CITY OF SCOTTSDALE

Water Study

Water and Wastewater Study Basis of Design Report

For

One Scottsdale

Southeast Corner of Scottsdale Road and Thompson Peak Parkway
Scottsdale, Arizona

Prepared for

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CEC PN # 180-168

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7-PP-2007#3
08/01/19

Table of Contents

Page No.

1.0 INTRODUCTION……...… 1

2.0 WATER STUDY – BASIS OF DESIGN……....…… 3

3.0 FIRE FLOW STUDY – BASIS OF DESIGN…… 4

4.0 WASTEWATER STUDY – BASIS OF DESIGN……...…….. 5

5.0 CONCLUSIONS…….5

APPENDIX A - SITE PLAN

APPENDIX B – OVERALL CONCEPTUAL UTILITY EXHIBIT IN BACK OF REPORT

APPENDIX C – PHASE 1 CONCEPTUAL UTILITY EXHIBIT IN BACK OF REPORT

APPENIDX D – SEWER EXHIBIT & CALCULATIONS

APPENDIX E – WATER MODEL CALCULATIONS & EXHIBIT

7-PP-2007#3
08/01/19

1.0 INTRODUCTION

The One Scottsdale project is a proposed 21.73 net acre commercial/retail project located southeast of the intersection of the Scottsdale Road and Thompson Peak Parkway in Scottsdale, Arizona. The site is further described as a portion of the NW1/4 of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to the Vicinity Map on the following page.

The site will consist of a hotel, Class A office buildings, underground and above ground parking structures, and retail pads. Phase I of the project will incorporate the hotel site and retail pads along with parking lots and drives. Refer to the Site Plan located in Appendix A at the back of this report.

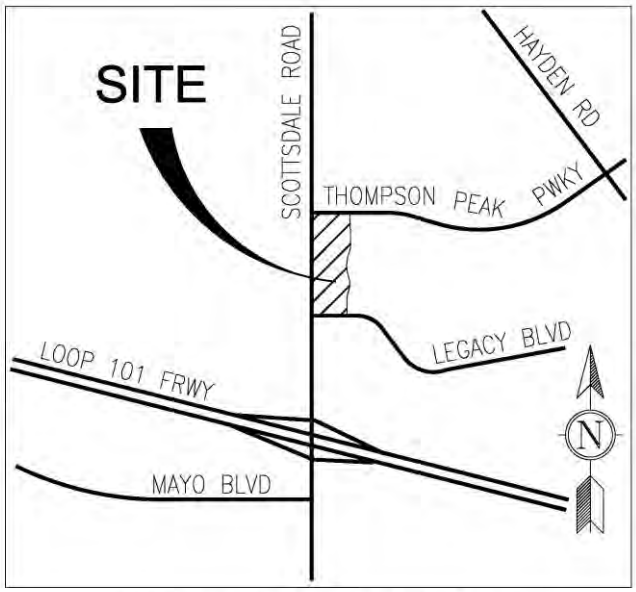
This Basis of Design report will document existing and proposed water and wastewater utility conditions for the 21.73-acre commercial parcel for the overall build-out condition and also the Phase 1 condition. Refer to the Concept Utility Plans located in Appendix B & C at the back of this report.

This site is located east of Scottsdale Road south of Thompson Peak Parkway, west of 73rd Drive, and north of Legacy Boulevard. Water and sewer utilities exist within the adjacent street and parcels, and are further described in the following section.

The purpose of this report is to satisfy the City of Scottsdale Design Review Board requirement regarding the basis of water and wastewater design for the proposed One Scottsdale project and to document water and sewer calculations for review and approval by the Maricopa County Environmental Services Department.

7-PP-2007#3
08/01/19

Vicinity Map



VICINITY MAP
N.T.S.

7-PP-2007#3
08/01/19

2.0 WATER STUDY – BASIS OF DESIGN

Existing Improvements

Existing public water lines are located on all sides of the proposed development. An existing 12-inch public water line is located on the north side of Thompson Peak Parkway within the public right of way. An existing 12-inch public water line is located in Scottsdale Road. An existing 16" public water line is located in Legacy Boulevard. An existing 12" public water line is located in 73rd Drive in a public utility easement. An existing 12" public water line extends between Scottsdale Road and 73rd Drive at the south 1/3 of the site. This line is located within a public utility easement. There is an existing PRV located at the NWC of the intersection of Scottsdale Road and Legacy Boulevard (#130) and at the NWC of the intersection of Legacy Boulevard and 73rd (#364).

Refer to the Concept Utility Plans in Appendix B & C at the back of this report for exact locations.

Proposed Improvements and Demand – Overall (21.73 acres)

The water needs for the project will be served by connecting an 8-inch public water line loop to the existing 12-inch public water line stub in Scottsdale Road and will loop back to two separate 8-inch connections in Scottsdale Road and one connection to the existing public water line in 73rd Drive. This will provide an overall water line loop for the entire development and eliminate the need for the existing 12-inch public water line that runs between Scottsdale Road and 73rd Drive. Once final construction is complete of the proposed 8" public water line loop, the existing 12" line will be removed.

The proposed 8-inch public waterline for this project will be constructed within a 20-foot wide public waterline easement. Refer to the Concept Utility Plan for proposed water line loop locations, fire hydrant locations, proposed 6-inch and 8-inch fireline stubs, 2" and 3" domestic services, and one 2" landscape service within the project. Where public water and sewer lines run parallel to each other they will be within a 20-foot easement with 8-feet of horizontal separation.

7-PP-2007#3
08/01/19

Calculations for estimated average day, max day, and peak demands for the development are as follows: exaggerate

DOMESTIC WATER DEMAND CALCULATIONS					
BUILDING/ PARCEL	SQUARE FOOTAGE	UNIT DEMAND (PER SQUARE FOOT)	TOTAL AVG. DAY DEMAND (GPM)	TOTAL MAX DAY DEMAND (GPM)	TOTAL PEAK DAY DEMAND (GPM)
PHASE 1	154,500	0.60	64.38	128.75	193
FUTURE PHASE NORTHWEST	133,500	0.60	55.63	111.25	167
FUTURE PHASE SOUTHEAST	154,500	0.60	64.38	128.75	193
FUTURE PHASE SOUTHWEST	133,500	0.60	55.63	111.25	167
FUTURE PAD A	8,000	1.30	7.22	14.44	22
FUTURE PAD B	8,000	1.30	7.22	14.44	22
FUTURE PAD C	8,000	1.30	7.22	14.44	22
FUTURE PAD D	8,000	1.30	7.22	14.44	22
TOTAL	***608,000***		***268.89***	***537.78***	***807***
DEMANDS ARE BASED ON PROPOSED BUILDING SQUARE FOOTAGE, USE, AND CITY OF SCOTTSDALE DESIGN STANDARDS & POLICIES MANUAL FIGURE 6.1-2					

Proposed Improvements – Phase 1

The water needs for Phase 1 of the project will be served by connecting an 8-inch public water line loop to the existing 12-inch public water line in Scottsdale Road at the main drive entrance and will loop back to the existing 12-inch public water line Scottsdale Road at the northern drive entrance. This will provide an overall water line loop for the entire development. An isolation gate valve will be added just north of the middle public water line connection on the existing public water line located in Scottsdale Road in order to provide second sourcing in accordance with COS DS&PM Sec. 6-1.416 and 7-1.409.

The proposed 8-inch public waterline, for this project, will be constructed within a 20-foot wide public waterline easement. Refer to the Concept Utility Plans located in Appendix B & C at the back of this report for proposed water line loop locations, fire hydrant locations, proposed 6-inch and 8-inch fireline stubs, 2" and 3" domestic services, and one 2" landscape service within the project. Where public water and sewer lines run parallel to each other they will be within a 20-foot easement with 8 feet of horizontal separation.

The existing 12" public line that runs through the site between Scottsdale Road and 73rd Drive will remain in place until the overall development is constructed.

3.0 FIRE FLOW STUDY – BASIS OF DESIGN

A worst-case fire flow requirement for this project assumes the largest building for calculation purposes (Phase 1 Building). Below is a summary table documenting fire flows required for each building.

FIRE FLOW DEMAND					
BUILDING	SQUARE FOOTAGE	CONSTR. TYPE	GPM REQUIRED	SPRINKLER REDUCTION	GPM ADJUSTED
PHASE 1	154,500	V-B	8000	50%	**4000**
FUTURE PHASE NORTHWEST	133,500	V-B	8000	50%	**4000**
FUTURE PHASE SOUTHEAST	154,500	V-B	8000	50%	**4000**
FUTURE PHASE SOUTHWEST	133,500	V-B	8000	50%	**4000**
FUTURE PAD A	8,000	V-B	2500	50%	**1500***
FUTURE PAD B	8,000	V-B	2500	50%	**1500***
FUTURE PAD C	8,000	V-B	2500	50%	**1500***
FUTURE PAD D	8,000	V-B	2500	50%	**1500***
SQUARE FOOTAGES ARE BASED ON GROSS BUILDING AREA					
GPM REQUIRED TAKEN FROM TABLE B105.1 OF THE INTERNATIONAL FIRE CODE					

Fire Flow Requirements = Max Day Demand + Sprinkler Flow+ 4000 Gal/Min (Commercial – Assume Sprinkler Flow = 500 GPM)
= 344 + 500 +4000 = 4844 GPM

A flow and pressure test was performed on December 21, 2105 by EJ Flow Testing Services. A copy of this flow test is provided in Appendix E at the back of this report. The flow test performed by EJ Flow Testing Services resulted in a static pressure of 72 psi, a Residual pressure of 35 psi with an available flow of 4,258 gpm at 20 psi. The flows test incorporated a safety factor of 33 psi based on the City of Scottsdale maximum static pressure requirements. The full build-out will have a total of (4) points of connection to the public water supply. Phase 1 will have a total of (2) points of connection to the public water supply. This in conjunction with a looped system will provide adequate fire flow requirements for the proposed development.

A water model was created to simulate the proposed Overall water system and also the Phase 1 water system. The model was analyzed for (4) different scenarios: Average Day Demand, Maximum Day Demand, Peak Hour Demand, and Maximum Day Demand + Fire Flow. The model was created using

7-PP-2007#3
08/01/19

Bentley WaterCAD V8 XM. The assumptions made for the model were friction factors based on pipe material, and minor loss coefficients based on fittings and valves. Water model calculations and node exhibit is located in Appendix E at the back of this report. Below is a detailed list of assumptions for the water model.

Friction Factors:

Ductile Iron Pipe: Manning Coefficient of 0.012

Minor Losses K Values:

90 degree smooth bend D=2	0.22
45 degree bend mitered	0.20
Tee – Line Flow	0.35
Tee – Branch Flow	1.28

Overall - Average Day Demand Model Results

The total average day water demand of 268.89 gallons per minute was placed on J-11, J-38, J-56, J-69, J-17, J-50, J-26, and J-32 within the water model.

The water model was successful for the average day water demand for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during average day conditions. The minimum pressure calculated was 66.4 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 77.7 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 0.7 fps.

Overall - Maximum Day Demand Model Results

The total maximum day water demand of 537.78 gallons per minute was placed on J-11, J-38, J-56, J-69, J-17, J-50, J-26, and J-32 within the water model.

The water model was successful for the maximum day water demand for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during maximum day conditions. The minimum pressure calculated was 67.3 psi.

7-PP-2007#3
08/01/19

2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 67.8 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 1.15 fps.

Overall - Peak Hour Demand Model Results

The total peak hour water demand of 807 gallons per minute was placed on J-11, J-38, J-56, J-69, J-17, J-50, J-26, and J-32 within the water model.

The water model was successful for the peak hour water demand for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during peak hour conditions. The minimum pressure calculated was 62.6 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 65.8 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 1.82 fps.

Overall - Max Day Demand + Fire Flow Model Results

The total max day water demand of 128.75 gallons per minute was placed on J-26and fire flow demand of 1,500 gallons per minute was placed on H-2, a fire flow demand of 1,250 gallons per minute was placed on H-3 and also H-9. The total modeled flow for this scenario is 4,128.75 gallons per minute. The largest building (Phase 1) was used in this simulation assuming the worst case fire flow requirement of 4,000 gpm based on IFC criteria.

The water model was successful for max day demand + fire flow for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 30 psi at the highest finished floor elevation during maximum day + fire flow conditions. The minimum pressure calculated was 41.8 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 60.3 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 11.31 fps.

Phase 1 - Average Day Demand Model Results

The total average day water demand of 64.38 (Phase 1 Building only) gallons per minute was placed on J-26 within the water model.

The water model was successful for the average day water demand for the Phase 1 condition based on the following factors:

4. Minimum water pressures are not less than 40 psi during average day conditions. The minimum pressure calculated was 68.6 psi.
5. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 75.9 psi.
6. The maximum velocity in the 8" onsite public water main was calculated to be 0.41 fps.

Phase 1 - Maximum Day Demand Model Results

The total maximum day water demand of 128.75 gallons per minute was placed on J-26 within the water model.

The water model was successful for the maximum day water demand for the Phase 1 condition based on the following factors:

4. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during maximum day conditions. The minimum pressure calculated was 67.9 psi.
5. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 75.3 psi.
6. The maximum velocity in the 8" onsite public water main was calculated to be 0.82 fps.

Phase 1 - Peak Hour Demand Model Results

The total peak hour water demand of 193 gallons per minute was placed on J-26 within the water model.

The water model was successful for the peak hour water demand for the Phase 1 condition based on the following factors:

4. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during peak hour conditions. The minimum pressure calculated was 67.2 psi.
5. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 74.5 psi.
6. The maximum velocity in the 8" onsite public water main was calculated to be 1.23 fps.

7-PP-2007#3
08/01/19

Phase 1 - Max Day Demand + Fire Flow Model Results

The total max day water demand of 128.75 gallons per minute was placed on J-26 and a fire flow demand of 1,500 gallons per minute was placed on H-10, a fire flow demand of 1,250 gallons per minute was placed on H-2 and also H-9. The total modeled flow for this scenario is 4,128.75 gallons per minute. The largest building (Phase 1) was used in this simulation assuming the worst case fire flow requirement of 4,000 gpm based on IFC criteria.

The water model was successful for max day demand + fire flow for the Phase 1 condition based on the following factors:

4. Minimum water pressures are not less than 30 psi at the highest finished floor elevation during maximum day + fire flow conditions. The minimum pressure calculated was 30.0 psi (H-2; rounded up from a calculated pressure of 29.5 – given multiple safety factors this was within the range of acceptability of the City of Scottsdale standards).
5. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 49.3 psi.
6. The maximum velocity in the 8" onsite public water main was calculated to be 13.46 fps.

4.0 WASTEWATER STUDY – BASIS OF DESIGN

Existing Improvements

An existing 15-inch VCP sewer line and manholes are located in Scottsdale Road just west of the proposed development, a 12-inch VCP sewer line and manholes in Thompson Peak Parkway just north of the proposed development, an 8-inch and 10-inch PVC sewer line in 73rd Avenue just east of the development, and a 12" PVC sewer line in Legacy Boulevard just south of the development. Also, there is an existing 10" PVC sewer line that through the proposed development between Scottsdale Road and 73rd Drive.

Proposed Improvements and Demands – Overall (21.73 acres)

The sewer needs for the One Scottsdale project will be served by extending a 15-inch and a 12-inch public sewer line through the site from Scottsdale Road, connecting to the existing 10-inch sewer line

7-PP-2007#3
08/01/19

in 73rd Drive. The proposed 15-inch public sewer line will connect to an existing manhole in Scottsdale Road. Once fully constructed, the existing 10-inch sewer line will be removed. The proposed 15-inch and 12-inch sewer lines will run at a slope of 0.0024 ft/ft due to site constraints at the connection points. Onsite 8-inch and 6-inch private plumbing lines will then service each of the proposed buildings as they are developed and per Uniform Plumbing Code slopes. Private plumbing slopes onsite are run at approximately between 1.0% and 5.0% slope to service the most remote buildings on the site. Refer to the Concept Utility Plan for proposed sewer line locations, stub location, slopes and inverts. Refer to the Sewer Exhibit located in the Appendix D at the back of this report for proposed sewer line designations in reference to calculations. Hydraulic calculations for each sewer line segment has been provided in Appendix D at the back of this report.

Calculations for estimated average day and peak demands for the development are as follows:

PROPOSED WASTEWATER DEMAND CALCULATIONS						
BUILDING/ PARCEL	SQUARE FOOTAGE	UNIT DEMAND (PER SQUARE FOOT)	TOTAL AVG. DAY DEMAND (GPD)	TOTAL PEAK DAY DEMAND (GPD)	TOTAL PEAK DAY DEMAND (GPM)	TOTAL PEAK DAY DEMAND (CFS)
PHASE 1	154,500	0.40	61800	185400	129	0.29
FUTURE PHASE NORTHWEST	133,500	0.40	53400	160200	111	0.25
FUTURE PHASE SOUTHEAST	154,500	0.40	61800	185400	129	0.29
FUTURE PHASE SOUTHWEST	133,500	0.40	53400	160200	111	0.25
FUTURE PAD A - RESTAURANT	4,000	1.20	4800	28800	20	0.04
FUTRURE PAD A - COMMERCIAL	4,000	0.50	2000	6000	4	0.01
FUTURE PAD B - RESTAURANT	4,000	1.20	4800	28800	20	0.04
FUTURE PAD B - COMMERCIAL	4,000	0.50	2000	6000	4	0.01
FUTURE PAD C - RESTAURANT	4,000	1.20	4800	28800	20	0.04
FUTURE PAD C - COMMERCIAL	4,000	0.50	2000	6000	4	0.01
FUTURE PAD D - RESTAURANT	4,000	1.20	4800	28800	20	0.04
FUTURE PAD D - COMMERCIAL	4,000	0.50	2000	6000	4	0.01
TOTAL	***608,000.00***		***255869***	***824938***	***1379***	***1.28***
DEMANDS ARE BASED ON PROPOSED BUILDING SQUARE FOOTAGE, USE, AND CITY OF SCOTTSDALE DESIGN STANDARDS & POLICIES MANUAL FIGURE 7.1-2						

Only a portion of the public sewer line will be built with Phase 1. During the overall construction an additional connection to 73rd Avenue will be constructed and the existing 10-inch sewer will be abandoned. A separate private sewer building connection will be constructed for Future Pad A with Phase 1. During the future phased construction, specifically Pad D, an additional private sewer building connection will be constructed from the existing sewer in Legacy Boulevard. These two connections will be single building feeds and will be 6-inch lines with a slope of 0.01 ft/ft.

Based on the One Scottsdale (Stacked 40s) Master On-Site Wastewater Plan, dated February 10, 2012, by Wood, Patel & Associates an upstream sewer flow of 0.69 cfs enters the proposed system at the

connection point in 73rd Avenue. A copy of the excerpts from the Stacked 40s Master On-Site Wastewater Plan has been provided in Appendix D at the back of this report. This flow was incorporated into this design. The existing One Scottsdale master plan outfall defined as "F1" had an estimated offsite wastewater flow of 207,479 gallons per day. The TDI development increased the estimated offsite wastewater flow to 446,145 gallons per day. The TDI development accompanied by this project estimates a total wastewater flow of 1.97 cfs at the connection to the existing 15-inch sewer in Scottsdale Road (this project contributing flow of 1.28 cfs + TDI offsite flow of 0.69 cfs).

5.0 CONCLUSIONS

The One Scottsdale project will provide service to the approximate 21.73-arce development (9 total buildings) by constructing a public looped 8" waterline system and one public 12" sewer line extended into the site to service proposed and future buildings. The water line will provide adequate protection for domestic, landscape and fire flow requirements.

The 15-inch and 12-inch public sewer line slopes are proposed at 0.24% from the existing 15-inch downstream sewer and the existing 10-inch upstream sewer. A 15-inch public sewer downstream connection will be made to an existing manhole located in Scottsdale Road.

