

Technical Memorandum

To: Kelye McKinney, City of Roseville
 From: Michael Smith, MacKay & Soms
 Reviewed by: Mark Sauer, MacKay & Soms
 CC: Jeff Jones
 Subject: Sierra Vista Specific Plan, Sanitary Sewer Master Plan Addendum # 1
 Date: July 6, 2009

This document updates the May 26, 2009 Sierra Vista Specific Plan (SVSP) Sanitary Sewer Master Plan to reflect the changes to the SVSP Land Use Plan update dated July 1, 2009. The following table summarizes the changes to the document. Red text in bold reflects the updated portion of the text.

In addition to the following table, a series of comparison tables, Tables A-1, A-2, B-1, B-2, C-1, C-2, D-1, D-2, E-1, E-2, F-1, and F-2, are enclosed and reflect the changes in the land uses and wastewater flows as a result of the updated July 1, 2009 Land Use Plan.

Page	Document Change
Figures 2, 4, 7	Figures 2, 4, and 7 (attached) reflect the July 1, 2009 Sierra Vista Specific Plan Land Use Plan
Tables 2, 3, 4, 5, 6, 7, 16, 17, 18, 19, 20, and 21	Tables 2, 3, 4, 5, 6, 7, 16, 17, 18, 19, 20, and 21 (attached) reflect the July 1, 2009 Sierra Vista Specific Plan Land Use Plan.
Exhibit 2	Exhibit 2 (attached) reflects the July 1, 2009 Sierra Vista Specific Plan Land Use Plan
P. 8, ¶ 2	Revise text to read: “The Specific Plan Area, as currently proposed under the “SVSP Base” condition, will generate an ADWF of 1.367 MGD. An average dry weather flow of 1.216 MGD will be delivered from the southern wastewater shed and 0.151 MGD will be delivered from the northern shed.”
P. 9, ¶ 1	Revise text to read: “The cumulative average dry weather flow for the “SVSP Base + Urban Reserve” condition is calculated to be 1.836 MGD. A summary of these flows is shown on Table 19. The cumulative average dry weather flow from the northern wastewater shed is estimated to be 0.593 MGD and is summarized by land use in Table 20. The cumulative average dry weather flow from the southern shed is estimated to be 1.243 MGD and is summarized by land use in Table 21.”
P. 10, ¶ 3	Revise text to read: “B) Development of the south wastewater shed under the “SVSP Base” condition results in an average dry weather flow of 1.216 MGD. Subsequent development of the Urban Reserve area in the south shed will result in the buildout of only an additional 143 low density residential units which will contribute an average dry weather flow of 0.027 MGD, less than 0.50% of the total 1.243 MGD average dry weather flow from the shed under the “SVSP BASE + Urban Reserve” condition.”

TABLE A-1
LAND USE COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009
LDR - Low Density Residential	484.6	2417	502.4	2524
MDR - Medium Density Residential	261.6	2350	250.0	2221
HDR - High Density Residential	66.1	1633	67.9	1650
CMU - Commercial Mixed Use	34.3	255	34.9	255
CC - Community Commercial	153.7		153.7	
CC/BP - Community Commercial / Business Park	27.3		27.3	
PARK - Parks > 10 Acres	50.6		39.9	
PQP-PUB - Public Facilities and Services	9.2		8.2	
PQP-REL - Religious Facilities	4.2		6.9	
PQP-SCHOOLS - Schools	57.6		45.6	
UR- Urban Reserve	346.5		346.5	
TOTAL	1,495.7	6,655.0	1,483.3	6,650.0

TABLE B-1
LAND USE COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
NORTH WASTEWATER SHED
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009
LDR - Low Density Residential	18.5	92	18.3	91
MDR - Medium Density Residential	62.9	565	62.2	558
HDR - High Density Residential	8.2	168	8.2	172
CMU - Commercial Mixed Use				
CC - Community Commercial				
CC/BP - Community Commercial / Business Park				
PARK - Parks > 10 Acres				
PQP-PUB - Public Facilities and Services	3.0		1.6	
PQP-REL - Religious Facilities	4.2		6.9	
PQP-SCHOOLS - Schools				
UR- Urban Reserve	317.9		317.9	
TOTAL	414.7	825.0	415.1	821.0

TABLE C-1
LAND USE COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
SOUTH WASTEWATER SHED
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009
LDR - Low Density Residential	466.1	2325	484.1	2433
MDR - Medium Density Residential	198.7	1785	187.8	1663
HDR - High Density Residential	57.9	1465	59.7	1478
CMU - Commercial Mixed Use	34.3	255	34.9	255
CC - Community Commercial	153.7		153.7	
CC/BP - Community Commercial / Business Park	27.3		27.3	
PARK - Parks > 10 Acres	50.6		39.9	
PQP-PUB - Public Facilities and Services	6.2		6.6	
PQP-REL - Religious Facilities				
PQP-SCHOOLS - Schools	57.6		45.6	
UR- Urban Reserve	28.6		28.6	
TOTAL	1,081.0	5,830.0	1,068.2	5,829.0

TABLE D-1
LAND USE COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009
LDR - Low Density Residential	621.7	3101	639.5	3208
MDR - Medium Density Residential	354.1	3179	342.5	3050
HDR - High Density Residential	110.4	2519	112.2	2536
CMU - Commercial Mixed Use	47.6	347	48.2	347
CC - Community Commercial	191.4		191.4	
CC/BP - Community Commercial / Business Park	27.3		27.3	
PARK - Parks > 10 Acres	60.6		49.9	
PQP-PUB - Public Facilities and Services	10.8		9.8	
PQP-REL - Religious Facilities	4.2		6.9	
PQP-SCHOOLS - Schools	67.6		55.6	
TOTAL	1,495.7	9,146	1,483.3	9,141

TABLE E-1
LAND USE COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
NORTH WASTEWATER SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009
LDR - Low Density Residential	127.0	633	126.8	632
MDR - Medium Density Residential	155.4	1394	154.7	1387
HDR - High Density Residential	52.5	1054	52.5	1058
CMU - Commercial Mixed Use	13.3	92	13.3	92
CC - Community Commercial	37.7		37.7	
CC/BP - Community Commercial / Business Park				
PARK - Parks > 10 Acres	10.0		10.0	
PQP-PUB - Public Facilities and Services	4.6		3.2	
PQP-REL - Religious Facilities	4.2		6.9	
PQP-SCHOOLS - Schools	10.0		10.0	
TOTAL	414.7	3,173	415.1	3,169

TABLE F-1
LAND USE COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
SOUTH WASTEWATER SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009
LDR - Low Density Residential	494.7	2468	512.7	2576
MDR - Medium Density Residential	198.7	1785	187.8	1663
HDR - High Density Residential	57.9	1465	59.7	1478
CMU - Commercial Mixed Use	34.3	255	34.9	255
CC - Community Commercial	153.7		153.7	
CC/BP - Community Commercial / Business Park	27.3		27.3	
PARK - Parks > 10 Acres	50.6		39.9	
PQP-PUB - Public Facilities and Services	6.2		6.6	
PQP-REL - Religious Facilities				
PQP-SCHOOLS - Schools	57.6		45.6	
TOTAL	1,081.0	5,973	1,068.2	5,972

TABLE A-2
WASTEWATER FLOW COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	ADWF (MGD) Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009	ADWF (MGD) July 1, 2009
LDR - Low Density Residential	484.6	2417	0.459	502.4	2524	0.479
MDR - Medium Density Residential	261.6	2350	0.446	250.0	2221	0.422
HDR - High Density Residential	66.1	1633	0.212	67.9	1650	0.214
CMU - Commercial Mixed Use	34.3	255	0.079	34.9	255	0.080
CC - Community Commercial	153.7		0.131	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023	27.3		0.023
PARK - Parks > 10 Acres	50.6		0.001	39.9		0.000
PQP-PUB - Public Facilities and Services	9.2		0.006	8.2		0.005
PQP-REL - Religious Facilities	4.2		0.003	6.9		0.005
PQP-SCHOOLS - Schools	57.6		0.010	45.6		0.008
UR-Urban Reserve	346.5		0.000	346.5		0.000
TOTAL	1,495.7	6,655.0	1.370	1,483.3	6,650.0	1.367

TABLE B-2
WASTEWATER FLOW COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
NORTH SHED
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	ADWF (MGD) Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009	ADWF (MGD) July 1, 2009
LDR - Low Density Residential	18.5	92	0.017	18.3	91	0.017
MDR - Medium Density Residential	62.9	565	0.107	62.2	558	0.106
HDR - High Density Residential	8.2	168	0.022	8.2	172	0.022
CMU - Commercial Mixed Use						
CC - Community Commercial						
CC/BP - Community Commercial / Business Park						
PARK - Parks > 10 Acres						
PQP-PUB - Public Facilities and Services	3.0		0.002	1.6		0.001
PQP-REL - Religious Facilities	4.2		0.003	6.9		0.005
PQP-SCHOOLS - Schools						
UR-Urban Reserve	317.9		0.000	317.9		
TOTAL	414.7	825.0	0.151	415.1	821.0	0.151

TABLE C-2
WASTEWATER FLOW COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
SOUTH SHED
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	ADWF (MGD) Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009	ADWF (MGD) July 1, 2009
LDR - Low Density Residential	466.1	2325	0.442	484.1	2433	0.462
MDR - Medium Density Residential	198.7	1785	0.339	187.8	1663	0.316
HDR - High Density Residential	57.9	1465	0.190	59.7	1478	0.192
CMU - Commercial Mixed Use	34.3	255	0.079	34.9	255	0.080
CC - Community Commercial	153.7		0.131	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023	27.3		0.023
PARK - Parks > 10 Acres	50.6		0.001	39.9		0.000
PQP-PUB - Public Facilities and Services	6.2		0.004	6.6		0.004
PQP-REL - Religious Facilities						0.000
PQP-SCHOOLS - Schools	57.6		0.010	45.6		0.008
UR-Urban Reserve	28.6		0.000	28.6		0.000
TOTAL	1,081.0	5830	1.219	1,068.2	5829	1.216

TABLE D-2
WASTEWATER FLOW COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	ADWF (MGD) Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009	ADWF (MGD) July 1, 2009
LDR - Low Density Residential	621.7	3101	0.589	639.5	3208	0.609
MDR - Medium Density Residential	354.1	3179	0.604	342.5	3050	0.580
HDR - High Density Residential	110.4	2519	0.327	112.2	2536	0.330
CMU - Commercial Mixed Use	47.6	347	0.109	48.2	347	0.110
CC - Community Commercial	191.4		0.163	191.4		0.163
CC/BP - Community Commercial / Business Park	27.3		0.023	27.3		0.023
PARK - Parks > 10 Acres	60.6		0.001	49.9		0.000
PQP-PUB - Public Facilities and Services	10.8		0.007	9.8		0.006
PQP-REL - Religious Facilities	4.2		0.003	6.9		0.005
PQP-SCHOOLS - Schools	67.6		0.012	55.6		0.010
TOTAL	1,495.7	9146	1.838	1,483.3	9141	1.836

TABLE E-2
WASTEWATER FLOW COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
NORTH SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	ADWF (MGD) Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009	ADWF (MGD) July 1, 2009
LDR - Low Density Residential	127.0	633	0.120	126.8	632	0.120
MDR - Medium Density Residential	155.4	1394	0.265	154.7	1387	0.264
HDR - High Density Residential	52.5	1054	0.137	52.5	1058	0.138
CMU - Commercial Mixed Use	13.3	92	0.030	13.3	92	0.030
CC - Community Commercial	37.7		0.032	37.7		0.032
CC/BP - Community Commercial / Business Park						
PARK - Parks > 10 Acres	10.0		0.000	10.0		0.000
PQP-PUB - Public Facilities and Services	4.6		0.003	3.2		0.002
PQP-REL - Religious Facilities	4.2		0.003	6.9		0.005
PQP-SCHOOLS - Schools	10.0		0.002	10.0		0.002
TOTAL	414.7	3173	0.592	415.1	3169	0.593

TABLE F-2
WASTEWATER FLOW COMPARISON
JANUARY 22, 2009 / JULY 1, 2009 LAND USE PLANS
SOUTH SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres) Jan. 22, 2009	UNITS Jan. 22, 2009	ADWF (MGD) Jan. 22, 2009	AREA SIZE (Acres) July 1, 2009	UNITS July 1, 2009	ADWF (MGD) July 1, 2009
LDR - Low Density Residential	494.7	2468	0.469	512.7	2576	0.489
MDR - Medium Density Residential	198.7	1785	0.339	187.8	1663	0.316
HDR - High Density Residential	57.9	1465	0.190	59.7	1478	0.192
CMU - Commercial Mixed Use	34.3	255	0.079	34.9	255	0.080
CC - Community Commercial	153.7		0.131	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023	27.3		0.023
PARK - Parks > 10 Acres	50.6		0.001	39.9		0.000
PQP-PUB - Public Facilities and Services	6.2		0.004	6.6		0.004
PQP-REL - Religious Facilities			0.000			0.000
PQP-SCHOOLS - Schools	57.6		0.010	45.6		0.008
TOTAL	1,081.0	5973	1.246	1,068.2	5972	1.243

TABLE 2
LAND USE SUMMARY
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	502.4	2524
MDR - Medium Density Residential	250.0	2221
HDR - High Density Residential	67.9	1650
CMU - Commercial Mixed Use	34.9	255
CC - Community Commercial	153.7	
CC/BP - Community Commercial / Business Park	27.3	
PARK - Parks > 10 Acres	39.9	
PQP-PUB - Public Facilities and Services	8.2	
PQP-REL - Religious Facilities	6.9	
PQP-SCHOOLS - Schools	45.6	
UR - Urban Reserve	346.5	
TOTAL	1,483.3	6,650

TABLE 3
LAND USE SUMMARY
NORTH WASTEWATER SHED - SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	18.3	91
MDR - Medium Density Residential	62.2	558
HDR - High Density Residential	8.2	172
CMU - Commercial Mixed Use		
CC - Community Commercial		
CC/BP - Community Commercial / Business Park		
PARK - Parks > 10 Acres		
PQP-PUB - Public Facilities and Services	1.6	
PQP-REL - Religious Facilities	6.9	
PQP-SCHOOLS - Schools		
UR - Urban Reserve	317.9	
TOTAL	415.1	821

TABLE 4
LAND USE SUMMARY
SOUTH WASTEWATER SHED - SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	484.1	2433
MDR - Medium Density Residential	187.8	1663
HDR - High Density Residential	59.7	1478
CMU - Commercial Mixed Use	34.9	255
CC - Community Commercial	153.7	
CC/BP - Community Commercial / Business Park	27.3	
PARK - Parks > 10 Acres	39.9	
PQP-PUB - Public Facilities and Services	6.6	
PQP-REL - Religious Facilities		
PQP-SCHOOLS - Schools	45.6	
UR - Urban Reserve	28.6	
TOTAL	1,068.2	5,829

TABLE 5
WASTEWATER FLOW SUMMARY
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	502.4	2524	0.479
MDR - Medium Density Residential	250.0	2221	0.422
HDR - High Density Residential	67.9	1650	0.214
CMU - Commercial Mixed Use	34.9	255	0.080
CC - Community Commercial	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023
PARK - Parks > 10 Acres	39.9		0.000
PQP-PUB - Public Facilities and Services	8.2		0.005
PQP-REL - Religious Facilities	6.9		0.005
PQP-SCHOOLS - Schools	45.6		0.008
UR - Urban Reserve	346.5		0.000
TOTAL	1,483.3	6,650.0	1.367

TABLE 6
WASTEWATER FLOW SUMMARY
NORTH SHED - SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	18.3	91	0.017
MDR - Medium Density Residential	62.2	558	0.106
HDR - High Density Residential	8.2	172	0.022
CMU - Commercial Mixed Use			0.000
CC - Community Commercial			0.000
CC/BP - Community Commercial / Business Park			0.000
PARK - Parks > 10 Acres			0.000
PQP-PUB - Public Facilities and Services	1.6		0.001
PQP-REL - Religious Facilities	6.9		0.005
PQP-SCHOOLS - Schools			0.000
UR - Urban Reserve	317.9		0.000
TOTAL	415.1	821.0	0.151

TABLE 7
WASTEWATER FLOW SUMMARY
SOUTH SHED - SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	484.1	2433	0.462
MDR - Medium Density Residential	187.8	1663	0.316
HDR - High Density Residential	59.7	1478	0.192
CMU - Commercial Mixed Use	34.9	255	0.080
CC - Community Commercial	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023
PARK - Parks > 10 Acres	39.9		0.000
PQP-PUB - Public Facilities and Services	6.6		0.004
PQP-REL - Religious Facilities			0.000
PQP-SCHOOLS - Schools	45.6		0.008
UR - Urban Reserve	28.6		0.000
TOTAL	1,068.2	5,829.0	1.216

TABLE 16
LAND USE SUMMARY
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	639.5	3208
MDR - Medium Density Residential	342.5	3050
HDR - High Density Residential	112.2	2536
CMU - Commercial Mixed Use	48.2	347
CC - Community Commercial	191.4	
CC/BP - Community Commercial / Business Park	27.3	
PARK - Parks > 10 Acres	49.9	
PQP-PUB - Public Facilities and Services	9.8	
PQP-REL - Religious Facilities	6.9	
PQP-SCHOOLS - Schools	55.6	
TOTAL	1,483.3	9,141

TABLE 17
LAND USE SUMMARY
NORTH WASTEWATER SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	126.8	632
MDR - Medium Density Residential	154.7	1387
HDR - High Density Residential	52.5	1058
CMU - Commercial Mixed Use	13.3	92
CC - Community Commercial	37.7	
CC/BP - Community Commercial / Business Park		
PARK - Parks > 10 Acres	10.0	
PQP-PUB - Public Facilities and Services	3.2	
PQP-REL - Religious Facilities	6.9	
PQP-SCHOOLS - Schools	10.0	
TOTAL	415.1	3,169

TABLE 18
LAND USE SUMMARY
SOUTH WASTEWATER SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	512.7	2576
MDR - Medium Density Residential	187.8	1663
HDR - High Density Residential	59.7	1478
CMU - Commercial Mixed Use	34.9	255
CC - Community Commercial	153.7	
CC/BP - Community Commercial / Business Park	27.3	
PARK - Parks > 10 Acres	39.9	
PQP-PUB - Public Facilities and Services	6.6	
PQP-REL - Religious Facilities		
PQP-SCHOOLS - Schools	45.6	
TOTAL	1,068.2	5,972

TABLE 19
WASTEWATER FLOW SUMMARY
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	639.5	3208	0.609
MDR - Medium Density Residential	342.5	3050	0.580
HDR - High Density Residential	112.2	2536	0.330
CMU - Commercial Mixed Use	48.2	347	0.110
CC - Community Commercial	191.4		0.163
CC/BP - Community Commercial / Business Park	27.3		0.023
PARK - Parks > 10 Acres	49.9		0.000
PQP-PUB - Public Facilities and Services	9.8		0.006
PQP-REL - Religious Facilities	6.9		0.005
PQP-SCHOOLS - Schools	55.6		0.010
TOTAL	1,483.3	9141	1.836

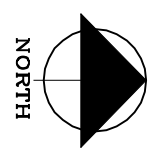
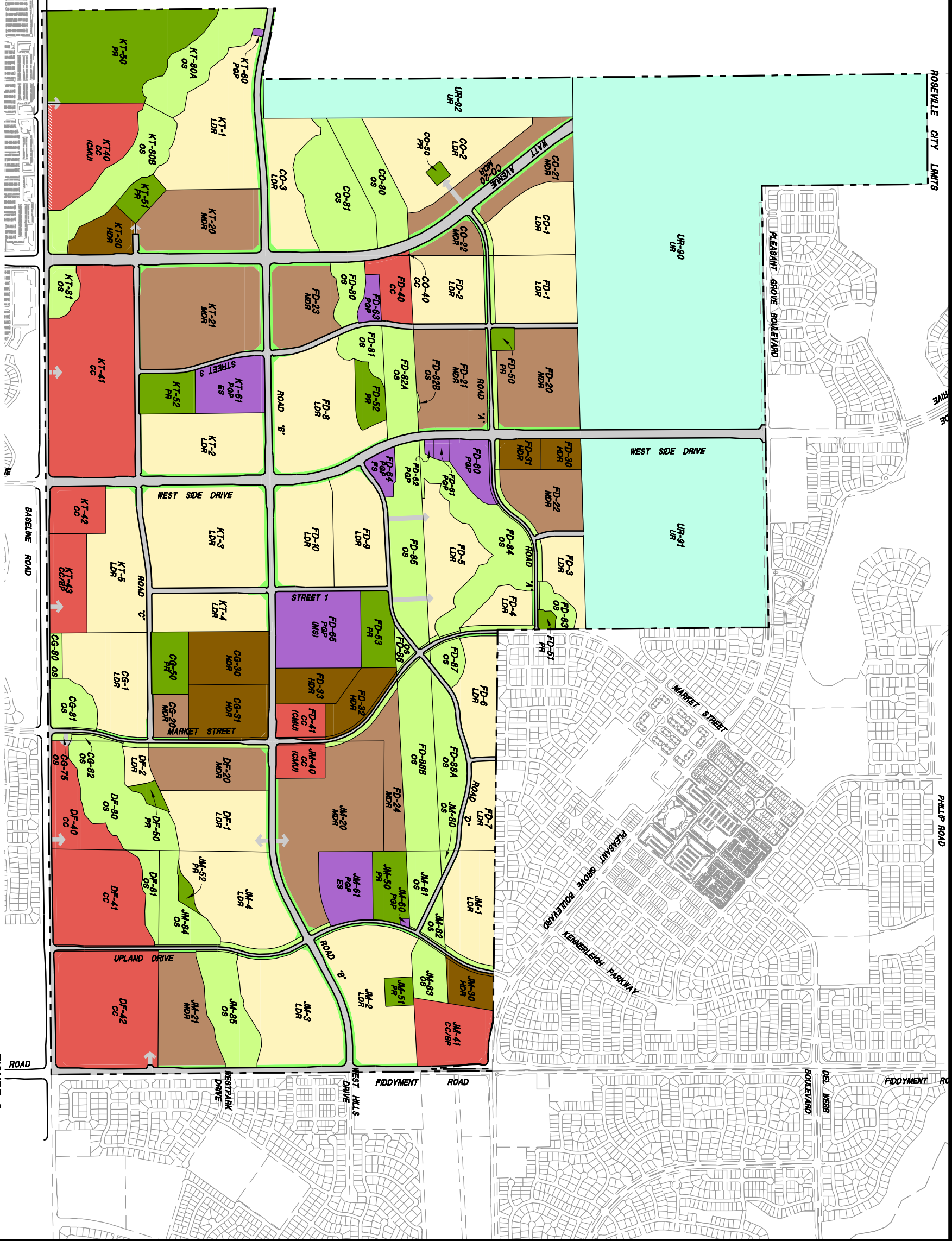
TABLE 20
WASTEWATER FLOW SUMMARY
NORTH SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	126.8	632	0.120
MDR - Medium Density Residential	154.7	1387	0.264
HDR - High Density Residential	52.5	1058	0.138
CMU - Commercial Mixed Use	13.3	92	0.030
CC - Community Commercial	37.7		0.032
CC/BP - Community Commercial / Business Park			0.000
PARK - Parks > 10 Acres	10.0		0.000
PQP-PUB - Public Facilities and Services	3.2		0.002
PQP-REL - Religious Facilities	6.9		0.005
PQP-SCHOOLS - Schools	10.0		0.002
TOTAL	415.1	3169	0.593

