

Sewer Basis of Design Report

Sereno Canyon Phase 4



prepared for:

Toll Brothers Inc.

8767 E. Via de Ventura, Suite 390
Scottsdale, Arizona 85258
480 951 0782

prepared by:



ARGUS CONSULTING
A CIVIL ENGINEERING COMPANY, PC

10115 E. Bell Road, Suite 107 - #104
Scottsdale, Arizona 85260
480 596 1131

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1.0 INTRODUCTION

1.1 General Description

This Sewer Basis of Design Report has been prepared to describe how sanitary sewer services will be provided to the proposed Sereno Canyon Phase 4 and Resort development, for Toll Brothers' Arizona Construction Company. The project is located within the City of Scottsdale, Arizona. This is the final phase of the Sereno Canyon Development that was developed by Crown Development in 2005. The development was to be subdivided into four phases. Phase 1 improvements have been completed. Phase 2 and Phase 3 will be completed in the future. Phase 4 of the project is approximately 121.65 acres with a total of 268 residential dwelling units and 29 Resort Casitas and a Restaurant 2400 square foot kitchen. The property is located on rolling terrain. The southern and western portions of the property slope to the north and to the east. The southeast portion of the property slope to the northeast and to the east. The site is within the elevation range from 2688 to 2855.

This analysis will present the design requirements for the collection system for the entire project and offsite lots *See Figure 2: Sewer Distribution Map.*

1.2 Location

The project is located in Section 11, Township 4 North, Range 5 East of the Gila and Salt River Baseline and Meridian, Maricopa County, Arizona. It is bound on south by Pinnacle Peak Road Alignment, west by 122nd Street and Phase 2 of Sereno Canyon. and on the north by Phase 1 and Phase 3 of Sereno Canyon and the East Alameda Road. and east by N. 128th Street and rural residential parcels. This property is located within Quarter Section map 45-57, and 45-58. *See Figure 1, Vicinity Map.*

1.3 Purpose

This report has been prepared to analyze the construction of the sanitary sewer system that will serve this project. The report shall provide technical information for the sanitary sewer distribution system for the entire project. This report analyzes the final design for the sewer distribution system. The lift station detailed design will be completed during the construction document process. The city will operate the Lift Station. The lift station is to be designed per the City's Lift Station Design Criteria, Dated Oct. 15th, 2015.

2.0 COLLECTION SYSTEM DESCRIPTION

2.1 Existing Collection System

Phase 4 of the Sereno Canyon development will connect to the City of Scottsdale existing sewer system. Approximately 97 dwelling units from phase 4 will convey their sewer flows to the existing 8 inch sewer pipe within East Alameda Road. The remaining 171 dwelling units will convey their sewer flows to the existing 8 inch sewer line within the East Ranch Gate Road. This 8 inch line within the East Ranch Gate Road alignment conveys flows to an existing sewer lift station located east of the Sereno Canyon project at the intersection of 128th St. and W. Buckskin Trail. This existing lift station has a 350 gpm capacity. Both 8 inch sewer lines have adequate capacity to include the additional sewer flows from the Sereno Canyon Development.

2.2 Proposed Collection System

The proposed collection system will convey the wastewater demand flows within a gravity pipe system. Of the 268 dwelling units and the 29 Resort Casitas and 2400 square foot restaurant, sewer flows from 97 units will be conveyed to the existing 8 inch sewer line within the E. Alameda Road alignment. The remaining 171 units and the 29 casitas will be conveyed to the 8 inch sewer line within the E. Ranch Gate Road alignment along the northern property boundary of Phase 1 of the Sereno Canyon Development. Of the 171 units, 130 dwelling units will be conveyed in an 8 inch sewer pipe line to a local on-site lift station. This lift station is design for a 170 gpm capacity. No off-site flows are proposed to be conveyed to this lift station. The location of the on-site lift station is near the northeast property of Phase 4. The lift station will discharge the demand flows from the lift station within a 3 inch force main to the proposed Biofilter site located near the intersection of the collector road and the resort. From the biofilter the flows will connect to the proposed SSMH-(56) then gravity feed north thru Phase 3 of Sereno Canyon and connect to the existing 8 inch sewer line within the E. Ranch Gate Road alignment. From the connection to the existing 8 inch sewer line in E. Ranch Gate Rd, the flows will be conveyed to the existing lift station located east of the project at the intersection of N. 128th Street and E. Buckskin Trail. All pipes within the project are to be gravity 8-inch diameter sewer pipe lines. See Figure 2: Sewer Distribution Map.

3.0 BASIS OF DESIGN

3.1 Design Flow Rates

As per the City of Scottsdale this Basis of Sewer Design Report was prepared according Design Standards & Policies Manual, dated January 2010. The following is a summary of the design criteria upon which this study is based.