7-PP-2007#3
08/01/19

APPENDIX A

Site Plan

7-PP-2007#3
08/01/19

APPENDIX B

Overall Concept Utility Plan

7-PP-2007#3
08/01/19

APPENDIX C

Phase 1 Concept Utility Plan

7-PP-2007#3
08/01/19

APPENDIX D

Sewer Exhibit & Calculations

7-PP-2007#3
08/01/19

APPENDIX E

Water Model Calculations & Exhibit

7-PP-2007#3
08/01/19

Flex Table: Juction Table - Average Daily Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	31	J-1	0.00	1,167.09	72.00
36	36	J-4	0.00	1,167.09	72.00
41	41	J-7	0.00	1,167.09	72.00
42	42	J-8	0.00	1,167.09	72.00
44	44	J-9	0.00	1,167.09	72.00
45	45	J-10	0.00	1,167.09	72.00
47	47	J-11	0.00	1,167.09	72.00
48	48	J-12	0.00	1,167.09	72.00
53	53	J-14	0.00	1,166.78	72.00
54	54	J-15	28.00	1,166.72	72.00
56	56	J-16	0.00	1,167.09	72.00
57	57	J-17	0.00	1,167.09	72.00
59	59	J-18	0.00	1,167.09	72.00
60	60	J-19	0.00	1,166.95	72.00
65	65	J-20	0.00	1,167.09	72.00

Flex Table: Hydrant Table - Average Daily Flow

Label	Demand (gpm)	Pressure (psi)	Elevation (ft)	Hydraulic Grade (ft)
H-1	0	72	1,000.00	1,167.09

Flex Table: Pipes Table - Average Daily Flow

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient	Flow (Maximum) (gpm)	Velocity (ft/s)
EX PIPE -1	R-3	PMP-2	120	Ductile Iron	130	0	14	0
EX PIPE -2	PMP-2	J-4	12	Ductile Iron	130	0	14	0.04
EX PIPE -3	PMP-1	J-1	12	Ductile Iron	130	0	14	0.04
EX PIPE -4	PMP-1	R-1	120	Ductile Iron	130	0	-14	0
PIPE -2	J-4	J-16	8	Ductile Iron	130	1	14	0.09
PIPE -4	J-9	J-10	8	Ductile Iron	130	1.28	0	0
PIPE -5	J-12	H-1	6	Ductile Iron	130	1	0	0
PIPE -6	J-9	J-1	8	Ductile Iron	130	1	-14	0.09
PIPE -8	J-11	J-12	8	Ductile Iron	130	0.35	-14	0.09
PIPE -9	J-7	J-11	8	Ductile Iron	130	0.35	-14	0.09
PIPE -10	J-18	J-7	8	Ductile Iron	130	0.35	-14	0.09
PIPE -11	J-16	J-18	8	Ductile Iron	130	1	14	0.09
PIPE -12	J-16	J-17	8	Ductile Iron	130	0.35	0	0
PIPE -15	J-18	J-19	3	Ductile Iron	130	1.28	28	1.25
PIPE -16	J-14	J-15	3	Ductile Iron	130	0.37	28	1.25
PIPE -17	J-11	J-20	8	Ductile Iron	130	1.28	0	0
PIPE -18	J-19	J-14	3	Ductile Iron	130	0	28	1.25
PIPE -19	J-7	J-8	8	Ductile Iron	130	1.28	0	0
PIPE-7	J-12	J-9	8	Ductile Iron	130	0	-14	0.09

Flex Table: Pump Table - Average Daily Flow

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
74	PMP-1	1,000.00	Pump - Phase 1	1,001.00	1,167.09	14	166.09
78	PMP-2	1,000.00	Pump - Phase 1	1,001.00	1,167.09	14	166.09

Flex Table: Reservoir Table - Average Daily Flow

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
72	R-1	1,001.00	14	1,001.00
77	R-3	1,001.00	14	1,001.00

Flex Table: Junctions Table - Max Daily Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	1,000.00	0	1,166.83	72
36	J-4	1,000.00	0	1,166.84	72
41	J-7	1,000.00	0	1,166.82	72
42	J-8	1,000.00	0	1,166.82	72
44	J-9	1,000.00	0	1,166.83	72
45	J-10	1,000.00	0	1,166.83	72
47	J-11	1,000.00	0	1,166.82	72
48	J-12	1,000.00	0	1,166.82	72
53	J-14	1,000.00	0	1,165.70	72
54	J-15	1,000.00	55	1,165.48	72
56	J-16	1,000.00	0	1,166.83	72
57	J-17	1,000.00	0	1,166.83	72
59	J-18	1,000.00	0	1,166.82	72
60	J-19	1,000.00	0	1,166.31	72
65	J-20	1,000.00	0	1,166.82	72

Flex Table: Hydrant Table - Max Daily Flow

Label	Demand (gpm)	Pressure (psi)	Elevation (ft)	Hydraulic Grade (ft)
H-1	0	72	1,000.00	1,166.82

Flex Table: Pipes Table - Max Daily Flow

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C
EX PIPE -1	R-3	PMP-2	120	Ductile Iron	130
EX PIPE -2	PMP-2	J-4	12	Ductile Iron	130
EX PIPE -3	PMP-1	J-1	12	Ductile Iron	130
EX PIPE -4	PMP-1	R-1	120	Ductile Iron	130
PIPE -2	J-4	J-16	8	Ductile Iron	130
PIPE -4	J-9	J-10	8	Ductile Iron	130
PIPE -5	J-12	H-1	6	Ductile Iron	130
PIPE -6	J-9	J-1	8	Ductile Iron	130
PIPE -8	J-11	J-12	8	Ductile Iron	130
PIPE -9	J-7	J-11	8	Ductile Iron	130
PIPE -10	J-18	J-7	8	Ductile Iron	130
PIPE -11	J-16	J-18	8	Ductile Iron	130
PIPE -12	J-16	J-17	8	Ductile Iron	130
PIPE -15	J-18	J-19	3	Ductile Iron	130
PIPE -16	J-14	J-15	3	Ductile Iron	130
PIPE -17	J-11	J-20	8	Ductile Iron	130
PIPE -18	J-19	J-14	3	Ductile Iron	130
PIPE -19	J-7	J-8	8	Ductile Iron	130
PIPE-7	J-12	J-9	8	Ductile Iron	130

Minor Loss Coefficient	Flow (Maximum) (g	Velocity (ft/s)
0	27	0
0	27	0.08
0	28	0.08
0	-28	0
1	27	0.17
1.28	0	0
1	0	0
1	-28	0.18
0.35	-28	0.18
0.35	-28	0.18
0.35	-28	0.18
1	27	0.17
0.35	0	0
1.28	55	2.5
0.37	55	2.5
1.28	0	0
0	55	2.5
1.28	0	0
0	-28	0.18

Flex Table: Pumps Table - Max Daily Flow

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)
74	PMP-1	1,000.00	Pump - Phase 1	1,001.00	1,166.83
78	PMP-2	1,000.00	Pump - Phase 1	1,001.00	1,166.84

Flow (Total) (gpm)	Pump Head (ft)
28	165.83
27	165.84

Flex Table: Reservoir Table - Max Daily Flow

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
72	R-1	1,001.00	28	1,001.00
77	R-3	1,001.00	27	1,001.00

Flex Table: Junctions Table - Peak Daily Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	31	J-1	0.00	1,166.56	72.00
36	36	J-4	0.00	1,166.56	72.00
41	41	J-7	0.00	1,166.53	72.00
42	42	J-8	0.00	1,166.53	72.00
44	44	J-9	0.00	1,166.54	72.00
45	45	J-10	0.00	1,166.54	72.00
47	47	J-11	0.00	1,166.54	72.00
48	48	J-12	0.00	1,166.54	72.00
53	53	J-14	0.00	1,164.11	71.00
54	54	J-15	83.00	1,163.63	71.00
56	56	J-16	0.00	1,166.55	72.00
57	57	J-17	0.00	1,166.55	72.00
59	59	J-18	0.00	1,166.53	72.00
60	60	J-19	0.00	1,165.42	72.00
65	65	J-20	0.00	1,166.54	72.00

Flex Table: Hydrant Table - Peak Daily Flow

Label	Demand (gpm)	Pressure (psi)	Elevation (ft)	Hydraulic Grade (ft)
H-1	0	72	1,000.00	1,166.54

Flex Table: Pipes Table - Peak Daily Flow

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient	Flow (Maximum) (gpm)	Velocity (ft/s)
EX PIPE -1	R-3	PMP-2	120	Ductile Iron	130	0	41	0
EX PIPE -2	PMP-2	J-4	12	Ductile Iron	130	0	41	0.12
EX PIPE -3	PMP-1	J-1	12	Ductile Iron	130	0	42	0.12
EX PIPE -4	PMP-1	R-1	120	Ductile Iron	130	0	-42	0
PIPE -2	J-4	J-16	8	Ductile Iron	130	1	41	0.26
PIPE -4	J-9	J-10	8	Ductile Iron	130	1.28	0	0
PIPE -5	J-12	H-1	6	Ductile Iron	130	1	0	0
PIPE -6	J-9	J-1	8	Ductile Iron	130	1	-42	0.27
PIPE -8	J-11	J-12	8	Ductile Iron	130	0.35	-42	0.27
PIPE -9	J-7	J-11	8	Ductile Iron	130	0.35	-42	0.27
PIPE -10	J-18	J-7	8	Ductile Iron	130	0.35	-42	0.27
PIPE -11	J-16	J-18	8	Ductile Iron	130	1	41	0.26
PIPE -12	J-16	J-17	8	Ductile Iron	130	0.35	0	0
PIPE -15	J-18	J-19	3	Ductile Iron	130	1.28	83	3.77
PIPE -16	J-14	J-15	3	Ductile Iron	130	0.37	83	3.77
PIPE -17	J-11	J-20	8	Ductile Iron	130	1.28	0	0
PIPE -18	J-19	J-14	3	Ductile Iron	130	0	83	3.77
PIPE -19	J-7	J-8	8	Ductile Iron	130	1.28	0	0
PIPE-7	J-12	J-9	8	Ductile Iron	130	0	-42	0.27

Flex Table: Pumps Table - Peak Daily Flow

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
74	PMP-1	1,000.00	Pump - North	1,001.00	1,166.56	42	165.56
78	PMP-2	1,000.00	Pump - North	1,001.00	1,166.56	41	165.56

Flex Table: Reservoir Table - Peak Daily Flow

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
72	R-1	1,001.00	42	1,001.00
77	R-3	1,001.00	41	1,001.00

Flex Table: Junctions Table - Max Day + Fire Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	1,000.00	0	1,139.62	60
36	J-4	1,000.00	0	1,144.12	62
41	J-7	1,000.00	0	1,130.94	57
42	J-8	1,000.00	0	1,130.94	57
44	J-9	1,000.00	0	1,132.79	57
45	J-10	1,000.00	0	1,132.79	57
47	J-11	1,000.00	0	1,130.51	56
48	J-12	1,000.00	0	1,130.43	56
53	J-14	1,000.00	0	1,131.26	57
54	J-15	1,000.00	55	1,131.04	57
56	J-16	1,000.00	0	1,138.18	60
57	J-17	1,000.00	0	1,138.18	60
59	J-18	1,000.00	0	1,132.38	57
60	J-19	1,000.00	0	1,131.87	57
65	J-20	1,000.00	500	1,129.79	56

Flex Table: Hydrant Table - Max Day + Fire Flow

Label	Demand (gpm)	Pressure (psi)	Elevation (ft)	Hydraulic Grade (ft)
H-1	1,500	53	1,000.00	1,121.97

Flex Table: Pipes Table - Max Day + Fire Flow

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C
EX PIPE -1	R-3	PMP-2	120	Ductile Iron	130
EX PIPE -2	PMP-2	J-4	12	Ductile Iron	130
EX PIPE -3	PMP-1	J-1	12	Ductile Iron	130
EX PIPE -4	PMP-1	R-1	120	Ductile Iron	130
PIPE -2	J-4	J-16	8	Ductile Iron	130
PIPE -4	J-9	J-10	8	Ductile Iron	130
PIPE -5	J-12	H-1	6	Ductile Iron	130
PIPE -6	J-9	J-1	8	Ductile Iron	130
PIPE -8	J-11	J-12	8	Ductile Iron	130
PIPE -9	J-7	J-11	8	Ductile Iron	130
PIPE -10	J-18	J-7	8	Ductile Iron	130
PIPE -11	J-16	J-18	8	Ductile Iron	130
PIPE -12	J-16	J-17	8	Ductile Iron	130
PIPE -15	J-18	J-19	3	Ductile Iron	130
PIPE -16	J-14	J-15	3	Ductile Iron	130
PIPE -17	J-11	J-20	8	Ductile Iron	130
PIPE -18	J-19	J-14	3	Ductile Iron	130
PIPE -19	J-7	J-8	8	Ductile Iron	130
PIPE-7	J-12	J-9	8	Ductile Iron	130

Minor Loss Coefficient	Flow (Maximum) (g	Velocity (ft/s)
0	944	0.03
0	944	2.68
0	1,111	3.15
0	-1,111	0.03
1	944	6.03
1.28	0	0
1	1,500	17.02
1	-1,111	7.09
0.35	389	2.48
0.35	889	5.68
0.35	889	5.68
1	944	6.03
0.35	0	0
1.28	55	2.5
0.37	55	2.5
1.28	500	3.19
0	55	2.5
1.28	0	0
0	-1,111	7.09

Flex Table: Pumps Table - Peak Daily Flow

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)
74	PMP-1	1,000.00	Pump - North	1,001.00	1,139.68
78	PMP-2	1,000.00	Pump - North	1,001.00	1,144.18

Flow (Total) (gpm)	Pump Head (ft)
1,111	138.68
944	143.18

Flex Table: Reservoir Table - Max Day + Fire Flow

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
72	R-1	1,001.00	1,111	1,001.00
77	R-3	1,001.00	944	1,001.00

Water and Wastewater Study Basis of Design Report

For

One Scottsdale

Southeast Corner of Scottsdale Road and Thompson Peak Parkway
Scottsdale, Arizona

Prepared for

DMB
7600 E Doubletree Ranch Road, Suite 300
Scottsdale, AZ 85258

October 29, 2019

CEC PN # 180-168
61-DR-2015#2

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Table of Contents

Page No.

1.0 INTRODUCTION……...… 1

2.0 WATER STUDY – BASIS OF DESIGN……....…… 3

3.0 FIRE FLOW STUDY – BASIS OF DESIGN…….…… 4

4.0 WASTEWATER STUDY – BASIS OF DESIGN……...…….…….. 5

5.0 CONCLUSIONS…….5

APPENDIX A - SITE PLAN

APPENDIX B – OVERALL CONCEPTUAL UTILITY EXHIBIT IN BACK OF REPORT

APPENDIX C – PHASE 1 CONCEPTUAL UTILITY EXHIBIT IN BACK OF REPORT

APPENIDX D – SEWER EXHIBIT & CALCULATIONS

APPENDIX E – WATER MODEL CALCULATIONS & EXHIBIT

1.0 INTRODUCTION

The One Scottsdale project is a proposed 21.73 net acre commercial/retail project located southeast of the intersection of the Scottsdale Road and Thompson Peak Parkway in Scottsdale, Arizona. The site is further described as a portion of the NW1/4 of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to the Vicinity Map on the following page.

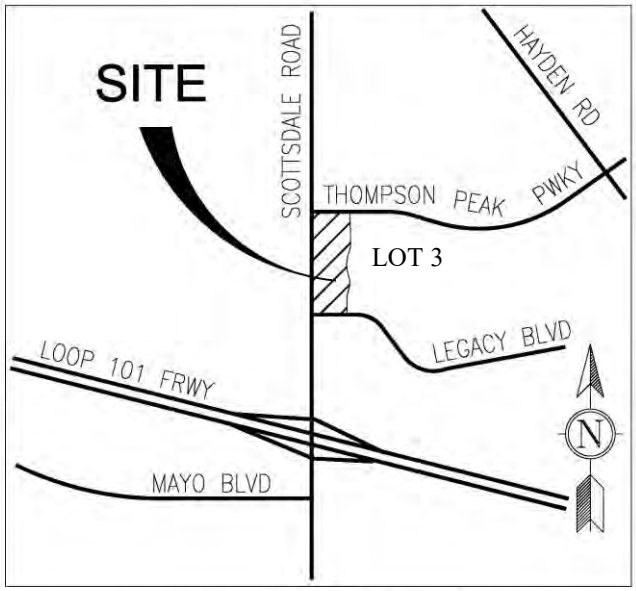
The site will consist of a hotel, Class A office buildings, underground and above ground parking structures, and retail pads. Phase I of the project will incorporate the hotel site with parking lot and drives. Refer to the Site Plan located in Appendix A at the back of this report.

This Basis of Design report will document existing and proposed water and wastewater utility conditions for the 21.73-acre commercial parcel for the overall build-out condition and also the Phase 1 condition. Refer to the Concept Utility Plans located in Appendix B & C at the back of this report.

This site is located east of Scottsdale Road south of Thompson Peak Parkway, west of 73rd Drive, and north of Legacy Boulevard. Water and sewer utilities exist within the adjacent street and parcels, and are further described in the following section.

The purpose of this report is to satisfy the City of Scottsdale Design Review Board requirement regarding the basis of water and wastewater design for the proposed One Scottsdale project and to document water and sewer calculations for review and approval by the Maricopa County Environmental Services Department.

Vicinity Map



VICINITY MAP
N.T.S.

2.0 WATER STUDY – BASIS OF DESIGN

Existing Improvements

Existing public water lines are located on all sides of the proposed development. An existing 12-inch D.I.P. public water line is located on the north side of Thompson Peak Parkway within the public right of way. An existing 12-inch D.I.P. public water line is located in Scottsdale Road. An existing 16" D.I.P. public water line is located in Legacy Boulevard. An existing 12" D.I.P. public water line is located in 73rd Drive in a public utility easement. An existing 12" D.I.P. public water line extends between Scottsdale Road and 73rd Drive at the south 1/3 of the site. This line is located within a public utility easement. There is an existing PRV located at the NWC of the intersection of Scottsdale Road and Legacy Boulevard (#130) and at the NWC of the intersection of Legacy Boulevard and 73rd (#364).

Refer to the Concept Utility Plans in Appendix B & C at the back of this report for exact locations.

Proposed Improvements and Demand – Overall (21.73 acres)

The water needs for the project will be served by connecting an 8-inch D.I.P. public water line loop to the existing 12-inch D.I.P. public water line stub in Scottsdale Road and will loop back to two separate 8-inch connections in Scottsdale Road and one connection to the existing public water line in 73rd Drive. This will provide an overall water line loop for the entire development and eliminate the need for the existing 12-inch D.I.P. public water line that runs between Scottsdale Road and 73rd Drive. Once final construction is complete of the proposed 8" D.I.P. public water line loop, the existing 12" D.I.P. line will be removed.

The proposed 8-inch D.I.P. public waterline for this project will be constructed within a 20-foot wide public waterline easement. Refer to the Concept Utility Plan for proposed water line loop locations, fire hydrant locations, proposed 6-inch D.I.P. and 8-inch D.I.P. fireline stubs, 2" and 3" domestic services, and one 2" landscape service within the project. Where public water and sewer lines run parallel to each other they will be within a 20-foot easement with 9-feet Mof horizontal separation.

Calculations for estimated average day, max day, and peak demands for the development are as follows:

DOMESTIC WATER DEMAND CALCULATIONS BUILDING/ PARCEL	SQUARE FOOTAGE	UNIT DEMAND (PER SQUARE FOOT)	TOTAL AVG. DAY DEMAND (GPM)	TOTAL MAX DAY DEMAND (GPM)	TOTAL PEAK DAY DEMAND (GPM)
FUTURE OFFICE A	180,000	0.000834	150.12	300.24	525.42
FUTURE PAD A	9,000	0.001110	9.99	19.98	34.97
SHOPS A	9,600	0.001110	10.66	21.31	37.30
HOTEL	123 ROOMS	0.63 PER ROOM	77.49	154.98	271.22
SHOPS B	10,700	0.001810	19.37	38.73	67.78
FUTURE PAD B	9,000	0.001110	9.99	19.98	34.97
FUTURE OFFICE B	240,000	0.000834	200.16	400.32	700.56
TOTAL	***458,300***		***477.77***	***955.55***	***1,672.21***
DEMANDS ARE BASED ON PROPOSED BUILDING SQUARE FOOTAGE, USE, AND CITY OF SCOTTSDALE DESIGN STANDARDS & POLICIES MANUAL FIGURE 6.1-2					

Proposed Improvements – Phase 1

The water needs for Phase 1 of the project will be served by connecting an 8-inch D.I.P. public water line loop to the existing 12-inch D.I.P. public water line in Scottsdale Road at the main drive entrance and will loop back to the existing 12-inch D.I.P. public water line Scottsdale Road at the future northern drive entrance. This will provide an overall water line loop for the entire development. An isolation gate valve will be added just north of the middle public water line connection on the existing public water line located in Scottsdale Road in order to provide second sourcing in accordance with COS DS&PM Sec. 6-1.416 and 7-1.409.

The proposed 8-inch D.I.P. public waterline, for this project, will be constructed within a 20-foot wide public waterline easement. Refer to the Concept Utility Plans located in Appendix B & C at the back of this report for proposed water line loop locations, fire hydrant locations, proposed fireline stubs, a 3" domestic service, and one 2" landscape service within the project. Where public water and sewer lines run parallel to each other they will be within a 20-foot easement with 9 feet of horizontal separation.

The existing 12" D.I.P. public line that runs through the site between Scottsdale Road and 73rd Drive

will remain in place until the overall development is constructed.

3.0 FIRE FLOW STUDY – BASIS OF DESIGN

A worst-case fire flow requirement for this project assumes the largest building for calculation purposes (Future Office B). Below is a summary table documenting fire flows required for each building.