TABLE 21
WASTEWATER FLOW SUMMARY
SOUTH SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN




LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	512.7	2576	0.489
MDR - Medium Density Residential	187.8	1663	0.316
HDR - High Density Residential	59.7	1478	0.192
CMU - Commercial Mixed Use	34.9	255	0.080
CC - Community Commercial	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023
PARK - Parks > 10 Acres	39.9		0.000
PQP-PUB - Public Facilities and Services	6.6		0.004
PQP-REL - Religious Facilities			0.000
PQP-SCHOOLS - Schools	45.6		0.008
TOTAL	1,068.2	5972	1.243

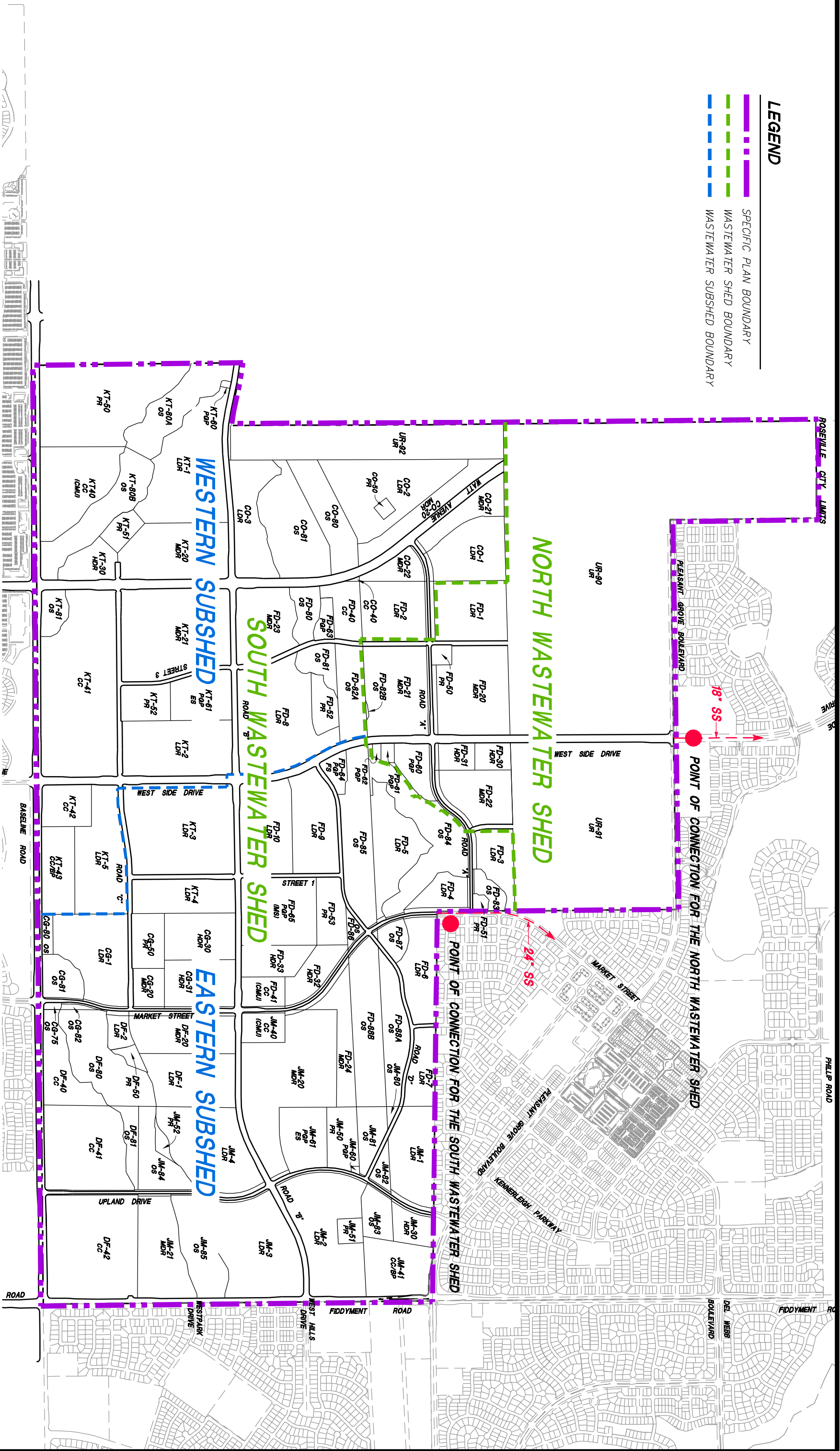
LAND USE LEGEND		ACRES
LDR	LOW DENSITY RESIDENTIAL	502.4
MDR	MEDIUM DENSITY RESIDENTIAL	250.0
HDR	HIGH DENSITY RESIDENTIAL	67.9
CC	COMMUNITY COMMERCIAL	153.7
CC (CMU)	COMMUNITY COMMERCIAL COMMERCIAL MIXED USE	34.9
CC/BP	COMMUNITY COMMERCIAL BUSINESS PARK	27.3
PQP	PUBLIC QUASI PUBLIC	60.7
PR	PARK	90.6
Paseo	OPEN SPACE - PASEO (601)	14.0
OS	OPEN SPACE	286.9
	LANDSCAPE CORRIDOR	38.8
UR	URBAN RESERVE	432.2
	MAJOR ROADS	124.7
SIERRA VISTA SPECIFIC PLAN AREA		2064.1



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FIGURE 2
 SIERRA VISTA SPECIFIC PLAN
 LAND USE PLAN
 SVSP BASE CONDITION
 NOT TO SCALE
 JULY 6, 2009

- LEGEND**
-  SPECIFIC PLAN BOUNDARY
 -  WASTEWATER SHED BOUNDARY
 -  WASTEWATER SUBSHED BOUNDARY



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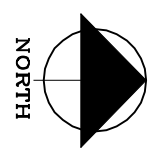
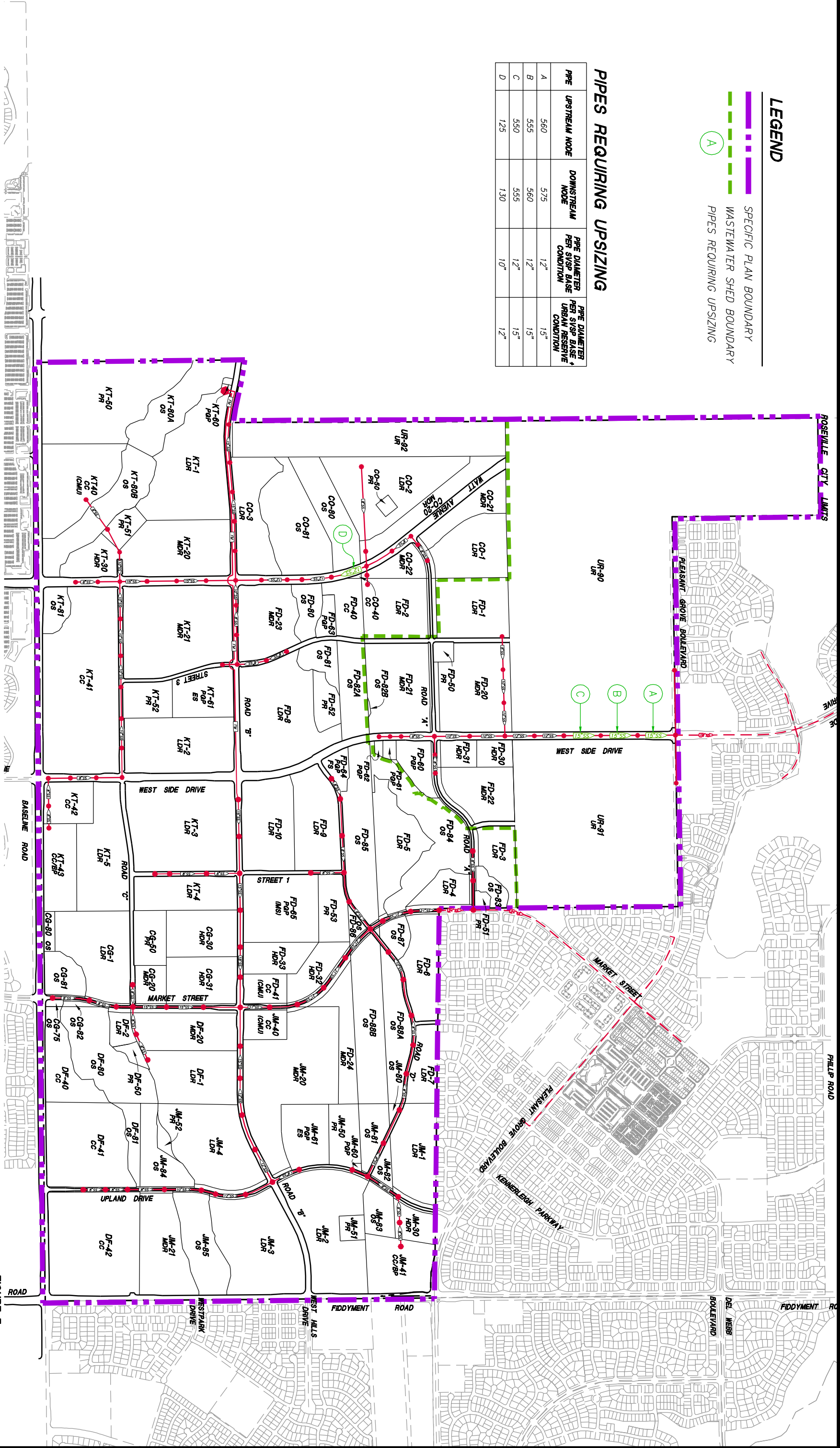
FIGURE 4
 SIERRA VISTA SPECIFIC PLAN
 SPECIFIC PLAN WASTEWATER SHEDS
 NOT TO SCALE
 JULY 6, 2009

LEGEND

-  SPECIFIC PLAN BOUNDARY
-  WASTEWATER SHED BOUNDARY
-  PIPES REQUIRING UPSIZING

PIPES REQUIRING UPSIZING

PIPE	UPSTREAM NODE	DOWNSTREAM NODE	PIPE DIAMETER PER SVSP BASE CONDITION	PIPE DIAMETER PER SVSP BASE + URBAN RESERVE CONDITION
A	560	575	12"	15"
B	555	560	12"	15"
C	550	555	12"	15"
D	125	130	10"	12"



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SIERRA VISTA SPECIFIC PLAN
PIPE UPSIZING
 SVSP BASE + URBAN RESERVE CONDITION
 NOT TO SCALE
 JULY 6, 2009

FIGURE 7

SIERRA VISTA SPECIFIC PLAN
PLACER COUNTY, CALIFORNIA

SANITARY SEWER MASTER PLAN

Prepared for:

City of Roseville

Prepared by:

MacKay & Somps Civil Engineers, Inc.
1552 Eureka Road, Suite 100
Roseville, California 95661

March 19, 2009
Revised April 27, 2009
Revised May 26, 2009

SIERRA VISTA SPECIFIC PLAN
PLACER COUNTY, CALIFORNIA

SANITARY SEWER MASTER PLAN

Prepared for:

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Revised April 27, 2009
Revised May 26, 2009

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Figure 4 – Specific Plan Wastewater Sheds

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Figure 7 - Pipe Upsizing – SVSP Base + Urban Reserve Condition

X. OVERSIZED EXHIBITS

Exhibit 1 – Sanitary Sewer Master Plan – SVSP Base Condition

Exhibit 2 – Sanitary Sewer Master Plan – SVSP Base + Urban Reserve Condition

Exhibit 3 – Preliminary Sanitary Sewer Manhole Data – SVSP Base + Urban Reserve Condition

XI. ATTACHMENTS

Attachment 1 – Sierra Vista Sanitary Sewer Lift Station Conceptual Design
Technical Memorandum prepared by: HydroScience Engineers, Inc.

Attachment 2 – Trunk Sewer Model for Sierra Vista-
Technical Memorandum prepared by: RMC Water and Environment

I. INTRODUCTION

LOCATION

The Sierra Vista Specific Plan Area consists of approximately 2064 acres of land located in the southwestern corner of Placer County adjacent to the western boundary of the City of Roseville. The Specific Plan Area is generally bound by the City of Roseville city limit line / West Roseville Specific Plan Area to the north, the City of Roseville city limit line / Fiddymment Road to the east, Base Line Road to the south, and the future extension of Watt Avenue to the west. The Sierra Vista Specific Plan (SVSP) area is currently situated in Placer County but is anticipated to be annexed into the City of Roseville.

The Specific Plan Area is identified as an Urban Growth Area (UGA) in the South Placer Regional Wastewater and Recycled Water Systems Evaluation prepared by RMC Water and Environment (RMC) for the South Placer Wastewater Authority (SPWA), an entity comprised of the City of Roseville, Placer County, and the South Placer Municipal Utility District (SPMUD). As defined by the Systems Evaluation the SVSP will be tributary to the Pleasant Grove Wastewater Treatment Plant (PGWWTP). Although the Specific Plan Area is within the Ultimate SPWA Service Area it is outside of the SPWA 2005 Service Area Boundary and approval will be required to join the Service Area and discharge to the PGWWTP.

Please refer to Figure 1 which depicts the location of the Plan Area as well as the 2005 Service Area Boundary.

PURPOSE

The purpose of this master plan study is to provide preliminary design and analysis for the sanitary sewer infrastructure to serve the Sierra Vista Specific Plan Area. The design and analysis presented in this report will also be used to support the environmental review process and utility demand planning by the City of Roseville. Background information including wastewater generation rates, peaking factors, proposed plan area land uses, and tributary areas will be used to plan the location and size of proposed sanitary sewer facilities for the SVSP. Additionally, existing topography will be utilized to determine which portions of the Specific Plan Area can deliver wastewater flows to the Pleasant Grove Wastewater Treatment Plant solely via gravity transmission pipes and which areas will require the transmission of wastewater through lift stations and force mains to carry wastewater to the gravity sewer system for delivery to the treatment plant.

PHASING

The Sierra Vista Specific Plan is designed to allow the sewer backbone infrastructure, defined as the pipe network within this report, to be installed in different construction phases. Phases may be developed in any sequence provided public safety, health, and welfare issues are addressed and will be subject to the approval of the City of Roseville. Parcel Specific Improvements will be determined with Small Lot Tentative Maps or subsequent entitlements.

II. PROJECT DESCRIPTION

PLAN AREA DESCRIPTION

The Sierra Vista Specific Plan Area currently consists of sparsely developed agricultural land characterized by agricultural planting of row crops, as well as natural vegetation, trees, and grassland. The topography within the Plan Area can generally be characterized as rolling hills with slopes between 1% and 5%. Ground elevations of 125± occur in the eastern portion of the Plan Area and decline to elevations of 75± in the west.

The Specific Plan Area is proposed to be divided into multiple parcels with a variety of land uses including residential, commercial, open space, schools, and parks. The proposed project land use plan is depicted on Figure 2. A summary of the proposed land use acreages and residential unit counts is shown on Table 2.

Using topographic mapping and the project land use plan the SVSP has been divided into two primary wastewater sheds, a northern shed and a southern shed. The southern shed is further divided into an eastern shed, which can be served entirely by a gravity pipe system, and a western shed, which requires a permanent sewer lift station and force main to transport wastewater flows to the gravity pipe system. The primary wastewater sheds and subsheds are shown on Figure 4. Summaries of the land use acreages and residential unit counts within the northern and southern wastewater sheds are shown on Tables 3 and 4 respectively.

Portions of the Specific Plan Area have been designated with an Urban Reserve land use. The Urban Reserve land use carries no development rights. Future entitlement requests and environmental review will be required prior to development of land with this designation. However, in order to adequately size sanitary sewer infrastructure within the Plan Area that both serves areas with and without the urban reserve designation, future land use designations have been assumed for the Urban Reserve parcels. The assumed land use plan for the Urban Reserve area in the northern wastewater shed is shown on Figure 3. It has been assumed that the Urban Reserve area in the southern shed will be developed as

low density residential. A summary of the assumed future land use acreages and residential unit counts is shown on Table 10. A summary of the assumed future land use acreages and residential unit counts within the northern wastewater shed is shown on Table 11. Table 12 contains a summary of assumed future land acreages and unit counts within the southern wastewater shed.

Wastewater flows for two development scenarios will be analyzed in this master plan study. In the study the development scenario for the Plan Area without development rights on the Urban Reserve parcels will be referred to as the “SVSP Base” condition. The development scenario representing the cumulative development of the Plan Area, when both the “SVSP Base” and future land uses on the Urban Reserve parcels are considered, will be referred to as the “SVSP Base + Urban Reserve” condition.

The sanitary sewer infrastructure within the Sierra Vista Specific Plan will be sized to carry the “SVSP Base + Urban Reserve” wastewater flows. Table 16 shows a summary of the “SVSP Base + Urban Reserve” land use acreages and unit counts. The summary combines the “SVSP Base” land use acreages and residential unit counts with the land use acreages and residential unit counts assumed for future development of the Urban Reserve parcels. Summaries of the “SVSP Base + Urban Reserve” land use acreages and residential unit counts within the northern and southern wastewater sheds are shown in Tables 17 and 18 respectively.

TREATMENT PLANT DESCRIPTION

Wastewater flows from the Sierra Vista Specific Plan will be conveyed by new onsite transmission facilities, as well as offsite facilities installed as part of the Westpark Community Funding District Phases 2B and 3, to the Pleasant Grove Wastewater Treatment Plant. The PGWWTP is owned and operated by the City of Roseville for the benefit of the South Placer Wastewater Authority. The locations of the PGWWTP and offsite transmission facilities are shown on Figure 5, which is Figure 9-2 from the West Roseville Specific Plan.

The City of Roseville uses average dry weather flow volumes when analyzing wastewater treatment plant capacity. According to the South Placer Regional Wastewater and Recycled Water Systems Evaluation prepared by RMC, the current average dry weather flow capacity of the PGWWTP is 12.0 MGD. The measured dry weather flow in 2007 was 7.1 MGD. The ultimate buildout dry weather flow projection for the PGWWTP is 24 MGD.

In Technical Memorandum No. 2b from Appendix D of the South Placer Regional Wastewater and Recycled Water Systems Evaluation, an estimated ADWF of 2.10 MGD would be tributary to the PGWWTP from buildout of the Sierra Vista Specific Plan Area under a development scenario similar to the “SVSP Base + Urban Reserve” condition considered in this study. The flow projected in the Technical Memorandum exceeds the 1.838 MGD calculated in this master plan. The difference in the flow calculations can be attributed primarily to a difference in the number of residential units assumed in each projection. The cumulative number of 8,799 low, medium, and high density residential units used in this study compares to 10,198 residential units used in the RMC projection.

Although the average dry weather flow generated by the SVSP as calculated in this report is slightly less than the flow considered in the Systems Evaluation the conclusions and projections discussed in the Evaluation remain valid. The Systems Evaluation and related Technical Memorandum updates should be reviewed for information related to any required PGWWTP expansions necessary to provide service to the SVSP.

III. SEWER MASTER PLAN METHODOLOGY

ANALYSIS PROCEDURE

The following procedure was used for the preliminary design and analysis of the sanitary sewer system proposed in the SVSP Sewer Master Plan:

- The primary wastewater sheds within the plan area were delineated.
- A sewer trunk system alignment was defined to collect wastewater flows within the Sierra Vista Specific Plan Area. The gravity sewer system was placed within the proposed road system shown on the Specific Plan Land Use Map wherever feasible.
- Node points were inserted into the sewer system alignment to define flow collection points within the sewer system.
- The primary wastewater sheds were subdivided into secondary sheds to determine tributary areas into the trunk system node points.
- Proposed land use acreages and residential unit counts within each secondary wastewater shed were tabulated.
- Wastewater flows, including average dry weather flows, factored flows, and peak wet weather flows were calculated at each node point using the design methodology defined in Section 9 – Sanitary Sewer Design, of the City of Roseville Design and Construction Standards dated March 2007.
- Average dry weather flows were calculated using the Average Dry Weather Unit Flow Factors for the land use types within each secondary wastewater shed.
- Factored flows were calculated by multiplying average dry weather flows by a factor of safety of 2.0.
- Peak wet weather flows within the trunk system were calculated by summing factored flows at the nodes along the trunk system alignment and applying appropriate peaking factors from the Peaking Factor Curve shown in Figure SS-1 of Section 9 of the Design Standards.
- Trunk system pipe sizes were initially sized based on peak wet weather flows and pipe capacities based on minimum pipe slopes.

