WALDORF URBAN REDEVELOPMENT CORRIDOR
TASK A.2 SUPPORTING DOCUMENTATION

SANITARY SEWER TABLES S.1 THROUGH S.14

LOIEDERMAN SOLTESZ ASSOCIATES, INC. .

Table S.1: Wastewater Demand Analysis

Service Area	Use	Total SF	EDUs	ADF (GPD)	ADF (MGD)
1	Residential		12	2424	0.002
1	Residential		12	2424	0.002
1	Residential		15	2595	0.003
1	Residential		20	3460	0.003
1	Residential		20	3460	0.003
1	Residential		23	4037	0.004
1	Residential		25	4325	0.004
1	Residential		33	5767	0.006
1	Residential		35	6055	0.006
1	Residential		35	6055	0.006
1	Residential		50	8650	0.009
Total ADF Residential Component				49251	0.049

Service Area	Use	Total SF	EDUs	ADF (GPD)	ADF (MGD)
1	Parking			0	0.000
1	Parking			0	0.000
1	Retail/Office	30,000		2100	0.002
1	Retail/Office	34,000		2380	0.002
1	Retail/Office	16,000		1120	0.001
1	Retail/Office	30,000		2100	0.002
1	Parking			0	0.000
1	Parking			0	0.000
1	Parking			0	0.000
1	Retail/Office	30,000		2100	0.002
1	Retail/Office	16,000		1120	0.001
1	Retail/Office	30,000		2100	0.002
1	Civic	5,000		350	0.000
1	Retail/Office	15,000		1050	0.001
* Projected flows acquired from BDA Zekiah Pump Station Study (01-0038/59)	Retail/Office			0	0.000
1	Parking			0	0.000
1	Parking			0	0.000
1	Retail/Office	30,000		2100	0.002

1	Retail/Office	28,000		1960	0.002
1	Retail/Office	14,000		980	0.001
1	Retail/Office	6,000		420	0.000
1	Retail/Office	12,000		840	0.001
1	Retail/Office	6,000		420	0.000
1	Retail/Office	24,000		1680	0.002
1	Parking			0	0.000
1	Parking			0	0.000
1	Retail/Office	20,000		1400	0.001
1	Retail/Office	5,000		350	0.000
1	Retail/Office	8,000		560	0.001
1	Retail/Office	10,000		700	0.001
1	Existing Retail	85,000		4250	0.004
1	Existing Office	85,000		4250	0.004
1	Existing Supermarket	40,000		8000	0.008
Total ADF Commercial Component				42330	0.042

Service Area	Use	Total SF	EDUs	ADF (GPD)	ADF (MGD)
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		14	2828	0.003
2	Residential		14	2828	0.003

2	Residential		14	2828	0.003
2	Residential		15	2595	0.003
2	Residential		15	2595	0.003
2	Residential		16	3232	0.003
2	Residential		16	3232	0.003
2	Residential		16	3232	0.003
2	Residential		16	3232	0.003
2	Residential		16	3232	0.003
2	Residential		16	3232	0.003
2	Residential		17	2883	0.003
2	Residential		17	2883	0.003
2	Residential		17	2883	0.003
2	Residential		18	3636	0.004
2	Residential		18	3172	0.003
2	Residential		18	3172	0.003
2	Residential		18	3172	0.003
2	Residential		18	3172	0.003
2	Residential		20	3460	0.003
2	Residential		20	3460	0.003
2	Residential		20	3460	0.003
2	Residential		20	3460	0.003
2	Residential		20	3460	0.003
2	Residential		20	3460	0.003
2	Residential		20	3460	0.003
2	Residential		20	3460	0.003
2	Residential		23	3893	0.004
2	Residential		23	4037	0.004
2	Residential		23	4037	0.004
2	Residential		23	4037	0.004
2	Residential		23	4037	0.004
2	Residential		23	4037	0.004
2	Residential		23	4037	0.004
2	Residential		23	4037	0.004
2	Residential		25	4325	0.004
2	Residential		25	4325	0.004
2	Residential		25	4325	0.004
2	Residential		25	4325	0.004
2	Residential		27	4613	0.005

