Flow Area	40.86	in²
Wetted Perimeter	1.34	ft
Hydraulic Radius	2.550	in
Top Width	0.83	ft
Critical Depth	0.38	ft
Percent Full	51.6	%
Critical Slope	0.00632	ft/ft
Velocity	2.67	ft/s
Velocity Head	0.11	ft
Specific Energy	0.54	ft
Froude Number	0.81	
Maximum Discharge	1.55	ft³/s
Discharge Full	1.44	ft³/s
Slope Full	0.00119	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	51.59	%
Downstream Velocity	Infinity	ft/s

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Worksheet for Option 2: 10" Sewer Palm

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.159	in
Critical Depth	0.38	ft
Channel Slope	0.43000	%
Critical Slope	0.00632	ft/ft

Cross Section for Option 2: 10" Sewer Palm

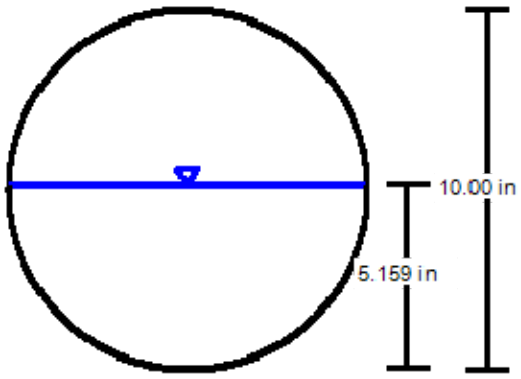
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.43000	%
Normal Depth	5.159	in
Diameter	10.00	in
Discharge	339.78	gpm

Cross Section Image



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APPENDIX G

Existing Sewer FlowMaster Data

Worksheet for Existing: 8" Sewer Palm Lane Overflow to Weir

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Diameter	8.00	in
Discharge	218.69	gpm

Results

Normal Depth	5.296	in
Flow Area	35.32	in²
Wetted Perimeter	1.27	ft
Hydraulic Radius	2.323	in
Top Width	0.63	ft
Critical Depth	0.33	ft
Percent Full	66.2	%
Critical Slope	0.00697	ft/ft
Velocity	1.99	ft/s
Velocity Head	0.06	ft
Specific Energy	0.50	ft
Froude Number	0.56	
Maximum Discharge	0.68	ft³/s
Discharge Full	0.63	ft³/s
Slope Full	0.00163	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	66.20	%
Downstream Velocity	Infinity	ft/s

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Worksheet for Existing: 8" Sewer Palm Lane Overflow to Weir

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.296	in
Critical Depth	0.33	ft
Channel Slope	0.27000	%
Critical Slope	0.00697	ft/ft

Cross Section for Existing: 8" Sewer Palm Lane Overflow to Weir

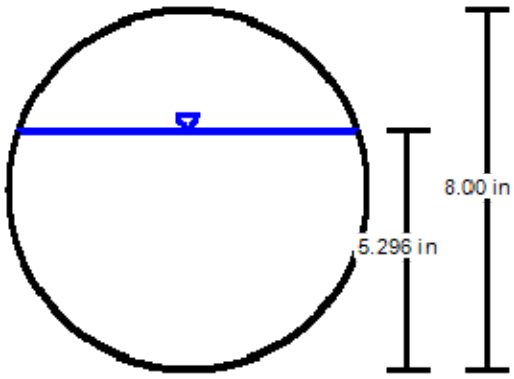
Project Description

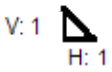
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Normal Depth	5.296	in
Diameter	8.00	in
Discharge	218.69	gpm

Cross Section Image





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Worksheet for Existing: 8" Sewer Palm Lane

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Diameter	8.00	in
Discharge	169.95	gpm

Results

Normal Depth	4.480	in
Flow Area	28.97	in²
Wetted Perimeter	1.13	ft
Hydraulic Radius	2.141	in
Top Width	0.66	ft
Critical Depth	0.29	ft
Percent Full	56.0	%
Critical Slope	0.00669	ft/ft
Velocity	1.88	ft/s
Velocity Head	0.06	ft
Specific Energy	0.43	ft
Froude Number	0.60	
Maximum Discharge	0.68	ft³/s
Discharge Full	0.63	ft³/s
Slope Full	0.00098	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	56.01	%
Downstream Velocity	Infinity	ft/s

Worksheet for Existing: 8" Sewer Palm Lane

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.480	in
Critical Depth	0.29	ft
Channel Slope	0.27000	%
Critical Slope	0.00669	ft/ft

Cross Section for Existing: 8" Sewer Palm Lane

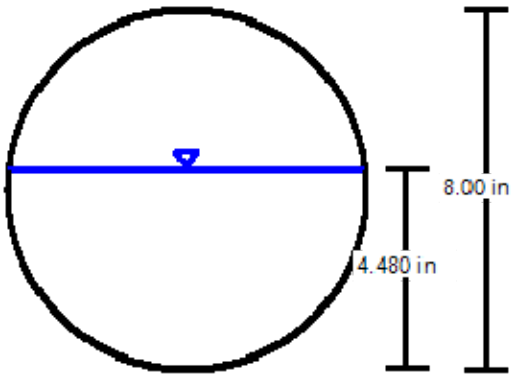
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Normal Depth	4.480	in
Diameter	8.00	in
Discharge	169.95	gpm

Cross Section Image



V: 1
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Worksheet for Existing: 8" Sewer Scottsdale Road

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.19000	%
Diameter	8.00	in
Discharge	214.41	gpm

Results

Normal Depth	5.974	in
Flow Area	40.26	in²
Wetted Perimeter	1.39	ft
Hydraulic Radius	2.411	in
Top Width	0.58	ft
Critical Depth	0.32	ft
Percent Full	74.7	%
Critical Slope	0.00694	ft/ft
Velocity	1.71	ft/s
Velocity Head	0.05	ft
Specific Energy	0.54	ft
Froude Number	0.43	
Maximum Discharge	0.57	ft³/s
Discharge Full	0.53	ft³/s
Slope Full	0.00156	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	74.67	%
Downstream Velocity	Infinity	ft/s

Worksheet for Existing: 8" Sewer Scottsdale Road

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.974	in
Critical Depth	0.32	ft
Channel Slope	0.19000	%
Critical Slope	0.00694	ft/ft

Cross Section for Existing: 8" Sewer Scottsdale Road

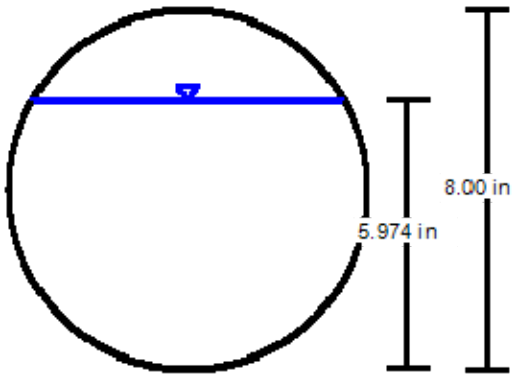
Project Description

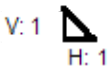
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.19000	%
Normal Depth	5.974	in
Diameter	8.00	in
Discharge	214.41	gpm

Cross Section Image





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Worksheet for Existing: 10" Sewer Palm

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.43000	%
Diameter	10.00	in
Discharge	61.91	gpm

Results

Normal Depth	2.093	in
Flow Area	11.93	in²
Wetted Perimeter	0.79	ft
Hydraulic Radius	1.256	in
Top Width	0.68	ft
Critical Depth	0.16	ft
Percent Full	20.9	%
Critical Slope	0.00621	ft/ft
Velocity	1.66	ft/s
Velocity Head	0.04	ft
Specific Energy	0.22	ft
Froude Number	0.84	
Maximum Discharge	1.55	ft³/s
Discharge Full	1.44	ft³/s
Slope Full	0.00004	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	20.93	%
Downstream Velocity	Infinity	ft/s