FIRE FLOW DEMAND BUILDING	SQUARE FOOTAGE	CONSTR. TYPE	GPM REQUIRED	SPRINKLER REDUCTION	GPM ADJUSTED
FUTURE OFFICE A	180,000	V-B	8000	50%	**4000**
FUTURE PAD A	9,000	V-B	2500	50%	**1500***
SHOPS A	9,600	V-B	2500	50%	**1500***
HOTEL	123 ROOMS	V-B	8000	50%	**4000**
SHOPS B	10,700	V-B	2500	50%	**1500***
FUTURE PAD B	9,000	V-B	2500	50%	**1500***
FUTURE OFFICE B	240,000	V-B	8000	50%	**4000**
SQUARE FOOTAGES ARE BASED ON GROSS BUILDING AREA GPM REQUIRED TAKEN FROM TABLE B105.1 OF THE INTERNATIONAL FIRE CODE					

Fire Flow Requirements = Max Day Demand + Sprinkler Flow + 4000 Gal/Min (Commercial – Assume Sprinkler Flow = 500 GPM)
= 400.32 + 500 +4000 = 4900.32 GPM

A flow and pressure test was performed on October 9, 2019 by EJ Flow Testing Services. A copy of this flow test is provided in Appendix E at the back of this report. The flow test performed by EJ Flow Testing Services resulted in a static pressure of 72 psi, a Residual pressure of 52 psi with an available flow of 6,062 gpm at 20 psi. The flows test incorporated a safety factor of 27 psi based on the City of Scottsdale maximum static pressure requirements. The full build-out will have a total of (4) points of connection to the public water supply. Phase 1 will have a total of (2) points of connection to the public water supply. This in conjunction with a looped system will provide adequate fire flow requirements for the proposed development.

A water model was created to simulate the proposed Overall water system and also the Phase 1 and

Phase 2 water system. The model was analyzed for (3) different scenarios: Average Day Demand, Peak Hour Demand, and Maximum Day Demand + Fire Flow. The model was created using Bentley WaterCAD V8 XM. The assumptions made for the model were friction factors based on pipe material, and minor loss coefficients based on fittings and valves. Water model calculations and node exhibit is located in Appendix E at the back of this report. Below is a detailed list of assumptions for the water model.

Friction Factors:

Ductile Iron Pipe: Manning Coefficient of 0.012

Minor Losses K Values:

90 degree smooth bend D=2	0.22
45 degree bend mitered	0.20
Tee – Line Flow	0.35
Tee – Branch Flow	1.28

Overall - Average Day Demand Model Results

The total average day water demand of 477.77 gallons per minute was placed on J-3, J-8, J-18, J-20, J-32, J-200 and J-47 within the water model.

The water model was successful for the average day water demand for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during average day conditions. The minimum pressure calculated was 68 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 71 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 0.79 fps.

Overall - Peak Hour Demand Model Results

The total peak hour water demand of 1,672.21 gallons per minute was placed on J-3, J-8, J-18, J-20, J-32, J-200 and J-47 within the water model.

The water model was successful for the peak hour water demand for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during peak hour conditions. The minimum pressure calculated was 49 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 69 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 2.87 fps.

Overall - Max Day Demand + Fire Flow Model Results

The total max day water demand of 955.55 gallons per minute was placed on J-3, J-8, J-18, J-20, J-32, J-200 and J-47 and fire flow demand of 1,500 gallons per minute was placed on H-1, a fire flow demand of 1,250 gallons per minute was placed on H-2, H-3, H-4, H-5 and H-6 and a fire flow of 300 gallons per minute on J-15. The total modeled flow for this scenario is 9,005.55 gallons per minute. The largest building was used in this simulation assuming the worst case fire flow requirement of 4,000 gpm based on IFC criteria.

The water model was successful for max day demand + fire flow for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 30 psi at the highest finished floor elevation during maximum day + fire flow conditions. The minimum pressure calculated was 37 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 51 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 14.75 fps.

Phase 1/Phase 2 - Average Day Demand Model Results

The total average day water demand of 477.77 gallons per minute was placed on J-1, J-6, J-8, J-18, J-20, J-31 and J-32 within the water model.

The water model was successful for the average day water demand for the Phase 1/Phase 2 condition based on the following factors:

1. Minimum water pressures are not less than 40 psi during average day conditions. The minimum pressure calculated was 69 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 70 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 1.47 fps.

Phase 1/Phase 2 - Peak Hour Demand Model Results

The total peak hour water demand of 1,672.21 gallons per minute was placed on J-1, J-6, J-8, J-18, J-20, J-31 and J-32 within the water model.

The water model was successful for the peak hour water demand for the Phase 1 condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during peak hour conditions. The minimum pressure calculated was 53 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 60 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 4.92 fps.

Phase 1/Phase2 - Max Day Demand + Fire Flow Model Results

The total max day water demand of 955.55 gallons per minute was placed on J-1, J-6, J-8, J-18, J-20, J-31 and J-32 and a fire flow demand of 1,500 gallons per minute was placed on H-10, a fire flow demand of 1,250 gallons per minute was placed on H-2 and also H-3 and a fire flow of 300 gallons per minute were placed on J-15. The total modeled flow for this scenario is 5,255.55 gallons per minute. The largest building was used in this simulation assuming the worst case fire flow requirement of 4,000 gpm based on IFC criteria.

The water model was successful for max day demand + fire flow for the Phase 1 condition based on the following factors:

1. Minimum water pressures are not less than 30 psi at the highest finished floor elevation during maximum day + fire flow conditions. The minimum pressure calculated was 40 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 49 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 12.97 fps.

4.0 WASTEWATER STUDY – BASIS OF DESIGN

Existing Improvements

An existing 15-inch VCP sewer line and manholes are located in Scottsdale Road just west of the proposed development, a 12-inch VCP sewer line and manholes in Thompson Peak Parkway just north of the proposed development, an 8-inch and 10-inch PVC sewer line in 73rd Avenue just east of the development, and a 12" PVC sewer line in Legacy Boulevard just south of the development. Also, there is an existing 10" PVC sewer line that through the proposed development between Scottsdale Road and 73rd Drive.

Proposed Improvements and Demands – Overall (21.73 acres)

The sewer needs for the One Scottsdale project will be served by extending a 15-inch and a 12-inch PVC public sewer line through the site from Scottsdale Road, connecting to the existing 10-inch PVC sewer line in 73rd Drive. The proposed 15-inch PVC public sewer line will connect to an existing manhole in Scottsdale Road. Once fully constructed, the existing 10-inch PVC sewer line will be removed. The proposed 15-inch and 12-inch PVC sewer lines will run at a slope of 0.0024 ft/ft due to site constraints at the connection points. Onsite 8-inch and 6-inch PVC private plumbing lines will then service each of the proposed buildings as they are developed and per Uniform Plumbing Code slopes. Private plumbing slopes onsite are run at approximately between 1.0% and 5.0% slope to service the most remote buildings on the site. Refer to the Concept Utility Plan for proposed sewer line locations, stub location, slopes and inverts. Refer to the Sewer Exhibit located in the Appendix D at the back of this report for proposed sewer line designations in reference to calculations. Hydraulic calculations for each sewer line segment has been provided in Appendix D at the back of this report.

Calculations for estimated average day and peak demands for the development are as follows:

PROPOSED WASTEWATER DEMAND CALCULATIONS						
BUILDING/ PARCEL	SQUARE FOOTAGE	UNIT DEMAND (PER SQUARE FOOT)	TOTAL AVG. DAY DEMAND (GPD)	TOTAL PEAK DAY DEMAND (GPD)	TOTAL PEAK DAY DEMAND (GPM)	TOTAL PEAK DAY DEMAND (CFS)
FUTURE OFFICE A	180,000	0.40	72,000	216,000	150	0.33
FUTURE PAD A	9,000	0.50	4,500	13,500	9	0.02
SHOPS A	9,600	0.50	4,800	14,400	10	0.02
HOTEL	123 ROOMS	380 PER ROOM	46,740	140,220	97	0.22
SHOPS B	10,700	1.20	12,840	77,040	54	0.12
FUTURE PAD B	9,000	0.50	4,500	13,500	9	0.02
FUTURE OFFICE B	240,000	0.40	96,000	576,000	400	0.89
TOTAL	***458,300.00***		***241,380***	***1,050,660***	***730***	***1.63***
DEMANDS ARE BASED ON PROPOSED BUILDING SQUARE FOOTAGE, USE, AND CITY OF SCOTTSDALE DESIGN STANDARDS & POLICIES MANUAL FIGURE 7.1-2						

Only a portion of the public sewer line will be built with Phase 1. During the overall construction an additional connection to 73rd Avenue will be constructed and the existing 10-inch PVC sewer will be abandoned. During the future phased construction, specifically Pad D, an additional private sewer building connection will be constructed from the existing sewer in Legacy Boulevard. These two connections will be single building feeds and will be 6-inch PVC lines with a slope of 0.01 ft/ft.

Based on the One Scottsdale (Stacked 40s) Master On-Site Wastewater Plan, dated February 10, 2012, by Wood, Patel & Associates an upstream sewer flow of 308 gpm enters the proposed system at the connection point in 73rd Avenue. A copy of the excerpts from the Stacked 40s Master On-Site Wastewater Plan has been provided in Appendix D at the back of this report. This flow was incorporated into this design. The existing One Scottsdale master plan outfall defined as "F1" had an estimated offsite wastewater flow of 207,479 gallons per day. The TDI development increased the estimated offsite wastewater flow to 446,145 gallons per day. The TDI development accompanied by this project estimates a total wastewater flow of 1.97 cfs at the connection to the existing 15-inch PVC sewer in Scottsdale Road (this project contributing flow of 1.28 cfs + TDI offsite flow of 0.69 cfs).

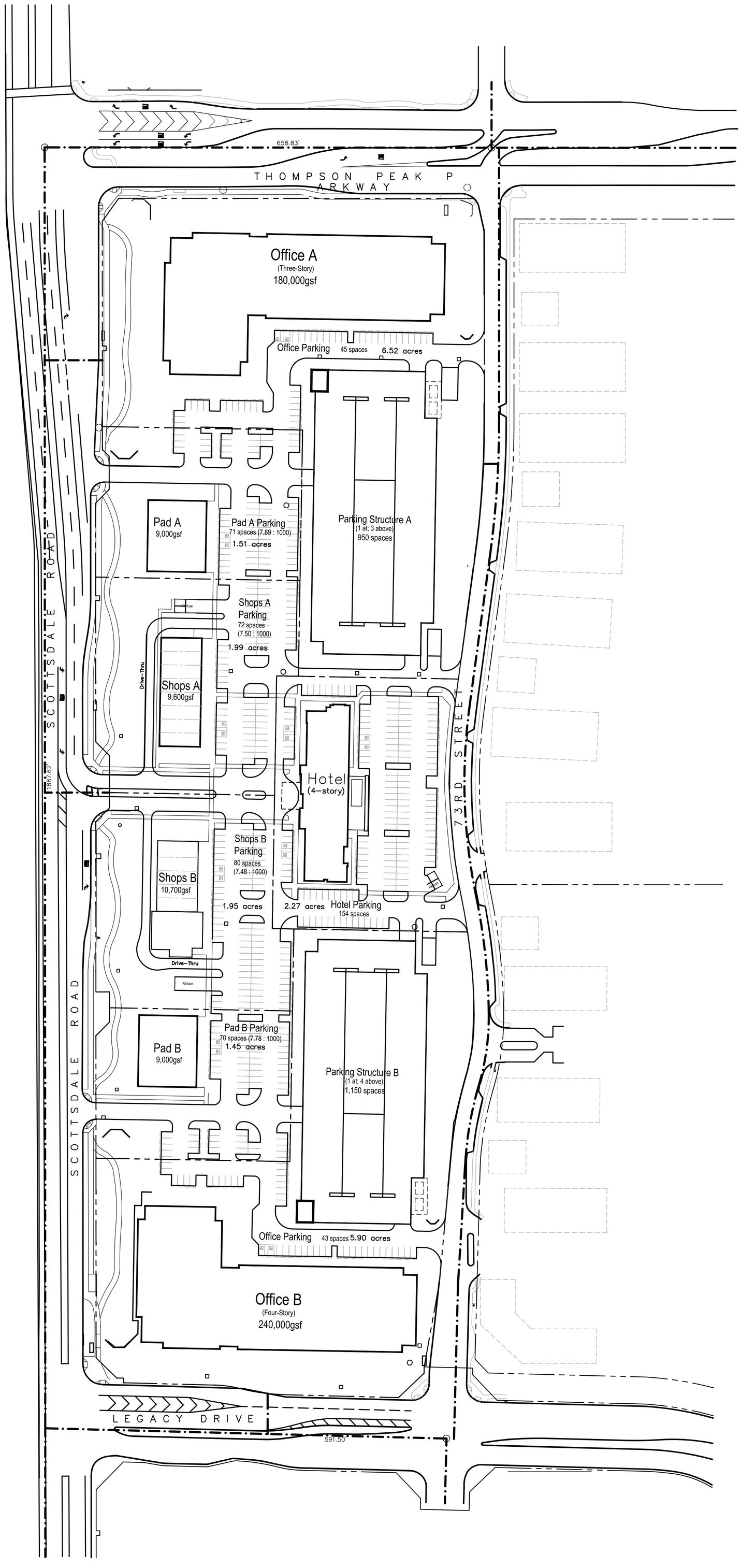
5.0 CONCLUSIONS

The One Scottsdale project will provide service to the approximate 21.73-arce development (9 total buildings) by constructing a public looped 8" waterline system and one public 12" sewer line extended into the site to service proposed and future buildings. The water line will provide adequate protection for domestic, landscape and fire flow requirements.

The 15-inch and 12-inch PVC public sewer line slopes are proposed at 0.24% from the existing 15-inch downstream sewer and the existing 10-inch upstream sewer. A 15-inch PVC public sewer downstream connection will be made to an existing manhole located in Scottsdale Road.

APPENDIX A

Site Plan



Master Site Plan

Total Office Area:	420,000gsf (401,000rsf)
Total Retail Area:	38,300gsf
Total Area:	538,300gsf
Hotel:	66,000gsf (123 keys)

0' 80' 160' 240' 320' NORTH

14164

5-30-19

ONE SCOTTSDALE- Scottsdale, Arizona

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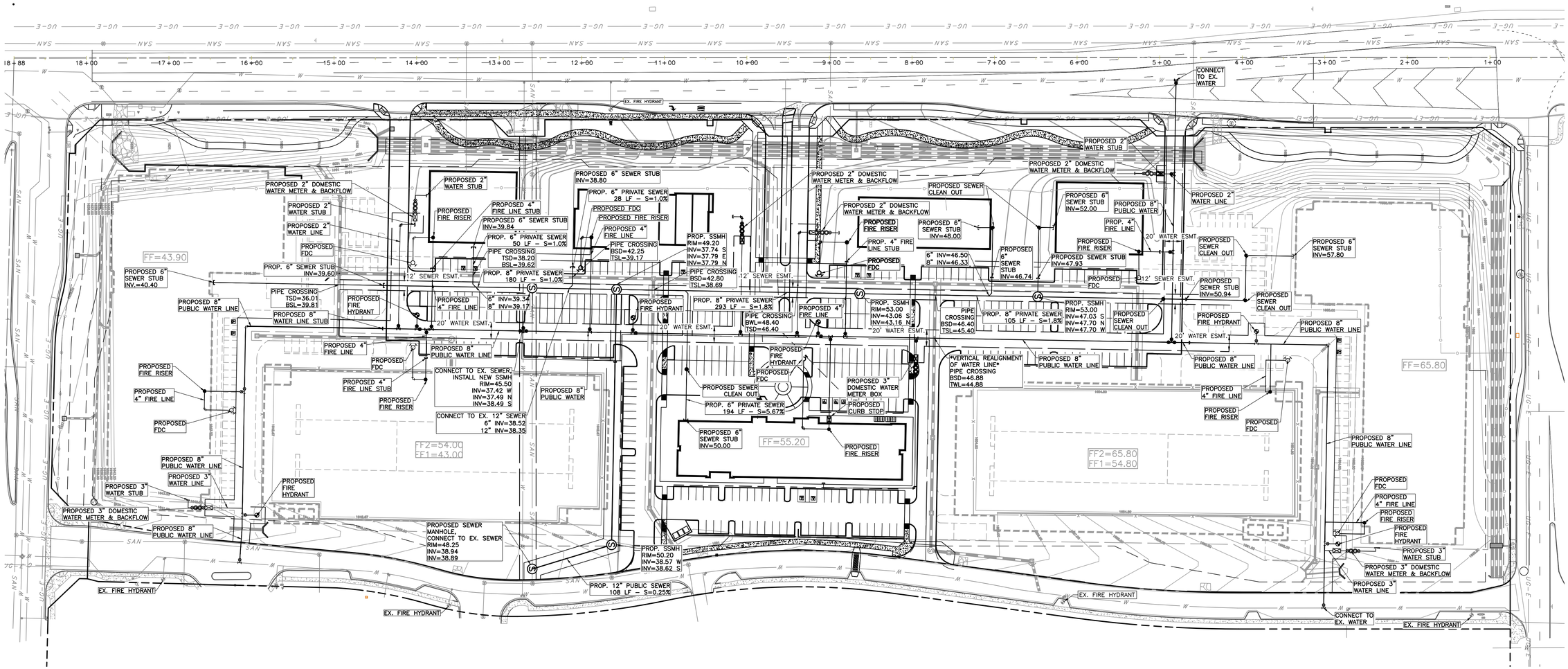
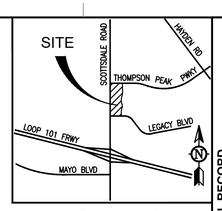
DAVIS

APPENDIX B

Overall Concept Utility Plan





VICINITY MAP
N.T.S.

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

ONE SCOTTSDALE CIVIL IMPROVEMENT PLANS SCOTTSDALE, AZ

OVERALL CONCEPT UTILITY

DATE:	11/5/19
DWG SCALE:	1"=60'
PROJECT NO:	180-168
APPROVED BY:	JSE
DRAWN BY:	BB
CHECKED BY:	KE

Call at least two full working days before you begin excavation.
ARIZONA 811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

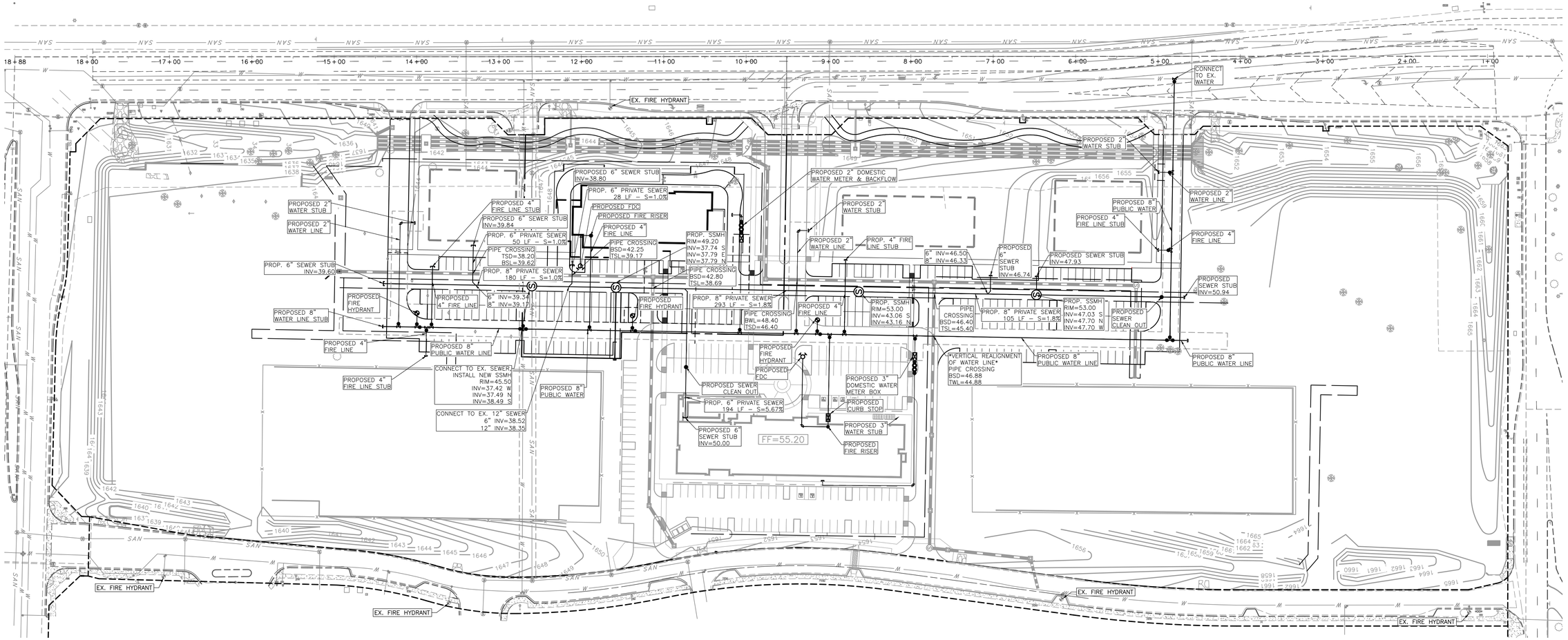
REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 23980
JEFFREY S. ERICKSON
Date Signed 11/05/19
ARIZONA, U.S.A.
Expires 09/30/20

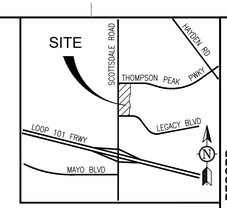
DRAWING NO.: CU01
SHEET 1 OF 1

P:\2018\180-168\-CAD\Dwg\CV01\Concept Utility\180168-CP01-Concept_Utility.dwg[CU01] LS:(11/5/2019 - bbartlett) - LP: 11/6/2019 9:48 AM

APPENDIX C

Phase 1 and Phase 2 Concept Utility Plans





VICINITY MAP
N.T.S.