- Trunk sewer pipes initially calculated to be 18” or larger were restudied and resized as appropriate using hydraulic modeling. The hydraulic modeling results can be found in Attachment 2 – Trunk Sewer Model for Sierra Vista prepared by RMC.
- Preliminary pipe inverts were calculated and compared to existing ground grades and conceptual finished grades to check the ability to serve the secondary sheds with gravity sewer pipe systems.

PIPELINE DESIGN

The proposed pipe size diameters were selected using the following pipe criteria:

- A Manning’s “n” value of 0.013 was used for all pipe-sizing calculations.
- Pipes 10 inches and less in diameter and pipes with lateral connections are designed to have a maximum depth of flow 70% of the pipe diameter.
- Pipes 12 inches and larger with no lateral connections are designed to flow full.
- Pipe sizes have been selected assuming pipes will be installed at minimum slopes. The minimum slope for a pipe is a slope that yields a minimum 2 feet per second velocity when flowing at design capacity.
- Pipes proposed to be placed deeper than 20 feet shall conform to the pipe manufacturer’s construction recommendations and comply with the City of Roseville improvement standards.

IV. WASTEWATER FLOWS

AVERAGE DRY WEATHER FLOWS

Average Dry Weather Flows (ADWF) within the Sierra Vista Specific Plan Area have been calculated using the Average Dry Weather Unit Flow Factors shown in Table 1 and the residential unit counts and non-residential acreages for the Plan Area parcels within the wastewater sheds.

The Specific Plan Area, as currently proposed under the “SVSP Base” condition, will generate an ADWF of 1.370 MGD. An average dry weather flow of 1.219 MGD will be delivered from the southern wastewater shed and 0.151 MGD will be delivered from the northern shed. A summary of the average dry weather flow from the proposed “SVSP Base” is shown in Table 5. Table 6 summarizes the flows from the north wastewater shed by land use type and Table 8 identifies the ADWF at each node. The southern shed flows are summarized by land use type in Table 7 and Table 9 identifies the ADWF at each node.

On oversized Exhibit 1 the average dry weather flows for the “SVSP Base” condition at each node are depicted graphically on an exhibit showing the proposed sanitary sewer pipe layout within the Plan Area. The proposed land use parcels and the primary and secondary wastewater shed boundaries are also delineated on the exhibit.

Additional dry weather flows will be generated when the Plan Area parcels currently designated with an Urban Reserve land use are developed in the future. An average dry weather flow of 0.468 MGD will be generated by development of the parcels currently designated as Urban Reserve using the assumed future land uses for these areas. A summary of these flows is shown on Table 13. The 0.468 MGD flow is comprised of 0.441 MGD from the northern wastewater shed and 0.027 from the southern shed. Table 14 summarizes the flows from the north wastewater shed and the southern shed flows are shown in Table 15.

The cumulative average dry weather flow for the “SVSP Base + Urban Reserve” condition is calculated to be 1.838 MGD. A summary of these cumulative flows is shown on Table 19. The cumulative average dry weather flow from the northern wastewater shed is estimated to be 0.592 MGD and is summarized by land use in Table 20. The cumulative average dry weather flow from the southern shed is estimated to be 1.246 MGD and is summarized by land use in Table 21. Tables 22 and 23 identify the ADWF at each node in the northern and southern wastewater sheds respectively. On oversized Exhibit 2 the “SVSP Base + Urban Reserve” average dry weather flows at each node are depicted graphically on an exhibit showing the proposed sanitary sewer pipe layout within the Plan Area.

FACTORED FLOWS

Factored wastewater flows are used in the design process to calculate peak wet weather flows. Factored flows are determined by multiplying average dry weather flows by a factor of 2.0 as stated in the City of Roseville Design and Construction Standards. The factored flows are then multiplied by peaking factors to obtain peak wet weather flows.

PEAK WET WEATHER FLOWS

Peak wet weather flows have been calculated to size trunk sewer pipelines in the Sierra Vista Specific Plan Area sanitary sewer system. Peak flows have been calculated for the both the “SVSP Base” and “SVSP Base + Urban Reserve” conditions.

The “SVSP Base” peak wet weather flows for each node in the northern and southern wastewater sheds, are shown on Tables 8 and 9 respectively. On oversized Exhibit 1, the peak wet weather flows at each node are depicted graphically on an exhibit showing the sanitary sewer pipe layout within the Plan Area.

The “SVSP Base + Urban Reserve” peak wet weather flows for each node in the northern wastewater shed are shown on Table 22. The peak wet weather flows for each node in the southern wastewater shed are shown on Table 9. On oversized Exhibit 2, the “SVSP Base + Urban Reserve” peak wet weather flows at each node are depicted graphically on an exhibit showing the sanitary sewer pipe layout within the Plan Area.

For pipes up to 15” in diameter the peak wet weather flows have been determined using average dry weather flows, factored flows, and peaking factors as outlined in the City of Roseville Design and Construction Standards. For pipes with diameters 15” and larger the peak wet weather flows have been calculated using hydraulic modeling.

Hydraulic modeling was prepared for the “SVSP Base + Urban Reserve” condition but not the “SVSP Base” condition. The “SVSP Base” condition was not modeled for the following reasons: A) In the north wastewater shed pipe sizing calculations did not yield the need for any onsite sewer pipes larger than 15” in diameter under either the “SVSP Base” or “SVSP Base + Urban Reserve” conditions. Hydraulic modeling was needed only to confirm the adequacy of offsite pipelines. If modeling confirmed that offsite pipes were adequate under the “SVSP Base + Urban Reserve” condition, they would, by default, be adequate for the “SVSP Base” condition which results in smaller flows. B) Development of the south wastewater shed under the “SVSP Base” condition results in an average dry weather flow of 1.219 MGD. Subsequent development of the Urban Reserve area in the south shed will result in the buildout of only an additional 143 low density residential units which will contribute an average dry weather flow of 0.027 MGD, less than 0.50% of the total 1.246 MGD average dry weather flow from the shed under the “SVSP Base + Urban Reserve” condition. This negligible difference in flows will have little or no effect on 15” or larger diameter pipelines.

Therefore the determination was made to model only the “SVSP Base + Urban Reserve” condition. The results of the hydraulic modeling prepared by RMC for the Plan Area “SVSP Base + Urban Reserve” condition are presented in Attachment 2.

OFFSITE CONNECTIONS

The sanitary sewer trunk pipe systems within the Sierra Vista Specific Plan ultimately discharge to two existing sewer pipes constructed as a part of the Westpark CFD Phase 2B and 3 improvements. The outlet pipe from the southern wastewater shed will connect to a manhole at the end of a 24” sewer pipe constructed in Market Street at the boundary between the Sierra Vista and West Roseville Specific Plan Areas. The outlet pipe from the northern wastewater shed will connect to an 18” sewer main to be constructed at the intersection of West Side Drive and Pleasant Grove Boulevard.

These offsite connection points can be seen on Exhibits 1 and 2. The connection point for the southern wastewater shed is identified as Node 360 and corresponds to Node W5a in the West Roseville Specific Plan (WRSP) Master Sewer Plan. The connection point for the northern wastewater shed is identified on the exhibits as Node 575 and corresponds to Node W19 from the WRSP Master Sewer Plan.

The hydraulic modeling performed by RMC included the modeling of the offsite wastewater transmission pipes in West Roseville, downstream from the offsite two connection points that will deliver flows from the Sierra Vista Specific Plan to the Pleasant Grove Wastewater Treatment Plant. As stated in the RMC Final Technical Memorandum in Attachment 2: “The model results indicate that the modeled pipes downstream from the Sierra Vista UGA, including the recently constructed pipes in West Roseville, have sufficient capacity to handle PWWF from Sierra Vista under the buildout scenario.”

V. WASTEWATER INFRASTRUCTURE IMPROVEMENTS

COLLECTION AND TRANSMISSION

A sanitary sewer system comprised of gravity trunk pipelines, a lift station, and a force main was defined to collect wastewater flows within the Sierra Vista Specific Plan Area. The gravity pipelines and force main were placed within the proposed road system serving the Plan Area wherever feasible. The sewer system designed to serve the Plan Area using the “SVSP Base” development scenario is shown on oversized Exhibit 1. The sewer system designed to serve the Plan Area using the “SVSP Base + Urban Reserve” scenario when future land uses have been assumed for Urban Reserve parcels is shown on oversized Exhibit 2.

Four sewer pipelines are required to be upsized from the “SVSP Base” condition to serve the Plan Area when the Urban Reserve parcels are developed, three pipes in West Side Drive in the north wastewater shed and one pipe in Watt Avenue in the south wastewater shed. These pipes are depicted on Figure 7. The pipes in West Side Drive must be upsized from 12” to 15” diameter pipes. The pipe in Watt Avenue must be upsized from a 10” to 12” pipe.

The sanitary sewer system constructed to serve the Sierra Vista Specific Plan Area will be sized to serve the “SVSP Base + Urban Reserve” condition. This sewer system is depicted on oversized Exhibit 3. Preliminary pipe inverts and manhole rim grades are also shown on the exhibit.

EFFLUENT / DISPOSAL

Effluent from the PGWWTP is released through an outfall structure into Pleasant Grove Creek. The current plant NPDES permit allows for a maximum of 12 MGD average dry weather flow (which may be increased to 15 MGD upon completion of upgrades to the PGWWTP) to be discharged to Pleasant Grove Creek. The outfall location is shown on Figure 6.

RECYCLED WATER

The Sierra Vista Specific Plan anticipates receiving a commitment for recycled water from the City of Roseville for an amount equal to the average daily dry weather wastewater flow generated and conveyed by the SVSP to the Pleasant Grove Wastewater Treatment Plant.

FORCE MAIN AND LIFT STATIONS

A portion of the southern wastewater shed within the Plan Area requires the use of a permanent sanitary sewer lift station and force main to convey flows to the gravity pipe sewer system. The lift station is proposed to be constructed near the westerly terminus of Road “B”, on the south side of the road, between the road and a tributary of Curry Creek. The proposed lift station will be constructed above and outside the 100-year flood plain, as shown on the sewer master plan depicted on Exhibit 1. The lift station will be accessed from Road “B.”

A 12” force main will carry flows from the lift station easterly along Road “B” to a 72” transition manhole which will discharge to a gravity pipe system which will convey flows to the offsite connection point. Based on preliminary invert and rim grades the 72” transition manhole will be approximately 16.0 feet deep. At this depth the transition manhole will have adequate capacity to accept the active volume pumped from the lift station while maintaining over 4.5 feet of freeboard.

A preliminary conceptual design for the lift station and force main has been prepared by HydroScience Engineers, Inc. and is included as Attachment 1. The conceptual design for the lift station and force main is based on the peak wet weather flow at the lift station node as calculated by RMC using hydraulic modeling.

INTERIM IMPROVEMENTS/ SUBSHED BOUNDARY MODIFICATIONS

Interim sanitary sewer improvements will be allowed on a temporary basis to provide sewer service for parcel development within the Plan Area. Interim improvements may include pipe alignments or points of connection that differ from those shown in the master plan for individual land use parcels, temporary sewer lift stations for individual land use parcels to provide sewer service until permanent infrastructure is constructed, as well as other types of interim improvements. All interim improvements shall be designed and constructed per City of Roseville Standards.

During the final grading and utility design process for individual development projects within the Plan Area, it may become apparent that there is a more efficient method of delivering wastewater flows to the sanitary sewer trunk system than at the node defined in the sewer master plan. Minor wastewater shed boundary adjustments will be allowed during the final design process.

All interim sanitary sewer improvements and wastewater shed adjustments will be subject to the review and approval of the City of Roseville Environmental Utilities Department.

VI. REFERENCES

Central Valley RWQCB – Waste Discharge Requirements For The City of Roseville
Pleasant Grove Wastewater Treatment Plant, Placer County
Order No. R5-2008-0079, NPDES No. CA0084573

Sierra Vista Specific Plan – Preliminary Land Use Plan & Tables for January 22, 2009
Land Use Plan

Urban Reserve Land Use Plan – Preliminary Land Use Plan & Tables for June 13,
2008 Land Use Plan

South Placer Regional Wastewater and Recycled Water Systems Evaluation
Final Report – June 2007 (Including Updated Technical Documents as of
03/05/2009. Updated documents include Appendices A (TM 1b), C (TM 2a), D
(TM 2b), F (TM 2c), H (TM 3b), N (TM 4a), O (TM 4b), P (TM 5a), Q (TM 5b),
and TM 4c.

West Roseville Specific Plan
February 04, 2004

West Roseville Specific Plan – Master Sewer Plan
April 12, 2005

VII. ABBREVIATIONS

AC	Acres
ADW	Average Dry Weather
ADWF	Average Dry Weather Flow
CC	Community Commercial
CC/BP	Community Commercial/Business Park
CFD	Community Funding District
CMU	Commercial Mixed Use
DU	Dwelling Unit
EDU	Equivalent Dwelling Unit
GPD	Gallons per Day
HDR	High Density Residential
LDR	Low Density Residential
M&S	MacKay & Somps
MDR	Medium Density Residential
MGD	Million Gallons per Day
NPDES	National Pollution Discharge Elimination System
PGWWTP	Pleasant Grove Wastewater Treatment Plan
PQP	Public Quasi Public
PQPS	Public Quasi Public Schools
PR	Park Reserve
SPMUD	South Placer Municipal Utility District
SPWA	South Placer Wastewater Authority
UR	Urban Reserve
UGA	Urban Growth Area
WRSP	West Roseville Specific Plan

TABLES

TABLE 1
AVERAGE DRY WEATHER UNIT FLOW FACTORS
SIERRA VISTA SPECIFIC PLAN

LAND USE	FLOW RATE ⁽¹⁾
LDR - Low Density Residential	190 gpd/du
MDR - Medium Density Residential	190 gpd/du
HDR - High Density Residential	130 gpd/du
CMU - Commercial Mixed Use	2300 gpd/ac
CC - Community Commercial	850 gpd/ac
CC/BP - Community Commercial / Business Park	850 gpd/ac
PARK - Parks	10 gpd/ac
PQP-PUB - Public Facilities and Services	660 gpd/ac
PQP-REL - Religious Facilities	660 gpd/ac
PQP-SCHOOLS - Schools	170 gpd/ac

Notes:

1. Per Table 1 - Average Dry Weather Unit Flow Factors, shown in Section 9 - Sanitary Sewer Design of the City of Roseville Design and Construction Standards dated March 2007

TABLE 2
LAND USE SUMMARY
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	484.6	2417
MDR - Medium Density Residential	261.6	2350
HDR - High Density Residential	66.1	1633
CMU - Commercial Mixed Use	34.3	255
CC - Community Commercial	153.7	
CC/BP - Community Commercial / Business Park	27.3	
PARK - Parks > 10 Acres	50.6	
PQP-PUB - Public Facilities and Services	9.2	
PQP-REL - Religious Facilities	4.2	
PQP-SCHOOLS - Schools	57.6	
UR - Urban Reserve	346.5	
TOTAL	1,495.7	6,655

TABLE 3
LAND USE SUMMARY
NORTH WASTEWATER SHED - SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	18.5	92
MDR - Medium Density Residential	62.9	565
HDR - High Density Residential	8.2	168
CMU - Commercial Mixed Use		
CC - Community Commercial		
CC/BP - Community Commercial / Business Park		
PARK - Parks > 10 Acres		
PQP-PUB - Public Facilities and Services	3.0	
PQP-REL - Religious Facilities	4.2	
PQP-SCHOOLS - Schools		
UR - Urban Reserve	317.9	
TOTAL	414.7	825

TABLE 4
LAND USE SUMMARY
SOUTH WASTEWATER SHED - SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	466.1	2325
MDR - Medium Density Residential	198.7	1785
HDR - High Density Residential	57.9	1465
CMU - Commercial Mixed Use	34.3	255
CC - Community Commercial	153.7	
CC/BP - Community Commercial / Business Park	27.3	
PARK - Parks > 10 Acres	50.6	
PQP-PUB - Public Facilities and Services	6.2	
PQP-REL - Religious Facilities		
PQP-SCHOOLS - Schools	57.6	
UR - Urban Reserve	28.6	
TOTAL	1,081.0	5,830

TABLE 5
WASTEWATER FLOW SUMMARY
SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	484.6	2417	0.459
MDR - Medium Density Residential	261.6	2350	0.446
HDR - High Density Residential	66.1	1633	0.212
CMU - Commercial Mixed Use	34.3	255	0.079
CC - Community Commercial	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023
PARK - Parks > 10 Acres	50.6		0.001
PQP-PUB - Public Facilities and Services	9.2		0.006
PQP-REL - Religious Facilities	4.2		0.003
PQP-SCHOOLS - Schools	57.6		0.010
UR - Urban Reserve	346.5		0.000
TOTAL	1,495.7	6,655.0	1.370

TABLE 6
WASTEWATER FLOW SUMMARY
NORTH SHED - SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	18.5	92	0.017
MDR - Medium Density Residential	62.9	565	0.107
HDR - High Density Residential	8.2	168	0.022
CMU - Commercial Mixed Use			0.000
CC - Community Commercial			0.000
CC/BP - Community Commercial / Business Park			0.000
PARK - Parks > 10 Acres			0.000
PQP-PUB - Public Facilities and Services	3.0		0.002
PQP-REL - Religious Facilities	4.2		0.003
PQP-SCHOOLS - Schools			0.000
UR - Urban Reserve	317.9		0.000
TOTAL	414.7	825.0	0.151

TABLE 7
WASTEWATER FLOW SUMMARY
SOUTH SHED - SVSP BASE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	466.1	2325	0.442
MDR - Medium Density Residential	198.7	1785	0.339
HDR - High Density Residential	57.9	1465	0.190
CMU - Commercial Mixed Use	34.3	255	0.079
CC - Community Commercial	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023
PARK - Parks > 10 Acres	50.6		0.001
PQP-PUB - Public Facilities and Services	6.2		0.004
PQP-REL - Religious Facilities			0.000
PQP-SCHOOLS - Schools	57.6		0.010
UR - Urban Reserve	28.6		0.000
TOTAL	1,081.0	5,830.0	1.219

TABLE 9
WASTEWATER FLOWS BY NODE
SOUTH SHED - SVSP BASE CONDITION
SIERRA VISTA SPEC FIC PLAN

REFERENCE NODE #	CONTRIBUTING NODE #	(190 GPD / DU)			(130 GPD / DU)			(2300 GPD / ACRE)			(170 GPD / ACRE)			(850 GPD / AC)			(660 GPD / AC)			(10 GPD / ACRE)			TOTAL	FACTORED	PEAKING	TOTAL	PIPE	PIPE	% FULL			
		DU	CUM. DU	Q(ADWF)	DU	CUM. DU	Q(ADWF)	DU	CUM. DU	AREA	CUM. AREA	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	Q(ADWF)	FLOW	FACTOR	Q(PWWF)	SIZE	SLOPE	Q(PWWF)				
#	#	#	MGD	#	MGD	#	MGD	#	ACRE	ACRE	MGD	ACRE	ACRE	MGD	ACRE	ACRE	MGD	ACRE	ACRE	MGD	ACRE	ACRE	MGD	MGD	MGD	MGD	IN.	FT/FT	(d/D)			
5															12.200	12.2	0.010						0.010	0.021	3.52	0.073	8	0.0035	13			
10	5														8.8	21.0	0.018						0.018	0.036	3.48	0.124	8	0.0035	23			
15	10															21.0	0.018						0.018	0.036	3.48	0.124	8	0.0035	23			
20	15	119	119	0.023												21.0	0.018						0.040	0.081	3.29	0.266	8	0.0035	49			
25	20															21.0	0.018						0.040	0.081	3.29	0.266	8	0.0035	49			
30	25	169	288	0.055												21.0	0.018						0.073	0.145	3.08	0.447	10	0.0025	54			
35	30	152	440	0.084												21.0	0.018						0.101	0.203	2.91	0.590	10	0.0025	71			
40															56	56.0	0.048						0.048	0.095	3.23	0.307	8	0.0035	57			
45								175	175	23.5	23.5	0.054										39.9	39.9	0.000	0.054	0.109	3.19	0.347	8	0.0035	64	
50	45				152	152	0.020		175	23.5	0.054												39.9	0.000	0.074	0.148	3.07	0.456	10	0.0025	55	
55	35,40,50		440	0.084		152	0.020		175	23.5	0.054					77.0	0.065						39.9	0.000	0.223	0.447	2.50	1.116	15	0.0015	70	
70		121	121	0.023																				0.023	0.046	3.43	0.158	8	0.0035	29		
60													12.0	12.0	0.002									0.002	0.004	3.60	0.015	8	0.0035	3		
65	60	108	108	0.021									12.0	0.002										0.023	0.045	3.42	0.154	8	0.0035	28		
75	65,70		229	0.044									12.0	0.002										0.046	0.091	3.26	0.297	8	0.0035	55		
80	75	153	382	0.073									12.0	0.002										0.075	0.149	3.07	0.458	10	0.0025	55		
90		86	86	0.016																				0.016	0.033	3.48	0.114	8	0.0035	21		
95	90	70	156	0.030																				0.030	0.059	3.38	0.200	8	0.0035	37		
100	95		156	0.030																				0.030	0.059	3.38	0.200	8	0.0035	37		
105		82	82	0.016																				0.016	0.031	3.49	0.109	8	0.0035	20		
110	105	43	125	0.024																				0.024	0.048	3.42	0.162	8	0.0035	30		
115		144	144	0.027																					0.027	0.055	3.41	0.187	8	0.0035	34	
120	115	84	228	0.043																					0.043	0.087	3.28	0.284	8	0.0035	52	
125	100,110,120		509	0.097																					0.097	0.193	2.95	0.571	10	0.0025	69	
130	125		509	0.097											7.7	7.7	0.007	3.1	3.1	0.002					0.105	0.211	2.90	0.611	12	0.0020	61	
135	130	144	653	0.124												7.7	0.007		3.1	0.002					0.133	0.265	2.77	0.735	12	0.0020	73	
140	55,80,135		1475	0.280		152	0.020		175	23.5	0.054		12.0	0.002		84.7	0.072		3.1	0.002			39.9	0.000	0.431	N/A	N/A	1.000	15	0.0015	63	
145	140	203	1678	0.319		152	0.020		175	23.5	0.054		12.0	0.002		84.7	0.072		3.1	0.002			39.9	0.000	0.469	N/A	N/A	1.060	15	0.0015	66	
150	145	78	1756	0.334		152	0.020		175	23.5	0.054		12.0	0.002		84.7	0.072		3.1	0.002			39.9	0.000	0.484	N/A	N/A	1.070	15	0.0015	67	
155	150	164	1920	0.365		152	0.020		175	23.5	0.054		12.0	0.002		84.7	0.072		3.1	0.002			39.9	0.000	0.515	N/A	N/A	1.140	15	0.0015	71	
160	155		1920	0.365		152	0.020		175	23.5	0.054		12.0	0.002		84.7	0.072		3.1	0.002			39.9	0.000	0.515	N/A	N/A	1.150	12" FM			
170	160	290	2210	0.420		152	0.020		175	23.5	0.054		12.0	0.002		84.7	0.072		3.1	0.002			39.9	0.000	0.570	N/A	N/A	1.360	15	0.0015	85	
175																																
180	175												12.0	12.0	0.002								10.7	10.7	0.000	0.000	0.000	3.65	0.001	8	0.0035	0
185	180	24	24	0.005									12.0	0.002										10.7	0.000	0.007	0.013	3.56	0.048	8	0.0035	9
190	170,185		2234	0.424		152	0.020		175	23.5	0.054		24.0	0.004		84.7	0.072		3.1	0.002			50.6	0.001	0.577	N/A	N/A	1.380	15	0.0015	86	
195	190		2234	0.424		172	0.042		175	23.5	0.054		24.0	0.004		84.7	0.072		3.1	0.002			50.6	0.001	0.599	N/A	N/A	1.530	18	0.0012	65	