Worksheet for Existing: 10" Sewer Palm

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.093	in
Critical Depth	0.16	ft
Channel Slope	0.43000	%
Critical Slope	0.00621	ft/ft

Cross Section for Existing: 10" Sewer Palm

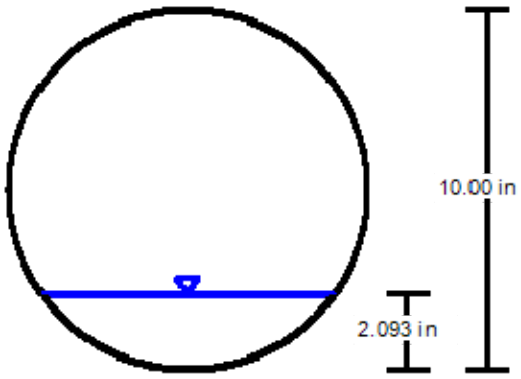
Project Description

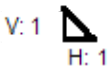
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.43000	%
Normal Depth	2.093	in
Diameter	10.00	in
Discharge	61.91	gpm

Cross Section Image





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Worksheet for Existing Apartment Segment: 8" Sewer min slope

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Diameter	8.00	in
Discharge	91.15	gpm

Results

Normal Depth	3.126	in
Flow Area	18.20	in²
Wetted Perimeter	0.90	ft
Hydraulic Radius	1.684	in
Top Width	0.65	ft
Critical Depth	0.21	ft
Percent Full	39.1	%
Critical Slope	0.00640	ft/ft
Velocity	1.61	ft/s
Velocity Head	0.04	ft
Specific Energy	0.30	ft
Froude Number	0.64	
Maximum Discharge	0.68	ft³/s
Discharge Full	0.63	ft³/s
Slope Full	0.00028	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.000	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.000	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	39.08	%
Downstream Velocity	Infinity	ft/s

Worksheet for Existing Apartment Segment: 8" Sewer min slope

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.126	in
Critical Depth	0.21	ft
Channel Slope	0.27000	%
Critical Slope	0.00640	ft/ft

Cross Section for Existing Apartment Segment: 8" Sewer min slope

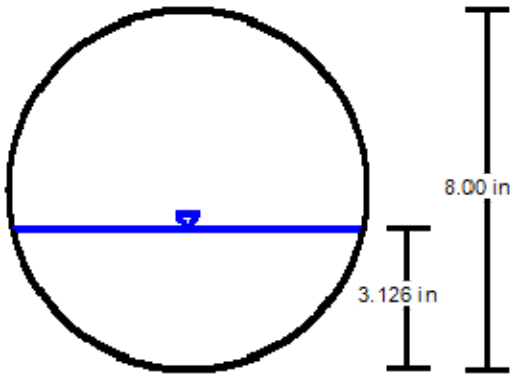
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.27000	%
Normal Depth	3.126	in
Diameter	8.00	in
Discharge	91.15	gpm

Cross Section Image



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5-ZN-2020
4/16/2020

Worksheet for Existing: Rectangular Weir Overflow NW

Project Description

Solve For	Discharge

Input Data

Headwater Elevation		2.296	in
Crest Elevation		0.00	in
Tailwater Elevation		0.00	in
Weir Coefficient		3.00	US
Crest Length		5.19	in
Number Of Contractions	0		

Results

Discharge	48.74	gpm
Headwater Height Above Crest	0.19	ft
Tailwater Height Above Crest	0.00	ft
Flow Area	11.92	in²
Velocity	1.31	ft/s
Wetted Perimeter	0.82	ft
Top Width	0.43	ft

Cross Section for Existing: Rectangular Weir Overflow NW

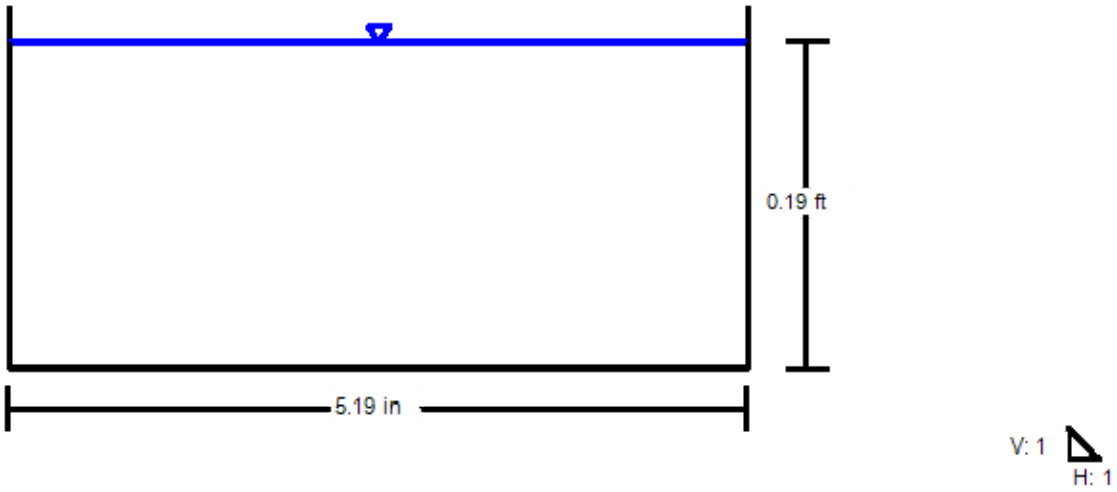
Project Description

Solve For	Discharge

Input Data

Discharge	48.74	gpm
Headwater Elevation	2.296	in
Crest Elevation	0.00	in
Tailwater Elevation	0.00	in
Weir Coefficient	3.00	US
Crest Length	5.19	in
Number Of Contractions	0	

Cross Section Image



5-ZN-2020
4/16/2020

APPENDIX H

Preliminary Onsite Utility Plans

MATCHLINE - SEE SHEET 3

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

CONNECT TO EXISTING 8" WATERLINE

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

PROPOSED 8" D.I.P. FIRELINE (PRESSURE CLASS 350)

PROPOSED 12' WATERLINE EASEMENT

PROPOSED 4" DOMESTIC WATERLINE

PROPOSED BACKFLOW PREVENTER

PROPOSED 4" WATER METER

PROPOSED 4" D.I.P. WATERLINE (PRESSURE CLASS 350)

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

PARKING GARAGE

LF_{88}=1243.00
PAD=1242.33

PROPOSED 12' WATERLINE EASEMENT

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

PROPOSED 12' WATERLINE EASEMENT

PROPOSED FIRE HYDRANT COMPLETE (TYP.)

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

70TH STREET
S00°00'32"W 2673.68'
339.74'

S00°00'32"W 254.07'

S00°00'32"W 602.48'

1330.00'
N00°00'00"E 2660.04'

SCOTTSDALE ROAD

E. LINE, W. 380.00'
W. LINE, SE. 1/4,
SE. 1/4, SECTION 34

A.P.N. 129-33-020A
CHAPMAN MCDOWELL LLC
2011-0226253 M.C.R.

30' R/W

30' R/W

FD. 1/2" REBAR
W/ CAP L.S. #22768

D=91° 15'38"
R=19.56'
L=31.17'

FD. 1/2" REBAR
NO I.D.