FLOOD ZONE

ALL BUILDINGS WILL BE STRUCTURALLY INDEPENDENT AND WILL BE FLOODPROOFED TO 2 FEET ABOVE THE HIGHEST ADJACENT NATURAL GRADE WITHIN THE REGULATORY FLOODPLAIN – ZONE AO, DEPTH=1 FOOT.

OWNER

DMB
7600 E DOUBLETREE RANCH RD, SUITE 300
SCOTTSDALE, AZ 85258
CONTACT: MIKE BURKE

ARCHITECT

DAVIS
74 E. RIO SALADO PARKWAY, STE. 200
TEMPE, AZ 85281
PH: 480-638-1100
CONTACT: MIKE DAVIS

ENGINEER

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
118111 N. TATUM BLVD., SUITE 3057
PHOENIX, ARIZONA 85028
PH: 602-760-2324
FX: 602-760-2330
CONTACT: KALEY BUETHE, PE

PROPOSED LEGEND

- DRAINAGE AREA BOUNDARY
- PAVEMENT ELEVATION — P=58.00
- ONSITE DRAINAGE ARROW
- OFFSITE DRAINAGE ARROW
- CURB OPENING
- DRAINAGE AREA LABEL — DA2
- GRADE BREAK — G.B.
- DRYWELL
- RETENTION BASIN

PRELIMINARY
NOT FOR CONSTRUCTION OR RECORDING

NORTH

SCALE IN FEET
0 60 120

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23980
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ARIZONA, U.S.A.
Expires 09/30/20

REVISION RECORD

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Ph: 602.760.2324 - 877.231.2324 - Fax: 602.760.2330
www.cecinc.com

ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

CONCEPT UTILITY PHASE I/II

DRAWN BY:	BB
CHECKED BY:	KE
DWG SCALE:	1"=60'
PROJECT NO:	180-168
APPROVED BY:	JSE
DATE:	NOVEMBER 2019

DRAWING NO.:
CU01
SHEET 1 OF 1

P:\2018\180-168\-CAD\Dwg\CU02\Concept Utility\180168-CP02-Concept_Utility_Phase 2.dwg[ARCH1] LS(11/8/2019 - bbarthel) - LP: 11/8/2019 9:56 AM
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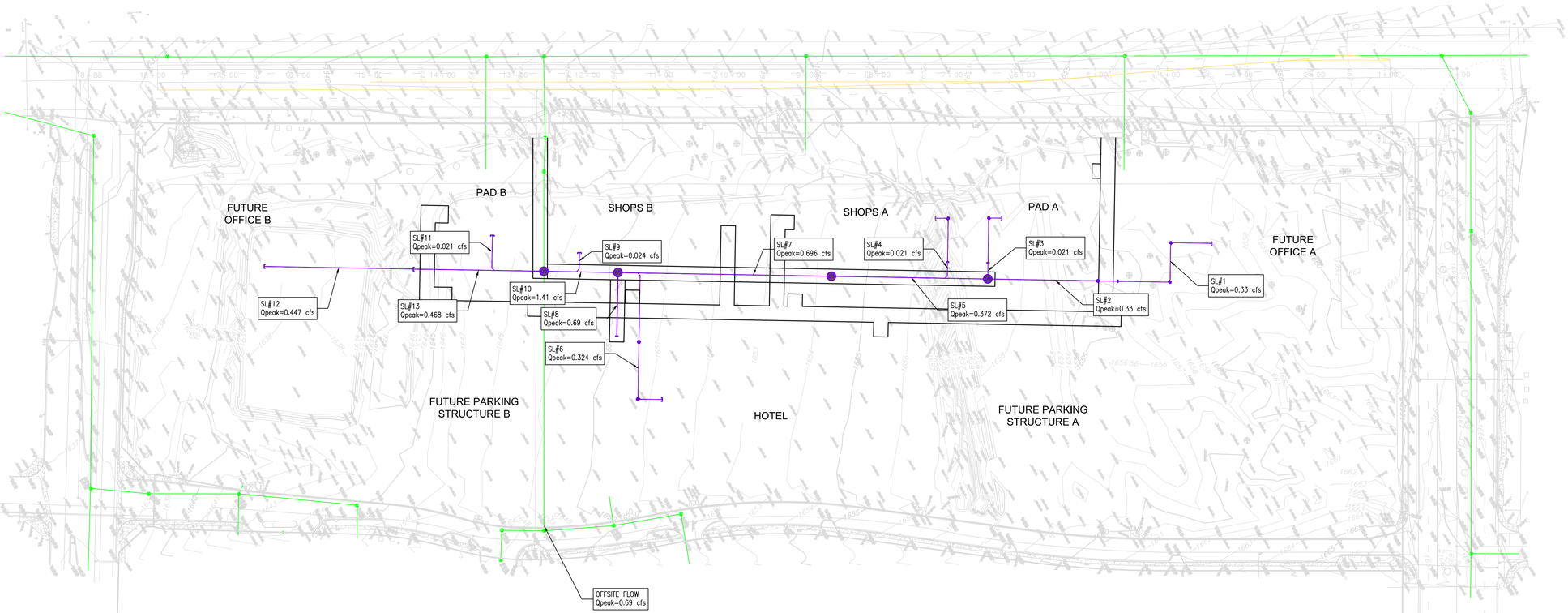
APPENDIX D

Sewer Exhibit & Calculations



NORTH

SCALE IN FEET

0 80 160

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ARIZONA811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
23980
JEFFREY S. ERICKSON
Date Signed 10/15/19
ARIZONA, U.S.A.
Expires 09/30/20

REVISION RECORD

NO	DATE	DESCRIPTION

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Ph: 602.760.2324 - 877.231.2324 - Fax: 602.760.2330
www.cecinc.com

ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

SEWER EXHIBIT

DRAWN BY:	BB
CHECKED BY:	KE
DWG SCALE:	
PROJECT NO:	180-168
APPROVED BY:	JSE
DATE:	10/15/19

DRAWING NO.:

EX-1

SHEET 1 OF 1

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Monday, October 14, 2019

Project Units: U.S. Customary Units

Notes:

Channel Analysis: SL#1

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.5000 ft

Longitudinal Slope: 0.0380 ft/ft

Manning's n: 0.0130

Flow: 0.1100 cfs

Result Parameters

Depth: 0.1071 ft

Area of Flow: 0.0308 ft^2

Wetted Perimeter: 0.4811 ft

Hydraulic Radius: 0.0641 ft

Average Velocity: 3.5683 ft/s

Top Width: 0.4102 ft

Froude Number: 2.2939

Critical Depth: 0.1641 ft

Critical Velocity: 1.9619 ft/s

Critical Slope: 0.0071 ft/ft

Critical Top Width: 0.47 ft

Calculated Max Shear Stress: 0.2539 lb/ft^2

Calculated Avg Shear Stress: 0.1519 lb/ft^2

Channel Analysis: SL#2

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0180 ft/ft

Manning's n: 0.0130

Flow: 0.1100 cfs

Result Parameters

Depth: 0.1174 ft

Area of Flow: 0.0415 ft^2

Wetted Perimeter: 0.5788 ft

Hydraulic Radius: 0.0718 ft

Average Velocity: 2.6484 ft/s

Top Width: 0.5095 ft

Froude Number: 1.6346

Critical Depth: 0.1510 ft

Critical Velocity: 1.8486 ft/s

Critical Slope: 0.0065 ft/ft

Critical Top Width: 0.56 ft

Calculated Max Shear Stress: 0.1319 lb/ft^2

Calculated Avg Shear Stress: 0.0806 lb/ft^2

Channel Analysis: SL#3

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.5000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0130

Flow: 0.0070 cfs

Result Parameters

Depth: 0.0392 ft

Area of Flow: 0.0071 ft^2

Wetted Perimeter: 0.2837 ft

Hydraulic Radius: 0.0251 ft

Average Velocity: 0.9813 ft/s

Top Width: 0.2687 ft

Froude Number: 1.0613

Critical Depth: 0.0403 ft

Critical Velocity: 0.9393 ft/s

Critical Slope: 0.0088 ft/ft

Critical Top Width: 0.27 ft

Calculated Max Shear Stress: 0.0244 lb/ft^2

Calculated Avg Shear Stress: 0.0157 lb/ft^2

Channel Analysis: SL#4

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.5000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0130

Flow: 0.0074 cfs

Result Parameters

Depth: 0.0403 ft

Area of Flow: 0.0074 ft^2

Wetted Perimeter: 0.2877 ft

Hydraulic Radius: 0.0258 ft

Average Velocity: 0.9988 ft/s

Top Width: 0.2721 ft

Froude Number: 1.0652

Critical Depth: 0.0416 ft

Critical Velocity: 0.9529 ft/s

Critical Slope: 0.0087 ft/ft

Critical Top Width: 0.28 ft

Calculated Max Shear Stress: 0.0251 lb/ft^2

Calculated Avg Shear Stress: 0.0161 lb/ft^2

Channel Analysis: SL#5

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0180 ft/ft

Manning's n: 0.0130

Flow: 0.1240 cfs

Result Parameters

Depth: 0.1245 ft

Area of Flow: 0.0452 ft^2

Wetted Perimeter: 0.5973 ft

Hydraulic Radius: 0.0757 ft

Average Velocity: 2.7434 ft/s

Top Width: 0.5213 ft

Froude Number: 1.6419

Critical Depth: 0.1605 ft

Critical Velocity: 1.9114 ft/s

Critical Slope: 0.0065 ft/ft

Critical Top Width: 0.57 ft

Calculated Max Shear Stress: 0.1399 lb/ft^2

Calculated Avg Shear Stress: 0.0850 lb/ft^2

Channel Analysis: SL#6

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.5000 ft

Longitudinal Slope: 0.0567 ft/ft

Manning's n: 0.0130

Flow: 0.0720 cfs

Result Parameters

Depth: 0.0788 ft

Area of Flow: 0.0199 ft^2

Wetted Perimeter: 0.4084 ft

Hydraulic Radius: 0.0486 ft

Average Velocity: 3.6258 ft/s

Top Width: 0.3645 ft

Froude Number: 2.7374

Critical Depth: 0.1318 ft

Critical Velocity: 1.7403 ft/s

Critical Slope: 0.0071 ft/ft

Critical Top Width: 0.44 ft

Calculated Max Shear Stress: 0.2790 lb/ft^2

Calculated Avg Shear Stress: 0.1720 lb/ft^2

Channel Analysis: SL#7

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0180 ft/ft

Manning's n: 0.0130

Flow: 0.1960 cfs

Result Parameters

Depth: 0.1563 ft

Area of Flow: 0.0625 ft^2

Wetted Perimeter: 0.6754 ft

Hydraulic Radius: 0.0925 ft

Average Velocity: 3.1371 ft/s

Top Width: 0.5667 ft

Froude Number: 1.6650

Critical Depth: 0.2032 ft

Critical Velocity: 2.1709 ft/s

Critical Slope: 0.0064 ft/ft

Critical Top Width: 0.62 ft

Calculated Max Shear Stress: 0.1755 lb/ft^2

Calculated Avg Shear Stress: 0.1039 lb/ft^2

Channel Analysis: SL#8

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.0000 ft

Longitudinal Slope: 0.0025 ft/ft

Manning's n: 0.0130

Flow: 0.2300 cfs

Result Parameters

Depth: 0.2427 ft

Area of Flow: 0.1472 ft^2

Wetted Perimeter: 1.0302 ft

Hydraulic Radius: 0.1429 ft

Average Velocity: 1.5622 ft/s

Top Width: 0.8574 ft

Froude Number: 0.6644

Critical Depth: 0.1968 ft

Critical Velocity: 2.1052 ft/s

Critical Slope: 0.0058 ft/ft

Critical Top Width: 0.80 ft

Calculated Max Shear Stress: 0.0379 lb/ft^2

Calculated Avg Shear Stress: 0.0223 lb/ft^2

Channel Analysis: SL#9

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.5000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0130

Flow: 0.0080 cfs

Result Parameters

Depth: 0.0417 ft

Area of Flow: 0.0078 ft^2

Wetted Perimeter: 0.2930 ft

Hydraulic Radius: 0.0267 ft

Average Velocity: 1.0218 ft/s

Top Width: 0.2765 ft

Froude Number: 1.0702

Critical Depth: 0.0432 ft

Critical Velocity: 0.9722 ft/s

Critical Slope: 0.0087 ft/ft

Critical Top Width: 0.28 ft

Calculated Max Shear Stress: 0.0260 lb/ft^2

Calculated Avg Shear Stress: 0.0167 lb/ft^2

Channel Analysis: SL#10

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.0000 ft

Longitudinal Slope: 0.0074 ft/ft

Manning's n: 0.0130

Flow: 0.4340 cfs

Result Parameters

Depth: 0.2542 ft

Area of Flow: 0.1572 ft^2

Wetted Perimeter: 1.0569 ft

Hydraulic Radius: 0.1487 ft

Average Velocity: 2.7605 ft/s

Top Width: 0.8709 ft

Froude Number: 1.1449

Critical Depth: 0.2725 ft

Critical Velocity: 2.5046 ft/s

Critical Slope: 0.0056 ft/ft

Critical Top Width: 0.89 ft

Calculated Max Shear Stress: 0.1174 lb/ft^2

Calculated Avg Shear Stress: 0.0687 lb/ft^2

Channel Analysis: SL#11

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.5000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0130

Flow: 0.0070 cfs

Result Parameters

Depth: 0.0392 ft

Area of Flow: 0.0071 ft^2

Wetted Perimeter: 0.2837 ft

Hydraulic Radius: 0.0251 ft

Average Velocity: 0.9813 ft/s

Top Width: 0.2687 ft

Froude Number: 1.0613

Critical Depth: 0.0403 ft

Critical Velocity: 0.9393 ft/s

Critical Slope: 0.0088 ft/ft

Critical Top Width: 0.27 ft

Calculated Max Shear Stress: 0.0244 lb/ft^2

Calculated Avg Shear Stress: 0.0157 lb/ft^2

Channel Analysis: SL#12

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0038 ft/ft

Manning's n: 0.0130

Flow: 0.1490 cfs

Result Parameters

Depth: 0.2018 ft

Area of Flow: 0.0895 ft^2

Wetted Perimeter: 0.7785 ft

Hydraulic Radius: 0.1149 ft

Average Velocity: 1.6654 ft/s

Top Width: 0.6148 ft

Froude Number: 0.7693

Critical Depth: 0.1763 ft

Critical Velocity: 2.0109 ft/s

Critical Slope: 0.0064 ft/ft

Critical Top Width: 0.59 ft

Calculated Max Shear Stress: 0.0479 lb/ft^2

Calculated Avg Shear Stress: 0.0272 lb/ft^2

Channel Analysis: SL#13

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0038 ft/ft

Manning's n: 0.0130

Flow: 0.1560 cfs

Result Parameters

Depth: 0.2067 ft

Area of Flow: 0.0925 ft^2

Wetted Perimeter: 0.7891 ft

Hydraulic Radius: 0.1172 ft

Average Velocity: 1.6871 ft/s

Top Width: 0.6189 ft

Froude Number: 0.7692

Critical Depth: 0.1806 ft

Critical Velocity: 2.0361 ft/s

Critical Slope: 0.0064 ft/ft

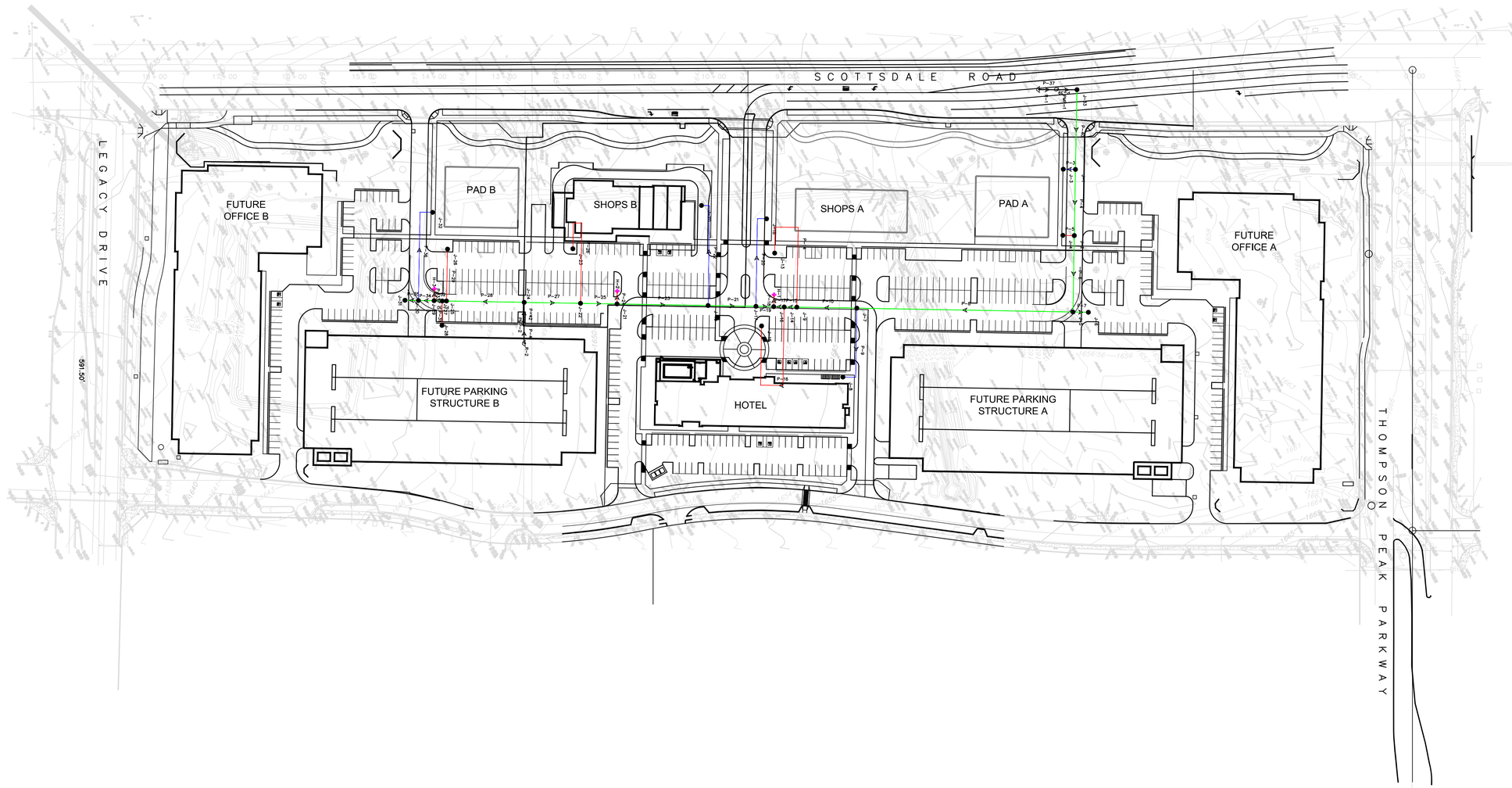
Critical Top Width: 0.59 ft

Calculated Max Shear Stress: 0.0490 lb/ft^2

Calculated Avg Shear Stress: 0.0278 lb/ft^2

APPENDIX E

Water Model Calculations & Exhibit



NORTH
SCALE IN FEET
0 80 160

Call at least two full working days before you begin excavation.
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In Maricopa County: (602) 263-1100

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
23980
JEFFREY S. ERICKSON
Date Signed 10/15/19
ARIZONA, U.S.A.
Expires 09/30/20

REVISION RECORD

NO	DATE	DESCRIPTION

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Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