Basis of Sewer Design

- The total number of units = 268 dwelling unit plus 29 Resort Casitas
- Per the City of Scottsdale design standards section 7-1.403 residential design flow will be 100 gallons per capita day with 2.5 persons per dwelling unit.
- Resort demand flows will be 380 gallons per casita (room)
- Resort Restaurant flows will be 1.2 gpd per square foot
- A peaking factor of 4 will be used for residential dwellings
- A peaking factor of 6 will be used for Resort Restaurant

Sewer flow was calculated as follows:

Total residential units = 268

Total Resort Casitas = 29

Total average day Flow = 100 gpcd x 2.5 persons x 268 units = 67,000 gpd

Total average day flows = 29 casitas x 380 = 11,020 gpd

Restaurant at Resort = 2400 sf kitchen x 1.2 = 2880 gpd

Average Daily Flow = 56.18 gpm = 0.1251 cfs

Residential Peak Day Flow = 54.18 gpm x 4 = 216.72 gpm = 0.4829 cfs

Restaurant Resort Peak Day Flow = 2 gpm x 6 = 12 gpm = 0.0046 cfs

Peak Hour Flow = 0.4875 cfs x 1.7 = 0.82875 cfs

The collection system design criterion is based on the City of Scottsdale DSPM. The following represents the design criteria for the collection system:

- Mean full flow velocity = 2.5 feet per second
- Peak Flow velocity = 10.0 feet per second maximum.
- The Manning's roughness coefficient, $n=0.013$ for all pipe materials.
- Maximum sewer capacity: $d/D=65\%$ at peak flow conditions.
- Manhole spacing shall not exceed 500 feet for sewer lines less than 18 inches in diameter
- The minimum drop in elevation from the invert to the outlet of a manhole shall be 0.1 feet.
- The minimum manhole diameter shall be 48 inches for manholes less than 10 feet deep and the pipe is less than 15 inches in diameter.
- MAG Standard 601 and 615 and any subsequent MAG specification and details, shall be followed for trench bedding.
- Minimum slopes: Use the minimum slope of 0.52% calculated from Manning's Formula using a sewage velocity of 2.5 feet per second when flowing full.
- Force Main shall be designed per the DSPM under section 7-1.303.
- Lift Station design shall include an allowance of 35 gpm per pump for swimming pool discharge.
- Line separation shall be designed per the DSPM under section 7-1.407.

3.2 Sewer Capacity

The Sereno Canyon Phase 4 development will accumulate 80,900 gallons per day average day flow at buildout. At Peak Day Flows the development will accumulate 329,360 gallons per day at buildout for the development. The existing lift station located east of the Sereno Canyon Development has a design capacity of 350 gpm. The peak dry weather flows contributing from the development are 217.59 gpm. These flows include the required 35 gpm allowance per pump for swimming pool discharge. The Peak Wet Weather Flows are calculated to be 228.24. Based on the analysis the existing sewage lift station has adequate capacity for the development.