FD. 1/2" REBAR
W/ CAP L.S. #42137

S88°44'54"W 330.08'

EXCEPTION OF
THE SOUTH 65.00'

65' R/W

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

65.02'

68TH STREET

FD. 3" CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE

8.51'

1312.38'

51.44'

S01°15'06"E
65.00'

328.65'
S88°44'54"W 2624.74'

932.27'

LOCALLY ACCEPTED
S 1/4 COR. SEC. 34
FD. 3" BRASS CAP
IN HANDHOLE

FD. 3/4" IRON PIPE
IN POTHOLE

SMH
RIM:39.78
INV:34.92

MCDOWELL ROAD

SE COR. SEC. 34
(BENCHMARK = 1230.47')
FD. 3" CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE

CONNECT TO EXISTING 12" WATERLINE

SCALE: 1"= 20'

0' 10' 20' 40'

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

SNOISIA3d

SOUTHDALE
7000 E. MCDOWELL ROAD, SCOTTSDALE, AZ 85257
PRELIMINARY UTILITY PLAN

Registered Professional Engineer
CERTIFICATE NO.
46857
DANIEL G. MANN
Date Signed
ARIZONA, U.S.A.

3 engineering
surveying
civil engineering
planning

CAD TECH: PHILIP K.
DESIGNER: D. MANN
ENGINEER: D. MANN

3 ENGINEERING, LLC
6370 E. THOMAS ROAD
SUITE # 200
SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387
FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 04/09/20

PROJECT NO.
1872

SHEET NO.
PUTL202
2 of 3

Q.S.#13-44

5-ZN-2020
4/16/2020

C:\My Securesync\Projects\1872_70th_St_McDowell_Apartments\1872putl02.dgn

OAK STREET

E 1/4 COR. SEC. 34
FD. 3" CITY OF SCOTTSDALE
BRASS CAP IN HANDHOLE

1330.03'

FD. 3" CITY OF SCOTTSDALE
BRASS CAP IN FLUSH

PALM LANE
S 89°03'15" W 2624.03'
1312.02'

LOT 1 WONDERLAND
BK. 100, PG. 19, M.C.R.
A.P.N. 129-33-018B
CAPITAL REAL ESTATE-DWELL LLC
2016-0940342 M.C.R.

SMH
RIM: 41.36
INV 8" N: 34.98
INV 8" S: 34.99

N. LINE, S. 1/2,
SE. 1/4, SE. 1/4,
SECTION 34

A.P.N. 129-33-019B
CAPITAL REAL ESTATE-DWELL LLC
2016-0940342 M.C.R.

EXISTING BUILDING

A.P.N. 129-33-019A
CHAPMAN MCDOWELL LLC
2011-0226253 M.C.R.

FD. NAIL IN
WASHER L.S. #42137

4" E
6' BLOCK WALL
N88°54'05"E 230.06'

PROPOSED FIRE HYDRANT
COMPLETE (TYP.)

PROPOSED
12' WATERLINE
EASEMENT

PROPOSED 8" D.I.P. WATERLINE
(PRESSURE CLASS 350)

LF_{88}=1243.00
PAD=1242.33

WV
6"W (ACP)

E. LINE, W. 380.00'
W. LINE, SE. 1/4,
SE. 1/4, SECTION 34

70TH STREET
S00°00'32"W 2673.68'
997.27'

8" S (VCP)
2" G
OHE
CENTURY LINK
6' BLOCK WALL
7' BLOCK WALL
GM
PP
EDGE OF PAVEMENT (TYP.)

FD. 1/2" REBAR
NO I.D.

S00°00'32"W 955.77'

S00°00'32"W 331.66'

S00°00'32"W 602.48'

1330.00'
N00°00'00"E 2660.04'
SCOTTSDALE ROAD

6"W (ACP)

PARKING
GARAGE

PROPOSED FIRE HYDRANT
COMPLETE (TYP.)

A.P.N. 129-33-020A
CHAPMAN MCDOWELL LLC
2011-0226253 M.C.R.

30'
R/W

30'
R/W

8" W (ACP)
ROLL CURB
MEDIAN CURB
CONCRETE SIDEWALK
SIGN
DG
BFP
WM
ASPHALT PAVEMENT
DRIVEWAY
CURB
W

SMH
RIM: 40.74
INV 8" N: 36.07
INV 8" S: 36.17

SMH
RIM: 40.88
INV 8" N: 36.39
INV 8" W: 36.46

CATCH BASIN
RIM: 40.57

5' ELECTRIC
EASEMENT
PER REC. NO.
2000-0291367

FD. 1/2" REBAR
W/ CAP
L.S. #21081

FD. 1/2" REBAR
W/ CAP
L.S. #42137

LF_{88}=1243.00
PAD=1242.33

LF_{88}=1243.00
PAD=1242.33

CONNECT TO EXISTING
SEWER MANHOLE

PROPOSED 8" P.V.C.
SEWERLINE (SDR-35)

PROPOSED 8" D.I.P. WATERLINE
(PRESSURE CLASS 350)

PROPOSED
12' WATERLINE
EASEMENT

PROPOSED 8" D.I.P. WATERLINE
(PRESSURE CLASS 350)

PROPOSED 8" D.I.P. WATERLINE
(PRESSURE CLASS 350)

PROPOSED
12' WATERLINE
EASEMENT

PROPOSED 8" D.I.P. WATERLINE
(PRESSURE CLASS 350)

PROPOSED FIRE HYDRANT (TYP.)

SMH
RIM: 43.86
8" E: 37.29
8" W: 37.32

30.00'

N89°59'28"W 119.98'

GATE

FH
WV

MATCHLINE - SEE SHEET 2

SCALE: 1"= 20'
0' 10' 20' 40'

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

SNOW3A38

SOUTHDALE
7000 E. MCDOWELL ROAD, SCOTTSDALE, AZ 85257

PRELIMINARY UTILITY PLAN

Registered Professional Engineer
CERTIFICATE NO.
46857
DANIEL G. MANN
12-31-20
ARIZONA, U.S.A.

3engineering
civil engineering
planning
surveying

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CAD TECH: PHILIE V.
DESIGNER: D. MANN
ENGINEER: D. MANN

3 ENGINEERING, LLC
6370 E. THOMAS ROAD
SUITE # 200
SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387
FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 04/09/20

PROJECT NO.
1872

SHEET NO.
PUTL203
3 of 3

Q.S.#13-44

5-ZN-2020
4/16/2020

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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 ldillon **DATE** 5/11/2020

05/11/2020

Address comments below and herein on a final BOD. Conform to stipulations listed.

1) **Stipulation:** Connect new proposed 8" water loop to 6-inch line at northeast corner with isolation valve.
2) Consider tying proposed 8" water loop at northwest corner to existing dead-end 8-inch public line in community to the north (120 feet of water line versus 300+ feet of new water line)
3) Revise domestic water demand values to the gpm values listed in DS&PM Chapter 6.
4) Call out existing water meter sizes on utility plan. Call out what is to occur with the existing meters and fire line. Note that only 1 meter can service each new building.
5) Call out proposed riser room for each building. Are any FDC lines to be installed? If so indicate locations.
6) Confirm fire flow required. Value included seems too high
7) Based on hydrant flow test provided there are no capacity concerns. However, water modeling included is invalid and will need to be revised in final BOD. Set reservoir HGL for each scenario using supply curve point from hydrant flow test at required fire flow (or use pump that changes dynamically to simulate supply curve). Fire flow should only be split to a maximum of two worst-case hydrants for modeling purposes.
8) Confirm new water meter sizing. If 3" and larger call out on utility plan that a meter vault per COS detail 2345 has to be used.
9) Main connection on 70th St will require full 8X8 tee.
10) Connections to existing ACP mains requires a portion of mainline to be replaced with DIP per DS&PM 6-1.408 and 6-1.413. 2 connections, 70th St and McDowell.
11.) Address all comments marked up on utility plan.
12.) Water line only utility easement minimum width shall be 14ft (not 12ft as shown).

