

APPENDIX G
SEWER STUDY

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ROBLA ESTATES

City of Sacramento
March 12, 2021

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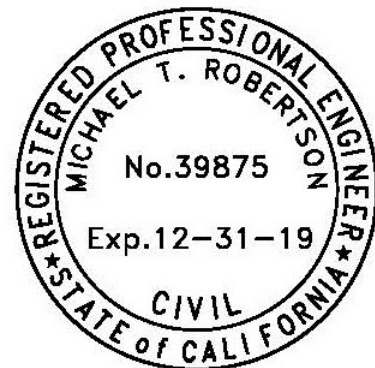


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- A) Sewer Shed Map
- B) Sewer Calculations

I. Introduction and Background

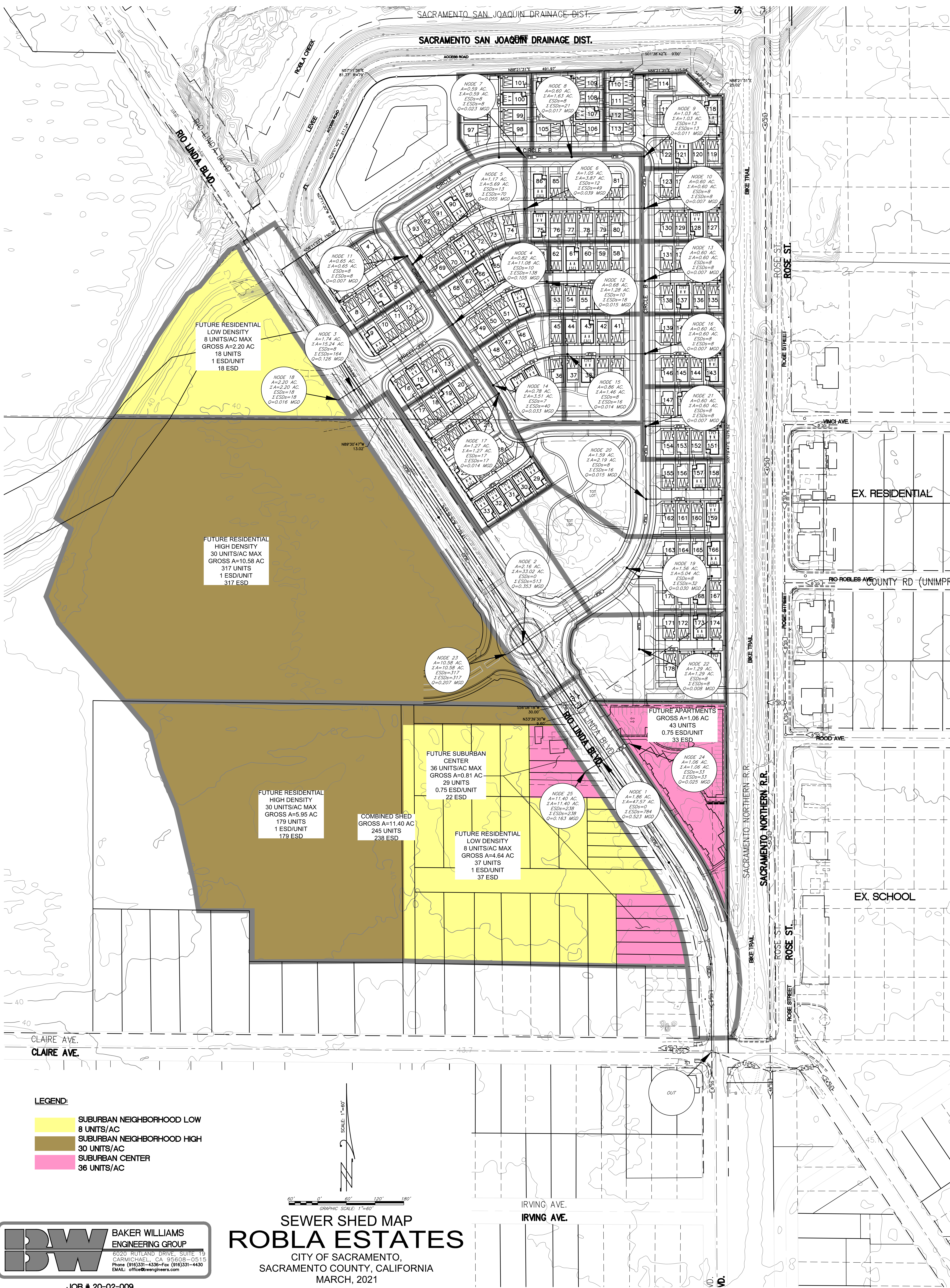
The project is an approved 178 lot residential subdivision located on the east side of Rio Linda Blvd. south of Robla Creek and north of Claire Ave. and Marysville Blvd. within the city limits of Sacramento, see Figure 1. There is an existing 6” sewer line on the west side of Rio Linda Blvds that connects to a 10” sewer line which proceeds to the east to an existing 48” sewer main to the south of the project. The existing 6” sewer line in Rio Linda Blvd. will be abandoned and replaced with a new 10” sewer line. The new 10” sewer line will run up the west side of Rio Linda Blvd. to serve the proposed and future projects.