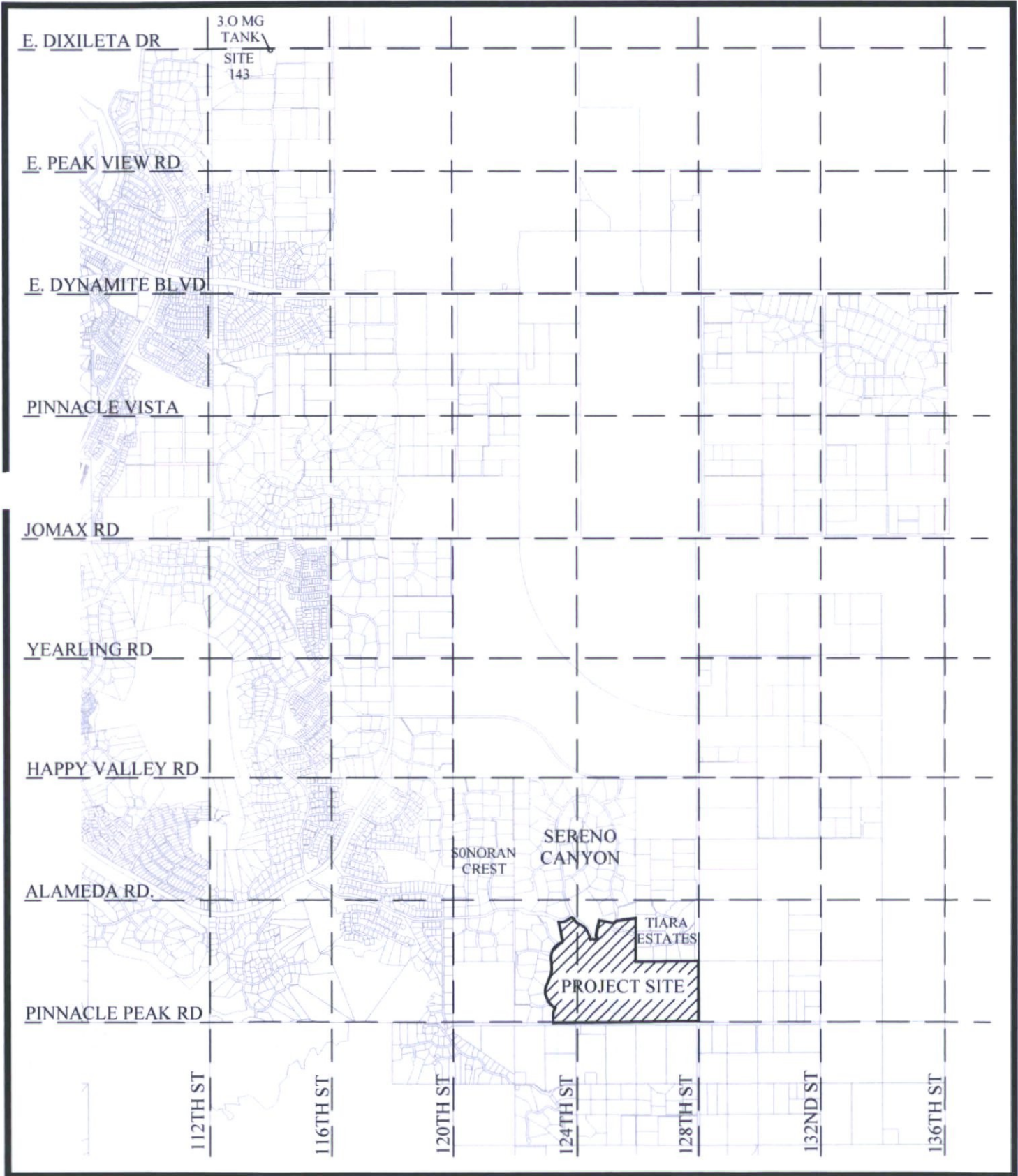
4.0 On-site Improvements

The collection system for the community is to be a gravity sewer system. The pipes shall be constructed within the proposed streets and dedicated sewer easements. The onsite gravity sewer collection system will collect and convey portions of the sewer flows to the existing 8 inch sewer line in E. Alameda Road, and a proposed Lift Station that will be constructed near the east property boundary of phase 4. This lift station is to discharge the sewer flows within a 3-inch diameter force main. The force main will be constructed within the proposed street section for the project. The force main will connect to a proposed odor control discharge divergence structure (Biofilter) located in a tract to be deeded to the City of Scottsdale, along the north right of way line of the collector street and the entry to the resort. From this structure, the flows will be discharged to a proposed sewer manhole depicted as SSMH-(56). Flows within this proposed 8 inch sewer line system are conveyed to the north within the N. 125th Street alignment to an existing manhole within phase 1 of Sereno Canyon, depicted as Exist SSMH- (6). From this existing manhole an 8- inch gravity pipe is constructed within the N. 125th Place alignment which connects to an existing 8 inch sewer line within the E. Ranch Gate Road alignment. Then the flows will be conveyed to the existing lift station located east of the Sereno Canyon Development at the northeast corner of the intersection of 128th Street and E. Buckskin Trail. See *Figure 2: Sewer Distribution Map*.

The proposed Lift Station will be designed per the minimum requirements of the Arizona Administration Code, Title 18, Chapter 9 "Water Pollution Control" and the City of Scottsdale Water Resources Department design standards. The total peak dry weather flows for the dwelling units being conveyed to the proposed on-site lift station are calculated to be 131.31 gpm plus the required 35 gpm flow allowance for swimming pool discharge for a total of 166.31 gpm. The proposed lift station should have a minimum capacity of 170 gpm. Final design calculations for the Lift Station will be completed with the final design phase of the project. The elevation difference from the order control structure and the proposed Lift Station is 51 feet. The flow velocities in the force main must be between 4 and 6 feet per second.

See Appendix A for calculations and a summary of the proposed system design and capacity. The appendix shows the proposed sewer slopes, projected peak flows, and pipe flow capacities meeting minimum design standards. Final hydraulics will be included in a Final Basis of Design Report.

Figure 1: Vicinity Map



SERENO CANYON
 PHASE 4
 SCOTTSDALE, AZ

VICINITY MAP
 FIGURE 1



ARGUS CONSULTING
 A CIVIL ENGINEERING COMPANY, P.C.
 10115 E. Bell Road, Suite 107 - #104
 Scottsdale, Arizona 85260 480-596-1131