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SOUTHDALE
Final Water Basis of Design Report
3 engineering Job #: 1872
April 9, 2020

5-ZN-2020
4/16/2020

3 engineering
planning civil engineering surveying

SOUTHDALE

FINAL WATER BASIS OF DESIGN REPORT

Prepared for:

Hawkins Companies LLC
4700 S. McClintock Drive #160
Scottsdale, Arizona 85257
Contact: Mark Mitchell
Phone: (480) 223-8239

Daniel G. Mann, P.E.

April 9, 2020

Submittal to:

City of Scottsdale
7447 E. Indian School Road, Suite 105
Scottsdale, AZ 85251

Prepared by:

3 engineering, LLC
6370 E. Thomas Road, Suite #200
Scottsdale, Arizona 85251
Contact: Dan G. Mann, P.E.

Job Number 1872

5-ZN-2020
4/16/2020

3 engineering
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Table of Contents

Tables

Appendices

1. Introduction

The project site, Southdale, is located in the southeast quarter of Section 34, Township 2 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona within the City of Scottsdale. The project is located at 7000 E. McDowell Road, Scottsdale, AZ 85257. The site is bounded on the north by an apartment complex, on the east by a commercial development, on the south by McDowell Road, and on the west by 70th Street. See Appendix A for a site map.

The existing zoning is C-3. The land is currently used as a commercial development. The General Plan shows the site as a Mixed-Use Neighborhood. The proposed zoning is PUD. The site is a proposed 267-unit apartment complex with office and retail space.

2. Existing Conditions

The existing zoning is C-3. The existing land is a commercial development. See Appendix A for a site map. The site is surrounded by existing multi-family residential development and commercial development.

The site currently has a 6" D.I.P. private fireline with fire hydrants. The fireline is tied into an existing 8" A.C.P. water main in 70th Street, west of the site. There is also an existing 12" A.C.P. waterline in McDowell Road, south of the site, and an existing 6" A.C.P. waterline in APN 129-33-020A, east of the site. See Water Plans in Appendix D for existing waterline layout.

The certified flow test can be found in Appendix B. The static pressure of the existing system was 72.0 psi and the residual pressure was 54.0 psi at 2,392 gpm with a 16.0 psi factor of safety. The test was taken at two hydrants in 70th Street, west of the site.

3. Proposed Conditions

50% or 75%? confirm

refer to comments

The project consists of a 267-unit apartment complex with 3,300 s.f. of office space and 1,100 s.f. of retail space on 3.83 acres. The proposed building has a fire flow demand of 4,000 gpm based on Table B105.1 of the International Fire Code. This is using the total square footage of the building which is 285,240 s.f. and a construction type of V-B and a 50% reduction for fire sprinklers. The proposed water system is to be public and is to be maintained by the City of Scottsdale. The system will connect to the existing 8" A.C.P. water main in 70th Street and the existing 12" A.C.P. Waterline in McDowell Road. The proposed water system includes four (4) new fire hydrants, connected by 10" D.I.P. and 8" D.I.P. waterline. See Water Plans in Appendix D for proposed waterline layout, pipe sizes and material.

where? call -out

4. Required Computations & Hydraulic Modeling

The purpose of this basis of design report is to verify that the existing City of Scottsdale water system is able to accommodate demands generated by the proposed project, Southdale. Demands were calculated using Figure 6.1-2 of the City of Scottsdale Design Standards and Policies Manual dated 2018. It is our opinion that this report is in accordance with the 2018 City of Scottsdale Design Standards and Policies Manual.

The following demand criteria were used in determining the system demands for the proposed site.

1. 267 proposed units
2. 3.83 acre site (70 du/ac)

3. 185.3 gallons per day per unit (per Figure 6.2 of D.S.&P.M. 2018 for Residential Demand, High density Condo)
4. 3,300 s.f. proposed Office Space
5. 0.6 gallons per day per square foot (Per DSPM, Office)
6. 1,100 s.f. proposed Retail Space
7. 0.8 gallons per day per square foot (Per DSPM, Commercial/Retail)
8. Proposed Building = 285,240 s.f.., Building type V-B, per Table B105.1 of the 2012 International Fire Code the fire flow = 8,000 gpm. 50% reduction based on fully sprinklered buildings not less than 1,500 gpm (Multi-family). Fire Flow = 4,000 gpm.
9. Max day flow = 2.0 x average day demand
10. Peak hour flow = 3.5 x average day demand

verify

TABLE 1: ON-SITE WATER DEMANDS	
Avg. daily demand	36.34 gpm
Max day demand	72.69 gpm
Peak hour flow rate	127.20 gpm
Fire flow	4,000 gpm
Fire flow + Max Day	4,072.69 gpm

Average Daily Demand Residential: 267-units x 185.3 gpdpu = 49,475.1 gpd
= 49,475.1 gpd/1440 mpd = 34.36 gpm

Average Daily Demand Office: 3,300 s.f. x 0.6 gpdpsf = 1,980 gpd
= 1,980 gpd/1440 mpd = 1.38 gpm

Average Daily Demand Retail: 1,100 s.f. x 0.8 gpdpsf = 880 gpd
= 880 gpd/1440 mpd = 0.61 gpm

Total Average Daily Demand = 52,335.1 gpd
= 52,335.1 gpd/1440 mpd = 36.34 gpm

Max Day Demand = 2.0 x 52,335.1 gpd = 104,670.2 gpd
= 104,670.2 gpd/1440 mpd = 72.69 gpm

Peak Hour Flow rate = 3.5 x 52,335.1 gpd = 183,172.85 gpd
= 183,172.85 gpd/1440 mpd = 127.20 gpm

use gpm values from DS&PM table, result is 72gpm

revise per gpm value in DS&PM

use gpm values from DS&PM table, result is 250gpm.