Figure 1 – Project Site

- II. Sewer System Analysis The existing 6” sewer line located on the west side of Rio Linda Blvd is too small to serve the project therefore a new 10” sewer line will be necessary to serve the proposed and future projects. The new 10” sewer line will connect in to the existing manhole within the intersection of Rio Linda Blvd., Claire Ave., and Marysville Blvd. The proposed 10” sewer line has been analyzed to ensure the line will meet capacity requirements for the proposed project as well as future projects that the line will serve. The proposed 178 lot subdivision will be built on a vacant 20.55 acre lot. The vacant lot is labeled as a medium density suburban neighborhood in the City of Sacramento 2035 General Plan (GP). There is a future 1.29 acre, 43 unit apartment site to the south of the project which is listed as a suburban center in the GP. The proposed sewer line in Rio Linda Blvd. will also serve future development to the west of the proposed project. The GP was used to determine the future development’s impact on the sewer system. The future parcels are zoned for a combination of low density residential, high density residential, and suburban center. The maximum unit per acre shown in the GP were used for sewer calculation for worst case scenario to ensure the proposed sewer system has the capacity for the future development. See Appendix A for the Sewer Shed Map, which shows color coordinated future land uses based on the GP.
- III. Sewer Calculations Proposed sewer flows were calculated based on the City of Sacramento Design and Procedures Manual Section 9, Sewer Collection Systems (DPM). According to Table 9-1 of the DPM the maximum d/D for 8” and 10” is 0.70. The maximum d/D of 0.70 was used to determine the maximum allowable peak wet weather flow for each pipe based on diameter and slope. The other requirement stated in the DPM was that the slope of the sewer line should be increase to ensure a flow velocity of at least 1 ft/sec. All pipe slopes have been increased to ensure that flow velocities do not drop below 1 ft/sec. See Appendix B for Sewer Calculations.