ONE SCOTTSDALE
CIVIL IMPROVEMENT PLANS
SCOTTSDALE, AZ

WATER EXHIBIT-PHASE 1/PHASE 2

DRAWN BY:	BB
CHECKED BY:	KE
DATE:	10/15/19
DWG SCALE:	
PROJECT NO.	180-168
APPROVED BY:	JSE

DRAWING NO.:
EX-1
SHEET 1 OF 1

P:\2018\180--168\--DOD\Dwg\Exhibits\180--168 WaterCAD Exhibit.dwg(LAYOUT1) LS:(10/22/2019 - 10:07:00) - LD: 10/22/2019 2:21 PM

Phase1/Phase2

Average Day Demand **FlexTable: Junction Table**

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	10	1,162.22	70
J-2	1,000.00	0	1,162.12	70
J-3	1,000.00	0	1,162.22	70
J-4	1,000.00	0	1,162.12	70
J-5	1,000.00	0	1,162.00	70
J-6	1,000.00	150	1,161.98	70
J-7	1,000.00	0	1,161.95	70
J-8	1,000.00	77	1,159.72	69
J-9	1,000.00	0	1,161.95	70
J-13	1,000.00	0	1,161.95	70
J-14	1,000.00	0	1,161.95	70
J-15	1,000.00	0	1,161.95	70
J-16	1,000.00	0	1,161.95	70
J-17	1,000.00	0	1,161.95	70
J-18	1,000.00	11	1,161.47	70
J-19	1,000.00	0	1,161.96	70
J-20	1,000.00	19	1,160.33	69
J-21	1,000.00	0	1,161.96	70
J-22	1,000.00	0	1,161.96	70
J-23	1,000.00	0	1,161.96	70
J-24	1,000.00	0	1,161.97	70
J-25	1,000.00	0	1,161.85	70
J-26	1,000.00	0	1,161.85	70
J-27	1,000.00	0	1,161.85	70
J-28	1,000.00	0	1,161.85	70
J-29	1,000.00	0	1,161.84	70
J-30	1,000.00	0	1,161.81	70
J-31	1,000.00	200	1,161.79	70
J-32	1,000.00	10	1,161.37	70
J-33	1,000.00	0	1,162.36	70

Phase1/Phase2

Average Day Demand **FlexTable: Pipe Table**

Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
17	J-1	J-3	2.0	Ductile Iron	130.0	0	0.00
95	J-1	J-2	8.0	Ductile Iron	130.0	221	1.41
16	J-2	J-4	4.0	Ductile Iron	130.0	0	0.00
109	J-2	J-5	8.0	Ductile Iron	130.0	221	1.41
22	J-5	J-6	8.0	Ductile Iron	130.0	150	0.96
309	J-5	J-7	8.0	Ductile Iron	130.0	70	0.45
117	J-7	J-8	3.0	Ductile Iron	130.0	77	3.52
86	J-7	J-9	8.0	Ductile Iron	130.0	-7	0.04
185	J-9	J-13	6.0	Ductile Iron	130.0	0	0.00
18	J-9	J-14	8.0	Ductile Iron	130.0	-7	0.04
229	J-14	J-15	4.0	Ductile Iron	130.0	0	0.00
15	J-14	J-16	8.0	Ductile Iron	130.0	-7	0.04
17	J-16	H-1	6.0	Ductile Iron	130.0	0	0.00
26	J-16	J-17	8.0	Ductile Iron	130.0	-7	0.04
138	J-17	J-18	2.0	Ductile Iron	130.0	11	1.09
68	J-17	J-19	8.0	Ductile Iron	130.0	-18	0.11
155	J-19	J-20	2.0	Ductile Iron	130.0	19	1.98
130	J-19	J-21	8.0	Ductile Iron	130.0	-37	0.24
18	J-21	H-2	6.0	Ductile Iron	130.0	0	0.00
52	J-21	J-22	8.0	Ductile Iron	130.0	-37	0.24
164	J-22	J-23	4.0	Ductile Iron	130.0	0	0.00
81	J-22	J-24	8.0	Ductile Iron	130.0	-37	0.24
111	J-24	J-25	8.0	Ductile Iron	130.0	210	1.34
74	J-25	J-26	4.0	Ductile Iron	130.0	0	0.00
6	J-25	J-27	8.0	Ductile Iron	130.0	210	1.34
35	J-27	J-28	4.0	Ductile Iron	130.0	0	0.00
12	J-27	J-29	8.0	Ductile Iron	130.0	210	1.34
17	J-29	H-3	6.0	Ductile Iron	130.0	0	0.00
22	J-29	J-30	8.0	Ductile Iron	130.0	210	1.34
19	J-30	J-31	8.0	Ductile Iron	130.0	200	1.28
144	J-30	J-32	2.0	Ductile Iron	130.0	10	1.02
26	R-1	PMP-1	120.0	Ductile Iron	130.0	231	0.01
29	PMP-1	J-33	12.0	Ductile Iron	130.0	231	0.65
114	J-33	J-1	8.0	Ductile Iron	130.0	231	1.47
29	R-2	PMP-2	120.0	Ductile Iron	130.0	247	0.01
30	PMP-2	J-24	12.0	Ductile Iron	130.0	247	0.70

Phase1/Phase2

Average Day Demand

FlexTable: Hydrant Table

Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	Open	0.00	0	1,161.95	503
H-2	Open	0.00	0	1,161.96	503
H-3	Open	0.00	0	1,161.84	503

Phase1/Phase2

Average Day Demand **FlexTable: Reservoir Table**

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	1,001.00	231	1,001.00
R-2	1,001.00	247	1,001.00

Average Day Demand **FlexTable: Pump Table**

Label	Elevation (ft)	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,001.00	On	1,001.00	1,162.37	231	161.37
PMP-2	1,001.00	On	1,001.00	1,161.97	247	160.97

Phase1/Phase2

Peak Hour Demand **FlexTable: Pipe Table**

Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
17	J-1	J-3	2.0	Ductile Iron	130.0	0	0.00
95	J-1	J-2	8.0	Ductile Iron	130.0	735	4.69
16	J-2	J-4	4.0	Ductile Iron	130.0	0	0.00
109	J-2	J-5	8.0	Ductile Iron	130.0	735	4.69
22	J-5	J-6	8.0	Ductile Iron	130.0	525	3.35
309	J-5	J-7	8.0	Ductile Iron	130.0	210	1.34
117	J-7	J-8	3.0	Ductile Iron	130.0	271	12.31
86	J-7	J-9	8.0	Ductile Iron	130.0	-61	0.39
185	J-9	J-13	6.0	Ductile Iron	130.0	0	0.00
18	J-9	J-14	8.0	Ductile Iron	130.0	-61	0.39
229	J-14	J-15	4.0	Ductile Iron	130.0	0	0.00
15	J-14	J-16	8.0	Ductile Iron	130.0	-61	0.39
17	J-16	H-1	6.0	Ductile Iron	130.0	0	0.00
26	J-16	J-17	8.0	Ductile Iron	130.0	-61	0.39
138	J-17	J-18	2.0	Ductile Iron	130.0	37	3.81
68	J-17	J-19	8.0	Ductile Iron	130.0	-99	0.63
155	J-19	J-20	2.0	Ductile Iron	130.0	68	6.92
130	J-19	J-21	8.0	Ductile Iron	130.0	-166	1.06
18	J-21	H-2	6.0	Ductile Iron	130.0	0	0.00
52	J-21	J-22	8.0	Ductile Iron	130.0	-166	1.06
164	J-22	J-23	4.0	Ductile Iron	130.0	0	0.00
81	J-22	J-24	8.0	Ductile Iron	130.0	-166	1.06
111	J-24	J-25	8.0	Ductile Iron	130.0	736	4.69
74	J-25	J-26	4.0	Ductile Iron	130.0	0	0.00
6	J-25	J-27	8.0	Ductile Iron	130.0	736	4.69
35	J-27	J-28	4.0	Ductile Iron	130.0	0	0.00
12	J-27	J-29	8.0	Ductile Iron	130.0	736	4.69
17	J-29	H-3	6.0	Ductile Iron	130.0	0	0.00
22	J-29	J-30	8.0	Ductile Iron	130.0	736	4.69
19	J-30	J-31	8.0	Ductile Iron	130.0	701	4.47
144	J-30	J-32	2.0	Ductile Iron	130.0	35	3.57
26	R-1	PMP-1	120.0	Ductile Iron	130.0	770	0.02
29	PMP-1	J-33	12.0	Ductile Iron	130.0	770	2.19
114	J-33	J-1	8.0	Ductile Iron	130.0	770	4.92
29	R-2	PMP-2	120.0	Ductile Iron	130.0	902	0.03
30	PMP-2	J-24	12.0	Ductile Iron	130.0	902	2.56

Phase1/Phase2

Peak Hour Demand **FlexTable: Junction Table**

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	35	1,147.46	64
J-2	1,000.00	0	1,146.48	63
J-3	1,000.00	0	1,147.46	64
J-4	1,000.00	0	1,146.48	63
J-5	1,000.00	0	1,145.35	63
J-6	1,000.00	525	1,145.23	63
J-7	1,000.00	0	1,145.04	63
J-8	1,000.00	271	1,122.34	53
J-9	1,000.00	0	1,145.05	63
J-13	1,000.00	0	1,145.05	63
J-14	1,000.00	0	1,145.05	63
J-15	1,000.00	0	1,145.05	63
J-16	1,000.00	0	1,145.05	63
J-17	1,000.00	0	1,145.05	63
J-18	1,000.00	37	1,140.15	61
J-19	1,000.00	0	1,145.07	63
J-20	1,000.00	68	1,128.53	56
J-21	1,000.00	0	1,145.16	63
J-22	1,000.00	0	1,145.19	63
J-23	1,000.00	0	1,145.19	63
J-24	1,000.00	0	1,145.24	63
J-25	1,000.00	0	1,144.09	62
J-26	1,000.00	0	1,144.09	62
J-27	1,000.00	0	1,144.03	62
J-28	1,000.00	0	1,144.03	62
J-29	1,000.00	0	1,143.91	62
J-30	1,000.00	0	1,143.68	62
J-31	1,000.00	701	1,143.50	62
J-32	1,000.00	35	1,139.14	60
J-33	1,000.00	0	1,148.75	64

Phase1/Phase2

Peak Hour Demand **FlexTable: Hydrant Table**

Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	Open	1,000.00	0	1,145.05	63
H-2	Open	1,000.00	0	1,145.16	63
H-3	Open	1,000.00	0	1,143.91	62

Phase1/Phase2

Peak Hour Demand **FlexTable: Reservoir Table**

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	1,001.00	770	1,001.00
R-2	1,001.00	902	1,001.00

Phase1/Phase2

Peak Hour Demand **FlexTable: Pump Table**

Label	Elevation (ft)	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,001.00	On	1,001.00	1,148.79	770	147.79
PMP-2	1,001.00	On	1,001.00	1,145.31	902	144.31

Phase1/Phase2

Max Day + FF Demand **FlexTable: Pipe Table**

Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
17	J-1	J-3	2.0	Ductile Iron	130.0	0	0.00
95	J-1	J-2	8.0	Ductile Iron	130.0	2,012	12.84
16	J-2	J-4	4.0	Ductile Iron	130.0	0	0.00
109	J-2	J-5	8.0	Ductile Iron	130.0	2,012	12.84
22	J-5	J-6	8.0	Ductile Iron	130.0	300	1.92
309	J-5	J-7	8.0	Ductile Iron	130.0	1,712	10.93
117	J-7	J-8	3.0	Ductile Iron	130.0	155	7.03
86	J-7	J-9	8.0	Ductile Iron	130.0	1,557	9.94
185	J-9	J-13	6.0	Ductile Iron	130.0	0	0.00
18	J-9	J-14	8.0	Ductile Iron	130.0	1,557	9.94
229	J-14	J-15	4.0	Ductile Iron	130.0	300	7.66
15	J-14	J-16	8.0	Ductile Iron	130.0	1,257	8.02
17	J-16	H-1	6.0	Ductile Iron	130.0	1,500	17.02
26	J-16	J-17	8.0	Ductile Iron	130.0	-243	1.55
138	J-17	J-18	2.0	Ductile Iron	130.0	21	2.18
68	J-17	J-19	8.0	Ductile Iron	130.0	-264	1.69
155	J-19	J-20	2.0	Ductile Iron	130.0	39	3.96
130	J-19	J-21	8.0	Ductile Iron	130.0	-303	1.93
18	J-21	H-2	6.0	Ductile Iron	130.0	1,250	14.18
52	J-21	J-22	8.0	Ductile Iron	130.0	-1,553	9.91
164	J-22	J-23	4.0	Ductile Iron	130.0	0	0.00
81	J-22	J-24	8.0	Ductile Iron	130.0	-1,553	9.91
111	J-24	J-25	8.0	Ductile Iron	130.0	1,670	10.66
74	J-25	J-26	4.0	Ductile Iron	130.0	0	0.00
6	J-25	J-27	8.0	Ductile Iron	130.0	1,670	10.66
35	J-27	J-28	4.0	Ductile Iron	130.0	0	0.00
12	J-27	J-29	8.0	Ductile Iron	130.0	1,670	10.66
17	J-29	H-3	6.0	Ductile Iron	130.0	1,250	14.18
22	J-29	J-30	8.0	Ductile Iron	130.0	420	2.68
19	J-30	J-31	8.0	Ductile Iron	130.0	400	2.56
144	J-30	J-32	2.0	Ductile Iron	130.0	20	2.04
26	R-1	PMP-1	120.0	Ductile Iron	130.0	2,032	0.06
29	PMP-1	J-33	12.0	Ductile Iron	130.0	2,032	5.77
114	J-33	J-1	8.0	Ductile Iron	130.0	2,032	12.97
29	R-2	PMP-2	120.0	Ductile Iron	130.0	3,223	0.09
30	PMP-2	J-24	12.0	Ductile Iron	130.0	3,223	9.14

Phase1/Phase2

Max Day + FF Demand **FlexTable: Junction Table**

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	20	1,105.79	46
J-2	1,000.00	0	1,099.48	43
J-3	1,000.00	0	1,105.79	46
J-4	1,000.00	0	1,099.48	43
J-5	1,000.00	0	1,092.19	40
J-6	1,000.00	300	1,092.15	40
J-7	1,000.00	0	1,076.90	33
J-8	1,000.00	155	1,068.84	30
J-9	1,000.00	0	1,073.33	32
J-13	1,000.00	0	1,073.33	32
J-14	1,000.00	0	1,072.59	31
J-15	1,000.00	300	1,059.42	26
J-16	1,000.00	0	1,072.17	31
J-17	1,000.00	0	1,072.20	31
J-18	1,000.00	21	1,070.46	30
J-19	1,000.00	0	1,072.31	31
J-20	1,000.00	39	1,066.44	29
J-21	1,000.00	0	1,072.57	31
J-22	1,000.00	0	1,074.73	32
J-23	1,000.00	0	1,074.73	32
J-24	1,000.00	0	1,078.05	34
J-25	1,000.00	0	1,072.80	31
J-26	1,000.00	0	1,072.80	31
J-27	1,000.00	0	1,072.52	31
J-28	1,000.00	0	1,072.52	31
J-29	1,000.00	0	1,071.96	31
J-30	1,000.00	0	1,071.88	31
J-31	1,000.00	400	1,071.82	31
J-32	1,000.00	20	1,070.27	30
J-33	1,000.00	0	1,113.54	49

Phase1/Phase2

Max Day + FF Demand **FlexTable: Hydrant Table**

Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	Open	1,000.00	1,500	1,069.50	30
H-2	Open	1,000.00	1,250	1,070.51	31
H-3	Open	1,000.00	1,250	1,070.06	30

Phase1/Phase2

Max Day + FF Demand **FlexTable: Reservoir Table**

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	1,001.00	2,032	1,001.00
R-2	1,001.00	3,223	1,001.00

Phase1/Phase2

Max Day + FF Demand **FlexTable: Pump Table**

Label	Elevation (ft)	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,001.00	On	1,001.00	1,113.81	2,032	112.81
PMP-2	1,001.00	On	1,001.00	1,078.72	3,223	77.72

NORTH

SCALE IN FEET

0 80 160

REVISION RECORD

NO	DATE	DESCRIPTION

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DATE:	10/15/19
DWG SCALE:	
PROJECT NO:	180-168
APPROVED BY:	JSE

DRAWING NO.:

EX-1

SHEET 1 OF 1

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
23980
JEFFREY S. ERICKSON
Date Signed 10/15/19
ARIZONA, U.S.A.
Expires 09/30/20

Call at least two full working days before you begin excavation.
ARIZONA 811
Arizona Blue Stake, Inc.
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Overall

Average Day Demand **FlexTable: Junction Table**

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	0	1,164.97	71
J-2	1,000.00	0	1,164.94	71
J-3	1,000.00	10	1,164.92	71
J-4	1,000.00	0	1,164.94	71
J-5	1,000.00	0	1,164.91	71
J-7	1,000.00	0	1,164.87	71
J-8	1,000.00	77	1,162.64	70
J-9	1,000.00	0	1,164.87	71
J-13	1,000.00	0	1,164.87	71
J-14	1,000.00	0	1,164.87	71
J-15	1,000.00	0	1,164.87	71
J-16	1,000.00	0	1,164.87	71
J-17	1,000.00	0	1,164.87	71
J-18	1,000.00	11	1,164.39	71
J-19	1,000.00	0	1,164.87	71
J-20	1,000.00	19	1,163.24	71
J-21	1,000.00	0	1,164.87	71
J-22	1,000.00	0	1,164.87	71
J-23	1,000.00	0	1,164.87	71
J-24	1,000.00	0	1,164.88	71
J-25	1,000.00	0	1,164.86	71
J-26	1,000.00	0	1,164.86	71
J-27	1,000.00	0	1,164.85	71
J-28	1,000.00	0	1,164.85	71
J-29	1,000.00	0	1,164.85	71
J-30	1,000.00	0	1,164.85	71
J-32	1,000.00	10	1,164.40	71
J-33	1,000.00	0	1,165.01	71
J-34	1,000.00	0	1,164.81	71
J-35	1,000.00	0	1,164.81	71
J-36	1,000.00	0	1,164.78	71
J-37	1,000.00	200	1,156.45	68
J-38	1,000.00	0	1,164.79	71
J-39	1,000.00	0	1,164.81	71
J-40	1,000.00	0	1,164.91	71
J-41	1,000.00	0	1,164.91	71
J-42	1,000.00	0	1,164.91	71
J-43	1,000.00	0	1,164.90	71
J-44	1,000.00	0	1,164.90	71
J-45	1,000.00	0	1,164.90	71
J-46	1,000.00	0	1,164.90	71
J-47	1,000.00	150	1,160.61	69
J-48	1,000.00	0	1,164.92	71