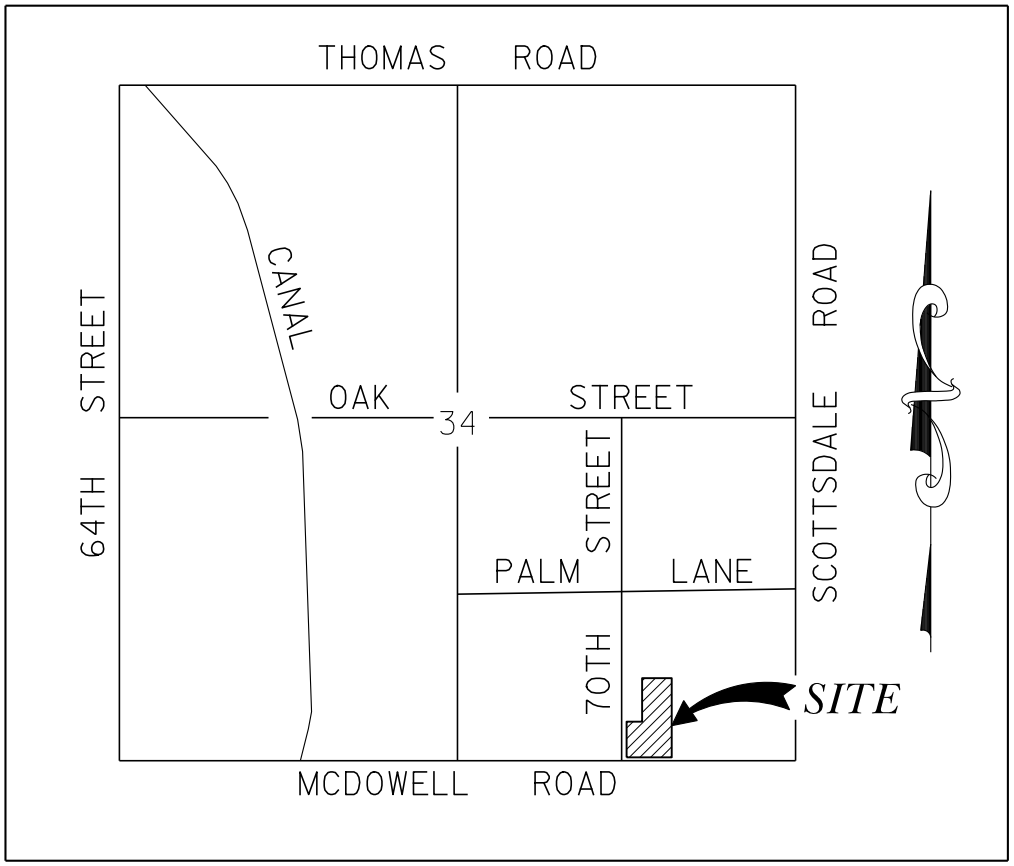
The WaterCAD system was modeled with connections to the existing water system using reservoirs with the static pressure from the fire flow test results. The Fire Flow + Max Day demand for the site is 4,072.69 gpm. At this flow, the pressure exceeds the City of Scottsdale Requirement of 30 psi minimum under fire flow conditions. The proposed pipes have velocities less than 10 fps. Therefore, the proposed water system is adequate to support the proposed improvements for the site. See WaterCAD Results in Appendix C.

5. ***Summary***

The Peak Hourly Flow for the proposed site is 127.20 gpm.
The fire flow for the Proposed building is 4,000 psi after a 50% reduction for fully sprinklered buildings.

APPENDIX A

Vicinity Map



VICINITY MAP

N.T.S.

APPENDIX B

Fire Flow Test Results

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

provide corresponding water supply curve from hydrant test. Use pressure at required fire flow to set reservoir HGL in model (or use pump with matching supply curve)

Project Name:	Not Provided
Project Address:	70th Street & McDowell (NEC), Scottsdale, Arizona, 85257
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	20109
Flow Test Permit No.:	C61639
Date and time flow test conducted:	March 20, 2020 at 7:20 AM
Data is current and reliable until:	September 20, 2020
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Coordinated by:	Ray Padilla –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data		**Data with 16 PSI Safety Factor**	
Static Pressure: (Measured in pounds per square inch)	**88.0 PSI**	Static Pressure: (Measured in pounds per square inch)	**72.0 PSI**
Residual Pressure: (Measured in pounds per square inch)	**70.0 PSI**	Residual Pressure: (Measured in pounds per square inch)	**54.0 PSI**
Pitot Pressure: (Measured in pounds per square inch)	**31.0 PSI**		
Diffuser Orifice Diameter: One 4-inch Pollard Diffuser (Measured in inches)		Distance between hydrants: Approx.: 160 feet Main size: Not Provided	
Coefficient of Diffuser: 0.9			
Flowing GPM: (Measured in gallons per minute)	**2,392 GPM**	Flowing GPM:	**2,392 GPM**
GPM @ 20 PSI:	**4,904 GPM**	GPM @ 20 PSI:	**4,243 GPM**

Scottsdale requires a maximum Static Pressure of 72 PSI for AFES Design.

Flow Test Location **North**

Flow Fire Hydrant

North 70th Street

Pressure Fire Hydrant

Project Site
70th Street & McDowell
(NEC)

East McDowell Road

5-ZN-2020
4/16/2020

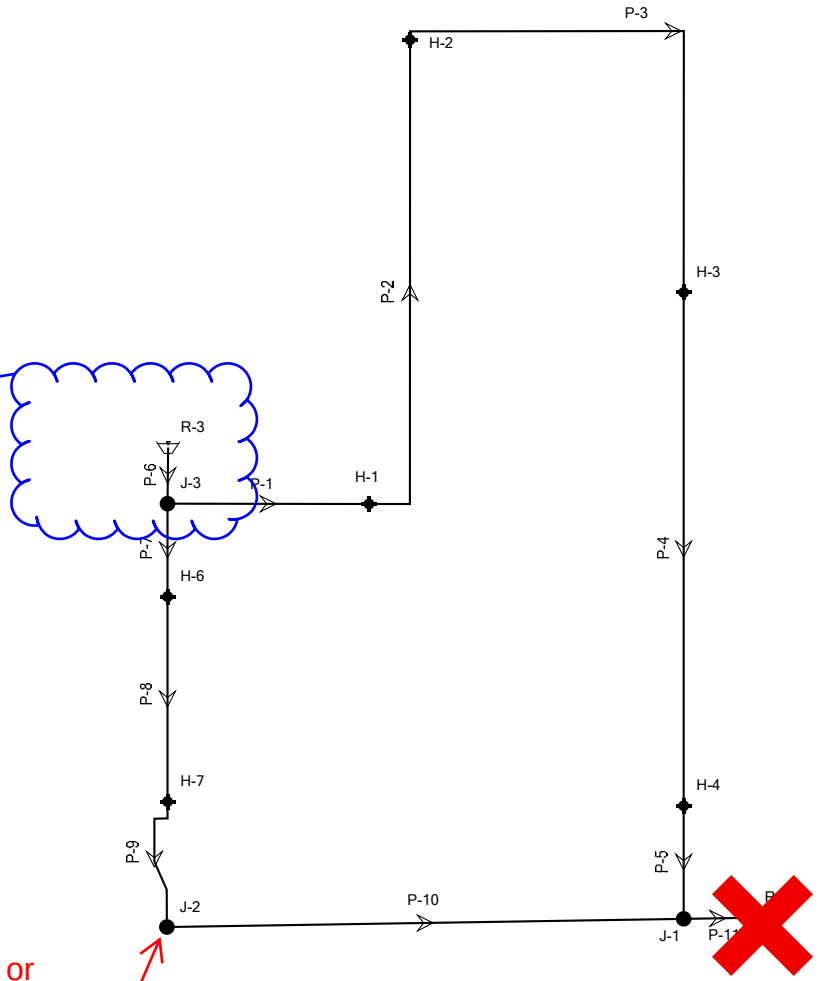
APPENDIX C

WaterCAD Results

Scenario: Average Day

Refer to other comments on max day plus fire flow model sheets

modeling system with just 1 reservoir is adequate/valid since only one hydrant flow test was done



place reservoir? or pump? (since hydrant flow test results would have been as-good or better on 12-inch line)

FlexTable: Hydrant Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
54	H-7	Closed	44.48	0	202.43	68.3
30	H-3	Closed	43.74	36	201.97	68.5
53	H-6	Closed	44.85	0	203.89	68.8
28	H-1	Closed	44.89	0	204.14	68.9
29	H-2	Closed	43.74	0	203.09	68.9
31	H-4	Closed	40.98	0	201.09	69.3

5-ZN-2020
4/16/2020

FlexTable: Junction Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
49	J-2	37.17	<None>	0	201.42	71.1
50	J-3	38.26	<None>	0	204.56	72.0
48	J-1	34.58	<None>	0	200.90	72.0