Figure 2: Sewer Distribution Map

Appendix A: Proposed System Design and Capacity

Name	US Node	DS Node	US Invert (ft)	DS Invert (ft)	2D Length (ft) center-to-center edge-to-edge	% Slope	Size (in)	Tributary Pipes	Peak Cumulative Flow (cfs)	Depth to Diameter Ratio (d/D)	Peak Flow Velocity (ft/s)
E. Alameda Road Sewer outfall											
Pipe - (5)	SSMH- (7)	SSMH- (8)	2780.51	2777.03	70.03 66.03	4.96	8		0.0015	0.0298	0.4800
Pipe - (6)	SSMH- (8)	SSMH- (9)	2776.94	2774.28	46.29 42.29	5.74	8		0.0031	0.0440	0.9900
Pipe - (7)	SSMH- (9)	SSMH- (10)	2774.18	2771.46	47.17 43.17	5.77	8		0.0062	0.0440	1.7400
Pipe - (8)	SSMH- (10)	SSMH- (11)	2771.36	2766.45	81.44 77.44	6.02	8		0.0093	0.0440	1.6200
Pipe - (9)	SSMH- (11)	SSMH- (12)	2766.35	2762.45	49.61 45.61	7.87	8		0.0124	0.0440	2.1600
Pipe - (10)	SSMH- (12)	SSMH- (13)	2762.35	2759	48.38 44.38	6.92	8		0.0155	0.0597	1.7900
Pipe - (11)	SSMH- (13)	SSMH- (14)	2758.9	2757.85	48.19 44.19	2.18	8		0.0170	0.0746	1.4100
Pipe - (12)	SSMH- (14)	SSMH- (15)	2757.75	2756.69	48.1 44.1	2.21	8		0.0186	0.0746	1.5500
Pipe - (151)	SSMH- (15)	SSMH- (152)	2756.59	2755.66	168.48 164.48	0.55	8		0.0248	0.1190	1.0200
Pipe - (146)	SSMH- (152)	SSMH- (153)	2755.56	2755.28	47.65 43.65	0.6	8		0.0248	0.1040	1.0100
Pipe - (147)	SSMH- (153)	SSMH- (154)	2755.18	2754.69	81.96 77.96	0.6	8		0.0248	0.1040	1.0100
Pipe - (148)	SSMH- (154)	SSMH- (155)	2754.59	2748.94	194.84 190.84	2.9	8		0.0248	0.0746	1.6600
Pipe - (149)	SSMH- (155)	SSMH- (156)	2748.84	2741.7	134.42 130.42	5.31	8		0.0248	0.0746	2.0600
Pipe - (150)	SSMH- (156)	SSMH- (150)	2741.6	2735	135.93 131.93	4.86	8		0.0248	0.0746	2.0600
Pipe - (13)	SSMH- (16)	SSMH- (17)	2829.93	2825.81	53.97 49.97	7.62	8		0.0046	0.0298	1.4700
Pipe - (14)	SSMH- (17)	SSMH- (22)	2825.72	2821.91	57.3 53.3	6.64	8		0.0062	0.0447	1.0800
Pipe - (4)	SSMH- (6)	SSMH- (5)	2826.79	2825.36	108.09 104.09	1.32	8		0.0015	0.0299	0.4800
Pipe - (22)	SSMH- (5)	SSMH- (22)	2825.26	2821.93	107.38 103.38	3.11	8		0.0062	0.0448	1.0800
Pipe - (15)	SSMH- (22)	SSMH- (18)	2821.81	2818.16	58.18 54.18	6.27	8	PIPE 22	0.0124	0.0597	1.4400
Pipe - (16)	SSMH- (18)	SSMH- (19)	2817.96	2811.75	157 153	3.96	8		0.0201	0.0746	1.6700
Pipe - (17)	SSMH- (19)	SSMH- (20)	2811.65	2808.68	79.97 75.97	3.72	8		0.0232	0.0746	1.9300
Pipe - (18)	SSMH- (20)	SSMH- (23)	2808.58	2806.63	79.01 75.01	2.46	8		0.0263	0.0895	1.6700
Pipe - (19)	SSMH- (23)	SSMH- (25)	2806.53	2793.53	368.97 364.97	3.52	8		0.0418	0.1045	2.1200
Pipe - (23)	SSMH- (25)	SSMH- (24)	2793.43	2790.79	36.56 32.56	7.23	8		0.0418	0.0896	2.6500