TABLE 10
LAND USE SUMMARY
URBAN RESERVE - FUTURE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	137.1	684
MDR - Medium Density Residential	92.5	829
HDR - High Density Residential	44.3	886
CMU - Commercial Mixed Use	13.3	92
CC - Community Commercial	37.7	
CC/BP - Community Commercial / Business Park		
PARK - Parks > 10 Acres	10.0	
PQP-PUB - Public Facilities and Services	1.6	
PQP-REL - Religious Facilities		
PQP-SCHOOLS - Schools	10.0	
TOTAL	346.5	2,491

TABLE 11
LAND USE SUMMARY
NORTH WASTEWATER SHED
URBAN RESERVE - FUTURE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	108.5	541
MDR - Medium Density Residential	92.5	829
HDR - High Density Residential	44.3	886
CMU - Commercial Mixed Use	13.3	92
CC - Community Commercial	37.7	
CC/BP - Community Commercial / Business Park		
PARK - Parks > 10 Acres	10.0	
PQP-PUB - Public Facilities and Services	1.6	
PQP-REL - Religious Facilities		
PQP-SCHOOLS - Schools	10.0	
TOTAL	317.9	2,348

TABLE 12
LAND USE SUMMARY
SOUTH WASTEWATER SHED
URBAN RESERVE - FUTURE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	28.6	143
MDR - Medium Density Residential		
HDR - High Density Residential		
CMU - Commercial Mixed Use		
CC - Community Commercial		
CC/BP - Community Commercial / Business Park		
PARK - Parks > 10 Acres		
PQP-PUB - Public Facilities and Services		
PQP-REL - Religious Facilities		
PQP-SCHOOLS - Schools		
TOTAL	28.6	143

TABLE 13
WASTEWATER FLOW SUMMARY
URBAN RESERVE - FUTURE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	137.1	684	0.130
MDR - Medium Density Residential	92.5	829	0.157
HDR - High Density Residential	44.3	886	0.115
CMU - Commercial Mixed Use	13.3	92	0.031
CC - Community Commercial	37.7		0.032
CC/BP - Community Commercial / Business Park			0.000
PARK - Parks > 10 Acres	10.0		0.000
PQP-PUB - Public Facilities and Services	1.6		0.001
PQP-REL - Religious Facilities			0.000
PQP-SCHOOLS - Schools	10.0		0.002
TOTAL	346.5	2,491.0	0.468

TABLE 14
WASTEWATER FLOW SUMMARY
NORTH SHED - URBAN RESERVE - FUTURE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	108.5	541	0.103
MDR - Medium Density Residential	92.5	829	0.157
HDR - High Density Residential	44.3	886	0.115
CMU - Commercial Mixed Use	13.3	92	0.031
CC - Community Commercial	37.7		0.032
CC/BP - Community Commercial / Business Park			0.000
PARK - Parks > 10 Acres	10.0		0.000
PQP-PUB - Public Facilities and Services	1.6		0.001
PQP-REL - Religious Facilities			0.000
PQP-SCHOOLS - Schools	10.0		0.002
TOTAL	317.9	2,348.0	0.441

TABLE 15
WASTEWATER FLOW SUMMARY
SOUTH SHED - URBAN RESERVE - FUTURE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	28.6	143	0.027
MDR - Medium Density Residential			0.000
HDR - High Density Residential			0.000
CMU - Commercial Mixed Use			0.000
CC - Community Commercial			0.000
CC/BP - Community Commercial / Business Park			0.000
PARK - Parks > 10 Acres			0.000
PQP-PUB - Public Facilities and Services			0.000
PQP-REL - Religious Facilities			0.000
PQP-SCHOOLS - Schools			0.000
TOTAL	28.6	143.0	0.027

TABLE 16
LAND USE SUMMARY
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	621.7	3101
MDR - Medium Density Residential	354.1	3179
HDR - High Density Residential	110.4	2519
CMU - Commercial Mixed Use	47.6	347
CC - Community Commercial	191.4	
CC/BP - Community Commercial / Business Park	27.3	
PARK - Parks > 10 Acres	60.6	
PQP-PUB - Public Facilities and Services	10.8	
PQP-REL - Religious Facilities	4.2	
PQP-SCHOOLS - Schools	67.6	
TOTAL	1,495.7	9,146

TABLE 17
LAND USE SUMMARY
NORTH WASTEWATER SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	127.0	633
MDR - Medium Density Residential	155.4	1394
HDR - High Density Residential	52.5	1054
CMU - Commercial Mixed Use	13.3	92
CC - Community Commercial	37.7	
CC/BP - Community Commercial / Business Park		
PARK - Parks > 10 Acres	10.0	
PQP-PUB - Public Facilities and Services	4.6	
PQP-REL - Religious Facilities	4.2	
PQP-SCHOOLS - Schools	10.0	
TOTAL	414.7	3,173

TABLE 18
LAND USE SUMMARY
SOUTH WASTEWATER SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS
LDR - Low Density Residential	494.7	2468
MDR - Medium Density Residential	198.7	1785
HDR - High Density Residential	57.9	1465
CMU - Commercial Mixed Use	34.3	255
CC - Community Commercial	153.7	
CC/BP - Community Commercial / Business Park	27.3	
PARK - Parks > 10 Acres	50.6	
PQP-PUB - Public Facilities and Services	6.2	
PQP-REL - Religious Facilities		
PQP-SCHOOLS - Schools	57.6	
TOTAL	1,081.0	5,973

TABLE 19
WASTEWATER FLOW SUMMARY
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	621.7	3101	0.589
MDR - Medium Density Residential	354.1	3179	0.604
HDR - High Density Residential	110.4	2519	0.327
CMU - Commercial Mixed Use	47.6	347	0.109
CC - Community Commercial	191.4		0.163
CC/BP - Community Commercial / Business Park	27.3		0.023
PARK - Parks > 10 Acres	60.6		0.001
PQP-PUB - Public Facilities and Services	10.8		0.007
PQP-REL - Religious Facilities	4.2		0.003
PQP-SCHOOLS - Schools	67.6		0.012
TOTAL	1,495.7	9,146.0	1.838

TABLE 20
WASTEWATER FLOW SUMMARY
NORTH SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	127.0	633	0.120
MDR - Medium Density Residential	155.4	1394	0.265
HDR - High Density Residential	52.5	1054	0.137
CMU - Commercial Mixed Use	13.3	92	0.030
CC - Community Commercial	37.7		0.032
CC/BP - Community Commercial / Business Park			0.000
PARK - Parks > 10 Acres	10.0		0.000
PQP-PUB - Public Facilities and Services	4.6		0.003
PQP-REL - Religious Facilities	4.2		0.003
PQP-SCHOOLS - Schools	10.0		0.002
TOTAL	414.7	3,173.0	0.592

TABLE 21
WASTEWATER FLOW SUMMARY
SOUTH SHED
SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

LAND USE	AREA SIZE (Acres)	UNITS	ADWF (MGD)
LDR - Low Density Residential	494.7	2468	0.469
MDR - Medium Density Residential	198.7	1785	0.339
HDR - High Density Residential	57.9	1465	0.190
CMU - Commercial Mixed Use	34.3	255	0.079
CC - Community Commercial	153.7		0.131
CC/BP - Community Commercial / Business Park	27.3		0.023
PARK - Parks > 10 Acres	50.6		0.001
PQP-PUB - Public Facilities and Services	6.2		0.004
PQP-REL - Religious Facilities			0.000
PQP-SCHOOLS - Schools	57.6		0.010
TOTAL	1,081.0	5,973.0	1.246

TABLE 22
WASTEWATER FLOWS BY NODE
NORTH SHED -SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

REFERENCE NODE	CONTRIBUTING NODE	LDR / MDR			HDR			CMU			SCHOOL			CC, CC/BP			PQP-PUB, PQP-REL			PARK - Parks > 10 Acres			TOTAL	FACTORED	PEAKING	TOTAL	PIPE	PIPE	% FULL		
		DU	CUM. DU	Q(ADWF)	DU	CUM. DU	Q(ADWF)	DU	CUM. DU	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	Q(ADWF)	MGD	MGD	MGD	MGD	SIZE	SLOPE	Q(PWWF)	
500		206	206	0.039																		0.039	0.079	3.30	0.260	8	0.0035	48			
505	500		206	0.039																		0.040	0.080	3.30	0.264	8	0.0035	49			
510	505		206	0.039																		0.043	0.085	3.28	0.280	8	0.0035	52			
515		130	130	0.025																		0.026	0.052	3.40	0.176	8	0.0035	32			
520	515		130	0.025	84	84	0.011															0.037	0.074	3.31	0.244	8	0.0035	45			
525	510,520		336	0.064		84	0.011															0.080	0.159	3.04	0.483	10	0.0025	58			
530		92	92	0.017																		0.017	0.035	3.48	0.122	8	0.0035	22			
535	530		229	0.061																		0.061	0.122	3.14	0.383	10	0.0025	46			
540	525,535		657	0.125	84	168	0.022															0.151	0.303	2.68	0.812	12	0.0002	81			
545	540	75	732	0.139		168	0.022	50	50	6.9	6.9	0.016										0.182	0.363	2.58	0.937	12	0.0002	94			
550	545		126	858	0.163	175	343	0.045														0.228	0.456	2.50	1.141	15	0.0015	71			
555	550			858	0.163		343	0.045														0.228	0.456	2.50	1.141	15	0.0015	71			
560	555			858	0.163	175	518	0.067								13.6	13.6	0.012				0.263	0.525	2.45	1.286	15	0.0015	80			
565		490	490	0.093																		0.093	0.186	2.97	0.553	10	0.0250	67			
570		679	679	0.129	536	536	0.070	42	42	6.4	6.4	0.015	10.0	10.0	0.002	24.1	24.1	0.020	1.6	1.6	0.001	10.0	10.0	0.000	0.237	0.474	2.48	1.174	15	0.0015	73
575	560,565,570			2027	0.385		1054	0.137														0.592	N/A	N/A	1.230	EXIST 18		52			
TOTAL				2027	0.385		1054	0.137														0.592	N/A	N/A	1.230	EXIST 18		52			

NOTES:

1 Peak Transmission Flow and Pipe Diameter based on hydraulic modeling prepared by RMC (Please refer to Attachment 2)

TABLE 23
WASTEWATER FLOWS BY NODE
SOUTH SHED - SVSP BASE + URBAN RESERVE CONDITION
SIERRA VISTA SPECIFIC PLAN

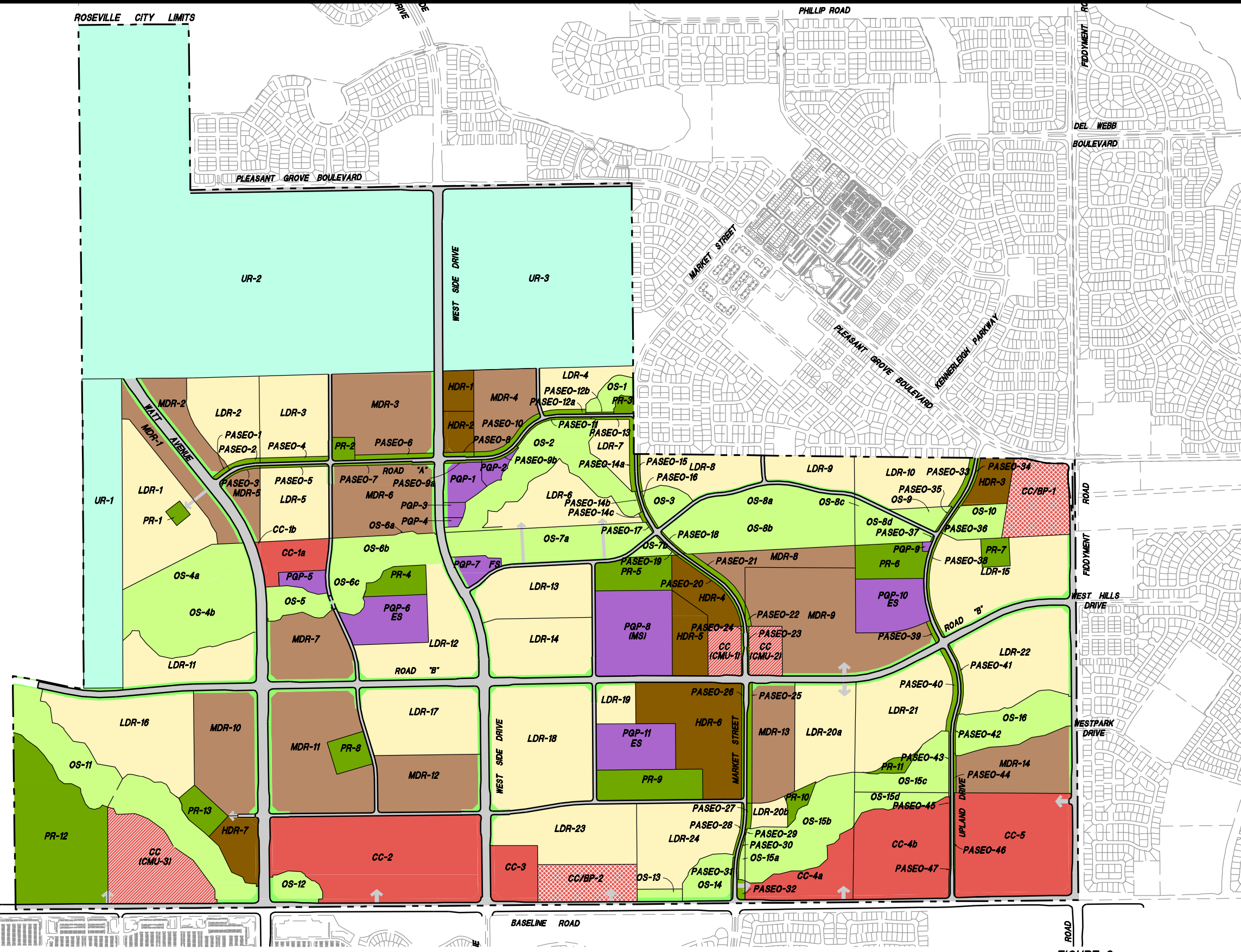
REFERENC E NODE	CONTRI- BUTING NODE	LDR / MDR (190 GPD / DU)			HDR (130 GPD / DU)			CMU (2300 GPD / ACRE)			SCHOOL (170 GPD / ACRE)			CC, CC/BP (850 GPD / AC)			PQP-PUB, PQP-REL (660 GPD / AC)			PARK - Parks > 10 Acres (10 GPD / ACRE)			TOTAL	FACTORED	PEAKING	TOTAL	PIPE	PIPE	% FULL
		DU	CUM. DU	Q(ADWF)	DU	CUM. DU	Q(ADWF)	DU	CUM. DU	AREA	CUM. AREA	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	AREA	CUM. AREA	Q(ADWF)	AREA	CUM AREA	Q(ADWF)	Q(ADWF)	FLOW	FACTOR	Q(PWWF)	SIZE	SLOPE	Q(PWWF)	
#	#	#	#	MGD	#	#	MGD	#	#	ACRE	ACRE	MGD	ACRE	ACRE	MGD	ACRE	ACRE	MGD	ACRE	ACRE	MGD	MGD	MGD	MGD	IN.	FT/FT	(d/D)		
5																						0.010	0.021	3.52	0.073	8	0.0035	13	
10	5																					0.018	0.036	3.48	0.124	8	0.0035	23	
15	10																					0.018	0.036	3.48	0.124	8	0.0035	23	
20	15	119	119	0.023																		0.040	0.081	3.29	0.266	8	0.0035	49	
25	20		119	0.023																		0.040	0.081	3.29	0.266	8	0.0035	49	
30	25	169	288	0.055																		0.073	0.145	3.08	0.447	10	0.0025	54	
35	30	152	440	0.084																		0.101	0.203	2.91	0.590	10	0.0025	71	
40																						0.048	0.095	3.23	0.307	8	0.0035	57	
45								175	175	23.5	23.5	0.054										0.054	0.109	3.19	0.347	8	0.0035	64	
50	45				152	152	0.020	175	175	23.5	23.5	0.054										0.074	0.148	3.07	0.456	10	0.0025	55	
55	35,40,50		440	0.084	152	152	0.020	175	175	23.5	23.5	0.054				77.0	0.065					0.223	0.447	2.50	1.116	15	0.0015	70	
70		121	121	0.023																		0.023	0.046	3.43	0.158	8	0.0035	29	
60													12.0	12.0	0.002							0.002	0.004	3.60	0.015	8	0.0035	3	
65	60	108	108	0.021									12.0	12.0	0.002							0.023	0.045	3.42	0.154	8	0.0035	28	
75	65,70		229	0.044									12.0	12.0	0.002							0.046	0.091	3.26	0.297	8	0.0035	55	
80	75	153	382	0.073									12.0	12.0	0.002							0.075	0.149	3.07	0.458	10	0.0025	55	
90		86	86	0.016																		0.016	0.033	3.48	0.114	8	0.0035	21	
95	90	70	156	0.030																		0.030	0.059	3.38	0.200	8	0.0035	37	
100	95		156	0.030																		0.030	0.059	3.38	0.200	8	0.0035	37	
105		82	82	0.016																		0.016	0.031	3.49	0.109	8	0.0035	20	
110	105	43	125	0.024																		0.024	0.048	3.42	0.162	8	0.0035	30	
115		287	287	0.055																		0.055	0.109	3.20	0.349	8	0.0035	64	
120	115	84	371	0.070																		0.070	0.141	3.10	0.437	8	0.0035	81	
125	100,110,120		652	0.124																		0.124	0.248	2.80	0.694	12	0.0025	69	
130	125		652	0.124												7.7	7.7	0.007	3.1	3.1	0.002	0.132	0.265	2.77	0.734	12	0.0020	73	
135	130	144	796	0.151												7.7	7.7	0.007	3.1	3.1	0.002	0.160	0.320	2.65	0.847	12	0.0020	85	
140	55,80,135		1618	0.307	152	152	0.020	175	175	23.5	23.5	0.054	12.0	12.0	0.002	84.7	0.072	3.1	0.002	39.9	0.000	0.458	N/A	N/A	1.000	15	0.0015	63	
145	140	203	1821	0.346	152	152	0.020	175	175	23.5	23.5	0.054	12.0	12.0	0.002	84.7	0.072	3.1	0.002	39.9	0.000	0.496	N/A	N/A	1.060	15	0.0015	66	
150	145	78	1899	0.361	152	152	0.020	175	175	23.5	23.5	0.054	12.0	12.0	0.002	84.7	0.072	3.1	0.002	39.9	0.000	0.511	N/A	N/A	1.070	15	0.0015	67	
155	150	164	2063	0.392	152	152	0.020	175	175	23.5	23.5	0.054	12.0	12.0	0.002	84.7	0.072	3.1	0.002	39.9	0.000	0.542	N/A	N/A	1.140	15	0.0015	71	
160	155		2063	0.392	152	152	0.020	175	175	23.5	23.5	0.054	12.0	12.0	0.002	84.7	0.072	3.1	0.002	39.9	0.000	0.542	N/A	N/A	1.150	12" FM			
170	160	290	2353	0.447	152	152	0.020	175	175	23.5	23.5	0.054	12.0	12.0	0.002	84.7	0.072	3.1	0.002	39.9	0.000	0.597	N/A	N/A	1.360	15	0.0015	85	
175																						0.000	0.000	3.65	0.001	8	0.0035	0	
180	175												12.0	12.0	0.002							0.000	0.002	0.004	3.60	0.015	8	0.0035	3
185	180	24	24	0.005									12.0	12.0	0.002							0.000	0.007	0.013	3.56	0.048	8	0.0035	9
190	170,185		2377	0.452	152	152	0.020	175	175	23.5	23.5	0.054	24.0	24.0	0.004	84.7	0.072	3.1	0.002	50.6	0.001	0.604	N/A	N/A	1.380	15	0.0015	86	
195	190		2377	0.452	172	324	0.042	175	175	23.5	23.5	0.054	24.0	24.0	0.004	84.7	0.072	3.1	0.002	50.6	0.001	0.626	N/A	N/A	1.530	18	0.0012	65	