FlexTable: Pipe Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
35	P-1	155	J-3	H-1	8.0	Ductile Iron	130.0	356	2.28	0.003
36	P-2	388	H-1	H-2	8.0	Ductile Iron	130.0	356	2.28	0.003
37	P-3	417	H-2	H-3	8.0	Ductile Iron	130.0	356	2.28	0.003
38	P-4	394	H-3	H-4	8.0	Ductile Iron	130.0	320	2.04	0.002
39	P-5	87	H-4	J-1	8.0	Ductile Iron	130.0	320	2.04	0.002
55	P-6	1	R-3	J-3	8.0	Asbestos Cement	140.0	1,106	7.06	0.019
56	P-7	71	J-3	H-6	8.0	Asbestos Cement	140.0	750	4.79	0.009
57	P-8	157	H-6	H-7	8.0	Asbestos Cement	140.0	750	4.79	0.009
58	P-9	108	H-7	J-2	8.0	Asbestos Cement	140.0	750	4.79	0.009
59	P-10	397	J-2	J-1	12.0	Asbestos Cement	140.0	750	2.13	0.001
60	P-11	1	J-1	R-4	12.0	Asbestos Cement	140.0	1,070	3.04	0.003

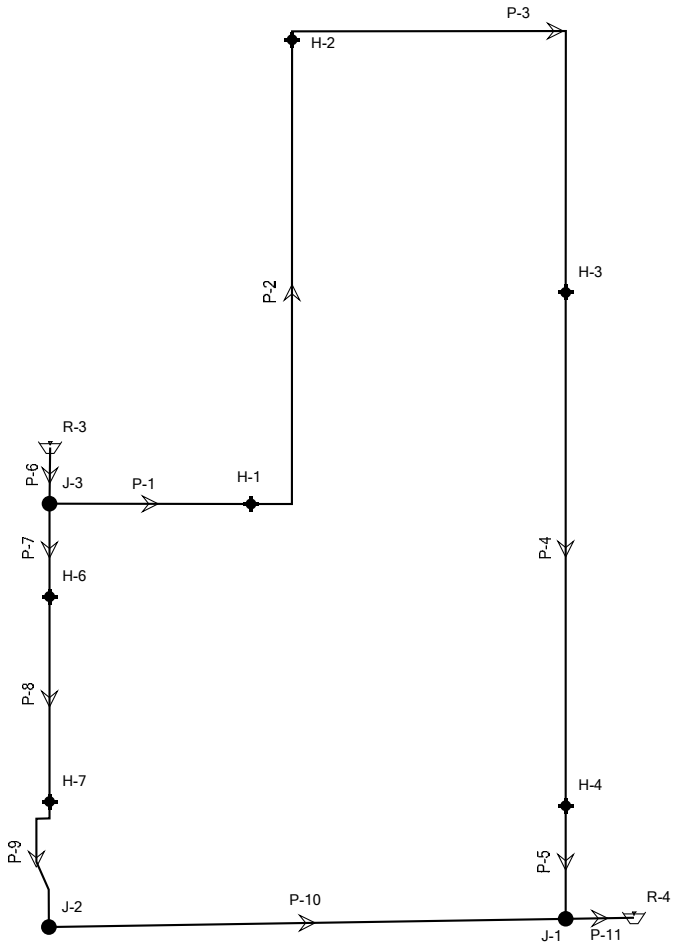
5-ZN-2020
4/16/2020

FlexTable: Reservoir Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
51	R-3	204.58	<None>	1,106	204.58
52	R-4	200.90	<None>	-1,070	200.90

Scenario: Max Day



FlexTable: Hydrant Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
54	H-7	Closed	44.48	0	202.43	68.3
30	H-3	Closed	43.74	73	201.82	68.4
53	H-6	Closed	44.85	0	203.89	68.8
28	H-1	Closed	44.89	0	204.12	68.9
29	H-2	Closed	43.74	0	203.01	68.9
31	H-4	Closed	40.98	0	201.07	69.3

FlexTable: Junction Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
49	J-2	37.17	<None>	0	201.42	71.1
50	J-3	38.26	<None>	0	204.56	72.0
48	J-1	34.58	<None>	0	200.90	72.0

FlexTable: Pipe Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
35	P-1	155	J-3	H-1	8.0	Ductile Iron	130.0	368	2.35	0.003
36	P-2	388	H-1	H-2	8.0	Ductile Iron	130.0	368	2.35	0.003
37	P-3	417	H-2	H-3	8.0	Ductile Iron	130.0	368	2.35	0.003
38	P-4	394	H-3	H-4	8.0	Ductile Iron	130.0	295	1.88	0.002
39	P-5	87	H-4	J-1	8.0	Ductile Iron	130.0	295	1.88	0.002
55	P-6	1	R-3	J-3	8.0	Asbestos Cement	140.0	1,117	7.13	0.020
56	P-7	71	J-3	H-6	8.0	Asbestos Cement	140.0	750	4.79	0.009
57	P-8	157	H-6	H-7	8.0	Asbestos Cement	140.0	750	4.79	0.009
58	P-9	108	H-7	J-2	8.0	Asbestos Cement	140.0	750	4.79	0.009
59	P-10	397	J-2	J-1	12.0	Asbestos Cement	140.0	750	2.13	0.001
60	P-11	1	J-1	R-4	12.0	Asbestos Cement	140.0	1,045	2.96	0.002

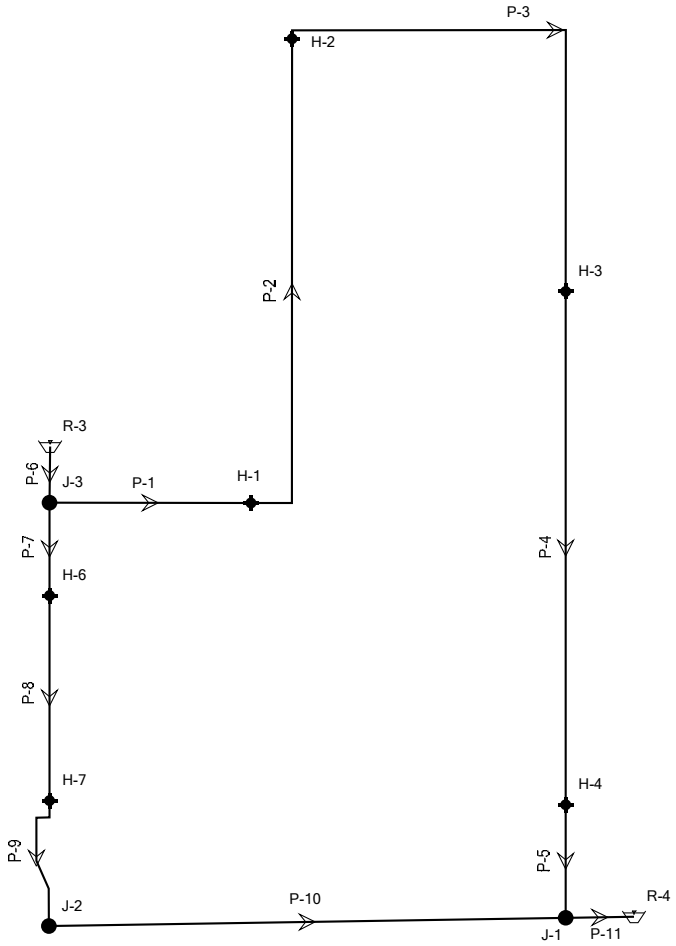
5-ZN-2020
4/16/2020

FlexTable: Reservoir Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
51	R-3	204.58	<None>	1,117	204.58
52	R-4	200.90	<None>	-1,045	200.90

Scenario: Peak Hour



FlexTable: Hydrant Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
30	H-3	Closed	43.74	127	201.60	68.3
54	H-7	Closed	44.48	0	202.42	68.3
53	H-6	Closed	44.85	0	203.89	68.8
29	H-2	Closed	43.74	0	202.89	68.9
28	H-1	Closed	44.89	0	204.08	68.9
31	H-4	Closed	40.98	0	201.03	69.2