Overall
Average Day Demand **FlexTable: Pipe Table**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-3	17	J-1	J-3	2.0	Ductile Iron	130.0	10	1.02
P-4	95	J-1	J-2	8.0	Ductile Iron	130.0	105	0.67
P-5	16	J-2	J-4	4.0	Ductile Iron	130.0	0	0.00
P-6	109	J-2	J-5	8.0	Ductile Iron	130.0	105	0.67
P-8	309	J-5	J-7	8.0	Ductile Iron	130.0	73	0.47
P-9	117	J-7	J-8	3.0	Ductile Iron	130.0	77	3.52
P-10	86	J-7	J-9	8.0	Ductile Iron	130.0	-4	0.03
P-14	185	J-9	J-13	6.0	Ductile Iron	130.0	0	0.00
P-15	18	J-9	J-14	8.0	Ductile Iron	130.0	-4	0.03
P-16	229	J-14	J-15	4.0	Ductile Iron	130.0	0	0.00
P-17	15	J-14	J-16	8.0	Ductile Iron	130.0	-4	0.03
P-18	17	J-16	H-1	6.0	Ductile Iron	130.0	0	0.00
P-19	26	J-16	J-17	8.0	Ductile Iron	130.0	-4	0.03
P-20	138	J-17	J-18	2.0	Ductile Iron	130.0	11	1.09
P-21	68	J-17	J-19	8.0	Ductile Iron	130.0	-15	0.09
P-22	155	J-19	J-20	2.0	Ductile Iron	130.0	19	1.98
P-23	130	J-19	J-21	8.0	Ductile Iron	130.0	-34	0.22
P-24	18	J-21	H-2	6.0	Ductile Iron	130.0	0	0.00
P-25	52	J-21	J-22	8.0	Ductile Iron	130.0	-34	0.22
P-26	164	J-22	J-23	4.0	Ductile Iron	130.0	0	0.00
P-27	81	J-22	J-24	8.0	Ductile Iron	130.0	-34	0.22
P-28	111	J-24	J-25	8.0	Ductile Iron	130.0	86	0.55
P-29	74	J-25	J-26	4.0	Ductile Iron	130.0	0	0.00
P-30	6	J-25	J-27	8.0	Ductile Iron	130.0	86	0.55
P-31	35	J-27	J-28	4.0	Ductile Iron	130.0	0	0.00
P-32	12	J-27	J-29	8.0	Ductile Iron	130.0	86	0.55
P-33	17	J-29	H-3	6.0	Ductile Iron	130.0	0	0.00
P-34	22	J-29	J-30	8.0	Ductile Iron	130.0	86	0.55
P-36	144	J-30	J-32	2.0	Ductile Iron	130.0	10	1.02
P-37	26	R-1	PMP-1	120.0	Ductile Iron	130.0	115	0.00
P-39	29	PMP-1	J-33	12.0	Ductile Iron	130.0	115	0.33
P-40	114	J-33	J-1	8.0	Ductile Iron	130.0	115	0.73
P-41	29	R-2	PMP-2	120.0	Ductile Iron	130.0	121	0.00
P-42	30	PMP-2	J-24	12.0	Ductile Iron	130.0	121	0.34
P-44	104	J-34	J-35	4.0	Ductile Iron	130.0	0	0.00
P-45	141	J-34	J-36	8.0	Ductile Iron	130.0	76	0.49
P-46	76	J-36	J-37	3.0	Ductile Iron	130.0	200	9.08
P-47	8	J-36	J-38	8.0	Ductile Iron	130.0	-124	0.79
P-48	18	J-38	H-4	6.0	Ductile Iron	130.0	0	0.00
P-49	58	J-38	J-39	8.0	Ductile Iron	130.0	-124	0.79
P-50	264	J-34	J-30	8.0	Ductile Iron	130.0	-76	0.49
P-51	15	R-3	PMP-3	120.0	Ductile Iron	130.0	124	0.00
P-52	15	PMP-3	J-39	12.0	Ductile Iron	130.0	124	0.35
P-53	103	J-5	J-40	8.0	Ductile Iron	130.0	32	0.20
P-54	15	J-40	H-5	6.0	Ductile Iron	130.0	0	0.00
P-55	18	J-40	J-41	8.0	Ductile Iron	130.0	32	0.20
P-56	129	J-41	J-42	4.0	Ductile Iron	130.0	0	0.00
P-57	284	J-41	J-43	8.0	Ductile Iron	130.0	32	0.20

Overall
Average Day Demand **FlexTable: Pipe Table**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-58	94	J-43	J-44	4.0	Ductile Iron	130.0	0	0.00
P-59	26	J-43	J-45	8.0	Ductile Iron	130.0	32	0.20
P-60	16	J-45	H-6	6.0	Ductile Iron	130.0	0	0.00
P-61	8	J-45	J-46	8.0	Ductile Iron	130.0	32	0.20
P-62	66	J-46	J-47	3.0	Ductile Iron	130.0	150	6.81
P-63	70	J-46	J-48	8.0	Ductile Iron	130.0	-119	0.76
P-64	13	R-4	PMP-4	120.0	Ductile Iron	130.0	119	0.00
P-65	14	PMP-4	J-48	12.0	Ductile Iron	130.0	119	0.34

Overall
Average Day Demand **FlexTable: Hydrant Table**

Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	Open	1,000.00	0	1,164.87	71
H-2	Open	1,000.00	0	1,164.87	71
H-3	Open	1,000.00	0	1,164.85	71
H-4	Open	1,000.00	0	1,164.79	71
H-5	Open	1,000.00	0	1,164.91	71
H-6	Open	1,000.00	0	1,164.90	71

Overall
Average Day Demand **FlexTable: Pump Table**

Label	Elevation (ft)	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,001.00	On	1,001.00	1,165.01	115	164.01
PMP-2	1,001.00	On	1,001.00	1,164.88	121	163.88
PMP-3	1,001.00	On	1,001.00	1,164.81	124	163.81
PMP-4	1,001.00	On	1,001.00	1,164.92	119	163.92

Overall
Average Day Demand

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	1,001.00	115	1,001.00
R-2	1,001.00	121	1,001.00
R-3	1,001.00	124	1,001.00
R-4	1,001.00	119	1,001.00

Overall
Peak Hour Demand **FlexTable: Junction Table**

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	0	1,158.35	69
J-2	1,000.00	0	1,158.11	68
J-3	1,000.00	35	1,157.80	68
J-4	1,000.00	0	1,158.11	68
J-5	1,000.00	0	1,157.83	68
J-7	1,000.00	0	1,157.44	68
J-8	1,000.00	271	1,134.74	58
J-9	1,000.00	0	1,157.44	68
J-13	1,000.00	0	1,157.44	68
J-14	1,000.00	0	1,157.44	68
J-15	1,000.00	0	1,157.44	68
J-16	1,000.00	0	1,157.44	68
J-17	1,000.00	0	1,157.45	68
J-18	1,000.00	37	1,152.54	66
J-19	1,000.00	0	1,157.46	68
J-20	1,000.00	68	1,140.91	61
J-21	1,000.00	0	1,157.52	68
J-22	1,000.00	0	1,157.54	68
J-23	1,000.00	0	1,157.54	68
J-24	1,000.00	0	1,157.58	68
J-25	1,000.00	0	1,157.38	68
J-26	1,000.00	0	1,157.38	68
J-27	1,000.00	0	1,157.37	68
J-28	1,000.00	0	1,157.37	68
J-29	1,000.00	0	1,157.35	68
J-30	1,000.00	0	1,157.31	68
J-32	1,000.00	35	1,152.78	66
J-33	1,000.00	0	1,158.70	69
J-34	1,000.00	0	1,156.94	68
J-35	1,000.00	0	1,156.94	68
J-36	1,000.00	0	1,156.74	68
J-37	1,000.00	701	1,071.94	31
J-38	1,000.00	0	1,156.78	68
J-39	1,000.00	0	1,157.02	68
J-40	1,000.00	0	1,157.79	68
J-41	1,000.00	0	1,157.79	68
J-42	1,000.00	0	1,157.79	68
J-43	1,000.00	0	1,157.70	68
J-44	1,000.00	0	1,157.70	68
J-45	1,000.00	0	1,157.69	68
J-46	1,000.00	0	1,157.69	68
J-47	1,000.00	525	1,114.03	49
J-48	1,000.00	0	1,157.93	68

Overall
Peak Hour Demand **FlexTable: Pipe Table**

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-3	17	J-1	J-3	2.0	Ductile Iron	130.0	35	3.57
P-4	95	J-1	J-2	8.0	Ductile Iron	130.0	347	2.22
P-5	16	J-2	J-4	4.0	Ductile Iron	130.0	0	0.00
P-6	109	J-2	J-5	8.0	Ductile Iron	130.0	347	2.22
P-8	309	J-5	J-7	8.0	Ductile Iron	130.0	235	1.50
P-9	117	J-7	J-8	3.0	Ductile Iron	130.0	271	12.31
P-10	86	J-7	J-9	8.0	Ductile Iron	130.0	-36	0.23
P-14	185	J-9	J-13	6.0	Ductile Iron	130.0	0	0.00
P-15	18	J-9	J-14	8.0	Ductile Iron	130.0	-36	0.23
P-16	229	J-14	J-15	4.0	Ductile Iron	130.0	0	0.00
P-17	15	J-14	J-16	8.0	Ductile Iron	130.0	-36	0.23
P-18	17	J-16	H-1	6.0	Ductile Iron	130.0	0	0.00
P-19	26	J-16	J-17	8.0	Ductile Iron	130.0	-36	0.23
P-20	138	J-17	J-18	2.0	Ductile Iron	130.0	37	3.81
P-21	68	J-17	J-19	8.0	Ductile Iron	130.0	-74	0.47
P-22	155	J-19	J-20	2.0	Ductile Iron	130.0	68	6.92
P-23	130	J-19	J-21	8.0	Ductile Iron	130.0	-141	0.90
P-24	18	J-21	H-2	6.0	Ductile Iron	130.0	0	0.00
P-25	52	J-21	J-22	8.0	Ductile Iron	130.0	-141	0.90
P-26	164	J-22	J-23	4.0	Ductile Iron	130.0	0	0.00
P-27	81	J-22	J-24	8.0	Ductile Iron	130.0	-141	0.90
P-28	111	J-24	J-25	8.0	Ductile Iron	130.0	286	1.82
P-29	74	J-25	J-26	4.0	Ductile Iron	130.0	0	0.00
P-30	6	J-25	J-27	8.0	Ductile Iron	130.0	286	1.82
P-31	35	J-27	J-28	4.0	Ductile Iron	130.0	0	0.00
P-32	12	J-27	J-29	8.0	Ductile Iron	130.0	286	1.82
P-33	17	J-29	H-3	6.0	Ductile Iron	130.0	0	0.00
P-34	22	J-29	J-30	8.0	Ductile Iron	130.0	286	1.82
P-36	144	J-30	J-32	2.0	Ductile Iron	130.0	35	3.57
P-37	26	R-1	PMP-1	120.0	Ductile Iron	130.0	382	0.01
P-39	29	PMP-1	J-33	12.0	Ductile Iron	130.0	382	1.08
P-40	114	J-33	J-1	8.0	Ductile Iron	130.0	382	2.44
P-41	29	R-2	PMP-2	120.0	Ductile Iron	130.0	427	0.01
P-42	30	PMP-2	J-24	12.0	Ductile Iron	130.0	427	1.21
P-44	104	J-34	J-35	4.0	Ductile Iron	130.0	0	0.00
P-45	141	J-34	J-36	8.0	Ductile Iron	130.0	251	1.60
P-46	76	J-36	J-37	3.0	Ductile Iron	130.0	701	31.80
P-47	8	J-36	J-38	8.0	Ductile Iron	130.0	-450	2.87
P-48	18	J-38	H-4	6.0	Ductile Iron	130.0	0	0.00
P-49	58	J-38	J-39	8.0	Ductile Iron	130.0	-450	2.87
P-50	264	J-34	J-30	8.0	Ductile Iron	130.0	-251	1.60
P-51	15	R-3	PMP-3	120.0	Ductile Iron	130.0	450	0.01
P-52	15	PMP-3	J-39	12.0	Ductile Iron	130.0	450	1.28
P-53	103	J-5	J-40	8.0	Ductile Iron	130.0	112	0.72
P-54	15	J-40	H-5	6.0	Ductile Iron	130.0	0	0.00
P-55	18	J-40	J-41	8.0	Ductile Iron	130.0	112	0.72
P-56	129	J-41	J-42	4.0	Ductile Iron	130.0	0	0.00
P-57	284	J-41	J-43	8.0	Ductile Iron	130.0	112	0.72

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-58	94	J-43	J-44	4.0	Ductile Iron	130.0	0	0.00
P-59	26	J-43	J-45	8.0	Ductile Iron	130.0	112	0.72
P-60	16	J-45	H-6	6.0	Ductile Iron	130.0	0	0.00
P-61	8	J-45	J-46	8.0	Ductile Iron	130.0	112	0.72
P-62	66	J-46	J-47	3.0	Ductile Iron	130.0	525	23.85
P-63	70	J-46	J-48	8.0	Ductile Iron	130.0	-413	2.64
P-64	13	R-4	PMP-4	120.0	Ductile Iron	130.0	413	0.01
P-65	14	PMP-4	J-48	12.0	Ductile Iron	130.0	413	1.17

Overall
Peak Hour Demand **FlexTable: Pump Table**

Label	Elevation (ft)	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,001.00	On	1,001.00	1,158.71	382	157.71
PMP-2	1,001.00	On	1,001.00	1,157.60	427	156.60
PMP-3	1,001.00	On	1,001.00	1,157.03	450	156.03
PMP-4	1,001.00	On	1,001.00	1,157.94	413	156.94

Overall
Peak Hour Demand **FlexTable: Hydrant Table**

Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	Open	1,000.00	0	1,157.44	68
H-2	Open	1,000.00	0	1,157.52	68
H-3	Open	1,000.00	0	1,157.35	68
H-4	Open	1,000.00	0	1,156.78	68
H-5	Open	1,000.00	0	1,157.79	68
H-6	Open	1,000.00	0	1,157.69	68

Overall
Peak Hour Demand **FlexTable: Reservoir Table**

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	1,001.00	382	1,001.00
R-2	1,001.00	427	1,001.00
R-3	1,001.00	450	1,001.00
R-4	1,001.00	413	1,001.00

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-3	17	J-1	J-3	2.0	Ductile Iron	130.0	20	2.04
P-4	95	J-1	J-2	8.0	Ductile Iron	130.0	1,867	11.92
P-5	16	J-2	J-4	4.0	Ductile Iron	130.0	0	0.00
P-6	109	J-2	J-5	8.0	Ductile Iron	130.0	1,867	11.92
P-8	309	J-5	J-7	8.0	Ductile Iron	130.0	1,305	8.33
P-9	117	J-7	J-8	3.0	Ductile Iron	130.0	155	7.03
P-10	86	J-7	J-9	8.0	Ductile Iron	130.0	1,151	7.34
P-14	185	J-9	J-13	6.0	Ductile Iron	130.0	0	0.00
P-15	18	J-9	J-14	8.0	Ductile Iron	130.0	1,151	7.34
P-16	229	J-14	J-15	4.0	Ductile Iron	130.0	300	7.66
P-17	15	J-14	J-16	8.0	Ductile Iron	130.0	851	5.43
P-18	17	J-16	H-1	6.0	Ductile Iron	130.0	1,500	17.02
P-19	26	J-16	J-17	8.0	Ductile Iron	130.0	-649	4.15
P-20	138	J-17	J-18	2.0	Ductile Iron	130.0	21	2.18
P-21	68	J-17	J-19	8.0	Ductile Iron	130.0	-671	4.28
P-22	155	J-19	J-20	2.0	Ductile Iron	130.0	39	3.96
P-23	130	J-19	J-21	8.0	Ductile Iron	130.0	-710	4.53
P-24	18	J-21	H-2	6.0	Ductile Iron	130.0	1,250	14.18
P-25	52	J-21	J-22	8.0	Ductile Iron	130.0	-1,960	12.51
P-26	164	J-22	J-23	4.0	Ductile Iron	130.0	0	0.00
P-27	81	J-22	J-24	8.0	Ductile Iron	130.0	-1,960	12.51
P-28	111	J-24	J-25	8.0	Ductile Iron	130.0	610	3.89
P-29	74	J-25	J-26	4.0	Ductile Iron	130.0	0	0.00
P-30	6	J-25	J-27	8.0	Ductile Iron	130.0	610	3.89
P-31	35	J-27	J-28	4.0	Ductile Iron	130.0	0	0.00
P-32	12	J-27	J-29	8.0	Ductile Iron	130.0	610	3.89
P-33	17	J-29	H-3	6.0	Ductile Iron	130.0	1,250	14.18
P-34	22	J-29	J-30	8.0	Ductile Iron	130.0	-640	4.09
P-36	144	J-30	J-32	2.0	Ductile Iron	130.0	20	2.04
P-37	26	R-1	PMP-1	120.0	Ductile Iron	130.0	1,887	0.05
P-39	29	PMP-1	J-33	12.0	Ductile Iron	130.0	1,887	5.35
P-40	114	J-33	J-1	8.0	Ductile Iron	130.0	1,887	12.04
P-41	29	R-2	PMP-2	120.0	Ductile Iron	130.0	2,569	0.07
P-42	30	PMP-2	J-24	12.0	Ductile Iron	130.0	2,569	7.29
P-44	104	J-34	J-35	4.0	Ductile Iron	130.0	0	0.00
P-45	141	J-34	J-36	8.0	Ductile Iron	130.0	-660	4.21
P-46	76	J-36	J-37	3.0	Ductile Iron	130.0	400	18.17
P-47	8	J-36	J-38	8.0	Ductile Iron	130.0	-1,061	6.77
P-48	18	J-38	H-4	6.0	Ductile Iron	130.0	1,250	14.18
P-49	58	J-38	J-39	8.0	Ductile Iron	130.0	-2,311	14.75
P-50	264	J-34	J-30	8.0	Ductile Iron	130.0	660	4.21
P-51	15	R-3	PMP-3	120.0	Ductile Iron	130.0	2,311	0.07
P-52	15	PMP-3	J-39	12.0	Ductile Iron	130.0	2,311	6.55
P-53	103	J-5	J-40	8.0	Ductile Iron	130.0	561	3.58
P-54	15	J-40	H-5	6.0	Ductile Iron	130.0	1,250	14.18
P-55	18	J-40	J-41	8.0	Ductile Iron	130.0	-689	4.40
P-56	129	J-41	J-42	4.0	Ductile Iron	130.0	0	0.00
P-57	284	J-41	J-43	8.0	Ductile Iron	130.0	-689	4.40

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-58	94	J-43	J-44	4.0	Ductile Iron	130.0	0	0.00
P-59	26	J-43	J-45	8.0	Ductile Iron	130.0	-689	4.40
P-60	16	J-45	H-6	6.0	Ductile Iron	130.0	1,250	14.18
P-61	8	J-45	J-46	8.0	Ductile Iron	130.0	-1,939	12.37
P-62	66	J-46	J-47	3.0	Ductile Iron	130.0	300	13.63
P-63	70	J-46	J-48	8.0	Ductile Iron	130.0	-2,239	14.29
P-64	13	R-4	PMP-4	120.0	Ductile Iron	130.0	2,239	0.06
P-65	14	PMP-4	J-48	12.0	Ductile Iron	130.0	2,239	6.35

Overall
Max Day + FF Demand

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	1,000.00	0	1,110.99	48
J-2	1,000.00	0	1,105.50	46
J-3	1,000.00	20	1,110.80	48
J-4	1,000.00	0	1,105.50	46
J-5	1,000.00	0	1,099.15	43
J-7	1,000.00	0	1,089.90	39
J-8	1,000.00	155	1,081.85	35
J-9	1,000.00	0	1,087.86	38
J-13	1,000.00	0	1,087.86	38
J-14	1,000.00	0	1,087.44	38
J-15	1,000.00	300	1,074.27	32
J-16	1,000.00	0	1,087.23	38
J-17	1,000.00	0	1,087.44	38
J-18	1,000.00	21	1,085.70	37
J-19	1,000.00	0	1,088.04	38
J-20	1,000.00	39	1,082.17	36
J-21	1,000.00	0	1,089.30	39
J-22	1,000.00	0	1,092.62	40
J-23	1,000.00	0	1,092.62	40
J-24	1,000.00	0	1,097.74	42
J-25	1,000.00	0	1,096.92	42
J-26	1,000.00	0	1,096.92	42
J-27	1,000.00	0	1,096.88	42
J-28	1,000.00	0	1,096.88	42
J-29	1,000.00	0	1,096.79	42
J-30	1,000.00	0	1,096.97	42
J-32	1,000.00	20	1,095.36	41
J-33	1,000.00	0	1,117.74	51
J-34	1,000.00	0	1,099.21	43
J-35	1,000.00	0	1,099.21	43
J-36	1,000.00	0	1,100.40	43
J-37	1,000.00	400	1,070.32	30
J-38	1,000.00	0	1,100.57	44
J-39	1,000.00	0	1,105.57	46
J-40	1,000.00	0	1,098.51	43
J-41	1,000.00	0	1,098.67	43
J-42	1,000.00	0	1,098.67	43
J-43	1,000.00	0	1,101.27	44
J-44	1,000.00	0	1,101.27	44
J-45	1,000.00	0	1,101.51	44
J-46	1,000.00	0	1,102.02	44
J-47	1,000.00	300	1,086.53	37
J-48	1,000.00	0	1,107.68	47

Overall
Max Day + FF Demand

FlexTable: Hydrant Table

Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	Open	1,000.00	1,500	1,084.56	37
H-2	Open	1,000.00	1,250	1,087.24	38
H-3	Open	1,000.00	1,250	1,094.90	41
H-4	Open	1,000.00	1,250	1,098.56	43
H-5	Open	1,000.00	1,250	1,096.80	42
H-6	Open	1,000.00	1,250	1,099.70	43

Overall
Max Day + FF Demand

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	1,001.00	1,887	1,001.00
R-2	1,001.00	2,569	1,001.00
R-3	1,001.00	2,311	1,001.00
R-4	1,001.00	2,239	1,001.00

FlexTable: Pump Table

Label	Elevation (ft)	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	1,001.00	On	1,001.00	1,117.98	1,887	116.98
PMP-2	1,001.00	On	1,001.00	1,098.17	2,569	97.17
PMP-3	1,001.00	On	1,001.00	1,105.75	2,311	104.75
PMP-4	1,001.00	On	1,001.00	1,107.84	2,239	106.84

Flow Test Summary

Project Name:	EJFT 19237
Project Address:	20201 N Scottsdale Rd, Scottsdale, AZ 85255
Date of Flow Test:	2019-10-09
Time of Flow Test:	7:00 AM
Data Reliable Until:	2020-04-09
Conducted By:	Cesar Reyna & Austin Gourley (EJ Flow Tests) 602.999.7637
Witnessed By:	Sonny Schreiner (City of Scottsdale) 602.819.7718
City Forces Contacted:	City of Scottsdale (602.819.7718)
Permit Number:	C59886

Note Scottsdale requires a max static pressure of 72 psi for safety factor.