2	Residential		28	4902	0.005
2	Residential		28	4902	0.005
2	Residential		30	5190	0.005
2	Residential		30	5190	0.005
2	Residential		30	5190	0.005
2	Residential		30	5190	0.005
2	Residential		30	5190	0.005
2	Residential		30	5190	0.005
2	Residential		33	5767	0.006
2	Residential		33	5767	0.006
2	Residential		35	6055	0.006
2	Residential		35	6055	0.006
2	Residential		37	6343	0.006
2	Residential		38	6488	0.006
2	Residential		40	6920	0.007
2	Residential		45	7785	0.008
2	Residential		47	8073	0.008
2	Residential		50	8650	0.009
2	Residential		50	8650	0.009
2	Residential		50	8650	0.009
2	Residential		55	9515	0.010
2	Residentail		55	9515	0.010
2	Residential		60	10380	0.010
2	Residential		12	2424	0.002
2	Residential		12	2424	0.002
2	Residential		15	2595	0.003
2	Residential		20	3460	0.003
2	Residential		20	3460	0.003
2	Residential		23	4037	0.004
2	Residential		25	4325	0.004
2	Residential		33	5767	0.006
2	Residential		35	6055	0.006
2	Residential		35	6055	0.006
1	Residential		50	8650	0.009
Total ADF Residential Component				334121	0.334

Service Area	Use	Total SF	EDUs	ADF (GPD)	ADF (MGD)
2	Retail/Office	10,000		700	0.001
2	Retail/Office	5,000		350	0.000
2	Retail/Office	14,000		980	0.001
2	Retail/Office	8,000		560	0.001
2	Retail/Office	14,000		980	0.001
2	Parking			0	0.000
2	Parking			0	0.000
2	Parking			0	0.000
2	Retail/Office	11,000		770	0.001
2	Retail/Office	22,000		1540	0.002
2	Civic	18,000		1260	0.001
2	Civic	10,000		700	0.001
2	Parking			0	0.000
2	Retail/Office	24,000		1680	0.002
2	Retail/Office	10,000		700	0.001
2	Retail/Office	9,000		630	0.001
2	Retail/Office	9,000		630	0.001
2	Parking			0	0.000
2	Retail/Office	20,000		1400	0.001
2	Retail/Office	14,000		980	0.001
2	Parking			0	0.000
2	Retail/Office	15,000		1050	0.001
2	Retail/Office	15,000		1050	0.001
2	Retail/Office	10,000		700	0.001
2	Retail/Office	14,000		980	0.001
2	Retail/Office	5,000		350	0.000
2	Retail/Office	11,000		770	0.001
2	Retail/Office	33,000		2310	0.002
2	Parking			0	0.000
2	Parking			0	0.000
2	Retail/Office	14,000		980	0.001
2	Retail/Office	15,000		1050	0.001
2	Retail/Office	11,000		770	0.001
2	Parking			0	0.000
2	Mixed Use Office or Retail w/ Office	13,000		910	0.001

2	Mixed Use Office or Retail w/ Office	39,000		2730	0.003
2	Retail/Office	18,000		1260	0.001
2	Retail/Office	12,000		840	0.001
2	Retail/Office	9,000		630	0.001
2	Retail/Office	18,000		1260	0.001
2	Parking			0	0.000
2	Parking			0	0.000
2	Mixed Use Office or Retail w/ Office	28,000		1960	0.002
2	Retail/Office	9,000		630	0.001
2	Retail/Office	15,000		1050	0.001
2	Retail/Office	18,000		1260	0.001
2	Parking			0	0.000
2	Mixed Use Office or Retail w/ Office	12,000		840	0.001
2	Retail/Office	18,000		1260	0.001
2	Retail/Office	14,000		980	0.001
2	Retail/Office	12,000		840	0.001
2	Retail/Office	14,000		980	0.001
2	Mixed Use Office or Retail w/ Office	14,000		980	0.001
2	Parking			0	0.000
2	Retail/Office	16,000		1120	0.001
2	Retail/Office	12,000		840	0.001
2	Retail/Office	12,000		840	0.001
2	Retail/Office	14,000		980	0.001
2	Parking			0	0.000
2	Retail/Office	9,000		630	0.001
2	Retail/Office	14,000		980	0.001
2	Retail/Office	17,000		1190	0.001
2	Parking			0	0.000
2	Retail/Office	22,000		1540	0.002
2	Retail/Office	14,000		980	0.001
2	Parking			0	0.000
2	Retail/Office	33,000		2310	0.002
2	Retail/Office	12,000		840	0.001
2	Retail/Office	12,000		840	0.001
2	Retail/Office	12,000		840	0.001