APPENDIX A
SEWER SHED MAP



**FUTURE RESIDENTIAL
LOW DENSITY**
8 UNITS/AC MAX
GROSS A=2.20 AC
18 UNITS
1 ESD/UNIT
18 ESD

**FUTURE RESIDENTIAL
HIGH DENSITY**
30 UNITS/AC MAX
GROSS A=10.58 AC
317 UNITS
1 ESD/UNIT
317 ESD

**FUTURE RESIDENTIAL
HIGH DENSITY**
30 UNITS/AC MAX
GROSS A=5.95 AC
179 UNITS
1 ESD/UNIT
179 ESD

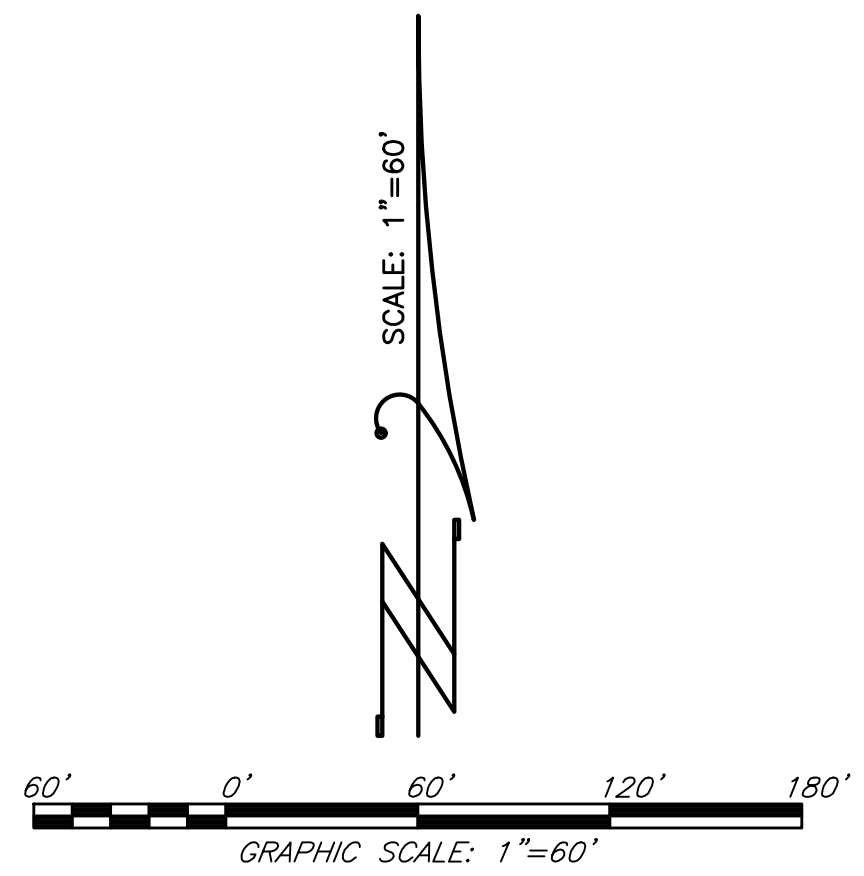
COMBINED SHED
GROSS A=11.40 AC
245 UNITS
238 ESD

**FUTURE SUBURBAN
CENTER**
36 UNITS/AC MAX
GROSS A=0.81 AC
29 UNITS
0.75 ESD/UNIT
22 ESD

**FUTURE RESIDENTIAL
LOW DENSITY**
8 UNITS/AC MAX
GROSS A=4.64 AC
37 UNITS
1 ESD/UNIT
37 ESD

FUTURE APARTMENTS
GROSS A=1.06 AC
43 UNITS
0.75 ESD/UNIT
33 ESD

- LEGEND:**
- SUBURBAN NEIGHBORHOOD LOW
8 UNITS/AC
 - SUBURBAN NEIGHBORHOOD HIGH
30 UNITS/AC
 - SUBURBAN CENTER
36 UNITS/AC



**SEWER SHED MAP
ROBLA ESTATES**
CITY OF SACRAMENTO,
SACRAMENTO COUNTY, CALIFORNIA
MARCH, 2021

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APPENDIX B
SEWER CALCULATIONS

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ROBLA ESTATES SEWER CALCULATIONS