Pipe - (20)	SSMH- (24)	SSMH- (21)	2790.69	2788.67	28.85 24.85	7	8		0.0418	0.0896	2.6500
Pipe - (21)	SSMH- (21)	SSMH- (142)	2788.57	2787.66	152.04 148.04	0.6	8		0.0449	0.1490	1.3600
Pipe - (127)	SSMH- (134)	SSMH- (135)	2809.9	2808.8	181.23 177.23	0.61	8		0.0031	0.0448	0.5400
Pipe - (129)	SSMH- (135)	SSMH- (136)	2808.7	2808.1	108.96 104.96	0.55	8		0.0046	0.0597	0.5300
Pipe - (130)	SSMH- (136)	SSMH- (137)	2808	2807	138.35 134.35	0.72	8		0.0062	0.0597	0.7200
Pipe - (131)	SSMH- (137)	SSMH- (138)	2806.9	2806.49	68.46 64.46	0.6	8		0.0077	0.0746	0.6400
Pipe - (132)	SSMH- (138)	SSMH- (139)	2806.4	2805.69	118.6 114.6	0.6	8		0.0093	0.0746	0.7700
Pipe - (133)	SSMH- (139)	SSMH- (140)	2805.6	2801.75	102.61 98.61	3.75	8		0.0108	0.0597	1.2500
Pipe - (134)	SSMH- (140)	SSMH- (141)	2801.65	2798	189.71 185.71	1.92	8		0.0124	0.0746	1.0300
Pipe - (135)	SSMH- (141)	SSMH- (142)	2797.9	2787.66	218.69 214.69	4.68	8		0.0155	0.0597	1.7900
Pipe - (136)	SSMH- (142)	SSMH- (143)	2787.56	2784.3	162.71 158.71	2	8	PIPE-21	0.0603	0.1340	2.1000
Pipe - (137)	SSMH- (143)	SSMH- (144)	2784.2	2777	135.57 131.57	5.31	8		0.0619	0.1045	3.1400
Pipe - (138)	SSMH- (144)	SSMH- (145)	2776.9	2768	158.87 154.87	5.6	8		0.0619	0.1045	3.1400
Pipe - (139)	SSMH- (145)	SSMH- (146)	2767.9	2765.5	116.08 112.08	2.07	8		0.0619	0.1343	2.1600
Pipe - (31)	SSMH- (34)	SSMH- (33)	2803.9	2799.26	118.69 114.69	3.91	8		0.0031	0.0299	0.9900
Pipe - (30)	SSMH- (33)	SSMH- (32)	2799.16	2796.05	102.82 98.82	3.02	8		0.0062	0.0448	1.0800
Pipe - (29)	SSMH- (32)	SSMH- (31)	2795.95	2793	97.61 93.61	3.02	8		0.0108	0.0597	1.2500
Pipe - (28)	SSMH- (31)	SSMH- (30)	2792.9	2788.82	127.35 123.35	3.2	8		0.0170	0.0746	1.4100
Pipe - (27)	SSMH- (30)	SSMH- (29)	2788.72	2784.47	78.84 74.84	5.4	8		0.0232	0.0746	1.9300
Pipe - (26)	SSMH- (29)	SSMH- (28)	2784.37	2779.78	74.72 70.72	6.15	8		0.0263	0.0746	2.1900
Pipe - (25)	SSMH- (28)	SSMH- (27)	2779.68	2771.43	144.3 140.3	5.72	8		0.0279	0.0746	2.3200
Pipe - (24)	SSMH- (27)	SSMH- (26)	2771.33	2768	61.43 57.43	5.42	8		0.0371	0.0896	2.3500
Pipe - (187)	SSMH- (26)	SSMH- (191)	2767.9	2766.07	149.44 145.44	1.22	8		0.0387	0.1194	1.6000
Pipe - (32)	SSMH- (35)	SSMH- (36)	2805.05	2796.3	160.74 156.74	5.45	8		0.0046	0.0299	1.4700
Pipe - (33)	SSMH- (36)	SSMH- (37)	2796.2	2788.77	182.64 178.64	4.07	8		0.0077	0.0448	1.3400
Pipe - (34)	SSMH- (38)	SSMH- (37)	2789.26	2788.77	95.04 91.04	0.52	8		0.0046	0.0597	0.5300
Pipe - (40)	SSMH- (37)	SSMH- (44)	2788.67	2786.87	48.53 44.53	3.7	8	Pipes 33, 34	0.0139	0.0597	1.6100
Pipe - (39)	SSMH- (44)	SSMH- (43)	2786.77	2784.67	134.41 130.41	1.57	8		0.0186	0.0896	1.1800