FlexTable: Junction Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
49	J-2	37.17	<None>	0	201.42	71.1
50	J-3	38.26	<None>	0	204.56	72.0
48	J-1	34.58	<None>	0	200.90	72.0

FlexTable: Pipe Table (1872.wtg)

Current Time: 0.000 hours

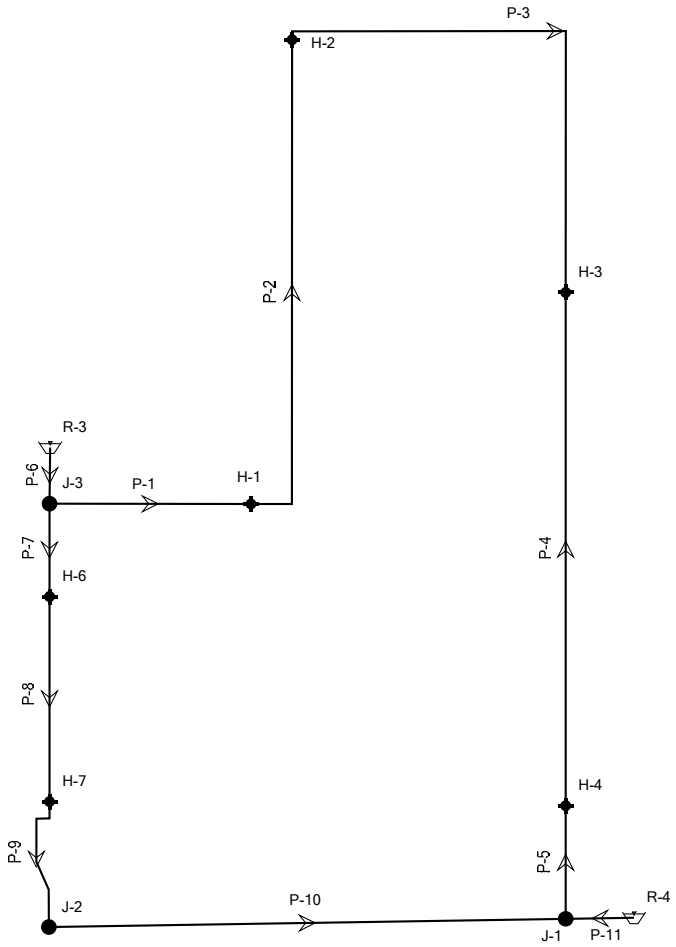
ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
35	P-1	155	J-3	H-1	8.0	Ductile Iron	130.0	383	2.44	0.003
36	P-2	388	H-1	H-2	8.0	Ductile Iron	130.0	383	2.44	0.003
37	P-3	417	H-2	H-3	8.0	Ductile Iron	130.0	383	2.44	0.003
38	P-4	394	H-3	H-4	8.0	Ductile Iron	130.0	255	1.63	0.001
39	P-5	87	H-4	J-1	8.0	Ductile Iron	130.0	255	1.63	0.001
55	P-6	1	R-3	J-3	8.0	Asbestos Cement	140.0	1,132	7.23	0.020
56	P-7	71	J-3	H-6	8.0	Asbestos Cement	140.0	750	4.79	0.009
57	P-8	157	H-6	H-7	8.0	Asbestos Cement	140.0	750	4.79	0.009
58	P-9	108	H-7	J-2	8.0	Asbestos Cement	140.0	750	4.79	0.009
59	P-10	397	J-2	J-1	12.0	Asbestos Cement	140.0	750	2.13	0.001
60	P-11	1	J-1	R-4	12.0	Asbestos Cement	140.0	1,005	2.85	0.002

FlexTable: Reservoir Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
51	R-3	204.58	<None>	1,132	204.58
52	R-4	200.90	<None>	-1,005	200.90

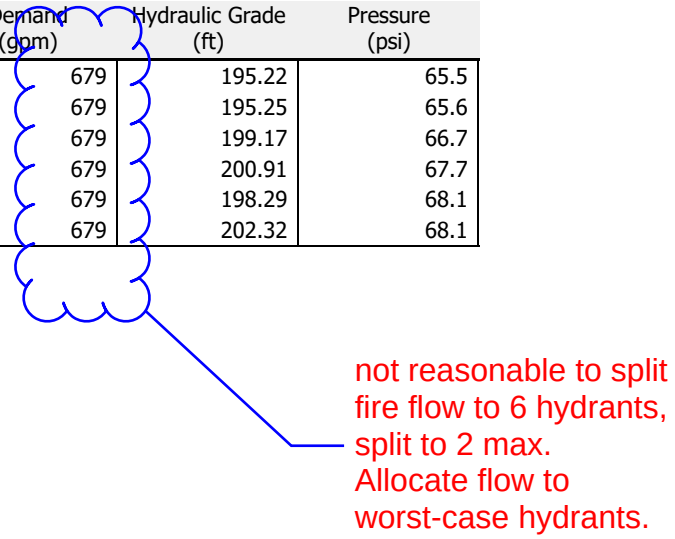
Scenario: Max Day + Fire Flow



FlexTable: Hydrant Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
30	H-3	Closed	43.74	679	195.22	65.5
29	H-2	Closed	43.74	679	195.25	65.6
28	H-1	Closed	44.89	679	199.17	66.7
54	H-7	Closed	44.48	679	200.91	67.7
31	H-4	Closed	40.98	679	198.29	68.1
53	H-6	Closed	44.85	679	202.32	68.1



FlexTable: Junction Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
49	J-2	37.17	<None>	0	200.90	70.8
50	J-3	38.26	<None>	0	204.47	71.9
48	J-1	34.58	<None>	0	200.90	72.0

FlexTable: Pipe Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
35	P-1	155	J-3	H-1	8.0	Ductile Iron	130.0	1,405	8.97	0.034
36	P-2	388	H-1	H-2	8.0	Ductile Iron	130.0	727	4.64	0.010
37	P-3	417	H-2	H-3	8.0	Ductile Iron	130.0	48	0.31	0.000
38	P-4	394	H-3	H-4	8.0	Ductile Iron	130.0	-631	4.03	0.008
39	P-5	87	H-4	J-1	8.0	Ductile Iron	130.0	-1,310	8.36	0.030
55	P-6	1	R-3	J-3	8.0	Asbestos Cement	140.0	2,818	17.99	0.108
56	P-7	71	J-3	H-6	8.0	Asbestos Cement	140.0	1,412	9.01	0.030
57	P-8	157	H-6	H-7	8.0	Asbestos Cement	140.0	734	4.68	0.009
58	P-9	108	H-7	J-2	8.0	Asbestos Cement	140.0	55	0.35	0.000
59	P-10	397	J-2	J-1	12.0	Asbestos Cement	140.0	55	0.16	0.000
60	P-11	1	J-1	R-4	12.0	Asbestos Cement	140.0	-1,255	3.56	0.003

5-ZN-2020
4/16/2020

FlexTable: Reservoir Table (1872.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
51	R-3	204.58	<None>	2,818	204.58
52	R-4	200.90	<None>	1,255	200.90

ok, with site @ 42ft elevation approx this is 70psi. So reservoirs/system can supply 70psi at 4,074gpm? no. Per hydrant test pressure is approaching 20psi at this demand. Set reservoir HGL using supply curve from hydrant flow test at required fire flow.