FLOW ACCUMULATIONS BASED ON PROPOSED AND FUTURE DEVELOPMENTS

		SHED DATA				FLOW CALCS								PIPE DATA						RESULTS	
FROM	TO	Gross Area (Ac)	ESD	Σ Gross Area (Acres)	Σ ESD	Q _{ADWF} (MGD)	PF	Q _{PDWF} (MGD)	Q _{I/I}	Q _{PWWF} (MGD)	Q _{ADWF} (cfs)	Q _{PWWF} (cfs)	Q _{MAX} (cfs)	LENGTH (FT)	DIA. (IN.)	SLOPE	F/L (FT)	RIM ELEV. (FT)	DEPTH F/L (FT)	V _{ADWF} (FT/S)	d/D
9	8	1.03	13	1.03	13	0.004	2.32	0.009	0.002	0.011	0.006	0.017	1.244	152	8	0.0150	32.65	38.70	6.0	1.0	0.045
8	7	0.60	8	1.63	21	0.007	2.25	0.015	0.003	0.017	0.010	0.027	1.015	97	8	0.0100	30.37	38.70	8.3	1.0	0.065
7	6	0.59	8	2.22	29	0.009	2.21	0.020	0.004	0.023	0.014	0.036	0.850	109	8	0.0070	29.40	38.50	9.1	1.0	0.081
6	5	1.05	12	3.87	49	0.015	2.15	0.033	0.006	0.039	0.024	0.060	0.717	266	8	0.0050	28.64	39.30	10.7	1.1	0.114
5	4	1.17	13	5.69	70	0.022	2.11	0.046	0.009	0.055	0.034	0.085	0.600	151	8	0.0035	27.31	38.30	11.0	1.1	0.147
4	3	0.82	10	11.30	138	0.043	2.03	0.087	0.018	0.105	0.066	0.162	0.600	243	8	0.0035	26.78	36.50	9.7	1.3	0.204
3	2	1.74	8	15.24	164	0.051	2.01	0.102	0.024	0.126	0.078	0.195	0.918	638	10	0.0025	25.93	37.50	11.6	1.2	0.180
2	1	2.16	0	33.02	513	0.159	1.88	0.300	0.053	0.353	0.246	0.545	0.918	295	10	0.0025	24.34	40.00	15.7	1.6	0.322
1	OUT	1.86	0	47.57	784	0.243	1.84	0.447	0.076	0.523	0.376	0.810	0.918	668	10	0.0025	23.60	41.40	17.8	1.8	0.408
OUT																	21.93	44.63	22.7		
10	6	0.60	8	0.60	8	0.002	2.38	0.006	0.001	0.007	0.004	0.011	1.435	251	8	0.0200	33.66	40.00	6.3	1.0	0.034
11	5	0.65	8	0.65	8	0.002	2.38	0.006	0.001	0.007	0.004	0.011	1.435	21	8	0.0200	27.73	38.40	10.7	1.0	0.034
13	12	0.60	8	0.60	8	0.002	2.38	0.006	0.001	0.007	0.004	0.011	1.435	205	8	0.0200	33.08	38.20	5.1	1.0	0.034
12	4	0.68	10	1.28	18	0.006	2.27	0.013	0.002	0.015	0.009	0.023	1.015	220	8	0.0100	28.98	37.20	8.2	1.0	0.060
16	15	0.60	8	0.60	8	0.002	2.38	0.006	0.001	0.007	0.004	0.011	1.435	163	8	0.0200	32.53	37.50	5.0	1.0	0.034
15	14	0.86	8	1.46	16	0.005	2.29	0.011	0.002	0.014	0.008	0.021	1.015	172	8	0.0100	29.27	37.20	7.9	1.0	0.057
14	4	0.78	7	3.51	40	0.012	2.17	0.027	0.006	0.033	0.019	0.050	0.717	153	8	0.0050	27.55	36.30	8.8	1.0	0.102
17	14	1.27	17	1.27	17	0.005	2.28	0.012	0.002	0.014	0.008	0.022	1.015	148	8	0.0100	29.03	36.50	7.5	1.0	0.057
18	3	2.20	18	2.20	18	0.005	2.28	0.012	0.004	0.016	0.008	0.025	1.015	43	8	0.0100	26.36	36.00	9.6	1.0	0.057
21	20	0.60	8	0.60	8	0.002	2.38	0.006	0.001	0.007	0.004	0.011	1.435	152	8	0.0200	30.78	36.00	5.2	1.0	0.034
20	19	1.59	8	2.19	16	0.005	2.29	0.011	0.004	0.015	0.008	0.023	1.015	160	8	0.0100	27.74	36.80	9.1	1.0	0.057
19	2	1.56	8	5.04	32	0.010	2.20	0.022	0.008	0.030	0.015	0.046	0.850	258	8	0.0070	26.14	35.50	9.4	1.0	0.084
22	19	1.29	8	1.29	8	0.002	2.38	0.006	0.002	0.008	0.004	0.012	1.435	152	8	0.0200	29.18	38.00	8.8	1.0	0.034
23	2	10.58	317	10.58	317	0.098	1.94	0.190	0.017	0.207	0.152	0.321	0.600	43	8	0.0035	24.49	38.00	13.5	1.6	0.312
24	1	1.29	33	1.29	33	0.010	2.20	0.022	0.002	0.025	0.016	0.038	0.717	66	8	0.0050	23.93	39.00	15.1	1.0	0.095
25	1	11.40	238	11.40	238	0.074	1.97	0.145	0.018	0.163	0.114	0.253	0.600	43	8	0.0035	23.75	41.00	17.2	1.5	0.273

- COMMENTS:
- 1.) FLOW BASED ON CITY OF SAC DESIGN PROCEDURE MANUAL
 - 2.) $Q_{ADWF} = 310 \text{ GPD/ESD}$
 - 3.) $PF = 1.7 * Q_{ADWF}^{-0.056}$
 - 4.) $Q_{PDWF} = Q_{ADWF} * PF$
 - 5.) $Q_{I/I} = 1600 \text{ GPD/AC.}$
 - 6.) $Q_{PWWF} = Q_{PDWF} + Q_{I/I}$
 - 7.) $V_{ADWF} = Q_{ADWF} / A$