Name	US Node	DS Node	US Invert (ft)	DS Invert (ft)	2D Length (ft) center-to-center edge-to-edge	% Slope	Size (in)	Tributary Pipes	Peak Cumulative Flow (cfs)	Depth to Diameter Ratio (d/D)	Peak Flow Velocity (ft/s)
Pipe - (38)	SSMH- (43)	SSMH- (42)	2784.57	2783.66	148.31 144.31	0.61	8		0.0248	0.1194	1.0200
Pipe - (37)	SSMH- (42)	SSMH- (41)	2783.56	2771.37	340.28 336.28	2.35	8		0.0356	0.1045	1.8100
Pipe - (36)	SSMH- (41)	SSMH- (40)	2771.37	2771.07	56.69 52.69	0.52	8		0.0387	0.1490	1.1700
Pipe - (35)	SSMH- (40)	SSMH- (39)	2770.97	2770.67	58.8 54.8	0.52	8		0.0418	0.1490	1.2600
Pipe - (184)	SSMH- (39)	SSMH- (188)	2770.57	2770.28	55.45 51.45	0.52	8		0.0418	0.1490	1.2600
Pipe - (182)	SSMH- (188)	SSMH- (189)	2770.18	2769.53	125.12 121.12	0.52	8		0.0418	0.1490	1.2600
Pipe - (183)	SSMH- (189)	SSMH- (190)	2769.43	2767.05	237.68 233.68	1	8		0.0418	0.1343	1.4600
Pipe - (185)	SSMH- (190)	SSMH- (191)	2766.95	2766.07	54.83 50.83	1.6	8		0.0418	0.1194	1.7300
Pipe - (186)	SSMH- (191)	SSMH- (146)	2765.97	2765.5	32.32 28.32	1.45	8	Pipes 185,187	0.0805	0.1642	2.1300
Pipe - (143)	SSMH- (146)	SSMH- (151)	2765.4	2749	275.89 271.89	5.94	8	Pipes 139,186	0.1454	0.1642	3.8400
Pipe - (144)	SSMH- (151)	SSMH- (147)	2748.9	2744	275.89 271.89	1.78	8		0.1485	0.2089	2.7700
Pipe - (140)	SSMH- (147)	SSMH- (148)	2743.9	2740	92.54 88.54	4.21	8		0.1516	0.1791	3.5300
Pipe - (141)	SSMH- (148)	SSMH- (149)	2739.9	2736	87.07 83.07	4.48	8		0.1516	0.1642	4.0000
Pipe - (142)	SSMH- (149)	SSMH- (150)	2735.9	2735	73.51 69.51	1.22	8		0.1516	0.2388	2.3200
Pipe - (145)	SSMH- (150)	EXIST SSMH- (5)	2735.8	2730	54.08 50.08	10.72	8	Pipes 142, 150	0.1779	0.1493	5.3700
EXIST Pipe - (4)	EXIST SSMH- (5)	EXIST SSMH- (4)	2730	2722.5	257.01 253.01	2.92	8		0.1795	0.2089	3.3500
EXIST Pipe - (3)	EXIST SSMH- (4)	EXIST SSMH- (3)	2722.4	2721.8	91.26 87.26	0.66	8		0.1795	0.2985	2.0100
EXIST Pipe - (2)	EXIST SSMH- (3)	EXIST SSMH- (2)	2721.7	2715.9	92.83 88.83	6.25	8		0.1795	0.1642	4.7400
EXIST Pipe - (1)	EXIST SSMH- (2)	EXIST SSMH- (1)	2715.8	2713.5	38 34	6.05	8		0.1810	0.1791	4.2100
E. Ranch Gate Road (Happy Valley Rd) Sewer outfall											
Pipe - (118)	SSMH- (123)	SSMH- (124)	2781.12	2774.36	95.81 91.81	7.06	8		0.0031	0.0299	0.4800
Pipe - (119)	SSMH- (124)	SSMH- (125)	2774.26	2771.74	46.88 42.88	5.38	8		0.0062	0.0299	1.4700
Pipe - (120)	SSMH- (125)	SSMH- (126)	2771.64	2769.51	46.88 42.88	4.54	8		0.0093	0.0448	1.3400
Pipe - (121)	SSMH- (126)	SSMH- (127)	2769.41	2765.11	96.5 92.5	4.45	8		0.0124	0.0597	1.2500
Pipe - (122)	SSMH- (127)	SSMH- (128)	2765.02	2762.11	81.93 77.93	3.55	8		0.0155	0.0597	1.6100