2	Retail/Office	28,000		1960	0.002
2	Retail/Office	28,000		1960	0.002
2	Parking			0	0.000
2	Retail/Office	9,000		630	0.001
2	Retail/Office	20,000		1400	0.001
2	Retail/Office	12,000		840	0.001
2	Retail/Office	17,000		1190	0.001
2	Retail/Office	11,000		770	0.001
2	Parking			0	0.000
2	Retail/Office	20,000		1400	0.001
2	Retail/Office	12,000		840	0.001
2	Retail/Office	30,000		2100	0.002
2	Parking			0	0.000
2	Parking			0	0.000
2	Parking			0	0.000
2	Mixed Use Office or Retail w/ Office	30,000		2100	0.002
2	Mixed Use Office or Retail w/ Office	20,000		1400	0.001
2	Retail/Office	30,000		2100	0.002
2	Retail/Office	30,000		2100	0.002
2	Mixed Use Office or Retail w/ Office	17,000		1190	0.001
2	Mixed Use Office or Retail w/ Office	17,000		1190	0.001
2	Existing Office	70,000		6300	0.006
2	Existing Restaurant	9,000		22500	0.023
2	Existing Retails	85,000		4250	0.004
Total ADF Commercial Component				112430	0.112

Service Area	Use	Total SF	EDUs	ADF (GPD)	ADF (MGD)
3	Retail/Office	34,000		2380	0.002
3	Retail/Office	22,000		1540	0.002
3	Retail/Office	10,000		700	0.001
3	Retail/Office	28,000		1960	0.002
3	Mixed Use Office or Retail w/ Office	22,000		1540	0.002

3	Mixed Use Office or Retail w/ Office	34,000		2380	0.002
3	Parking	-		0	0.000
3	Mixed Use Office or Retail w/ Office	14,000		980	0.001
3	Retail/Office	20,000		1400	0.001
3	Parking			0	0.000
3	Parking			0	0.000
3	Mixed Use Office or Retail w/ Office	40,000		2800	0.003
3	Mixed Use Office or Retail w/ Office	12,000		840	0.001
3	Retail/Office	15,000		1050	0.001
3	Mixed Use Office or Retail w/ Office	24,000		1680	0.002
3	Retail/Office	44,000		3080	0.003
3	Parking			0	0.000
3	Parking			0	0.000
3	Parking			0	0.000
3	Parking			0	0.000
3	Retail/Office	15,000		1050	0.001
3	Mixed Use Office or Retail w/ Office	24,000		1680	0.002
3	Mixed Use Office or Retail w/ Office	24,000		1680	0.002
3	Mixed Use Office or Retail w/ Office	10,000		700	0.001
3	Retail/Office	15,000		1050	0.001
3	Retail/Office	24,000		1680	0.002
3	Retail/Office	42,000		2940	0.003
3	Retail/Office	22,000		1540	0.002
3	Retail/Office	24,000		1680	0.002
3	Retail/Office	24,000		1680	0.002
3	Retail/Office	22,000		1540	0.002
3	Retail/Office	16,000		1120	0.001
3	Retail/Office	42,000		2940	0.003
3	Mixed Use Office or Retail w/ Office	24,000		1680	0.002
3	Existing Retail	105,000		7350	0.007

	Total			52640	0.053

Service Area	Zoning Description	Area (Ac.)	GPD/Ac	ADF (GPD)	ADF (MGD)
3	Commercial Neighborhood	42.4	2000	84800	0.085
4	Commercial Neighborhood	151	2000	302000	0.302
5	Commercial Neighborhood	-	-	792000	0.792

TABLE S.2: Peak Flow Analysis

Service Area	Land Use	ADF (MGD)	Peaking Factor	Peak Flows (MGD)
1	Residential	0.049	4	0.197
1	Commercial	0.042	2	0.085
2	Residential[1]	0.334	3.2	1.284
2	Commercial	0.112	2	0.225
3	Residential	0	4	0
3	Commercial	0.053	2	0.105
3	Existing Commercial	0.085	2	0.170
4	Existing Commercial	0.302	2	0.604
5	Existing Commercial[2]	0.792	1	0.792

TABLE S.3: Inflow/Infiltration Analysis

Service Area	Area (Ac.)	I/I (GPD/Ac.)	Infiltration (GPD)	Infiltration (MGD)
1	34.6	400	13840	0.0138
2	219.37	400	87748	0.0877
3	102.65	400	41060	0.0411
4	151	400	60400	0.0604
5[3]	-	-	-	-