Raw Flow Test Data

Static Pressure:	99.0 PSI
Residual Pressure:	79.0 PSI
Flowing GPM:	3,619
GPM @ 20 PSI:	7,598

Data with a 27 PSI Safety Factor

Static Pressure:	72.0 PSI
Residual Pressure:	52.0 PSI
Flowing GPM:	3,619
GPM @ 20 PSI:	6,062

Hydrant F_1

Pitot Pressure (1):	50	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	2.5	inches
Pitot Pressure (2):	50	PSI
Coefficient of Discharge (2):	0.9	
Hydrant Orifice Diameter (2):	2.5	inches

Hydrant F_2

Pitot Pressure (1):	55	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	2.5	inches

Static-Residual Hydrant

Flow Hydrant

Distance Between F_1 and R
1265 ft (measured linearly)

Static-Residual Elevation
1665 ft (above sea level)

Flow Hydrant (F_1) Elevation
1647 ft (above sea level)

Elevation & distance values are approximate

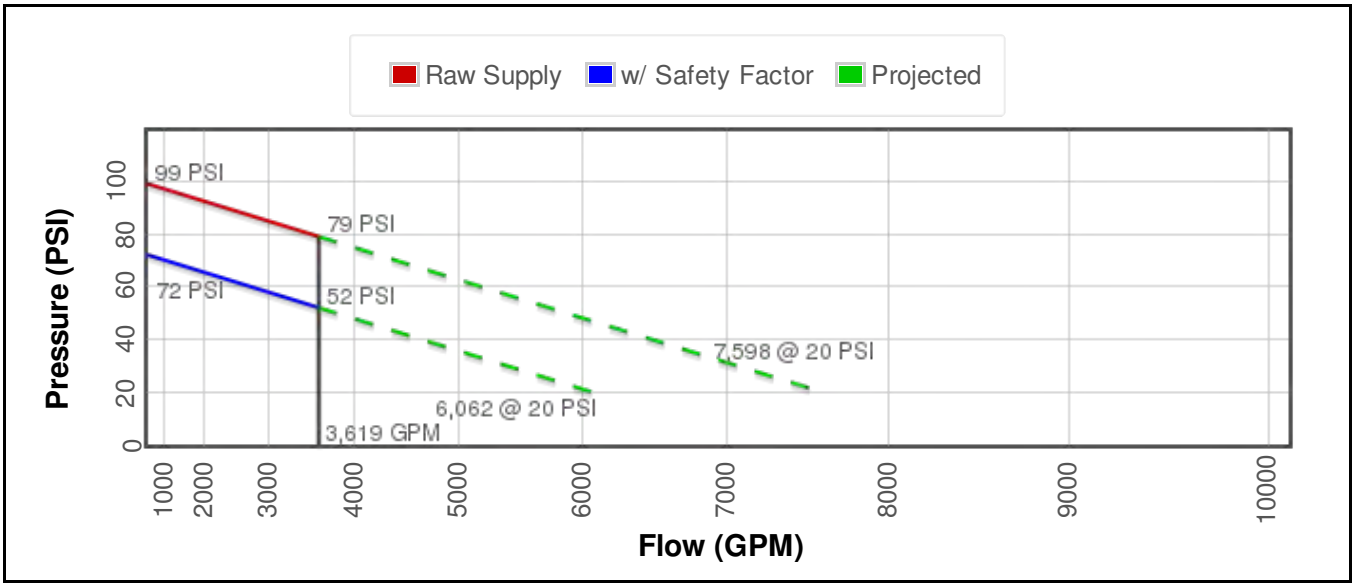
Flow Test Summary

Static-Residual Hydrant

Flow Hydrant (only hydrant F1 shown for clarity)

Approximate Project Site

Water Supply Curve $N^{1.85}$ Graph



WATER: REVISE AND RESUBMIT AHB 09/19/2019
1) No previous comments from 61-DR-2015#2 have been addressed AHB 09/19/2019
2) No site map/ concept utility Plan DSPM 6-1.202 AHB 09/19/2019
3) No network Diagram shown DSPM 6-1.202 AHB 09/19/2019
4) No Fire flow test provided. Referenced test is not attached but is also expired DSPM AHB 09/19/2019
5)There are numerous incorrect table values. Wrong demand node used in tables and was not what was referenced in report. AHB 09/19/2019
6) You lump summed your land use into "Office" but state that there will a hotel and retail pads for phase 1, both of which have COS tabulated values DSPM Figure 6-1.2 AHB 09/19/2019

WASTE WATER: REVISE AND RESUBMIT AHB 09/19/2019
1) Inconsistencies or confusion with new pipe connections to existing pipes. Are you connecting the new 12" to the new 15"? or both to the existing 10"? Please clarify. AHB 09/19/2019
2) You did not provide any reports or maps so I can not verify claims about easements or pipe locations, etc... DSPM 7-1.202 AHB 09/19/2019
3) Please include 100 GPM for pool backwash AHB 09/19/2019
4) your unit demand is for one land use type (office) and you stated there would be a hotel as well as retail shops. Please revise. DSPM 7-1.202 AHB 09/19/2019
5)I can not verify your existing off site flows into the proposed development or into the existing infrastructure. Please provide capacity details for the adjacent flows into the current and or new system AHB 09/19/2019

Water and Wastewater Study Basis of Design Report

For

One Scottsdale

Southeast Corner of Scottsdale Road and Thompson Peak Parkway
Scottsdale, Arizona

Prepared for

Ryan Companies US, Inc.
3900 E. Camelback Rd., Suite 100
Phoenix, AZ 85018

FINAL Basis of Design Report
❑ ACCEPTED
❑ ACCEPTED AS NOTED
☒ REVISE AND RESUBMIT

Reviewed by carollo
On behalf of the Scottsdale Water Resources Planning and Engineering Department

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 and 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 and clarifications contact the Water Resources Planning and Engineering Department at 480-321-5685

REVIEWER: Andrew Buell
EMAIL: abuell@carollo.com
DATE 09/19/2019

Missing Stamp; DSPM
6-1.202 AHB 9/16/19

April 9, 2019

CEC PN # 180-168

Civil & Environmental Consultants, Inc.
Phoenix | 11811 N. Tatum Boulevard, Suite 3057 | Phoenix, AZ 85028 | p: 602-760-2324 f: 602-760-2330 | www.cecinc.com

7-PP-2007#3
08/01/19

Table of Contents

Page No.

1.0 INTRODUCTION……...… 1

2.0 WATER STUDY – BASIS OF DESIGN……....…… 3

3.0 FIRE FLOW STUDY – BASIS OF DESIGN…… 4

4.0 WASTEWATER STUDY – BASIS OF DESIGN……...…….. 5

5.0 CONCLUSIONS…….5

APPENDIX A - SITE PLAN

APPENDIX B – OVERALL CONCEPTUAL UTILITY EXHIBIT IN BACK OF REPORT

APPENDIX C – PHASE 1 CONCEPTUAL UTILITY EXHIBIT IN BACK OF REPORT

APPENIDX D – SEWER EXHIBIT & CALCULATIONS

APPENDIX E – WATER MODEL CALCULATIONS & EXHIBIT

7-PP-2007#3
08/01/19

1.0 INTRODUCTION

The One Scottsdale project is a proposed 21.73 net acre commercial/retail project located southeast of the intersection of the Scottsdale Road and Thompson Peak Parkway in Scottsdale, Arizona. The site is further described as a portion of the NW1/4 of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to the Vicinity Map on the following page.

Your calculations cite Phase 1 as office space AHB 09/16/2019

The site will consist of a hotel, Class A office buildings, underground and above ground parking structures, and retail pads. Phase I of the project will incorporate the hotel site and retail pads along with parking lots and drives. Refer to the Site Plan located in Appendix A at the back of this report.

Missing AHB 09/16/2019

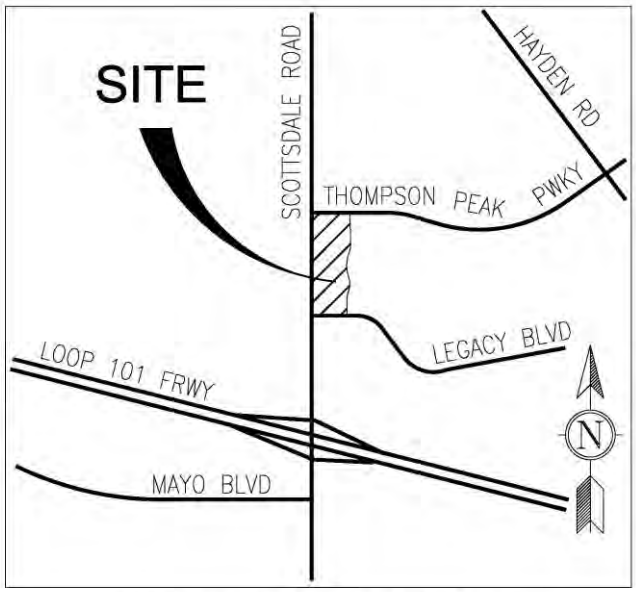
This Basis of Design report will document existing and proposed water and wastewater utility conditions for the 21.73-acre commercial parcel for the overall build-out condition and also the Phase 1 condition. Refer to the Concept Utility Plans located in Appendix B & C at the back of this report.

This site is located east of Scottsdale Road south of Thompson Peak Parkway, west of 73rd Drive, and north of Legacy Boulevard. Water and sewer utilities exist within the adjacent street and parcels, and are further described in the following section.

The purpose of this report is to satisfy the City of Scottsdale Design Review Board requirement regarding the basis of water and wastewater design for the proposed One Scottsdale project and to document water and sewer calculations for review and approval by the Maricopa County Environmental Services Department.

7-PP-2007#3
08/01/19

Vicinity Map



VICINITY MAP
N.T.S.

7-PP-2007#3
08/01/19

2.0 WATER STUDY – BASIS OF DESIGN

Existing Improvements

Existing public water lines are located on all sides of the proposed development. An existing 12-inch public water line is located on the north side of Thompson Peak Parkway within the public right of way. An existing 12-inch public water line is located in Scottsdale Road. An existing 16" public water line is located in Legacy Boulevard. An existing 12" public water line is located in 73rd Drive in a public utility easement. An existing 12" public water line extends between Scottsdale Road and 73rd Drive at the south 1/3 of the site. This line is located within a public utility easement. There is an existing PRV located at the NWC of the intersection of Scottsdale Road and Legacy Boulevard (#130) and at the NWC of the intersection of Legacy Boulevard and 73rd (#364).

Missing AHB 09/16/2019

Refer to the Concept Utility Plans in Appendix B & C at the back of this report for exact locations.

Proposed Improvements and Demand – Overall (21.73 acres)

The water needs for the project will be served by connecting an 8-inch public water line loop to the existing 12-inch public water line stub in Scottsdale Road and will loop back to two separate 8-inch connections in Scottsdale Road and one connection to the existing public water line in 73rd Drive. This will provide an overall water line loop for the entire development and eliminate the need for the existing 12-inch public water line that runs between Scottsdale Road and 73rd Drive. Once final construction is complete of the proposed 8" public water line loop, the existing 12" line will be removed.

The proposed 8-inch public waterline for this project will be constructed within a 20-foot wide public waterline easement. Refer to the Concept Utility Plan for proposed water line loop locations, fire hydrant locations, proposed 6-inch and 8-inch fireline stubs, 2" and 3" domestic services, and one 2" landscape service within the project. Where public water and sewer lines run parallel to each other they will be within a 20-foot easement with 8-feet of horizontal separation.

7-PP-2007#3
08/01/19

what are we exaggerating? AHB 09/16/2019

wrong unit demand. DSPM figure 6-1.2 AHB 09/16/2019

Calculations for estimated average day, max day, and peak demands for the development are as follows: exaggerate

DOMESTIC WATER DEMAND CALCULATIONS					
BUILDING/ PARCEL	SQUARE FOOTAGE	UNIT DEMAND (PER SQUARE FOOT)	TOTAL AVG. DAY DEMAND (GPM)	TOTAL MAX DAY DEMAND (GPM)	TOTAL PEAK DAY DEMAND (GPM)
PHASE 1	154,500	0.60	64.38	128.75	193
FUTURE PHASE NORTHWEST	133,500	0.60	55.63	111.25	167
FUTURE PHASE SOUTHEAST	154,500	0.60	64.38	128.75	193
FUTURE PHASE SOUTHWEST	133,500	0.60	55.63	111.25	167
FUTURE PAD A	8,000	1.30	7.22	14.44	22
FUTURE PAD B	8,000	1.30	7.22	14.44	22
FUTURE PAD C	8,000	1.30	7.22	14.44	22
FUTURE PAD D	8,000	1.30	7.22	14.44	22
TOTAL	***608,000***		***268.89***	***537.78***	***807***
DEMANDS ARE BASED ON PROPOSED BUILDING SQUARE FOOTAGE, USE, AND CITY OF SCOTTSDALE DESIGN STANDARDS & POLICIES MANUAL FIGURE 6.1-2					

material? DSPM 6-1.404

Proposed Improvements – Phase 1

The water needs for Phase 1 of the project will be served by connecting an 8-inch public water line loop to the existing 12-inch public water line in Scottsdale Road at the main drive entrance and will loop back to the existing 12-inch public water line Scottsdale Road at the northern drive entrance. This will provide an overall water line loop for the entire development. An isolation gate valve will be added just north of the middle public water line connection on the existing public water line located in Scottsdale Road in order to provide second sourcing in accordance with COS DS&PM Sec. 6-1.416 and 7-1.409.

Where????

The proposed 8-inch public waterline, for this project, will be constructed within a 20-foot wide public waterline easement. Refer to the Concept Utility Plans located in Appendix B & C at the back of this report for proposed water line loop locations, fire hydrant locations, proposed 6-inch and 8-inch fireline stubs, 2" and 3" domestic services, and one 2" landscape service within the project. Where public water and sewer lines run parallel to each other they will be within a 20-foot easement with 8 feet of horizontal separation.

The existing 12" public line that runs through the site between Scottsdale Road and 73rd Drive will remain in place until the overall development is constructed.

7-PP-2007#3
08/01/19

AHB 09/19/2019

Double Check Fire code for sprinkler reduction value

3.0 FIRE FLOW STUDY – BASIS OF DESIGN

A worst-case fire flow requirement for this project assumes the largest building for calculation purposes (Phase 1 Building). Below is a summary table documenting fire flows required for each building.

Multi use facility. Need to itemize the use for adequate FF

AHB 09/19/2019

FIRE FLOW DEMAND					
BUILDING	SQUARE FOOTAGE	CONSTR. TYPE	GPM REQUIRED	SPRINKLER REDUCTION	GPM ADJUSTED
PHASE 1	154,500	V-B	8000	50%	**4000**
FUTURE PHASE NORTHWEST	133,500	V-B	8000	50%	**4000**
FUTURE PHASE SOUTHEAST	154,500	V-B	8000	50%	**4000**
FUTURE PHASE SOUTHWEST	133,500	V-B	8000	50%	**4000**
FUTURE PAD A	8,000	V-B	2500	50%	**1500***
FUTURE PAD B	8,000	V-B	2500	50%	**1500***
FUTURE PAD C	8,000	V-B	2500	50%	**1500***
FUTURE PAD D	8,000	V-B	2500	50%	**1500***
SQUARE FOOTAGES ARE BASED ON GROSS BUILDING AREA					
GPM REQUIRED TAKEN FROM TABLE B105.1 OF THE INTERNATIONAL FIRE CODE					

Fire Flow Requirements = Max Day Demand + Sprinkler Flow+ 4000 Gal/Min (Commercial – Assume Sprinkler Flow = 500 GPM)

= 344 + 500 +4000 = 4844 GPM

Muse be no older than 1 yr. DSPM 6-1.202

AHB 09/19/2019

A flow and pressure test was performed on December 21, 2105 by EJ Flow Testing Services. A copy of this flow test is provided in Appendix E at the back of this report. The flow test performed by EJ Flow Testing Services resulted in a static pressure of 72 psi, a Residual pressure of 35 psi with an available flow of 4,258 gpm at 20 psi. The flows test incorporated a safety factor of 33 psi based on the City of Scottsdale maximum static pressure requirements. The full build-out will have a total of (4) points of connection to the public water supply. Phase 1 will have a total of (2) points of connection to the public water supply. This in conjunction with a looped system will provide adequate fire flow requirements for the proposed development.

A water model was created to simulate the proposed Overall water system and also the Phase 1 water system. The model was analyzed for (4) different scenarios: Average Day Demand, Maximum Day Demand, Peak Hour Demand, and Maximum Day Demand + Fire Flow. The model was created using

7-PP-2007#3
08/01/19

Bentley WaterCAD V8 XM. The assumptions made for the model were friction factors based on pipe material, and minor loss coefficients based on fittings and valves. Water model calculations and node exhibit is located in Appendix E at the back of this report. Below is a detailed list of assumptions for the water model.

Friction Factors:

Ductile Iron Pipe: Manning Coefficient of 0.012

Minor Losses K Values:

90 degree smooth bend D=2	0.22
45 degree bend mitered	0.20
Tee – Line Flow	0.35
Tee – Branch Flow	1.28

Overall - Average Day Demand Model Results

The total average day water demand of 268.89 gallons per minute was placed on J-11, J-38, J-56, J-69, J-17, J-50, J-26, and J-32 within the water model.

The water model was successful for the average day water demand for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during average day conditions. The minimum pressure calculated was 66.4 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 77.7 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 0.7 fps.

Overall - Maximum Day Demand Model Results

The total maximum day water demand of 537.78 gallons per minute was placed on J-11, J-38, J-56, J-69, J-17, J-50, J-26, and J-32 within the water model.

The water model was successful for the maximum day water demand for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during maximum day conditions. The minimum pressure calculated was 67.3 psi.

7-PP-2007#3
08/01/19

2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 67.8 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 1.15 fps.

Overall - Peak Hour Demand Model Results

The total peak hour water demand of 807 gallons per minute was placed on J-11, J-38, J-56, J-69, J-17, J-50, J-26, and J-32 within the water model.

The water model was successful for the peak hour water demand for the full build out condition based on the following factors:

1. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during peak hour conditions. The minimum pressure calculated was 62.6 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 65.8 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 1.82 fps.

Overall - Max Day Demand + Fire Flow Model Results

The total max day water demand of 128.75 gallons per minute was placed on J-26and fire flow demand of 1,500 gallons per minute was placed on H-2, a fire flow demand of 1,250 gallons per minute was placed on H-3 and also H-9. The total modeled flow for this scenario is 4,128.75 gallons per minute. The largest building (Phase 1) was used in this simulation assuming the worst case fire flow requirement of 4,000 gpm based on IFC criteria.

The water model was successful for max day demand + fire flow for the full build out condition based on the following factors:

AHB 09/19/2019

This node is not even in the provided table. You placed demand on J-15

1. Minimum water pressures are not less than 30 psi at the highest finished floor elevation during maximum day + fire flow conditions. The minimum pressure calculated was 41.8 psi.
2. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 60.3 psi.
3. The maximum velocity in the 8" onsite public water main was calculated to be 11.31 fps.

Phase 1 - Average Day Demand Model Results

The total average day water demand of 64.38 (Phase 1 Building only) gallons per minute was placed on J-26 within the water model.

7-PP-2007#3
08/01/19

The water model was successful for the average day water demand for the Phase 1 condition based on the following factors:

4. Minimum water pressures are not less than 40 psi during average day conditions. The minimum pressure calculated was 68.6 psi.
5. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 75.9 psi.
6. The maximum velocity in the 8" onsite public water main was calculated to be 0.41 fps.

Phase 1 - Maximum Day Demand Model Results

The total maximum day water demand of 128.75 gallons per minute was placed on J-26 within the water model.

The water model was successful for the maximum day water demand for the Phase 1 condition based on the following factors:

4. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during maximum day conditions. The minimum pressure calculated was 67.9 psi.
5. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 75.3 psi.
6. The maximum velocity in the 8" onsite public water main was calculated to be 0.82 fps.

Phase 1 - Peak Hour Demand Model Results

The total peak hour water demand of 193 gallons per minute was placed on J-26 within the water model.

The water model was successful for the peak hour water demand for the Phase 1 condition based on the following factors:

4. Minimum water pressures are not less than 40 psi at the highest finished floor elevation during peak hour conditions. The minimum pressure calculated was 67.2 psi.
5. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 74.5 psi.
6. The maximum velocity in the 8" onsite public water main was calculated to be 1.23 fps.