Pipe - (123)	SSMH- (128)	SSMH- (129)	2762.01	2761.14	167.03 163.03	0.52	8		0.0186	0.1045	0.8600
Pipe - (124)	SSMH- (129)	SSMH- (130)	2761.04	2739.68	500 496	4.27	8		0.0186	0.0597	1.9700
Pipe - (125)	SSMH- (130)	SSMH- (131)	2739.58	2729.74	240.78 236.78	4.08	8		0.0186	0.0597	1.9700
Pipe - (128)	SSMH- (131)	SSMH- (133) Lift Station (LS)	2729.65	2729.03	119.16 115.16	0.52	8		0.0186	0.1045	0.8600
Pipe - (73)	SSMH- (78)	SSMH- (79)	2813.55	2808.51	71.72 67.72	7.02	8		0.0046	0.0299	1.4700
Pipe - (74)	SSMH- (79)	SSMH- (80)	2808.41	2800.31	116.94 112.94	6.93	8		0.0093	0.0448	1.6200
Pipe - (75)	SSMH- (80)	SSMH- (81)	2800.21	2789.03	206.43 202.43	5.42	8		0.0217	0.0746	1.8000
Pipe - (76)	SSMH- (81)	SSMH- (82)	2788.93	2784.28	161.05 157.05	2.89	8		0.0279	0.0896	1.7700
Pipe - (77)	SSMH- (82)	SSMH- (83)	2784.28	2781.33	171.25 167.25	1.72	8		0.0279	0.1044	1.4200
Pipe - (81)	SSMH- (87)	SSMH- (88)	2794.44	2790.23	68.27 64.27	6.17	8		0.0031	0.0298	0.9900
Pipe - (82)	SSMH- (88)	SSMH- (89)	2790.13	2783.78	131.74 127.74	4.82	8		0.0093	0.0448	1.6200
Pipe - (83)	SSMH- (89)	SSMH- (86)	2783.68	2782.59	128.71 124.71	0.85	8		0.0155	0.0896	0.9800
Pipe - (80)	SSMH- (86)	SSMH- (85)	2782.49	2782.15	65.38 61.38	0.52	8		0.0155	0.1045	0.7900
Pipe - (79)	SSMH- (85)	SSMH- (84)	2782.05	2781.58	90.9 86.9	0.52	8		0.0155	0.1045	0.7900
Pipe - (78)	SSMH- (84)	SSMH- (83)	2781.48	2781.33	28.12 24.12	0.52	8		0.0155	0.1045	0.7900
Pipe - (84)	SSMH- (83)	SSMH- (90)	2781.23	2778.44	79.49 75.49	3.51	8	Pipes 77,78	0.0433	0.1045	2.2000
Pipe - (85)	SSMH- (90)	SSMH- (91)	2778.35	2773.09	92.98 88.98	5.65	8		0.0480	0.0896	3.0500
Pipe - (86)	SSMH- (91)	SSMH- (92)	2772.99	2769.48	66.42 62.42	5.29	8		0.0511	0.1045	2.5900
Pipe - (87)	SSMH- (92)	SSMH- (93)	2769.38	2764.64	92.14 88.14	5.15	8		0.0557	0.1044	2.8300
Pipe - (88)	SSMH- (93)	SSMH- (94)	2764.54	2759.97	89.06 85.06	5.13	8		0.0603	0.1045	3.0600
Pipe - (89)	SSMH- (94)	SSMH- (95)	2759.87	2754.84	102.83 98.83	4.89	8		0.0650	0.1194	2.6900
Pipe - (90)	SSMH- (95)	SSMH- (75)	2754.74	2753.27	69.49 65.49	2.12	8		0.0665	0.1343	2.3200
Pipe - (66)	SSMH- (70)	SSMH- (71)	2783.38	2776.03	108.07 104.07	6.81	8		0.0031	0.0299	0.9900
Pipe - (67)	SSMH- (71)	SSMH- (72)	2776.03	2769.82	109.55 105.55	5.67	8		0.0062	0.0447	1.0800
Pipe - (68)	SSMH- (72)	SSMH- (73)	2769.82	2766.93	84.71 80.71	3.41	8		0.0062	0.0447	1.0800
Pipe - (69)	SSMH- (73)	SSMH- (74)	2766.83	2759.74	243.97 239.97	2.91	8		0.0124	0.0597	1.4400
Pipe - (70)	SSMH- (74)	SSMH- (75)	2759.64	2753.27	133.03 129.03	4.79	8		0.0124	0.0597	1.4400
Pipe - (71)	SSMH- (75)	SSMH- (76)	2753.17	2749.63	135.51 131.51	2.61	8	Pipes 70,90	0.0820	0.1493	2.4800