* Peak flows take I/I into consideration

TABLE S.4: Summary of Design Flow (Peak Flow and I/i)

Service Area	Total Peak flow (MGD) Table 2	Total Peak flow (cfs)	Infiltration (MGD)	Infiltration (cfs) Table 3	Total (MGD)	Total (cfs)
1	0.282	0.44	0.0138	0.0214	0.2955	0.4572
2	1.508	2.33	0.0877	0.1358	1.5961	2.4695
3	0.2749	0.43	0.0411	0.0635	0.3159	0.4888
4	0.6040	0.93	0.0604	0.0935	0.6644	1.0280
5	0.7920	1.23	-	-	0.7920	1.2254
6*	10.020	15.50	-	-	10.020	15.5029

* Projected flows acquired from BDA Zekiah Pump Station Study (01-0038/59)

TABLE S.5: Service Area 1 Evaluation of Existing Pipe Capacity

Percent Build Out	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	0.46	8.0	0.013	0.0035	0.349	2.09	0.17	0.72	0.64	Passed
80%	0.37	8.0	0.013	0.0035	0.349	2.09	0.17	0.72	0.52	Passed
70%	0.33	8.0	0.013	0.0035	0.349	2.09	0.17	0.72	0.46	Passed

TABLE S.6: Evaluation of Existing Pipe Capacity for Service Area 1 & 2

Build Out (%)	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	2.93	12.0	0.013	0.0026	0.785	3.14	0.25	1.82	1.61	Failed
80%	2.34	12.0	0.013	0.0026	0.785	3.14	0.25	1.82	1.29	Failed
70%	2.05	12.0	0.013	0.0026	0.785	3.14	0.25	1.82	1.13	Failed

TABLE S.7: Required pipe capacity to serve Service Areas 1 & 2

Build Out (%)	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	2.93	16.0	0.011	0.0026	1.396	4.19	0.33	4.63	0.63	Passed
80%	2.34	14.0	0.011	0.0026	1.068	3.66	0.29	3.25	0.72	Passed
70%	2.05	14.0	0.011	0.0026	1.068	3.66	0.29	3.25	0.63	Passed

TABLE S.8: Service Area 3 Evaluation of Existing Pipe Capacity

Build Out (%)	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	0.49	8.0	0.013	0.0028	0.349	2.09	0.17	0.64	0.76	Passed
80%	0.40	8.0	0.013	0.0028	0.349	2.09	0.17	0.64	0.63	Passed
70%	0.36	8.0	0.013	0.0028	0.349	2.09	0.17	0.64	0.56	Passed

TABLE S.9: Service Area 4 & 5 Evaluation of Existing 12" pipe Capacity*

Build Out (%)	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	2.25	12.0	0.013	0.0035	0.785	3.14	0.25	2.11	106.7%	Failed

* Service area 4 and 5 discharge into the existing 12" VCP East of Post Office Road

TABLE S.10: Service Area 1, 2, 4, & 5 Evaluation of Existing 16" Interceptor pipe Capacity*

Build Out (%)	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	5.18	16.0	0.013	0.00406	1.396	4.19	0.33	4.90	105.7%	Failed
80%	4.59	16.0	0.013	0.00406	1.396	4.19	0.33	4.90	93.8%	Failed
70%	4.30	16.0	0.013	0.00406	1.396	4.19	0.33	4.90	87.8%	Failed

*Interceptor Sewer exceed 2/3 of the capacity.

TABLE S.11: Service Area 1, 2, 4, & 5 required pipe cacapcity for future development of the WURC

Build Out (%)	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	5.18	20.0	0.013	0.00406	2.181	5.23	0.42	8.88	58.3%	Passed
80%	4.59	20.0	0.013	0.00406	2.181	5.23	0.42	8.88	51.7%	Passed
70%	4.30	20.0	0.013	0.00406	2.181	5.23	0.42	8.88	48.4%	Passed

TABLE S.12: Evaluation of Existing 18" Interceptor Pipe Capacity North of 301 (LynnBrook Outfall)*

Build Out (%)	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	17.89	18.0	0.013	0.0022	1.766	4.71	0.38	4.94	362.3%	Failed
80%	16.80	18.0	0.013	0.0022	1.766	4.71	0.38	4.94	340.3%	Failed
70%	16.50	18.0	0.013	0.0022	1.766	4.71	0.38	4.94	334.2%	Failed