7-PP-2007#3
08/01/19

Phase 1 - Max Day Demand + Fire Flow Model Results

The total max day water demand of 128.75 gallons per minute was placed on J-26 and a fire flow demand of 1,500 gallons per minute was placed on H-10, a fire flow demand of 1,250 gallons per minute was placed on H-2 and also H-9. The total modeled flow for this scenario is 4,128.75 gallons per minute. The largest building (Phase 1) was used in this simulation assuming the worst case fire flow requirement of 4,000 gpm based on IFC criteria.

The water model was successful for max day demand + fire flow for the Phase 1 condition based on the following factors:

4. Minimum water pressures are not less than 30 psi at the highest finished floor elevation during maximum day + fire flow conditions. The minimum pressure calculated was 30.0 psi (H-2; rounded up from a calculated pressure of 29.5 – given multiple safety factors this was within the range of acceptability of the City of Scottsdale standards).
5. Maximum water pressures are not in excess of 80 psi. The maximum pressure calculated was 49.3 psi.
6. The maximum velocity in the 8" onsite public water main was calculated to be 13.46 fps.

4.0 WASTEWATER STUDY – BASIS OF DESIGN

Existing Improvements

An existing 15-inch VCP sewer line and manholes are located in Scottsdale Road just west of the proposed development, a 12-inch VCP sewer line and manholes in Thompson Peak Parkway just north of the proposed development, an 8-inch and 10-inch PVC sewer line in 73rd Avenue just east of the development, and a 12" PVC sewer line in Legacy Boulevard just south of the development. Also, there is an existing 10" PVC sewer line that through the proposed development between Scottsdale Road and 73rd Drive.

Proposed Improvements and Demands – Overall (21.73 acres)

The sewer needs for the One Scottsdale project will be served by extending a 15-inch and a 12-inch public sewer line through the site from Scottsdale Road, connecting to the existing 10-inch sewer line

AHB 09/19/2019
Please revise this statement to be more clear? What is the 12" connecting to?

7-PP-2007#3
08/01/19

what will the velocities be? AHB 09/19/2019

in 73rd Drive. The proposed 15-inch public sewer line will connect to an existing manhole in Scottsdale Road. Once fully constructed, the existing 10-inch sewer line will be removed. The proposed 15-inch and 12-inch sewer lines will run at a slope of 0.0024 ft/ft due to site constraints at the connection points. Onsite 8-inch and 6-inch private plumbing lines will then service each of the proposed buildings as they are developed and per Uniform Plumbing Code slopes. Private plumbing slopes onsite are run at approximately between 1.0% and 5.0% slope to service the most remote buildings on the site. Refer to the Concept Utility Plan for proposed sewer line locations, stub location, slopes and inverts. Refer to the Sewer Exhibit located in the Appendix D at the back of this report for proposed sewer line designations in reference to calculations. Hydraulic calculations for each sewer line segment has been provided in Appendix D at the back of this report.

NONE of this is provided AHB 09/19/2019

How are you coming up with this number? AHB 09/19/2019

Calculations for estimated average day and peak demands for the development are as follows:

PROPOSED WASTEWATER DEMAND CALCULATIONS						
BUILDING/ PARCEL	SQUARE FOOTAGE	UNIT DEMAND (PER SQUARE FOOT)	TOTAL AVG. DAY DEMAND (GPD)	TOTAL PEAK DAY DEMAND (GPD)	TOTAL PEAK DAY DEMAND (GPM)	TOTAL PEAK DAY DEMAND (CFS)
PHASE 1	154,500	0.40	61800	185400	129	0.29
FUTURE PHASE NORTHWEST	133,500	0.40	53400	160200	111	0.25
FUTURE PHASE SOUTHEAST	154,500	0.40	61800	185400	129	0.29
FUTURE PHASE SOUTHWEST	133,500	0.40	53400	160200	111	0.25
FUTURE PAD A - RESTAURANT	4,000	1.20	4800	28800	20	0.04
FUTRURE PAD A - COMMERCIAL	4,000	0.50	2000	6000	4	0.01
FUTURE PAD B - RESTAURANT	4,000	1.20	4800	28800	20	0.04
FUTURE PAD B - COMMERCIAL	4,000	0.50	2000	6000	4	0.01
FUTURE PAD C - RESTAURANT	4,000	1.20	4800	28800	20	0.04
FUTURE PAD C - COMMERCIAL	4,000	0.50	2000	6000	4	0.01
FUTURE PAD D - RESTAURANT	4,000	1.20	4800	28800	20	0.04
FUTURE PAD D - COMMERCIAL	4,000	0.50	2000	6000	4	0.01
TOTAL	***608,000.00***		***255869***	***824938***	***1379***	***1.28***
DEMANDS ARE BASED ON PROPOSED BUILDING SQUARE FOOTAGE, USE, AND CITY OF SCOTTSDALE DESIGN STANDARDS & POLICIES MANUAL FIGURE 7.1-2						

AHB 09/19/2019 Please include 100 GPM for pool backwash

Only a portion of the public sewer line will be built with Phase 1. During the overall construction an additional connection to 73rd Avenue will be constructed and the existing 10-inch sewer will be abandoned. A separate private sewer building connection will be constructed for Future Pad A with Phase 1. During the future phased construction, specifically Pad D, an additional private sewer building connection will be constructed from the existing sewer in Legacy Boulevard. These two connections will be single building feeds and will be 6-inch lines with a slope of 0.01 ft/ft.

Based on the One Scottsdale (Stacked 40s) Master On-Site Wastewater Plan, dated February 10, 2012, by Wood, Patel & Associates an upstream sewer flow of 0.69 cfs enters the proposed system at the

309.6 GPM AHB 09/19/2019

7-PP-2007#3
08/01/19

missing
AHB 09/19/2019

connection point in 73rd Avenue. A copy of the excerpts from the Stacked 40s Master On-Site Wastewater Plan has been provided in Appendix D at the back of this report. This flow was incorporated into this design. The existing One Scottsdale master plan outfall defined as "F1" had an estimated offsite wastewater flow of 207,479 gallons per day. The TDI development increased the estimated offsite wastewater flow to 446,145 gallons per day. The TDI development accompanied by this project estimates a total wastewater flow of 1.97 cfs at the connection to the existing 15-inch sewer in Scottsdale Road (this project contributing flow of 1.28 cfs + TDI offsite flow of 0.69 cfs).

This is confusing and does not add up. The GPD flow from the existing flow adds up to 446500 GPD, not after the flow increase. Please recheck or confirm

5.0 CONCLUSIONS

AHB 09/19/2019

The One Scottsdale project will provide service to the approximate 21.73-arce development (9 total buildings) by constructing a public looped 8" waterline system and one public 12" sewer line extended into the site to service proposed and future buildings. The water line will provide adequate protection for domestic, landscape and fire flow requirements.

The 15-inch and 12-inch public sewer line slopes are proposed at 0.24% from the existing 15-inch downstream sewer and the existing 10-inch upstream sewer. A 15-inch public sewer downstream connection will be made to an existing manhole located in Scottsdale Road.

In addition to your comments, please list or summarize specifics as to why this will meet COS requirements

AHB 09/19/2019

7-PP-2007#3
08/01/19

APPENDIX A

Site Plan

7-PP-2007#3
08/01/19

APPENDIX B

Overall Concept Utility Plan

7-PP-2007#3
08/01/19

APPENDIX C

Phase 1 Concept Utility Plan

7-PP-2007#3
08/01/19

APPENDIX D

Sewer Exhibit & Calculations

7-PP-2007#3
08/01/19

APPENDIX E

Water Model Calculations & Exhibit

7-PP-2007#3
08/01/19

Flex Table: Juction Table - Average Daily Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	31	J-1	0.00	1,167.09	72.00
36	36	J-4	0.00	1,167.09	72.00
41	41	J-7	0.00	1,167.09	72.00
42	42	J-8	0.00	1,167.09	72.00
44	44	J-9	0.00	1,167.09	72.00
45	45	J-10	0.00	1,167.09	72.00
47	47	J-11	0.00	1,167.09	72.00
48	48	J-12	0.00	1,167.09	72.00
53	53	J-14	0.00	1,166.78	72.00
54	54	J-15	28.00	1,166.72	72.00
56	56	J-16	0.00	1,167.09	72.00
57	57	J-17	0.00	1,167.09	72.00
59	59	J-18	0.00	1,167.09	72.00
60	60	J-19	0.00	1,166.95	72.00
65	65	J-20	0.00	1,167.09	72.00

These are not elevations.

AHB 09/19/2019

Flex Table: Hydrant Table - Average Daily Flow

Label	Demand (gpm)	Pressure (psi)	Elevation (ft)	Hydraulic Grade (ft)
H-1	0	72	1,000.00	1,167.09

Flex Table: Pipes Table - Average Daily Flow

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient	Flow (Maximum) (gpm)	Velocity (ft/s)
EX PIPE -1	R-3	PMP-2	120	Ductile Iron	130	0	14	0
EX PIPE -2	PMP-2	J-4	12	Ductile Iron	130	0	14	0.04
EX PIPE -3	PMP-1	J-1	12	Ductile Iron	130	0	14	0.04
EX PIPE -4	PMP-1	R-1	120	Ductile Iron	130	0	-14	0
PIPE -2	J-4	J-16	8	Ductile Iron	130	1	14	0.09
PIPE -4	J-9	J-10	8	Ductile Iron	130	1.28	0	0
PIPE -5	J-12	H-1	6	Ductile Iron	130	1	0	0
PIPE -6	J-9	J-1	8	Ductile Iron	130	1	-14	0.09
PIPE -8	J-11	J-12	8	Ductile Iron	130	0.35	-14	0.09
PIPE -9	J-7	J-11	8	Ductile Iron	130	0.35	-14	0.09
PIPE -10	J-18	J-7	8	Ductile Iron	130	0.35	-14	0.09
PIPE -11	J-16	J-18	8	Ductile Iron	130	1	14	0.09
PIPE -12	J-16	J-17	8	Ductile Iron	130	0.35	0	0
PIPE -15	J-18	J-19	3	Ductile Iron	130	1.28	28	1.25
PIPE -16	J-14	J-15	3	Ductile Iron	130	0.37	28	1.25
PIPE -17	J-11	J-20	8	Ductile Iron	130	1.28	0	0
PIPE -18	J-19	J-14	3	Ductile Iron	130	0	28	1.25
PIPE -19	J-7	J-8	8	Ductile Iron	130	1.28	0	0
PIPE-7	J-12	J-9	8	Ductile Iron	130	0	-14	0.09

Flex Table: Pump Table - Average Daily Flow

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
74	PMP-1	1,000.00	Pump - Phase 1	1,001.00	1,167.09	14	166.09
78	PMP-2	1,000.00	Pump - Phase 1	1,001.00	1,167.09	14	166.09

Flex Table: Reservoir Table - Average Daily Flow

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
72	R-1	1,001.00	14	1,001.00
77	R-3	1,001.00	14	1,001.00

Flex Table: Junctions Table - Max Daily Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	1,000.00	0	1,166.83	72
36	J-4	1,000.00	0	1,166.84	72
41	J-7	1,000.00	0	1,166.82	72
42	J-8	1,000.00	0	1,166.82	72
44	J-9	1,000.00	0	1,166.83	72
45	J-10	1,000.00	0	1,166.83	72
47	J-11	1,000.00	0	1,166.82	72
48	J-12	1,000.00	0	1,166.82	72
53	J-14	1,000.00	0	1,165.70	72
54	J-15	1,000.00	55	1,165.48	72
56	J-16	1,000.00	0	1,166.83	72
57	J-17	1,000.00	0	1,166.83	72
59	J-18	1,000.00	0	1,166.82	72
60	J-19	1,000.00	0	1,166.31	72
65	J-20	1,000.00	0	1,166.82	72

Flex Table: Hydrant Table - Max Daily Flow

Label	Demand (gpm)	Pressure (psi)	Elevation (ft)	Hydraulic Grade (ft)
H-1	0	72	1,000.00	1,166.82

Flex Table: Pipes Table - Max Daily Flow

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C
EX PIPE -1	R-3	PMP-2	120	Ductile Iron	130
EX PIPE -2	PMP-2	J-4	12	Ductile Iron	130
EX PIPE -3	PMP-1	J-1	12	Ductile Iron	130
EX PIPE -4	PMP-1	R-1	120	Ductile Iron	130
PIPE -2	J-4	J-16	8	Ductile Iron	130
PIPE -4	J-9	J-10	8	Ductile Iron	130
PIPE -5	J-12	H-1	6	Ductile Iron	130
PIPE -6	J-9	J-1	8	Ductile Iron	130
PIPE -8	J-11	J-12	8	Ductile Iron	130
PIPE -9	J-7	J-11	8	Ductile Iron	130
PIPE -10	J-18	J-7	8	Ductile Iron	130
PIPE -11	J-16	J-18	8	Ductile Iron	130
PIPE -12	J-16	J-17	8	Ductile Iron	130
PIPE -15	J-18	J-19	3	Ductile Iron	130
PIPE -16	J-14	J-15	3	Ductile Iron	130
PIPE -17	J-11	J-20	8	Ductile Iron	130
PIPE -18	J-19	J-14	3	Ductile Iron	130
PIPE -19	J-7	J-8	8	Ductile Iron	130
PIPE-7	J-12	J-9	8	Ductile Iron	130

Minor Loss Coefficient	Flow (Maximum) (g	Velocity (ft/s)
0	27	0
0	27	0.08
0	28	0.08
0	-28	0
1	27	0.17
1.28	0	0
1	0	0
1	-28	0.18
0.35	-28	0.18
0.35	-28	0.18
0.35	-28	0.18
1	27	0.17
0.35	0	0
1.28	55	2.5
0.37	55	2.5
1.28	0	0
0	55	2.5
1.28	0	0
0	-28	0.18

Flex Table: Pumps Table - Max Daily Flow

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)
74	PMP-1	1,000.00	Pump - Phase 1	1,001.00	1,166.83
78	PMP-2	1,000.00	Pump - Phase 1	1,001.00	1,166.84

Flow (Total) (gpm)	Pump Head (ft)
28	165.83
27	165.84

Flex Table: Reservoir Table - Max Daily Flow

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
72	R-1	1,001.00	28	1,001.00
77	R-3	1,001.00	27	1,001.00

Flex Table: Junctions Table - Peak Daily Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	31	J-1	0.00	1,166.56	72.00
36	36	J-4	0.00	1,166.56	72.00
41	41	J-7	0.00	1,166.53	72.00
42	42	J-8	0.00	1,166.53	72.00
44	44	J-9	0.00	1,166.54	72.00
45	45	J-10	0.00	1,166.54	72.00
47	47	J-11	0.00	1,166.54	72.00
48	48	J-12	0.00	1,166.54	72.00
53	53	J-14	0.00	1,164.11	71.00
54	54	J-15	83.00	1,163.63	71.00
56	56	J-16	0.00	1,166.55	72.00
57	57	J-17	0.00	1,166.55	72.00
59	59	J-18	0.00	1,166.53	72.00
60	60	J-19	0.00	1,165.42	72.00
65	65	J-20	0.00	1,166.54	72.00

Flex Table: Hydrant Table - Peak Daily Flow

Label	Demand (gpm)	Pressure (psi)	Elevation (ft)	Hydraulic Grade (ft)
H-1	0	72	1,000.00	1,166.54

Flex Table: Pipes Table - Peak Daily Flow

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient	Flow (Maximum) (gpm)	Velocity (ft/s)
EX PIPE -1	R-3	PMP-2	120	Ductile Iron	130	0	41	0
EX PIPE -2	PMP-2	J-4	12	Ductile Iron	130	0	41	0.12
EX PIPE -3	PMP-1	J-1	12	Ductile Iron	130	0	42	0.12
EX PIPE -4	PMP-1	R-1	120	Ductile Iron	130	0	-42	0
PIPE -2	J-4	J-16	8	Ductile Iron	130	1	41	0.26
PIPE -4	J-9	J-10	8	Ductile Iron	130	1.28	0	0
PIPE -5	J-12	H-1	6	Ductile Iron	130	1	0	0
PIPE -6	J-9	J-1	8	Ductile Iron	130	1	-42	0.27
PIPE -8	J-11	J-12	8	Ductile Iron	130	0.35	-42	0.27
PIPE -9	J-7	J-11	8	Ductile Iron	130	0.35	-42	0.27
PIPE -10	J-18	J-7	8	Ductile Iron	130	0.35	-42	0.27
PIPE -11	J-16	J-18	8	Ductile Iron	130	1	41	0.26
PIPE -12	J-16	J-17	8	Ductile Iron	130	0.35	0	0
PIPE -15	J-18	J-19	3	Ductile Iron	130	1.28	83	3.77
PIPE -16	J-14	J-15	3	Ductile Iron	130	0.37	83	3.77
PIPE -17	J-11	J-20	8	Ductile Iron	130	1.28	0	0
PIPE -18	J-19	J-14	3	Ductile Iron	130	0	83	3.77
PIPE -19	J-7	J-8	8	Ductile Iron	130	1.28	0	0
PIPE-7	J-12	J-9	8	Ductile Iron	130	0	-42	0.27

Flex Table: Pumps Table - Peak Daily Flow

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
74	PMP-1	1,000.00	Pump - North	1,001.00	1,166.56	42	165.56
78	PMP-2	1,000.00	Pump - North	1,001.00	1,166.56	41	165.56

Flex Table: Reservoir Table - Peak Daily Flow

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
72	R-1	1,001.00	42	1,001.00
77	R-3	1,001.00	41	1,001.00

Flex Table: Junctions Table - Max Day + Fire Flow

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	1,000.00	0	1,139.62	60
36	J-4	1,000.00	0	1,144.12	62
41	J-7	1,000.00	0	1,130.94	57
42	J-8	1,000.00	0	1,130.94	57
44	J-9	1,000.00	0	1,132.79	57
45	J-10	1,000.00	0	1,132.79	57
47	J-11	1,000.00	0	1,130.51	56
48	J-12	1,000.00	0	1,130.43	56
53	J-14	1,000.00	0	1,131.26	57
54	J-15	1,000.00	55	1,131.04	57
56	J-16	1,000.00	0	1,138.18	60
57	J-17	1,000.00	0	1,138.18	60
59	J-18	1,000.00	0	1,132.38	57
60	J-19	1,000.00	0	1,131.87	57
65	J-20	1,000.00	500	1,129.79	56

Flex Table: Hydrant Table - Max Day + Fire Flow

Label	Demand (gpm)	Pressure (psi)	Elevation (ft)	Hydraulic Grade (ft)
H-1	1,500	53	1,000.00	1,121.97

Flex Table: Pipes Table - Max Day + Fire Flow

Label	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C
EX PIPE -1	R-3	PMP-2	120	Ductile Iron	130
EX PIPE -2	PMP-2	J-4	12	Ductile Iron	130
EX PIPE -3	PMP-1	J-1	12	Ductile Iron	130
EX PIPE -4	PMP-1	R-1	120	Ductile Iron	130
PIPE -2	J-4	J-16	8	Ductile Iron	130
PIPE -4	J-9	J-10	8	Ductile Iron	130
PIPE -5	J-12	H-1	6	Ductile Iron	130
PIPE -6	J-9	J-1	8	Ductile Iron	130
PIPE -8	J-11	J-12	8	Ductile Iron	130
PIPE -9	J-7	J-11	8	Ductile Iron	130
PIPE -10	J-18	J-7	8	Ductile Iron	130
PIPE -11	J-16	J-18	8	Ductile Iron	130
PIPE -12	J-16	J-17	8	Ductile Iron	130
PIPE -15	J-18	J-19	3	Ductile Iron	130
PIPE -16	J-14	J-15	3	Ductile Iron	130
PIPE -17	J-11	J-20	8	Ductile Iron	130
PIPE -18	J-19	J-14	3	Ductile Iron	130
PIPE -19	J-7	J-8	8	Ductile Iron	130
PIPE-7	J-12	J-9	8	Ductile Iron	130

Minor Loss Coefficient	Flow (Maximum) (g	Velocity (ft/s)
0	944	0.03
0	944	2.68
0	1,111	3.15
0	-1,111	0.03
1	944	6.03
1.28	0	0
1	1,500	17.02
1	-1,111	7.09
0.35	389	2.48
0.35	889	5.68
0.35	889	5.68
1	944	6.03
0.35	0	0
1.28	55	2.5
0.37	55	2.5
1.28	500	3.19
0	55	2.5
1.28	0	0
0	-1,111	7.09

Flex Table: Pumps Table - Peak Daily Flow

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)
74	PMP-1	1,000.00	Pump - North	1,001.00	1,139.68
78	PMP-2	1,000.00	Pump - North	1,001.00	1,144.18

Flow (Total) (gpm)	Pump Head (ft)
1,111	138.68
944	143.18

Flex Table: Reservoir Table - Max Day + Fire Flow

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
72	R-1	1,001.00	1,111	1,001.00
77	R-3	1,001.00	944	1,001.00