Name	US Node	DS Node	US Invert (ft)	DS Invert (ft)	2D Length (ft) center-to-center edge-to-edge	% Slope	Size (in)	Tributary Pipes	Peak Cumulative Flow (cfs)	Depth to Diameter Ratio (d/D)	Peak Flow Velocity (ft/s)
Pipe - (41)	SSMH- (45)	SSMH- (1)	2758.75	2755.09	52.66 48.66	6.96	8		0.3456	0.2090	5.4900
Pipe - (1)	SSMH- (1)	SSMH- (2)	2754.99	2754.31	135.9 131.9	0.5	8		0.3502	0.4179	2.1600
Pipe - (2)	SSMH- (2)	SSMH- (3)	2754.21	2753.61	115.13 111.13	0.52	8		0.3502	0.4179	2.1600
Pipe - (3)	SSMH- (3)	SSMH- (4)	2753.51	2752.8	137.13 133.13	0.52	8		0.3502	0.4179	2.1600
Pipe - (155)	SSMH- (4)	SSMH- (161)	2752.7	2752.2	72.61 68.61	0.69	8		0.3502	0.3881	2.3800
Pipe - (156)	SSMH- (161)	SSMH- (162)	2752.1	2751.2	96.39 92.39	0.93	8		0.3502	0.3582	2.6600
Pipe - (157)	SSMH- (162)	SSMH- (163)	2751.1	2750.5	149.91 145.91	0.4	8		0.3502	0.4478	1.9700
Pipe - (158)	SSMH- (163)	SSMH- (164)	2750.4	2749.8	99.44 95.44	0.6	8		0.3533	0.4030	2.2900
Pipe - (159)	SSMH- (164)	SSMH- (160)	2749.7	2749.3	60.16 56.16	0.66	8		0.3533	0.3881	2.4000
Pipe - (152)	SSMH- (157)	SSMH- (158)	2771.4	2770	89.98 85.98	1.56	8		0.0000	0.0000	0.0000
Pipe - (153)	SSMH- (158)	SSMH- (159)	2769.9	2761.7	121.47 117.47	6.75	8		0.0015	0.2985	0.4800
Pipe - (154)	SSMH- (159)	SSMH- (160)	2761.6	2749.3	209.77 205.77	5.86	8		0.0015	0.2985	0.4800
Pipe - (160)	SSMH- (160)	SSMH- (165)	2749.2	2745.1	143.68 139.68	2.85	8	Pipes 154,159	0.3564	0.2687	4.0500
Pipe - (161)	SSMH- (165)	SSMH- (166)	2745	2744.2	128.8 124.8	0.62	8		0.3564	0.3881	2.4300
Pipe - (162)	SSMH- (166)	SSMH- (167)	2744.1	2743.5	90.22 86.22	0.67	8		0.3564	0.3881	2.4300
Pipe - (163)	SSMH- (167)	SSMH- (168)	2743.4	2739	145.5 141.5	3.02	8		0.3564	0.2687	4.0500
Pipe - (164)	SSMH- (168)	SSMH- (169)	2738.9	2738.2	98.27 94.27	0.71	8		0.3580	0.3881	2.4400
Pipe - (165)	SSMH- (169)	SSMH- (170)	2738.1	2735	219.28 215.28	1.41	8		0.3611	0.3284	3.0900
Pipe - (166)	SSMH- (170)	SSMH- (171)	2734.9	2729.5	113.56 109.56	4.76	8		0.3626	0.2388	4.8400
Pipe - (167)	SSMH- (171)	SSMH- (172)	2729.4	2728	113.56 109.56	1.23	8		0.3626	0.3284	3.1000
Pipe - (168)	SSMH- (172)	SSMH- (173)	2727.9	2723.5	113.71 109.71	3.87	8		0.3642	0.2537	4.4600
Pipe - (169)	SSMH- (173)	SSMH- (174)	2723.4	2719.6	81.32 77.32	4.67	8		0.3657	0.2388	4.8900
Pipe - (179)	SSMH- (185)	SSMH- (186)	2725.9	2720.7	82.07 78.07	6.34	8		0.0031	0.0299	0.9900
Pipe - (180)	SSMH- (186)	SSMH- (187)	2720.6	2720.1	81.55 77.55	0.61	8		0.0046	0.0597	0.5300
Pipe - (181)	SSMH- (187)	SSMH- (174)	2720	2719.6	56.96 52.96	0.7	8		0.0046	0.0597	0.5300
Pipe - (170)	SSMH- (174)	SSMH- (175)	2719.5	2718	90.8 86.8	1.65	8	Pipes 169,181	0.3703	0.3134	3.4100
Pipe - (171)	SSMH- (175)	SSMH- (176)	2717.9	2717	90.69 86.69	0.99	8		0.3719	0.3582	2.8500
Pipe - (172)	SSMH- (176)	SSMH- (177)	2716.9	2711.1	173.48 169.48	3.34	8		0.3719	0.2687	4.2600
Pipe - (173)	SSMH- (177)	SSMH- (178)	2711	2709	86.17 82.17	2.32	8		0.3750	0.2836	3.9700
Pipe - (174)	SSMH- (178)	SSMH- (179)	2708.9	2701	123.31 119.31	6.41	8		0.3750	0.2239	5.5000
Pipe - (175)	SSMH- (179)	SSMH- (180)	2700.9	2698	108.83 104.83	2.66	8		0.3750	0.2836	3.9700
Pipe - (176)	SSMH- (180)	SSMH- (181)	2697.9	2695	108.83 104.83	2.66	8		0.3781	0.2836	4.0100
Pipe - (177)	SSMH- (181)	SSMH- (183)	2694.9	2688.8	99.37 95.37	6.14	8		0.3796	0.2239	5.5800
Pipe - (178)	SSMH- (183)	SSMH- (182)	2688.7	2687.6	215.53 213.53	0.51	8		0.3796	0.4328	2.2600
EXIST Pipe - (5)	SSMH- (182)	EXIST SSMH- (6)	2688.7	2687.5	202.54 200.54	0.59	8		0.3827	0.4179	2.3900
EXIST Pipe - (6)	EXIST SSMH- (6)	EXIST SSMH- (7)	2687.4	2686.4	157.2 153.2	0.64	8		0.3858	0.4179	2.4100
EXIST Pipe - (7)	EXIST SSMH- (7)	EXIST SSMH- (8)	2686.3	2685.1	149.17 145.17	0.8	8		0.3858	0.3881	2.6600

LIFT STATION DESIGN

Project: Sereno Canyon
 Location: Scottsdale Arizona

LIFT STATION	TOTAL DESIGN CAPACITY (GPM)	No. Sereno Canyon Dwelling Units	No. Sereno Canyon Resort Units	Average Daily Flow (GPM)	Peaking Factor	Demand Flow with Peaking Factor (GPM)	Peak Dry Weather Flow (GPM)*	Peak Wet Weather Flows (GPM)**	35 GPM flow allowance (GPM)
PROPOSED	170	130		23	4	125	131.31	164.14	166.31
EXISTING	350	256	29	52	4	243	182.59	228.24	217.59

Total

* Peak Dry Weather Flow in gpm= 17 x (no. of dwelling Units)^{0.42} per Title 18, Chapter 9 of AZ Administrative Code regarding lift station sizing

** Peak Wet Weather Flow = 125% of Peak Dry Weather Flow

Add 35 gpm flow allowance for swimming pool discharge per pump to Peak Dry Weather Flows