FIGURES

LAND USE LEGEND

LAND USE	ACRES
LDR LOW DENSITY RESIDENTIAL	484.6
MDR MEDIUM DENSITY RESIDENTIAL	261.6
HDR HIGH DENSITY RESIDENTIAL	66.1
CC COMMUNITY COMMERCIAL	153.6
CC/ICMU COMMUNITY COMMERCIAL COMMERCIAL MIXED USE	34.3
CC/BP COMMUNITY COMMERCIAL BUSINESS PARK	27.3
PQP PUBLIC QUASI PUBLIC	70.7
PR PARK	88.8
Paseo PASEO	26.1
OS OPEN SPACE	250.9
LANDSCAPE CORRIDOR	43.7
UR URBAN RESERVE	427.7
MAJOR ROADS	121.6

Sierra Vista Specific Plan Area 2064.1



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FIGURE 2
 SIERRA VISTA SPECIFIC PLAN
 LAND USE PLAN
 SVSP BASE CONDITION

NOT TO SCALE

APRIL 27, 2009

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4-16-2009 14:54:07 shaskell

LAND USE LEGEND

LAND USE	ACRES
LDR LOW DENSITY RESIDENTIAL	484.6
MDR MEDIUM DENSITY RESIDENTIAL	261.6
HDR HIGH DENSITY RESIDENTIAL	66.1
CC COMMUNITY COMMERCIAL	153.6
CC (CMU) COMMUNITY COMMERCIAL COMMERCIAL MIXED USE	34.3
CC/BP COMMUNITY COMMERCIAL BUSINESS PARK	27.3
PQP PUBLIC QUASI PUBLIC	70.7
PR PARK	88.8
Paseo PASEO	26.1
OS OPEN SPACE	256.9
LANDSCAPE CORRIDOR	43.7
UR URBAN RESERVE	427.7
MAJOR ROADS	121.6
Sierra Vista Specific Plan Area 2064.1	

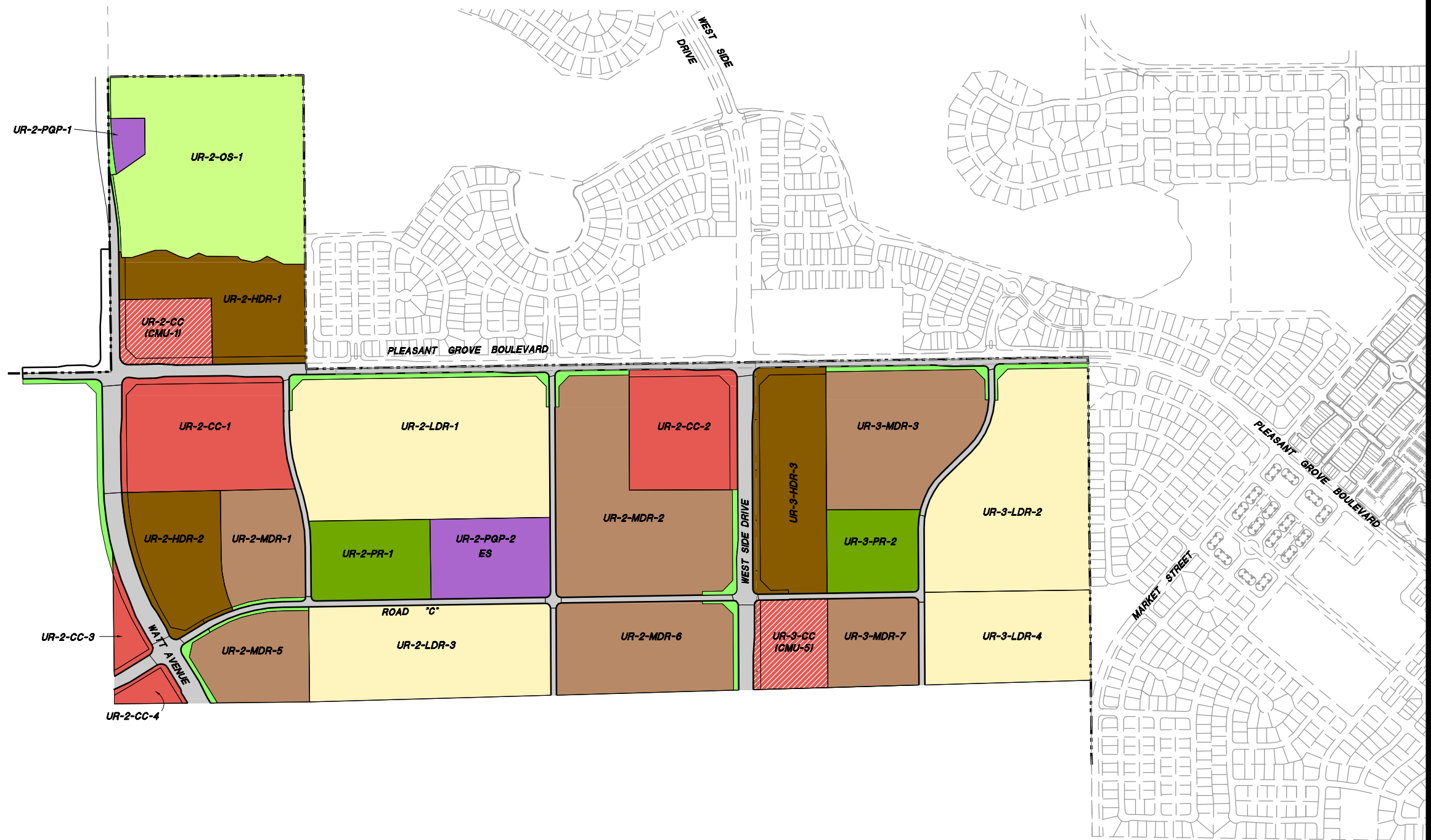


FIGURE 3
SIERRA VISTA SPECIFIC PLAN
URBAN RESERVE LAND USE PLAN
FUTURE CONDITION
 NOT TO SCALE APRIL 27, 2009

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Figure 9-2

Wastewater Collection System

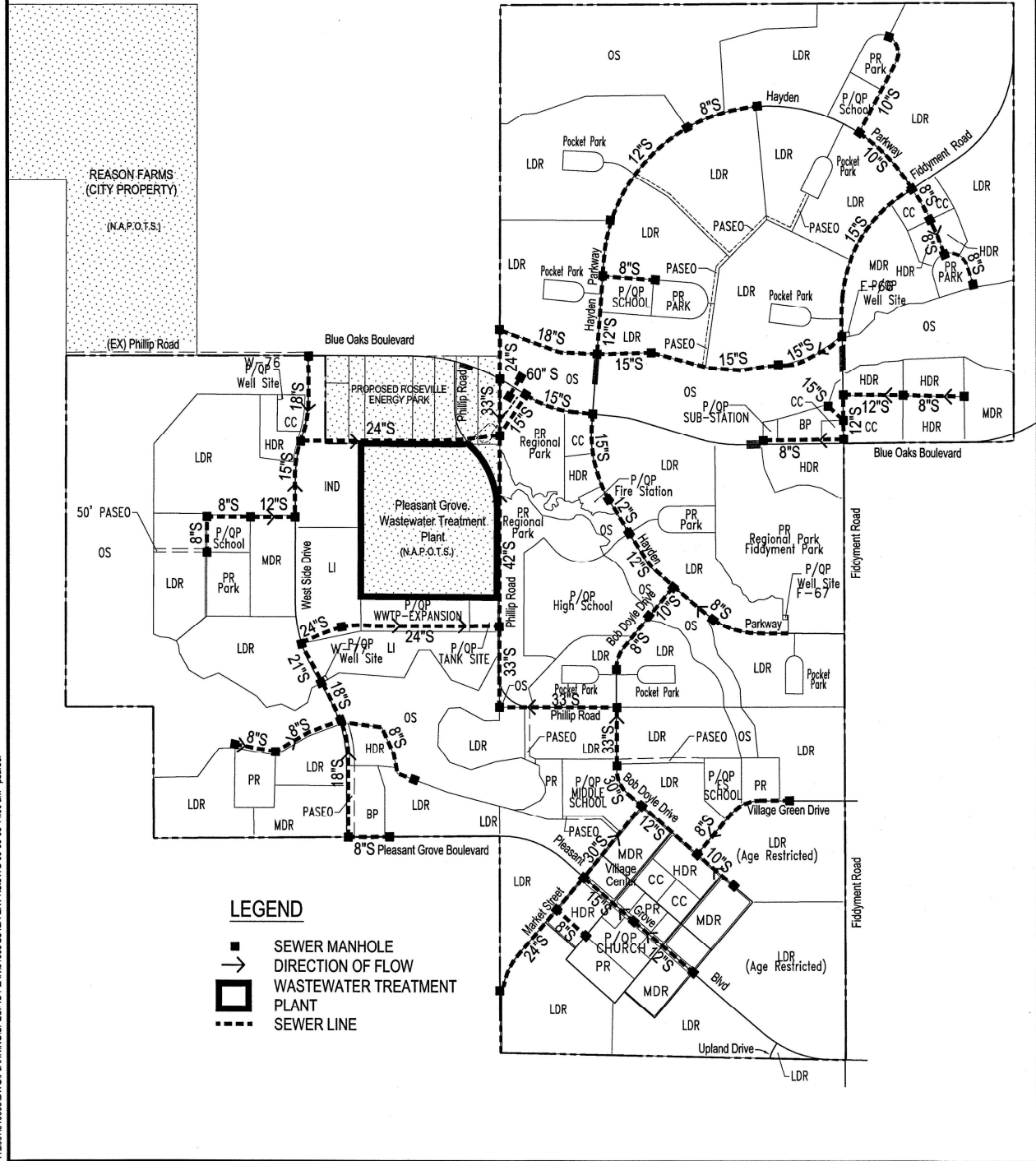





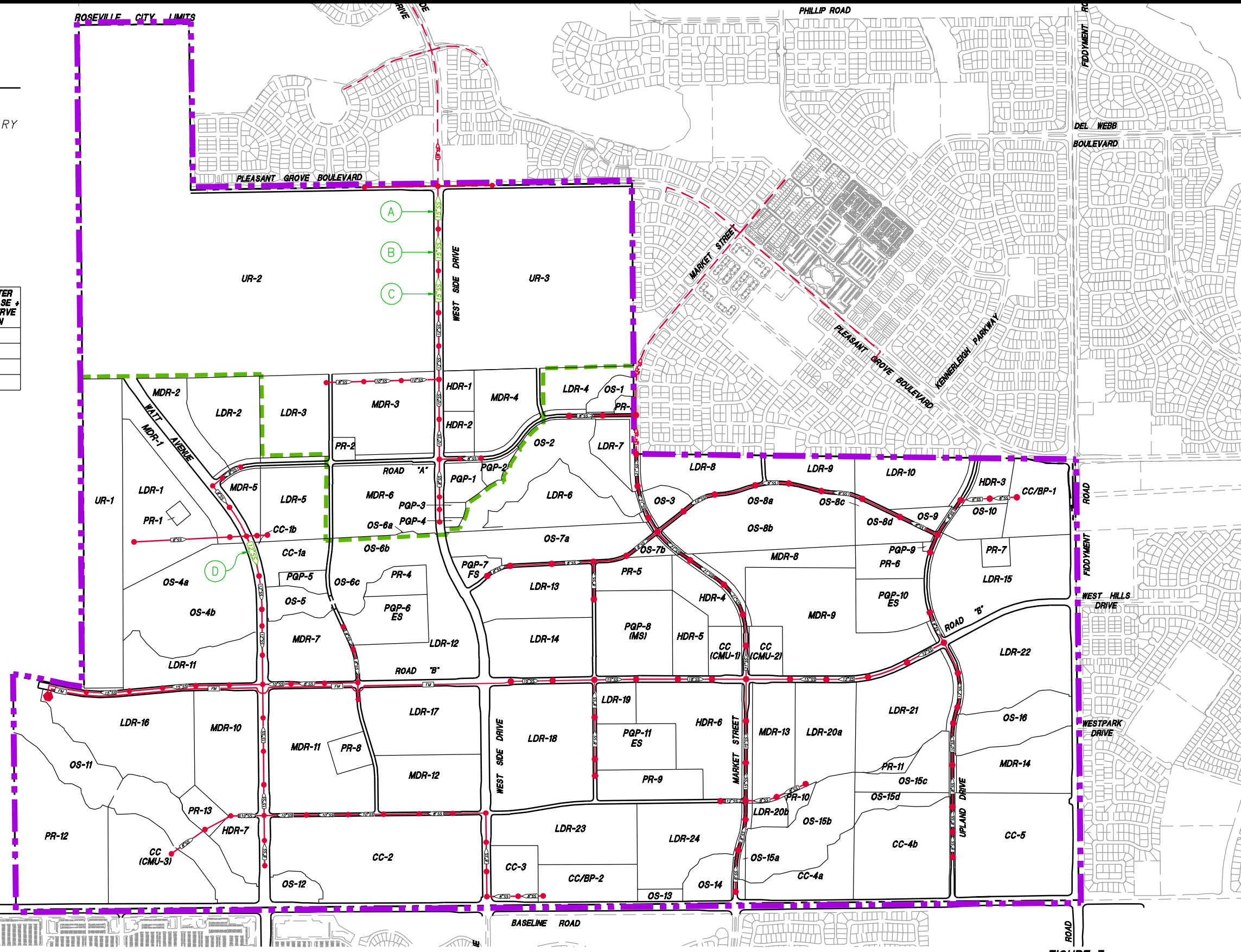
FIGURE 5
OFFSITE WASTEWATER COLLECTION SYSTEM

LEGEND

-  SPECIFIC PLAN BOUNDARY
-  WASTEWATER SHED BOUNDARY
-  PIPES REQUIRING UPSIZING

PIPES REQUIRING UPSIZING

PIPE	UPSTREAM NODE	DOWNSTREAM NODE	PIPE DIAMETER PER SVSP BASE CONDITION	PIPE DIAMETER PER SVSP BASE + URBAN RESERVE CONDITION
A	560	575	12"	15"
B	555	560	12"	15"
C	550	555	12"	15"
D	125	130	10"	12"



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FIGURE 7
 SIERRA VISTA SPECIFIC PLAN
 PIPE UPSIZING
 SVSP BASE + URBAN RESERVE CONDITION
 NOT TO SCALE
 APRIL 27, 2009

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OVERSIZED EXHIBITS

ATTACHMENTS

ATTACHMENT #1

To: Mark Sauer

From: Lydia W. Porras

Reviewed by: Curtis Lam

Subject: TM #1 Update: Sierra Vista Sanitary Sewer Lift Station Conceptual Design

Date: May 29, 2009

Purpose

HydroScience Engineers (HSe) was retained by MacKay & Somps to prepare a conceptual design for a Sierra Vista Sanitary Sewer Lift Station and its associated force main. This technical memorandum presents the conceptual design and phasing for the lift station. The purpose of the lift station conceptual design technical memorandum is to:

- Identify the major components of the design and operation for the lift station;
- Conceptually identify and size the facilities for the lift station; and
- Identify any significant construction constraints.

Background

HSe staff met with MacKay & Somps to identify potential project constraints and gather input for the project. MacKay & Somps also provided survey information, influent flow calculations, gravity sewer design information, and background data about the planned development.

This memo is updated from the July 2007 version to reflect the land uses in the January 22, 2009 land use plan for the Sierra Vista Specific Plan. This memo details the requirements for the lift station within the proposed SVSP. It should be noted that there is an additional lift station that would be required to serve portions of the UR-2 and UR-3 urban reserve areas, which are commonly referred to as the Richland property. That lift station and force main will be detailed as part of a separate memorandum when the land uses are determined and that project proceeds through their planning phase.

Design Criteria

This section describes the various design criteria utilized in the conceptual design of the lift station and force main. These design criteria are based on the City of Roseville's (City) Design Standards for new lift station design, the design of other local lift stations, and HSe's design experience:

C value: The head loss through the force main was calculated using the Hazen-Williams equation. The friction coefficient (C) used to analyze the force main was 120 per the City's Design Standards.

Velocity: Force main size and pump capacity were selected in order to maintain normal velocities within the force main between the standard design values of between 3.0 – 7.0 feet

per second (fps), consistent with the City's Design Standards. A minimum velocity of 3.0 fps is recommended to prevent solids and grit from settling in the force main. A maximum velocity of 7.0 fps is recommended to minimize the dynamic friction losses in the force main.

Storage: Storage requirements for a lift station typically vary depending on the lift station's size, location, and emergency power facilities. The amount of storage necessary will be further detailed during the design phase. Storage capacity typically consists of a combination of any wet well capacity, sewer system capacity, and specific storage capacity above the high water alarm and below overflow level.

In addition to storage, the risk of overflow is expected to be minimized by use of redundant fixtures for vital pump station systems including:

- A redundant pump under all flow conditions;
- Emergency power generation equipment including automatic transfer devices;
- Fuel for 24 operating hours of power generation equipment, with appropriate containment;
- Level controllers;
- Programmable logic controllers;
- SCADA control to be operated and monitored by the Pleasant Grove Wastewater Treatment Plant; and
- High level alarm systems.

Pump selection: The pumps were selected such that two pumps would be capable delivering the necessary flow under worst case flow conditions, with a third as backup. Pump selection and sizing were evaluated using Flyps 3.1 software and Flygt product material, based on the flow and TDH requirements.

The new triplex sewage lift station was designed to operate around a lead-lag-standby pump configuration. This allows for more efficient pumping of average flows with one pump while still being capable of handling peak flows with two pumps operating. The three pumps would automatically alternate between lead, lag, and standby to reduce wear and tear on any one pump. The calculations, system curves, and pump curves are included at the end for reference.

Anticipated Flows: The anticipated average and peak flows for the lift station were developed in the Technical Memo *Trunk Sewer Model for Sierra Vista* dated April 2009 prepared by RMC in accordance with the Sanitary Sewer Master Plan (SSMP) prepared by MacKay & Somps. The reader is referred to the Technical Memo and SSMP for additional information. Land use acreage and estimated EDUs were provided for the lift station by MacKay & Somps. The peaking factors and flow rate can be found below in the description of the lift station.

Wet Well: The active volume for each wet well was sized to limit the number of pump starts and stops to a maximum of 6 cycles per hour. In order to achieve adequate storage capacity, the depth and/or diameter of the wet well can be increased. The diameter of the wet well was generally increased when it was deemed necessary to limit any additional wet well depth.

Lift Station

Background: The lift station will be located in a low density residential area on the southwestern portion of the Sierra Vista Specific Plan, outside of the 100-year floodplain. Influent for this lift station flows through a 15-inch gravity sewer that receives sewage from a collection area generally comprising the western portion of Sierra Vista Specific Plan as seen in **Figure 1**. This lift station will need to pump a peak sewage flow of 800 gpm from an approximate wet well water elevation of 60 ft to the downstream transition manhole discharge elevation of 93.26 ft. The 5,610-foot lift station force main will discharge to this transition manhole at a higher invert elevation. The 72-inch diameter transition manhole will have adequate capacity to accept all of the wastewater flows from the lift station while maintaining 4 feet of freeboard. From the transition manhole the wastewater will continue east along Road "B" through a 15-inch gravity sewer main and then along Market Street to the Pleasant Grove Wastewater Treatment Plant. The design criteria for the lift station are identified in **Table 1**.

Table 1: Sierra Vista Lift Station³

Criteria	Value
EDUs ¹ Served	2,390
Average Dry Weather Flow	380 gpm ² (0.542 MGD)
Peaking Factor	2.50-3.60 ⁴
Peak Flow	800 gpm ² (1.15 MGD)
Ground Elevation	83.7 feet
Force Main Discharge Elevation	93.26 feet
Gravity Sewer Invert	65 feet
Pumping Distance	Approximately 5,610 feet

Notes:

1. EDU = equivalent dwelling units.
2. gpm = gallons per minute.
3. Data based on the Sierra Vista Specific Plan SSMP dated May 2009.
4. The peak flow was calculated using these peaking factors and an additional safety factor of two as outlined in the February 2006 RMC Technical Memorandum #3a and the Sierra Vista Specific Plan SSMP.

Design: The recommended build out design for this lift station is three 10 hp centrifugal pumps, with any two pumps capable of delivering 867 gpm at 52.8 ft TDH. The pumps combined capacity exceeds the design peak flow for the lift station. The force main is expected to be a 12-inch ductile iron pipe. This will minimize the head requirements under peak flow conditions and allow for lower horsepower pumps.

In the interim, it is recommended that the lift station be equipped with two of the three 10 hp pumps recommended for build out. These would alternate operation and each would be expected to be capable of pumping 433 gpm at 52.8 ft TDH. Once peak flows approach this rate, it would be necessary to install the third 10 hp pump. At build out the pumps will operate in a lead-lag-standby configuration. Under low flow conditions a single pump would operate, under peak flow conditions two pumps would operate, the third pump would serve as standby in case of pump failure.