APPENDIX D

Preliminary Water Plans

MATCHLINE - SEE SHEET 3

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

PROPOSED 4" DOMESTIC WATERLINE

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

CONNECT TO EXISTING 8" WATERLINE

PROPOSED BACKFLOW PREVENTER

PROPOSED 4" WATER METER

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

PROPOSED 12' WATERLINE EASEMENT

PROPOSED 8" D.I.P. FIRELINE (PRESSURE CLASS 350)

PARKING GARAGE

PROPOSED 4" D.I.P. WATERLINE (PRESSURE CLASS 350)

will require full 8X8 tee. Connection to ACP pipe require a portion of mainline to be replaced with DIP per DS&PM 6-1.408 and 6-1.413

LF_{88}=1243.00
PAD=1242.33

Refer to comment on other utility sheet about water line

Call out existign water meter sizes. Call out what is to occur with the existing meters and fire line. Call out proposed riser room for each building. Are any FDC lines to be installed? If so indicate locations.

LF_{88}=1243.00
PAD=1242.33

PROPOSED 12' WATERLINE EASEMENT

LF_{88}=1243.00
PAD=1242.33

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

PROPOSED 12' WATERLINE EASEMENT

PROPOSED FIRE HYDRANT COMPLETE (TYP.)

70TH STREET
S00°00'32"W 2673.68'
339.74'

S00°00'32"W 254.07'

30' R/W

30' R/W

FD. 1/2" REBAR W/ CAP L.S. #22768

D=91°15'38"
R=19.56'
L=31.17'

FD. 1/2" REBAR NO I.D.

S88°44'54"W 330.08'

FD. 1/2" REBAR W/ CAP L.S. #42137

GATE

E. LINE, W. 380.00'
W. LINE, SE. 1/4,
SE. 1/4, SECTION 34

A.P.N. 129-33-020A
CHAPMAN MCDOWELL LLC
2011-0226253 M.C.R.

S00°00'32"W 602.48'

1330.00'
N00°00'00"E 2660.04'

SCOTTSDALE ROAD

68TH STREET

FD. 3" CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE

8.51'

1312.38'

LOCALLY ACCEPTED S 1/4 COR. SEC. 34 FD. 3" BRASS CAP IN HANDHOLE

51.44'

FD. 3/4" IRON PIPE IN POTHOLE

EXCEPTION OF THE SOUTH 65.00'

S01°15'06"E 65.00'

65' R/W

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

65.02'

328.65'
S88°44'54"W 2624.74'

SMH
RIM:39.78
INV:34.92

MCDOWELL ROAD

932.27'

SE COR. SEC. 34 (BENCHMARK = 1230.47')
FD. 3" CITY OF SCOTTSDALE BRASS CAP IN HANDHOLE

CONNECT TO EXISTING 12" WATERLINE

Connection to ACP pipe require a portion of mainline to be replaced with DIP per DS&PM 6-1.408 and 6-1.413

SCALE: 1"= 20'

0' 10' 20' 40'

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

SNOISIA3S

SOUTHDALE
7000 E. MCDOWELL ROAD, SCOTTSDALE, AZ 85257

PRELIMINARY UTILITY PLAN

Registered Professional Engineer
CERTIFICATE NO.
46857
DANIEL G. MANN
04/16/20
Date Signed
ARIZONA, U.S.A.

3 engineering
civil engineering
planning
surveying

CAD TECH: PAULIE V.
DESIGNER: D. MANN
ENGINEER: D. MANN

3 ENGINEERING, LLC
6370 E. THOMAS ROAD
SUITE # 200
SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387
FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 04/09/20

PROJECT NO.
1872

SHEET NO.
PUTL202
2 of 3

Q.S.#13-44

5-ZN-2020
4/16/2020

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Provide looping connection to adjacent 6-inch line with isolation valve

Instead of installing 300+ feet of new water main south install 120ft of main offsite to the north and connect to existing 8" dead-end line with idolation valve.

Needs to be 14ft min. Type all.

OAK STREET

E 1/4 COR. SEC. 34
FD. 3" CITY OF SCOTTSDALE
BRASS CAP IN HANDHOLE

FD. 3" CITY OF SCOTTSDALE
BRASS CAP IN FLUSH

1330.03'

PALM LANE
S 89°03'15" W 2624.03'
1312.02'

LOT 1 WONDERLAND
BK. 100, PG. 19, M.C.R.
A.P.N. 129-33-018B
CAPITAL REAL ESTATE-DWELL LLC
2016-0940342 M.C.R.

A.P.N. 129-33-019B
CAPITAL REAL ESTATE-DWELL LLC
2016-0940342 M.C.R.

A.P.N. 129-33-019A
CHAPMAN MCDOWELL LLC
2011-0226253 M.C.R.

EXISTING BUILDING

FD. NAIL IN WASHER L.S. #42137

N. LINE, S. 1/2, SE. 1/4, SE. 1/4, SECTION 34

N88°54'05"E 230.06'

SMH
RIM: 41.36
INV 8" N: 34.98
INV 8" S: 34.99

6' BLOCK WALL

4" E

ET

WV

6"W (ACP)

PROPOSED FIRE HYDRANT COMPLETE (TYP.)

PROPOSED 12' WATERLINE EASEMENT

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

LF88=1243.00
PAD=1242.33

E. LINE, W. 380.00'
W. LINE, SE. 1/4,
SE. 1/4, SECTION 34

70TH STREET
S00°00'32"W 2673.68'
997.27'

FD. 1/2" REBAR
NO I.D.

S00°00'32"W 955.77'

8"S (VCP)

2' G

OHE

8"W (ACP)

CENTURY LINK

ROLL CURB

MEDIAN CURB

CONCRETE SIDEWALK

30' R/W

30' R/W

ASPHALT PAVEMENT

DRIVEWAY

CURB

SIGN

DG

BFP

WM

W

PP

SMH
RIM: 43.86
8"E: 37.29
8"W: 37.32

30.00'

N89°59'28"W 119.98'

FD. 1/2" REBAR
W/ CAP
L.S. #42137

5' ELECTRIC EASEMENT
PER REC. NO.
2000-0291367

FD. 1/2" REBAR
W/ CAP
L.S. #21081

SMH
RIM: 40.74
INV 8" N: 36.07
INV 8" S: 36.17

SMH
RIM: 40.88
INV 8" N: 36.39
INV 8" W: 36.46

CATCH BASIN
RIM: 40.57

GM

LP

EDGE OF PAVEMENT (TYP.)

S00°00'32"W 331.66'

7' BLOCK WALL

SIGN

GATE

CONNECT TO EXISTING SEWER MANHOLE

PROPOSED 8" P.V.C. SEWERLINE (SDR-35)

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

PROPOSED FIRE HYDRANT (TYP.)

PARKING GARAGE

PARKING GARAGE

PROPOSED FIRE HYDRANT COMPLETE (TYP.)

PROPOSED 8" D.I.P. WATERLINE (PRESSURE CLASS 350)

PROPOSED 12' WATERLINE EASEMENT

FH

S00°00'32"W 602.48'

1330.00'
N00°00'00"E 2660.04'

SCOTTSDALE ROAD

MATCHLINE - SEE SHEET 2

SCALE: 1" = 20'
0' 10' 20' 40'

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

SNOW3A38

SOUTHDALE
7000 E. MCDOWELL ROAD, SCOTTSDALE, AZ 85257
PRELIMINARY UTILITY PLAN

Registered Professional Engineer
CERTIFICATE NO.
46857
DANIEL G. MANN
12-31-20
ARIZONA, U.S.A.

3 engineering
civil engineering
planning
surveying

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DESIGNER: D. MANN
ENGINEER: D. MANN

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DATE: 04/09/20

PROJECT NO.
1872

SHEET NO.
PUTL203
3 of 3

Q.S.#13-44

5-ZN-2020
4/16/2020

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