*** Design flows are based on the Zekiah pump station design flows and Service area 3.**

TABLE S.13: Required pipe capacity for future development of the WURC (Lynn Brook Outfall)*

Build Out (%)	Design Flow (cfs)	Pipe Size (in.)	n	s	Area (sf)	Pw	Rh	Q Full (cfs)	q/Qfull	System Pass/Fail
100%	17.89	36.0	0.013	0.0022	7.065	9.42	0.75	31.35	57.1%	Passed
80%	16.80	36.0	0.013	0.0022	7.065	9.42	0.75	31.35	53.6%	Passed
70%	16.50	36.0	0.013	0.0022	7.065	9.42	0.75	31.35	52.6%	Passed

*** Design flows are based on the Zekiah pump station design flows and Service area 3.**

S.14: Zekiah Pump Station Analysis

Existing Flow from Service Area 2

Service Area	Zoning Description	Area (Ac.)	GPD/ Ac.	ADF (GPD)	ADF (MGD)
2	Commercial Neighborhood	246.10	2000	492200	0.49

Pre- Development Peak Flow Analysis

Service Area	Land Use	ADF (MGD)	Peaking Factor	Peak Flows (MGD)
2	Existing Commercial	0.4922	2	0.9844

Infiltration Analysis

Service Area	Area (Ac.)	I/I (GPD/Ac.)	Infiltration (GPD)	Infiltration (MGD)
2	246.10	400	98440	0.0984

Summary of Existing Flows

Service Area	Peak flow (MGD)	Peak flow (cfs)	Infiltration (MGD)	Infiltration (cfs)	Design Flow (GPM)
2	0.984	1.52	0.0984	0.1523	752

Proposed Flow From Service Area 2 at 100% build out

Build out (%) WUDS Only	Peak Flow (GPD)	Peak Flow (MGD)	Peak Flow (GPM)
100	1891635	1.892	1313.64
80	1513287	1.513	1050.89
70	1324126	1.324	919.53

Determining design flows for the Zekiah liftstation

Build out (%) WUDS Only	Projected Peak Flows (GPM)[1]	Existing flow from Service area 2 (GPM)	Proposed flow from Service area 2 (GPM)	Proposed* Flow (GPM)	Proposed Flow (CFS)
100	6960	751.956	1313.635	7632	17.40
80	6960	751.956	1050.894	7369	16.80
70	6960	751.956	919.532	7238	16.50

*An additional 110 GPM from Stonebridge (VR 12-0025) has been included.

Zekiah pump station wet well capacity at 100% build out

Criteria	Existing Conditions	Proposed Conditions[2]	Maximum Conditions[3]
Pumped Flow Rate (GPM)	1800	7632	1995
Wet Well Dimension (ft)	9x19	9x19	9x19
Proposed Active Volume (Gal)	4887	4887	4887
Time between starts (min.)	10.86	*2.56	10

* Pump station would operate under 10 minutes between starts.

Zekiah pump station wet well capacity at 80% build out

Criteria	Existing Conditions	Proposed Conditions[2]	Maximum Conditions[3]
Pumped Flow Rate (GPM)	1800	7369	1995
Wet Well Dimension (ft)	9x19	9x19	9x19
Proposed Active Volume (Gal)	4887	4887	4887
Time between starts (min.)	10.86	*2.65	10

* Pump station would operate under 10 minutes between starts.

Zekiah pump station wet well capacity at 70% build out

Criteria	Existing Conditions	Proposed Conditions[2]	Maximum Conditions[3]
Pumped Flow Rate (GPM)	1800	7238	1995
Wet Well Dimension (ft)	9x19	9x19	9x19
Proposed Active Volume (Gal)	4887	4887	4887
Time between starts (min.)	10.86	*2.7	10

* Pump station would operate under 10 minutes between starts.

Existing 12" Forcemain Capcity Analysis

Build out (%) WUDS only	Proposed Flow (CFS)	Nominal Diameter (in)	Velocity (FPS)
100	17.40	12	22.17
80	16.80	12	21.40
70	16.50	12	21.02

*The velocities exceed the County's maximum of 5 fps

Minimum pipe diameter required to meet % build out

Build out (%) WUDS only	Proposed Flow (CFS)	Nominal Diameter required (in)	Velocity (FPS)
100	17.40	30	3.55
80	16.80	28	3.93
70	16.50	28	3.86