The recommended diameter for this wet well is 10 ft to minimize the additional depth needed for the active volume. The lowest gravity invert entering the lift station is expected to be 20 ft below grade. At 10 ft in diameter, the wet well is expected to be roughly 26 ft deep. The active volume required to minimize the number of start/stop cycles is expected to be approximately 2,350 gallons. At 10 ft in diameter, this would be roughly four vertical feet of active volume.

Storage capacity in this wet well, above the high water level and below the rim elevation, at a diameter of 10 ft would be around 12,000 gallons. The collection system volume above the high water level and below the lowest invert will also provide additional storage capacity.

A preliminary 60 ft by 80 ft site plan for this facility can be found in **Figure 2**. This site plan includes the necessary facilities described above, with adequate room around the lift station itself to provide access for maintenance vehicles. A standby generator is provided to increase redundancy and minimize the likelihood of failure. A small building is also located on site to house the pump controls and other equipment. The layout of facilities and storage sizing will need to be further refined during the design phase. City Design Standards also require a 100 ft setback from the lift station to any home or structure. A typical profile detail for this lift station can be found in **Figure 3**.

72"Ø TRANSITION MANHOLE

FORCE MAIN

LIFT STATION
SEE FIGURE 2

COLLECTION SYSTEM AREA
SHED BOUNDARY
FOR LIFT STATION

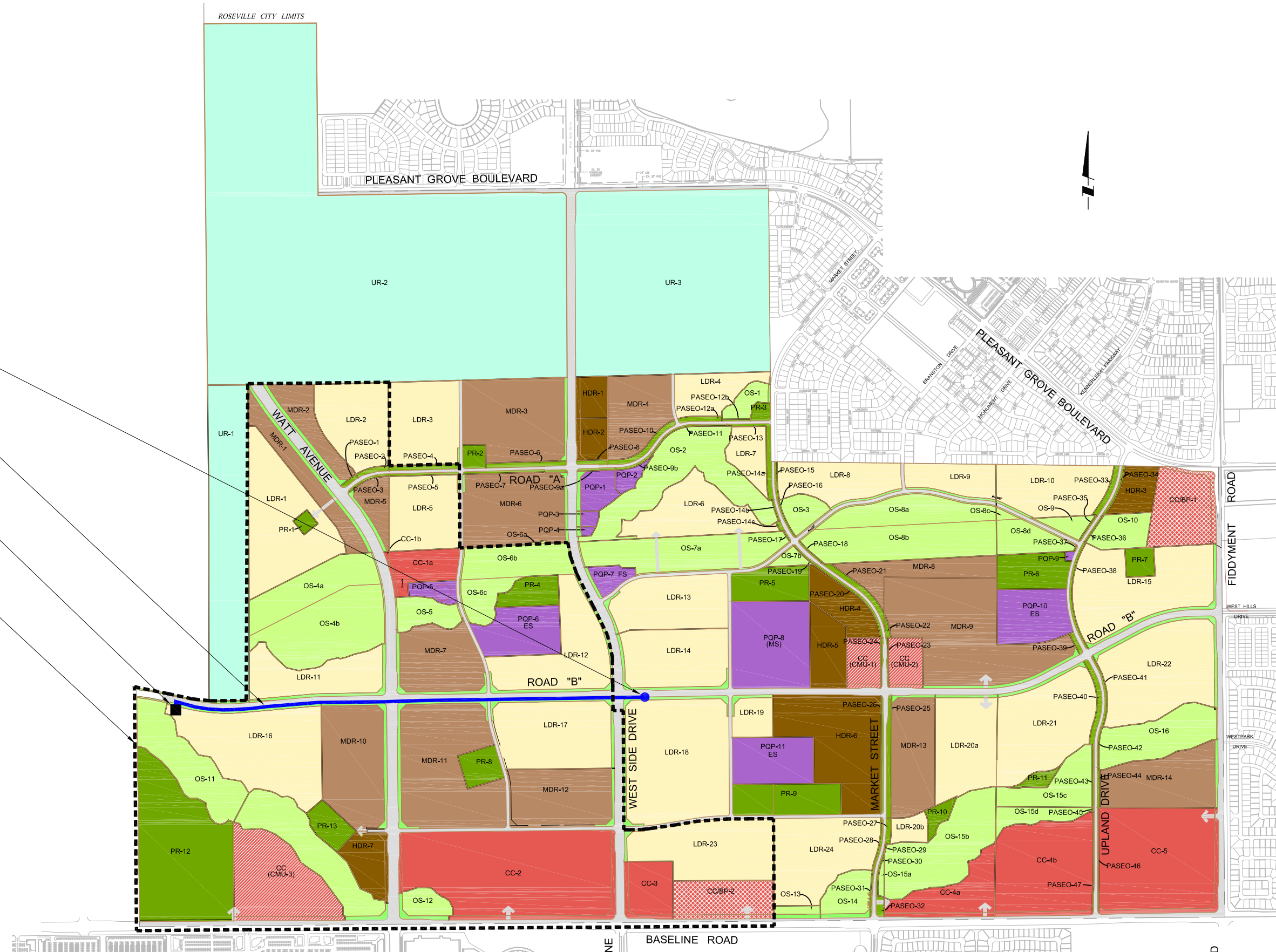


FIGURE 1
 MACKAY & SOMPS CIVIL ENGINEERS, INC
 SIERRA VISTA SANITARY SEWER LIFT STATION CONCEPTUAL DESIGN
 COLLECTION AREA

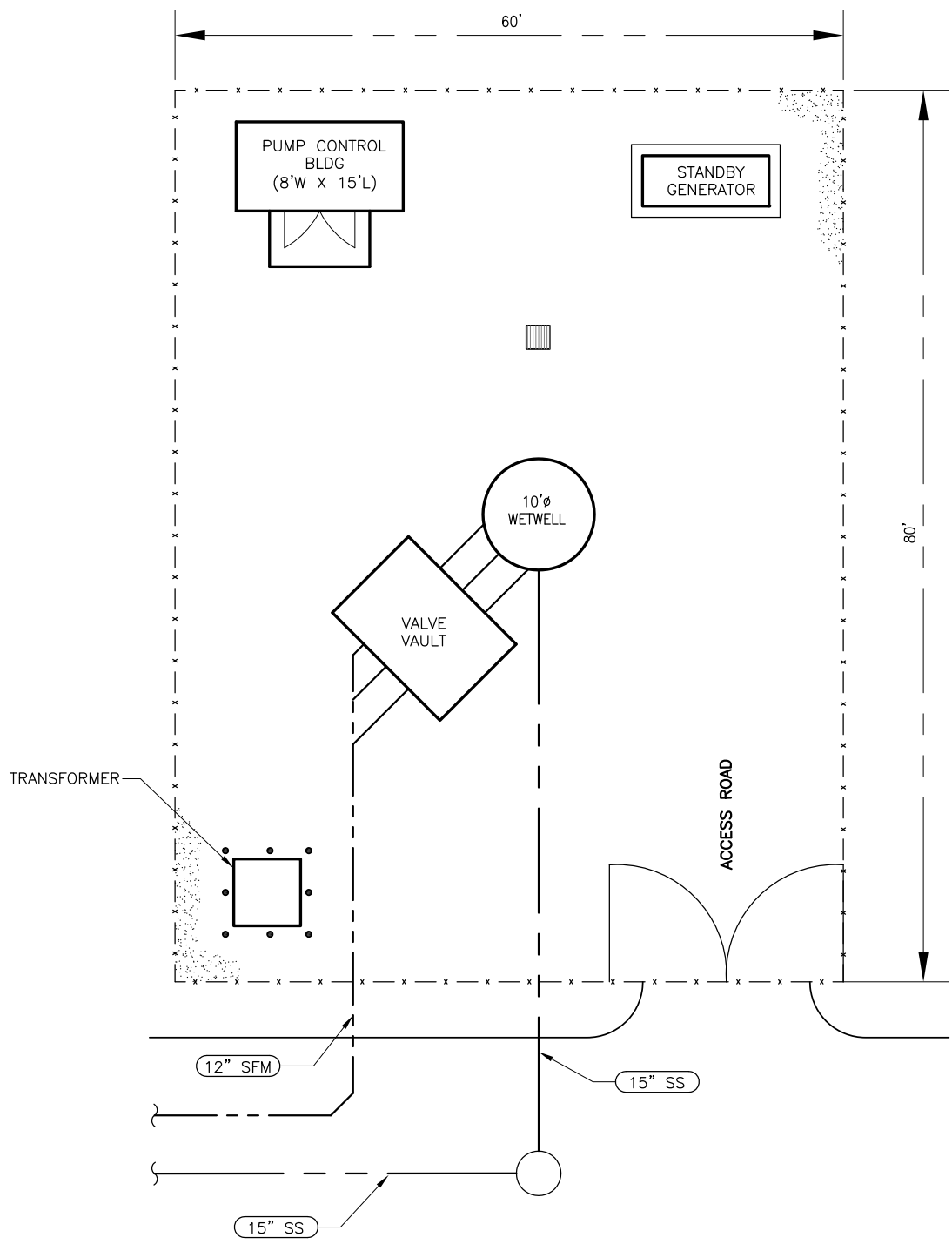
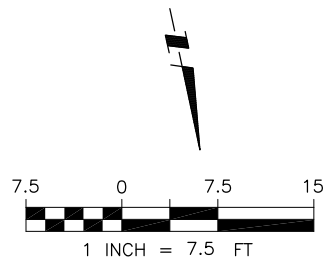
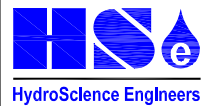
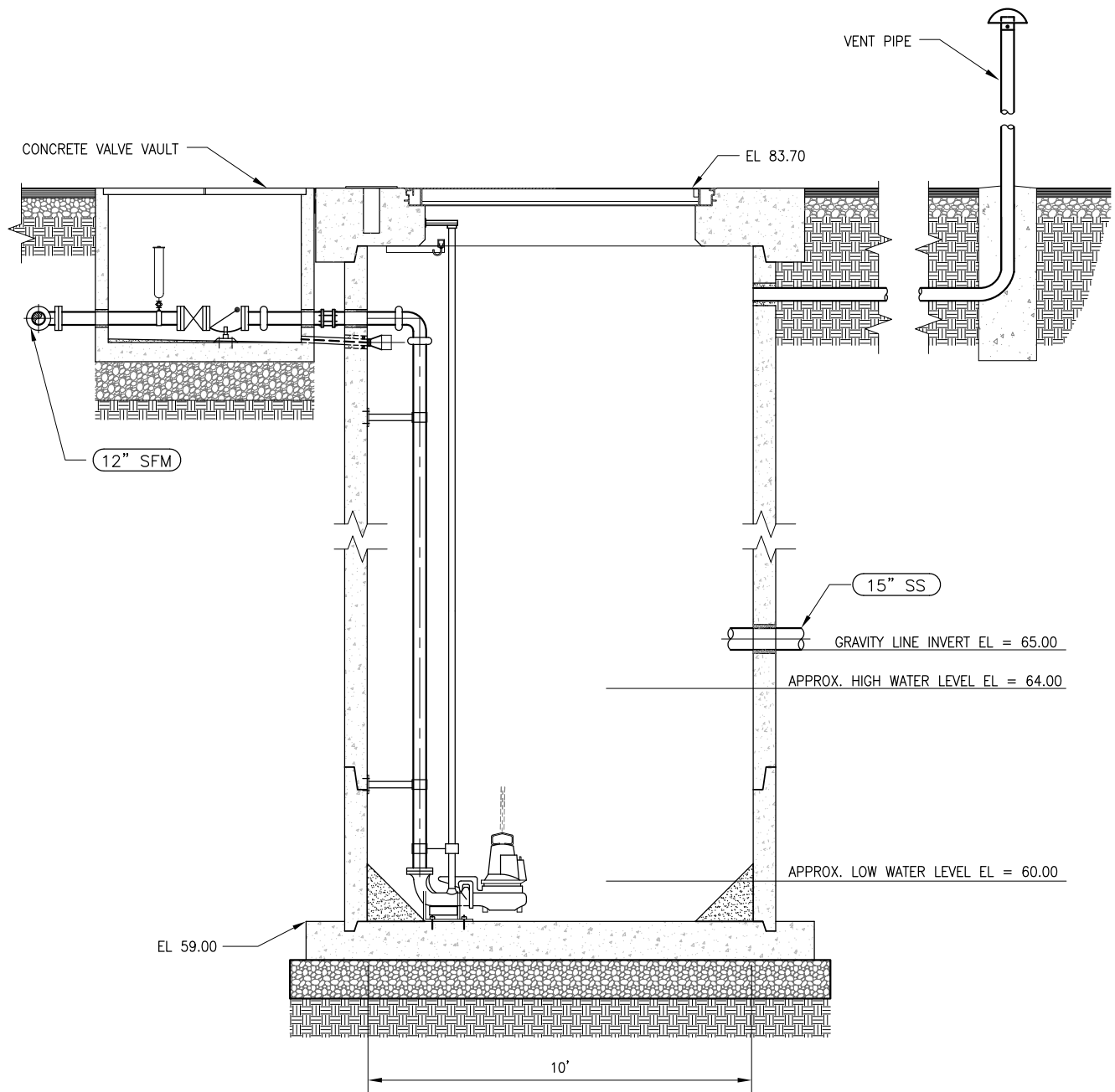


FIGURE 2
 MACKAY & SOMPS CIVIL ENGINEERS, INC.
 SIERRA VISTA SANITARY SEWER LIFT STATIONS CONCEPTUAL DESIGN
 PRELIMINARY SITE PLAN - LIFT STATION





NOT TO SCALE

FIGURE 3

MACKAY & SOMPS CIVIL ENGINEERS, INC.
 SIERRA VISTA SANITARY SEWER LIFT STATIONS CONCEPTUAL DESIGN
 TYPICAL LIFT STATION PROFILE - LIFT STATION

Sierra Vista Lift Station Update

Buildout Pumps

Design Pump Station Data

Design Flow:	800 gpm
Top of Wet Well:	83.7 ft
Diameter of Wet well:	10 ft
Bottom of Wet Well:	59.00 ft
HWL (Pump On):	64.00 ft
LWL (Pump Off):	60.00 ft
Inlet Elevation:	65.00 ft
Discharge Elevation:	93.26 ft
High Forcemain Elevation:	98 ft
Gallons per foot:	587.48 gpf

Pipeline Data

Material:	DIP
Pipe Dia:	12 inches
Pipe Area:	0.79 SF
Length:	5610 ft
C value:	120

Emergency Volume 11,573 gal

Minor Losses

Fittings	Quantity	K value	Extension
90 Elbow	0	0.9	0
45 Elbow	2	0.45	0.9
Tee	2	0.8	1.6
Check Valve	1	2.3	2.3
Plug Valve	1	0.6	0.6
Wye	1	0.8	0.8
Entrance	0	0.5	0
Exit	1	1	1
Total K =			7.2

Static Head

Max Static Lift:	38.00 ft
Min Static Lift:	34.00 ft

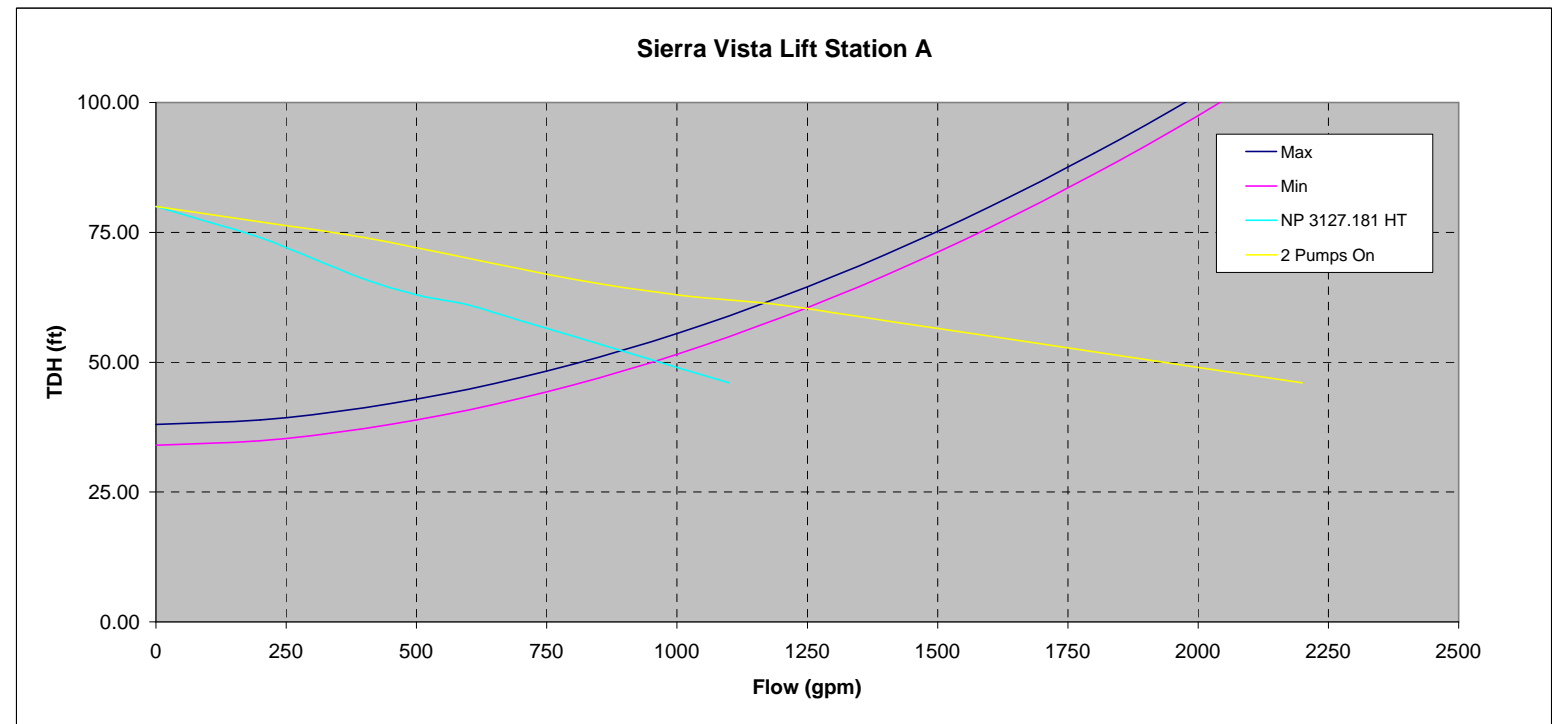
Pump Data

Model: NP 3127.181 HT Imp. 215 mm 10 hp
Curve #: 63-488-00-3704

Pump Flow (GPM)	TDH (FT)	Flow with 2 Pumps (GPM)
0	80	0
100	77	200
200	74	400
300	70	600
400	66	800
500	63	1000
600	61	1200
700	58	1400
800	55	1600
900	52	1800
1000	49	2000
1100	46	2200

Active Volume Calculation

Pump Starts (max 10):	
Design Flow @ Duty Point:	800 gpm
Active Volume:	2350.07 gal
Filling Rate:	400 gpm
Time:	5.88 min
Draining Rate:	400 gpm
Time:	5.88 min
Total Time:	11.75 min
Actual Starts per Hour:	5.11



One Pump

Flow (gpm)	Flow (cfs)	Forcemain Vel (fps)	System Minor Loss (ft)	Forcemain Friction Loss (ft)	System Max Lift TDH, ft	System Min Lift TDH, ft
0	0.00	0.00	0.00	0.00	38.00	34.00
100	0.22	0.28	0.01	0.23	38.24	34.24
200	0.45	0.57	0.04	0.85	38.88	34.88
300	0.67	0.85	0.08	1.79	39.87	35.87
400	0.89	1.14	0.14	3.05	41.19	37.19
500	1.12	1.42	0.23	4.61	42.83	38.83
600	1.34	1.70	0.32	6.46	44.78	40.78
700	1.56	1.99	0.44	8.59	47.03	43.03
800	1.78	2.27	0.58	10.99	49.57	45.57
900	2.01	2.56	0.73	13.67	52.40	48.40
1000	2.23	2.84	0.90	16.61	55.51	51.51
1100	2.45	3.12	1.09	19.82	58.91	54.91

Two Pumps

Flow (gpm)	Flow (cfs)	Forcemain Vel (fps)	System Minor Loss (ft)	Forcemain Friction Loss (ft)	System Max Lift TDH, ft	System Min Lift TDH, ft
0	0.00	0.00	0.00	0.00	38.00	34.00
200	0.45	0.57	0.04	0.85	38.88	34.88
400	0.89	1.14	0.14	3.05	41.19	37.19
600	1.34	1.70	0.32	6.46	44.78	40.78
800	1.78	2.27	0.58	10.99	49.57	45.57
1000	2.23	2.84	0.90	16.61	55.51	51.51
1200	2.68	3.41	1.30	23.28	62.57	58.57
1400	3.12	3.98	1.77	30.96	70.72	66.72
1600	3.57	4.54	2.31	39.63	79.94	75.94
1800	4.01	5.11	2.92	49.28	90.20	86.20
2000	4.46	5.68	3.61	59.89	101.49	97.49
2200	4.91	6.25	4.36	71.43	113.80	109.80



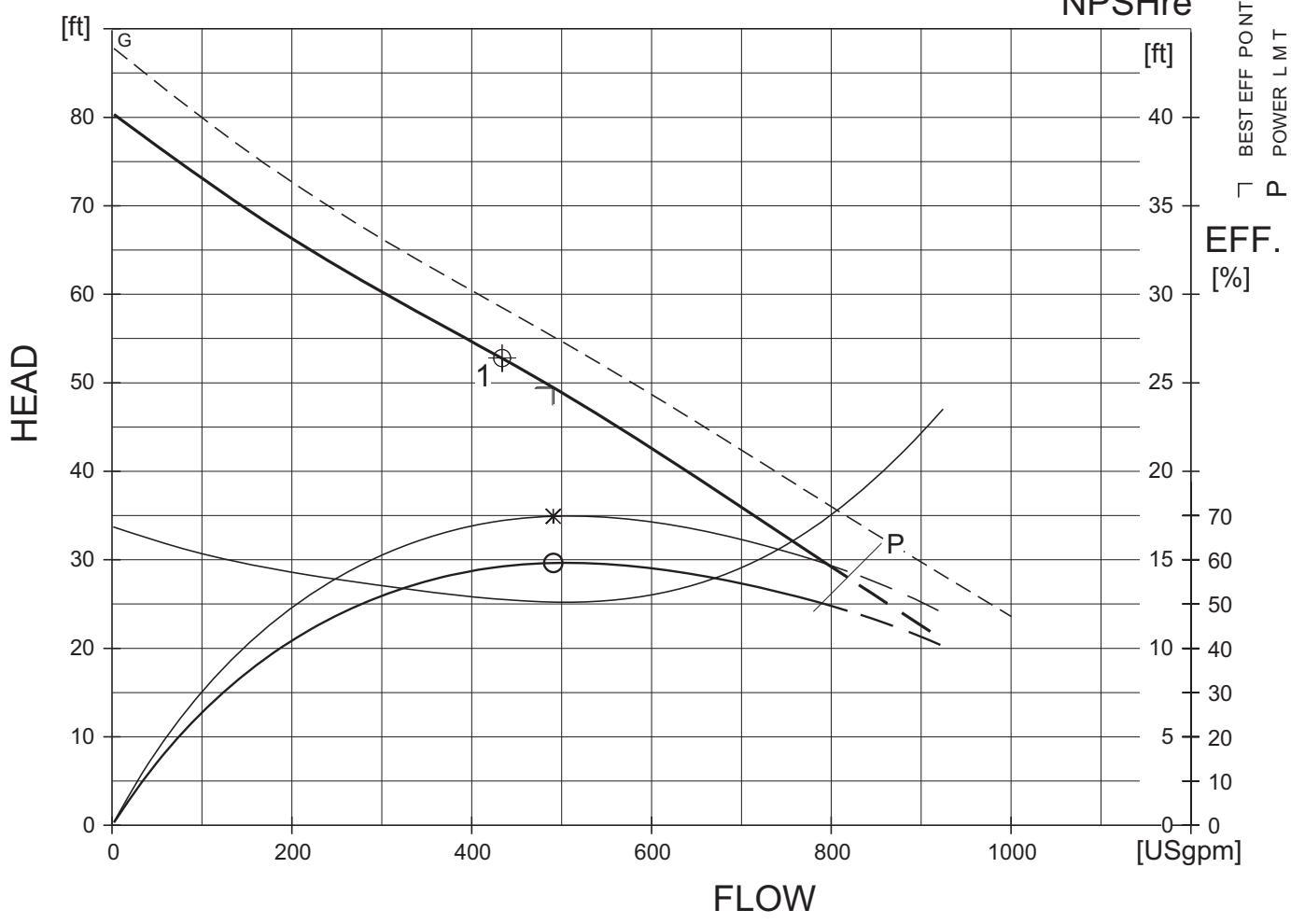
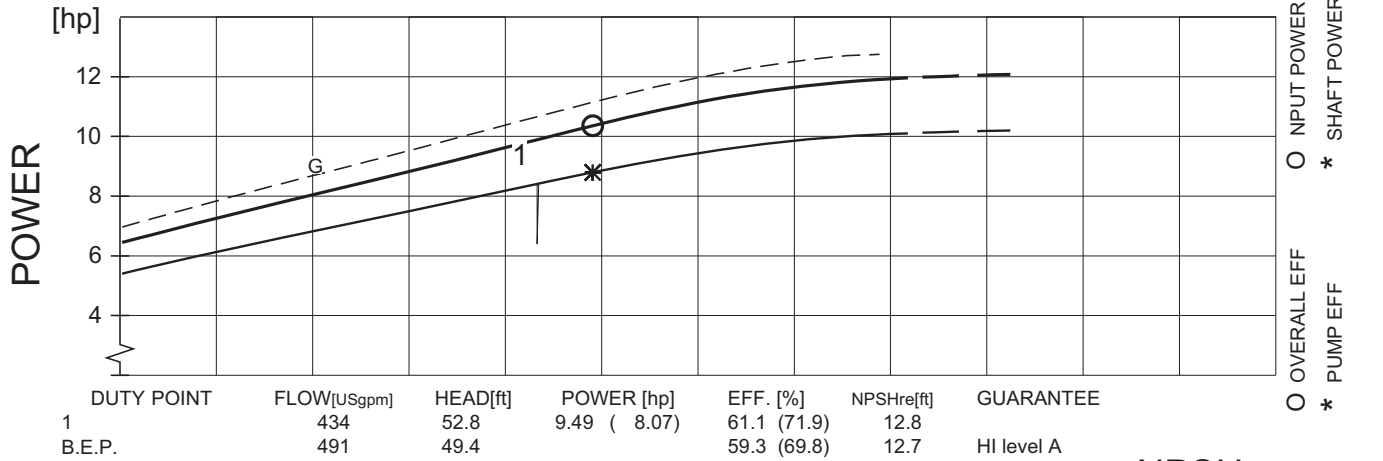
PERFORMANCE CURVE

PRODUCT	NP3127.181	TYPE	HT
CURVE NO	63-488-00-3702	ISSUE	1

DATE	2009-05-28	PROJECT	<unnamed>
------	------------	---------	-----------

	1/1 LOAD	3/4 LOAD	1/2 LOAD	
POWER FACTOR	0.87	0.83	0.75	RATED POWER 10 hp
EFFICIENCY	84.5 %	85.0 %	83.5 %	STARTING CURRENT ... 75 A
MOTOR DATA	---	---	---	RATED CURRENT ... 13 A
COMMENTS	INLET/OUTLET			RATED SPEED 1745 rpm
	-/ 4 inch			TOT.MOM.OF INERTIA ... 0.054 kgm2
	IMP. THROUGHLET			NO. OF BLADES 2

IMPELLER DIAMETER			
215 mm			
MOTOR #	STATOR	REV	
21-12-4AL	38D	11	
FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	460 V	4
GEARTYPE		RATIO	
---		---	



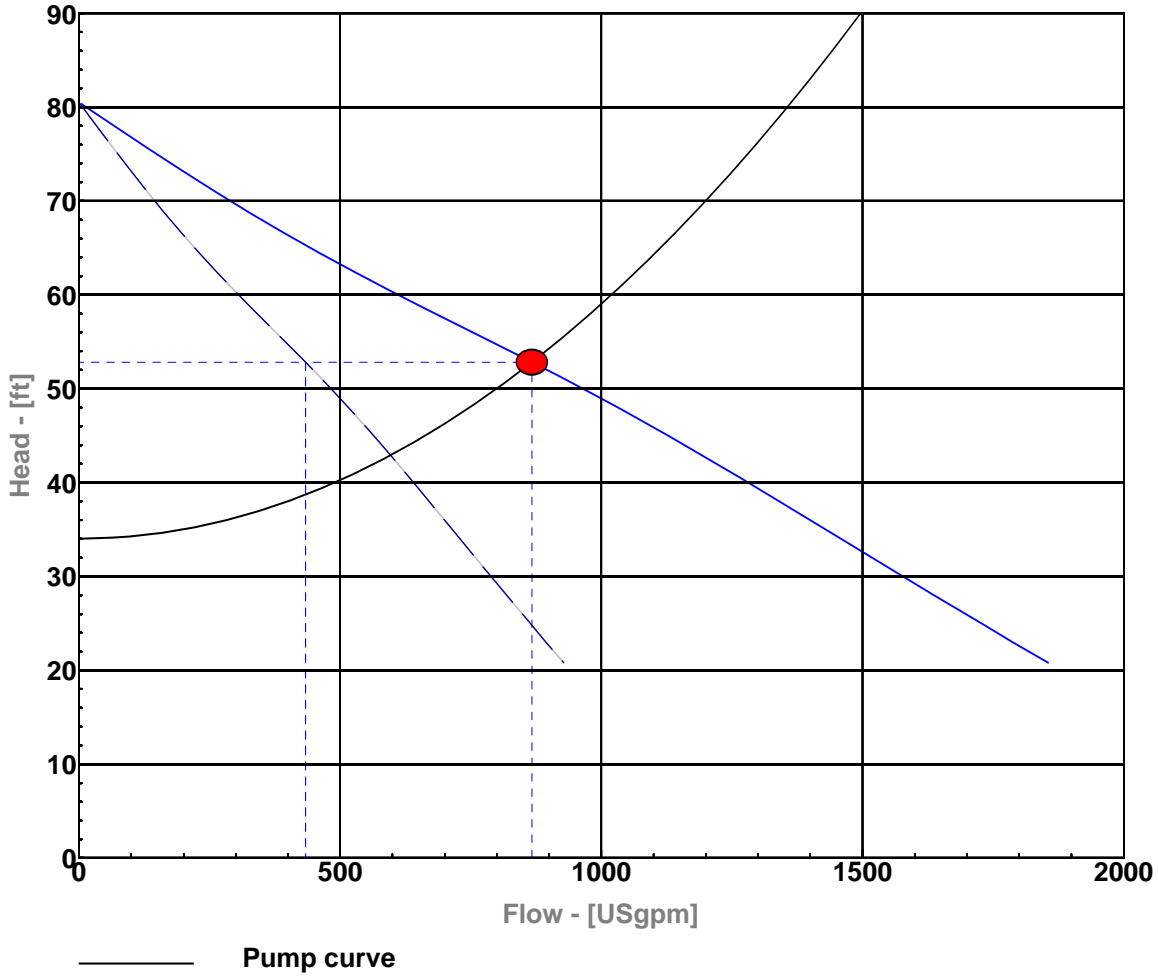
FLYPS3.1.0.0 (20050224)

NPSHre NPSH3% + min. operational margin
Performance with clear water and ambient temp 40 °C

GUARANTEE BETWEEN LIMITS (G) ACC. TO
HI level A

Project: SVMP LS

Created by:: lwp



2 NP 3127 63-488-00-3702

PRODUCT DATA

Rtd. pwr.: 10 hp
 Imp. diam.: 215 mm
 Vanes: 2

DUTY CONDITIONS

No of pumps: 2
 Flow: 867.1 USgpm
 Head: 52.8 ft
 Shaft power: 16.8 hp
 Pump efficiency: 72.0 %
 Specific energy: 281.0 kWh/mg



HydroScience Engineers, Inc.

PROJECT: SIERRA VISTA

SUBJECT: LIFT STATION DESIGN CALCS

JOB NO. _____

DESIGNED BY: lwp

CHECKED BY: _____

DATE: 05.28.2009

SHEET NO. 1

LIFT STATION

ADWF = 0.542 MGD

PEAKING FACTORS = 2.50 - 360

SAFETY FACTOR = 2

PWWF = 1.15 MGD = 798.6 gpm ≈ 800 gpm (g)

LIFT STATION ELEV_{rim} = 83.7 FT

LIFT STATION ELEV_{inlet} = 65 FT

FORCE MAIN DISCHARGE ELEV = 93.26 FT

HIGH FORCE MAIN ELEV = 98 FT

HIGH WATER ELEV = ELEV_{inlet} - 1 FT = 65 FT - 1 FT = 64 FT

STATIC HEAD = HIGH FORCE MAIN ELEV. - HIGH WATER LEVEL = 98 FT - 64 FT = 34 FT

MAX STATIC HEAD = STATIC HEAD + ACTIVE VOL = 34 FT + 4 FT = 38 FT

FORCE MAIN

DIAMETER = 12 INCHES

LENGTH = 5610 FT

H-W COEFFICIENT, C = 120

HEADLOSS DUE TO FRICTION (h_f) = $\frac{0.2083(100/C)^{1.852} q^{1.852}}{d_n^{4.8655}} = 11 \text{ FT}$

MINOR LOSSES

- 2 - 45° ELBOWS = 0.9
- 2 - TEES = 1.6
- 1 - CHECK VALVES = 2.3
- 1 - PLUG VALVES = 0.6
- 1 - WYE = 0.8
- 1 - EXIT = 1

Velocity: $\frac{(800 \text{ gpm})(1/40)(1/7.48)}{\pi (12/12)^2 / 4} = 2.27 \text{ F/S}$

HEADLOSS $h_m = \frac{KV^2}{2g} = \frac{7.2 (2.27)^2}{2(32.2)} = 0.58 \text{ FT}$

TOTAL HEADLOSS, MIN = $\overset{\text{STATIC}}{34} + \overset{\text{FRICTION}}{3.05} + \overset{\text{MINOR}}{0.14} = 37.19 \text{ FT}$

TOTAL HEADLOSS, MAX = $\overset{\text{STATIC}}{38} + \overset{\text{FRICTION}}{10.99} + \overset{\text{MINOR}}{0.58} = 49.57 \text{ FT}$

Architectural Scale

ATTACHMENT #2

Final Technical Memorandum



Sierra Vista Sewer Modeling

Subject: Trunk Sewer Model for Sierra Vista
Prepared For: Mike Smith, MacKay and Somsps
Prepared by: Chris van Lienden, RMC
Reviewed by: Dave Richardson, RMC
Date: April 16, 2009
Reference: 0201-003

1 Introduction

The purpose of this technical memorandum (TM) is to describe the sanitary sewer hydraulic modeling conducted for the Sierra Vista urban growth area (UGA) near the City of Roseville in Placer County. This TM was prepared for MacKay and Somsps Civil Engineers, Inc (MacKay and Somsps).

The Sierra Vista UGA is within the ultimate service area of the South Placer Wastewater Authority (SPWA). As such, MacKay and Somsps was asked by SPWA to add portions of the planned Sierra Vista sanitary sewer system to an existing hydraulic model of the SPWA trunk sewer system. Prior to the preparation of this TM, a Sanitary Sewer Master Plan had been prepared by MacKay and Somsps for the Sierra Vista UGA. The Sanitary Sewer Master Plan provides the basis for the modeling described in this TM.

As part of the South Placer Regional Wastewater and Recycled Water Systems Evaluation (Systems Evaluation), a TM titled *Unit Flow Factor Sets and Sewer Design Criteria* (TM 3a) was prepared by SPWA to provide criteria for the sizing of sewers for new developments. TM 3a states that for the sizing of future infrastructure facilities, the hydraulic model of the trunk sewer system should be used for pipes 15 to 18 inches in diameter and larger. TM 3a is attached to this TM (Attachment B).

1.1 Information Source

The alignments, diameters, inverts, and slopes of modeled sewers, as well as the locations, rim elevations, tributary areas and wastewater flow information associated with the modeled manholes were provided by MacKay and Somsps, and include base and urban reserve areas. A summary of this information is provided in Attachment A.

2 Hydraulic Model

Pipes 18 inches in diameter and larger in Sierra Vista UGA sanitary sewer system were added to an existing SPWA trunk sewer model. The SPWA trunk sewer model was designed to function as an extended period simulation, and features land use-specific diurnal curves, a design storm, and unit hydrographs for the purpose of simulating time-varying wastewater flows in the trunk sewer system during a design storm event. These same features were applied to the modeled Sierra Vista trunk sewers. For more information on the development of the SPWA trunk sewer model, refer to the SPWA TM titled *Trunk Sewer Hydraulic Analysis* (TM 3b). Since the publication of TM 3b, the city of Roseville has constructed a number of pipes in West Roseville. These newly constructed pipes have been added to the SPWA trunk sewer model for the current analysis. This analysis uses the Buildout PWWF model

described in TM 3b. The RDI/I and GWI rate parameters used were the same as surrounding UGAs (GWI: 100 gpad for the Pleasant Grove basin).

2.1 Model Software

The software used to model the Sierra Vista trunk sewers was H2OMap Sewer Professional Suite 7.0 (H2OMap Sewer), a product of MWH Soft, Inc. This software is widely used for hydraulic analysis of collection systems.

2.2 Model Results

The modeled Sierra Vista trunk sewers were evaluated using the same criteria used by SPWA (and presented in TM 3b) to evaluate other existing and planned trunk sewers in the SPWA service area. The surcharge criterion used for this analysis requires that under design flow conditions, trunk sewers shall not be allowed to surcharge.

According to the hydraulic model results, all of the Sierra Vista trunk sewers sized 18 inches in diameter and larger have ample capacity to convey the modeled peak wet weather flows (PWWF). As such, the sizes of the 18-inch and larger pipes were adjusted, as appropriate, to achieve the minimum size necessary to convey the PWWF without surcharging. **Table 1** below summarizes the modeled pipes and PWWF.

In addition to the pipes summarized in the table, an additional 46 EDUs on 9.3 acres, resulting in a PWWF of 0.022 mgd, was applied to SPWA manhole D99-090, which corresponds to Sierra Vista manhole 370. The model results indicate that the modeled pipes downstream from the Sierra Vista UGA, including the recently constructed pipes in West Roseville, have sufficient capacity to handle PWWF from Sierra Vista under the buildout scenario. The maximum q/Q at PWWF in the pipes downstream of Sierra Vista is 0.66.

Table 1: Modeled Pipe Summary

U/S Manhole ID	D/S Manhole ID	Dia-meter (in)	Length (ft)	Slope (ft/ft)	Modeled BSF (mgd)	ADWF-Calculated by Mackay & Soms (mgd)	BSF/ADWF	PWWF (mgd)	Velocity at PWWF (ft/s)	d/D at PWWF	q/Q at PWWF	Head-loss (ft)
SV-140	SV-145	15	786	0.0015	0.434	0.458	95%	1.00	2.16	0.56	0.61	n/a
SV-145	SV-150	15	805	0.0015	0.47	0.496	95%	1.06	2.17	0.59	0.66	n/a
SV-150	SV-155	15	501	0.0035	0.484	0.511	95%	1.07	3.01	0.46	0.43	n/a
SV-155	SV-160	15	576	0.0030	0.514	0.542	95%	1.14	2.90	0.50	0.49	n/a
SV-160 ^a	SV-170	12	5610	n/a	0.514	0.542	95%	1.15	2.26	n/a	n/a	11
SV-170	SV-190	15	949	0.0017	0.566	0.597	95%	1.36	2.40	0.67	0.80	n/a
SV-190	SV-195	15	1005	0.0015	0.573	0.604	95%	1.38	2.29	0.71	0.85	n/a
SV-195	SV-270	18	1017	0.0012	0.595	0.626	95%	1.53	2.18	0.59	0.65	n/a
SV-270	SV-275	21	400	0.0014	0.978	1.025	95%	2.14	2.52	0.70	0.83	n/a
SV-275	SV-280	21	375	0.0009	1.001	1.05	95%	2.15	2.17	0.61	0.69	n/a
SV-280	SV-285	21	974	0.0010	1.034	1.084	95%	2.19	2.27	0.60	0.67	n/a
SV-285	SV-345	21	503	0.0010	1.072	1.123	95%	2.23	2.24	0.61	0.69	n/a
SV-345	SV-350	21	211	0.0012	1.159	1.214	95%	2.35	2.43	0.60	0.67	n/a
SV-350	SV-355	21	367	0.0011	1.175	1.231	95%	2.38	2.36	0.62	0.70	n/a
SV-355	SV-360	21	370	0.0011	1.181	1.237	95%	2.73	2.42	0.68	0.81	n/a
SV-550	SV-555	15	500	0.0015	0.218	0.228	96%	0.56	1.86	0.58	0.63	n/a
SV-555	SV-560	15	514	0.0015	0.218	0.228	96%	0.54	1.82	0.56	0.61	n/a
SV-560	SV-575	15	511	0.0015	0.252	0.263	96%	0.61	1.88	0.61	0.69	n/a
SV-575	W18	18	455	0.0013	0.568	0.592	96%	1.23	2.16	0.50	0.50	n/a

Footnotes:

a. Force main for lift station at Node 160.

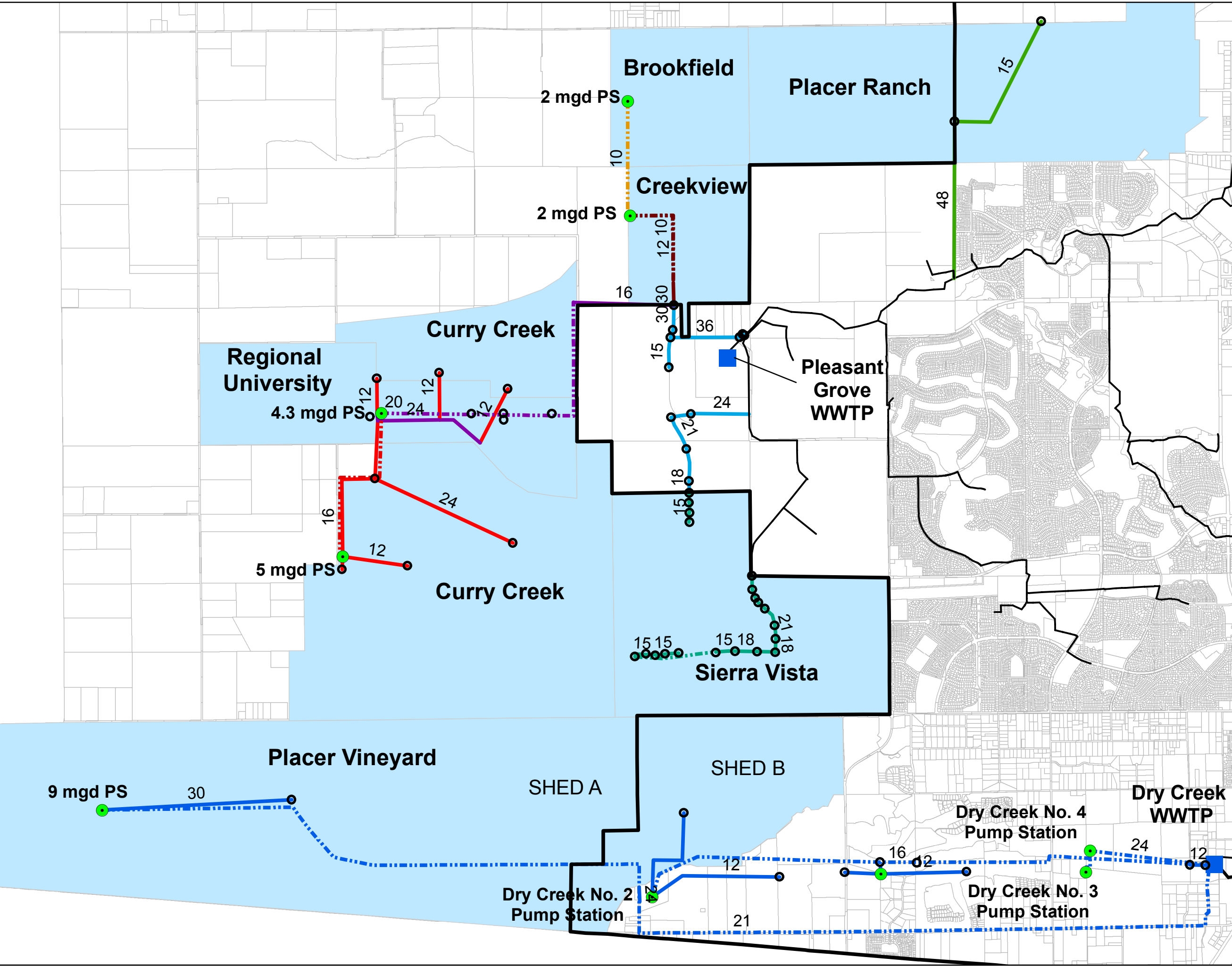
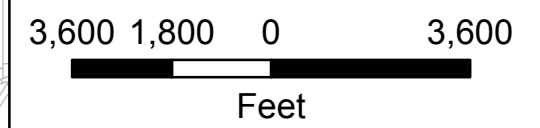
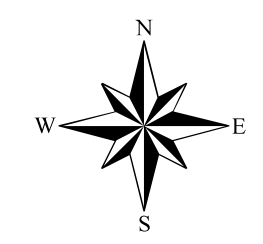
Legend

- WWTP
 - Pump Station
 - Modeled Manhole
 - Existing Pipe
 - - - Force Main
- Extension Project**
- West Roseville
 - Placer Ranch
 - Placer Vineyard
 - Regional University
 - Curry Creek
 - Creekview
 - Brookfield
 - Sierra Vista
 - Parcel Boundary

Sewer Extension Projects

South Placer Wastewater Authority

Regional Wastewater and Recycled Water Sewer Evaluation Project



Attachment A

TABLE III-7
WASTEWATER FLOWS BY NODE - SOUTH SHED
WITH URBAN RESERVE LAND USE
SIERRA VISTA SPECIFIC PLAN

Node No.	LDR (DU)	MDR (DU)	HDR (DU)	CMU		CC (Acres)	CC/BP (Acres)	PARK (Acres)	PQP-PUB (Acres)	PQP-REL (Acres)	SCHOOLS (Acres)	ADWF (MGD)	Tributary Nodes	Cumulative ADWF (MGD)	Factored Flow (MGD)	Peaking Factor	Peak Trans. Flow (MGD)	Pipe Diameter (in)
	190 gpd/du	190 gpd/du	130 gpd/du	(DU)	(Acres) 2300 gpd/ac	850 gpd/ac	850 gpd/ac	10 gpd/ac	660 gpd/ac	660 gpd/ac	170 gpd/ac							
5							12.2					0.010		0.010	0.021	3.52	0.073	8
10						8.8						0.007	5	0.018	0.036	3.48	0.124	8
15												0.000	10	0.018	0.036	3.48	0.124	8
20	119											0.023	15	0.040	0.081	3.29	0.266	8
25												0.000	20	0.040	0.081	3.29	0.266	8
30		169										0.032	25	0.073	0.145	3.08	0.447	10
35		152										0.029	30	0.101	0.203	2.91	0.590	10
40						56						0.048		0.048	0.095	3.23	0.307	8
45				175	23.5			39.9				0.054		0.054	0.109	3.19	0.347	8
50			152					4.2				0.020	45	0.074	0.149	3.07	0.456	10
55												0.000	35, 40, 50	0.223	0.447	2.50	1.117	15
70	121											0.023		0.023	0.046	3.43	0.158	8
60								5.0			12.0	0.002		0.002	0.004	3.60	0.015	8
65	108											0.021	60	0.023	0.045	3.42	0.155	8
75												0.000	65, 70	0.046	0.091	3.26	0.297	8
80		153						4.2				0.029	75	0.075	0.149	3.07	0.459	10
90	86											0.016		0.016	0.033	3.48	0.114	8
95		70										0.013	90	0.030	0.059	3.38	0.200	8
100												0.000	95	0.030	0.059	3.38	0.200	8
105	82											0.016		0.016	0.031	3.49	0.109	8
110		43										0.008	105	0.024	0.048	3.42	0.162	8
115	287							1.0				0.055		0.055	0.109	3.20	0.349	8
120		84										0.016	115	0.071	0.141	3.10	0.437	10
125												0.000	100, 110, 120	0.124	0.248	2.80	0.694	12
130						7.7			3.1			0.009	125	0.132	0.265	2.77	0.734	12
135		144										0.027	130	0.160	0.320	2.65	0.847	12
140												0.000	55, 80, 135	0.458	0.916	2.35	2.152	18
145		203										0.039	140	0.496	0.993	2.35	2.333	18
150	78											0.015	145	0.511	1.022	2.35	2.403	18
155	164											0.031	150	0.542	1.085	2.35	2.549	21
160												0.000	155	0.542	1.085	2.35	2.549	21
170	290											0.055	160	0.598	1.195	2.35	2.808	21
175								10.7				0.000		0.000	0.000	3.65	0.001	8
180											12.0	0.002	175	0.002	0.004	3.60	0.015	8
185	24											0.005	180	0.007	0.013	3.56	0.048	8
190												0.000	170, 185	0.604	1.208	2.35	2.840	21
195			172									0.022	190	0.627	1.253	2.35	2.945	21

TABLE III-7
WASTEWATER FLOWS BY NODE - SOUTH SHED
WITH URBAN RESERVE LAND USE
SIERRA VISTA SPECIFIC PLAN

Node No.	LDR (DU)	MDR (DU)	HDR (DU)	CMU (DU)	CMU (Acres)	CC (Acres)	CC/BP (Acres)	PARK (Acres)	PQP-PUB (Acres)	PQP-REL (Acres)	SCHOOLS (Acres)	ADWF (MGD)	Tributary Nodes	Cumulative ADWF (MGD)	Factored Flow (MGD)	Peaking Factor	Peak Trans. Flow (MGD)	Pipe Diameter (in)
200						12.6						0.011		0.011	0.021	3.52	0.075	8
205	117											0.022	200	0.033	0.066	3.34	0.220	8
210	15							1.9				0.003	205	0.036	0.072	3.32	0.238	8
215			843									0.110		0.110	0.219	2.86	0.627	12
220	94											0.018		0.018	0.036	3.48	0.124	8
225		144										0.027	220	0.045	0.090	3.26	0.295	8
230												0.000	210, 215, 220	0.191	0.381	2.55	0.972	15
250	148							2.6			12.0	0.030		0.030	0.060	3.38	0.204	8
235						68.6						0.058		0.058	0.117	3.17	0.370	8
240		168										0.032	235	0.090	0.180	2.98	0.538	10
245	151											0.029	240	0.119	0.238	2.81	0.668	12
255												0.000	245, 250	0.149	0.298	2.68	0.799	12
260	131							1.5				0.025	255	0.174	0.348	2.60	0.905	12
265		180										0.034	260	0.208	0.416	2.52	1.049	15
270												0.000	195, 230, 265	1.025	2.051	2.35	4.819	24
275				80	10.8							0.025	270	1.050	2.100	2.35	4.936	24
280		179										0.034	275	1.084	2.169	2.35	5.096	24
285		96	160									0.039	280	1.123	2.247	2.35	5.279	24
290											21.6	0.004		0.004	0.007	3.60	0.026	8
295	94								2.8			0.020		0.020	0.039	3.47	0.137	8
300								8.1				0.000	290, 295	0.023	0.047	3.42	0.160	8
305							15.1					0.013		0.013	0.026	3.51	0.090	8
310			138									0.018	305	0.031	0.062	3.37	0.207	8
315												0.000	310	0.031	0.062	3.37	0.207	8
320								8.0	0.3			0.000		0.000	0.001	3.65	0.002	8
325												0.000	315, 320	0.031	0.062	3.36	0.209	8
330	84											0.016	325	0.047	0.094	3.23	0.304	8
335	42											0.008	330	0.055	0.110	3.17	0.349	8
340	68											0.013	335	0.068	0.136	3.10	0.421	10
345												0.000	285, 300, 340	1.215	2.429	2.35	5.709	27
350	87											0.017	345	1.231	2.462	2.35	5.787	27
355	32											0.006	350	1.237	2.475	2.35	5.815	27
360												0.000	355	1.237	2.475	2.35	5.815	Existing 24
365	46							1.1				0.009		0.009	0.018	3.55	0.062	8
370												0.000	360, 365	1.246	2.492	2.35	5.856	Existing 24
TOTAL	2468	1785	1465	255	34.3	153.7	27.3	88.2	6.2	0	57.6	1.246		1.246	2.492		5.856	

Pipe Size to be determined using Hydraulic Modeling

Attachment B

Technical Memorandum

South Placer Regional Wastewater & Recycled Water Systems Evaluation Project

Subject: Unit Flow Factor Sets and Sewer Design Criteria –TM No. 3a (FINAL)

Prepared For: Art O’Brien – City of Roseville

Prepared By: Mai-Tram Le - RMC; revised by Gisa Ju - RMC

Reviewed By: Dave Richardson - RMC
Pete Bellows – BC

Date: May 25, 2005; Final revision October 3, 2006

Reference: 0091-4.02

This technical memorandum (TM) provides a definition of the unit flow factors that have been developed and used in analyses of treatment and trunk sewer facilities as part of the South Placer Regional Wastewater and Recycled Water Systems Evaluation Project (Project). The TM also proposes criteria to be used by developers for design of new sewer facilities.

The various analyses and their associated application are as follows:

1. **Treatment Plant Analyses** – A set of average dry weather unit flow factors has been developed for the entire South Placer Wastewater Authority (SPWA) service area. These factors include the average flow coming from various areas based on specific land use designations, along with a base dry weather groundwater infiltration (GWI) component across the service area. The average unit flow factors were developed using water use and flow monitoring data, as presented in TM 2a, “Dry Weather Flow Projection for 2005 Service Area.” For example, the unit flow factor for single-family residential dwelling units, regardless of density, is 190 gpd, of which 10 gpd represents the dry weather GWI component. The unit flow factors used for treatment plant analyses are presented in **Table 1**.
2. **Hydraulic Model Calibration and Trunk Sewer Analyses** – The dry weather flows used for model calibration and analyses of trunk sewers consists of base sanitary flows (BSF) which have been developed using the same unit flow factor concept as for the treatment plant analyses discussed above. However, the dry weather GWI component of the unit flow factors has been included on an areal basis based on actual measured flows, rather than having been considered as a uniform base dry weather GWI load across the service area.

Trunk Sewer analyses also include additional components of wet weather GWI and rainfall-dependent infiltration and inflow (RDI/I) that vary across the SPWA service area to reflect actual conditions as verified by the wet weather flow monitoring data. The wet weather GWI factors are specific to each wastewater treatment plant (WWTP) service area and were determined from analysis of WWTP flows to be 200 gpd/acre in the Dry Creek WWTP basin and 100 gpd/acre in the Pleasant Grove WWTP basin. The GWI rates and RDI/I parameters used in the trunk sewer model are documented in TM 2c, “Wet Weather Flow Projection for the Ultimate SPWA Service Area.”

**Table 1 – Average Dry Weather Unit Flow Factors
 Used for Treatment Plant Analyses**

Land Use Designation	Units	Flow Factor (gpd/unit)¹
Commercial	gpd per acre	850
Heavy Industrial	gpd per acre	850
Light Industrial	gpd per acre	850
Mixed Use	gpd per acre	2,300
Public/Quasi-Public	gpd per acre	660
Schools	gpd per acre	170
Residential 1 DU	gpd per DU	190
Residential 2 DU	gpd per DU	190
Residential 3 DU	gpd per DU	190
Residential Multiple DU ²	gpd per acre or gpd per DU	2,040 or 130
Open Space	gpd per acre	0
Parks > 10 Acres	gpd per acre	10
Vacant	gpd per acre	0

¹ Includes allowance for dry season GWI.

² Future development projects should use the factor that results in the highest flow .

3. **Design Flow Standards (Criteria) for Sizing Infrastructure** – For sizing future infrastructure facilities, the hydraulic model of the trunk sewer system should be used for pipes 18 inches in diameter and larger. For smaller facilities, the average dry weather unit flow factors for the treatment plant analyses can be used along with a safety factor of 2.0 and appropriate peaking factors. The safety factor of 2.0 will be used to factor the average dry weather unit flow factor in order to:

1. Account for changes that may occur over time in the behavior of residential and nonresidential contributors to the sewer systems, such as increased indoor water use;
2. Account for changes in environmental conditions (higher groundwater table and consequent higher GWI) and changes in infrastructure (aging pipes, etc.);
3. Provide for safety to adequately size the infrastructure to avoid any sanitary sewer overflows due to under-sizing;
4. Account for the increasing friction losses (increase in the roughness coefficient) due to pipe aging; and,
5. Account for nominal pipe diameter decreases due to accumulation of material adhering to the walls of the sewer piping and restricting capacity.

Peak wet weather flows will be accounted for using a system-wide peaking factor. A peaking factor curve was developed based on the following assumptions:

- Single family residential development at 4 DU/acre
- Design average dry weather flow (ADWF) based on a unit flow rate of 190 gpd/DU times a safety factor of 2.0

- Diurnal peaking factor ranging from 1.8 to 3.0 depending on area size (reflects the attenuation of peak flows through the sewer system as the tributary area increases – refer to Footnote 4 in Table 2))
- GWI at 150 gpd/acre
- RDI/I at 700 gpd/acre, estimated based on model parameters used for new development UGAs (Note: New development RDI/I parameters were assumed to be similar to those determined by flow monitoring and model calibration for relatively new areas of the system; see TM 2c for discussion.)
- Peak diurnal flow concurrent with peak RDI/I flow

The resultant peaking factor curve is presented in **Figure 1**. **Table 2** below shows the derivation of the peaking factor curve for areas ranging from 10 to 750 acres. (NOTE: the values in Table 2 are meant to support the derivation of the peaking factor curve, rather than to be published as design standards).

Table 2 - Derivation of Proposed Roseville/SPWA Design Peaking Factor Curve¹

Area (acres)	No. of DUs ¹	ADWF (mgd) ²	Factored Flow (mgd) ³	Diurnal PF ⁴	Wet GWI (mgd) ⁵	Peak RDI/I (mgd) ⁶	PWWF (mgd) ⁷	Peaking Factor	PF Curve
0			0						3.65
10	40	0.0076	0.0152	3.0	0.0015	0.0070	0.054	3.56	3.56
100	400	0.076	0.152	2.5	0.015	0.070	0.47	3.06	3.06
250	1,000	0.19	0.38	2.0	0.038	0.175	0.97	2.56	2.56
500	2,000	0.38	0.76	1.8	0.075	0.350	1.79	2.36	2.36
750	3,000	0.57	1.14	1.8	0.11	0.53	2.69	2.36	2.36

¹ Based on single-family residential development at 4 DUs/acre. 4 DUs/acre is considered to be a typical density for single family residences, and is not intended to be used as a design criterion.

² Based on 190 gpd/DU

³ Based on safety factor of 2.0

⁴ The diurnal PF values in this analysis are based on the peaking factor used for residential flows (PF = 1.8) in the hydraulic model, which was derived from dry weather flow monitoring data. Since that derivation was based on a large area, the PF value is increased progressively as the area decreases in order to account for decreased attenuation of peak flows. Selection of the upper limit of that range is based on engineering judgment and experience with similar analyses.

⁵ Based on 150 gpd/acre

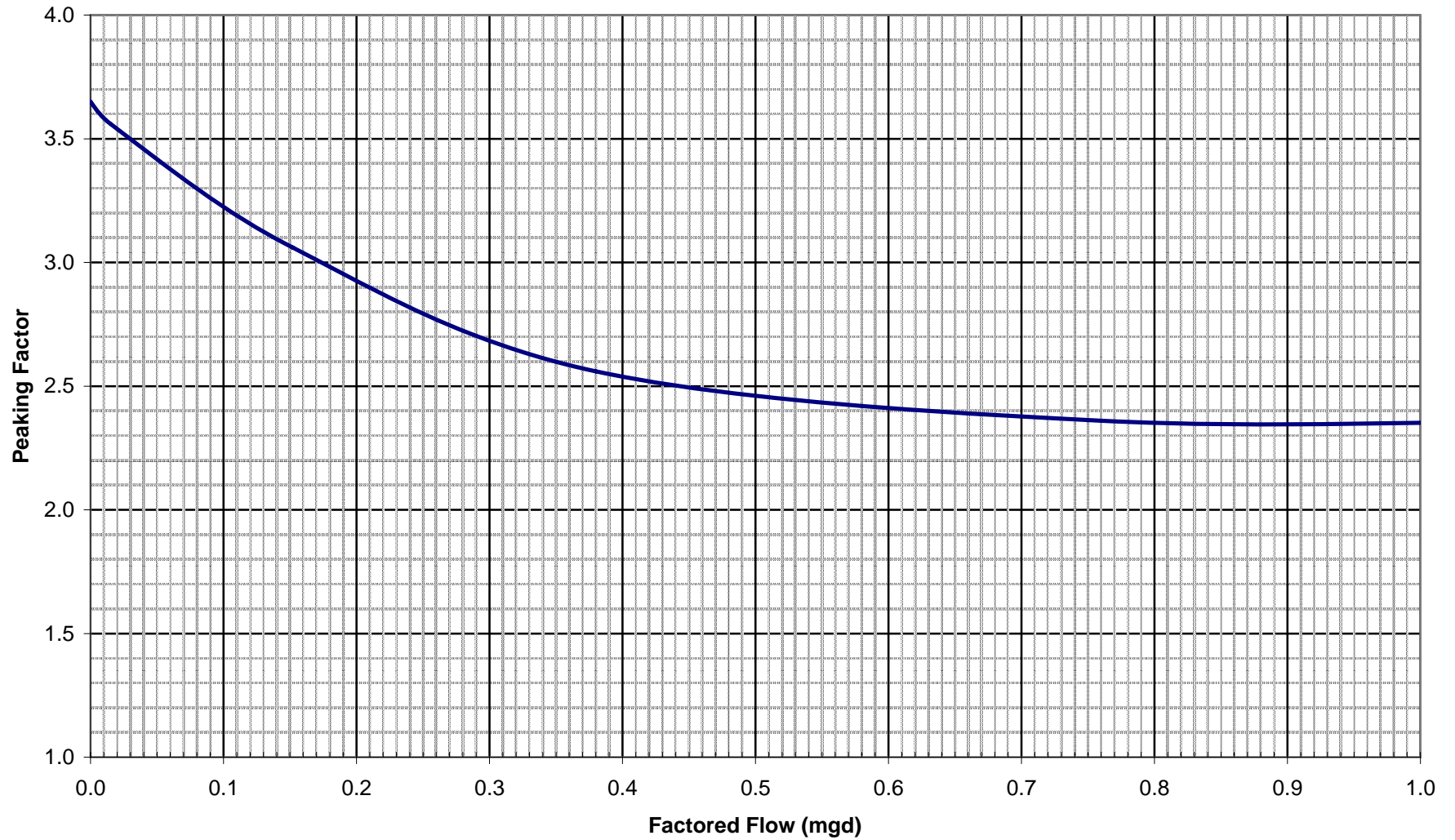
⁶ Based on 700 gpd/acre

⁷ Assumes peak RDI/I coincides with peak diurnal

Attachment A includes an example calculation illustrating the application of the peaking factor curve.

At the direction of SPWA member agencies, several planning-level criteria were developed to aid developers in the sizing and configuration of pump station and force main facilities. These criteria are presented in **Attachment B**.

Figure 1
SPWA Design Peaking Factor Curve



ATTACHMENT A: Example Design Flow Analysis for Sewers Smaller than 18-inches

Example calculation for application of peaking factor curve for 400-unit single family subdivision:

ADWF^a:

$$(400 \text{ DUs}) * (190 \text{ gpd/DU}) = \mathbf{76,000 \text{ gpd} = \text{ADWF}}$$

Factored Flow:

$$(\text{ADWF}) * (2.0) = (76,000 \text{ gpd}) * (2.0) = \mathbf{152,000 \text{ gpd} = \text{Factored Flow}}$$

PWWF:

$$(\text{Factored flow}) * (3.05^{\text{b}}) = (152,000) * (3.05) = \mathbf{464,000 \text{ gpd} = \text{PWWF}}$$

Per City of Roseville Improvement Standards, page SS-5, a 10-inch sewer at minimum slope is adequate for this PWWF.

^a Based on ADWF unit flow factors (as opposed to base sanitary flow unit flow factors, which do not allow for dry season GWI)

^b From Figure 1: SPWA Design Peaking Factor Curve

ATTACHMENT B: Recommended Planning Level Criteria for Pump Stations and Force Mains

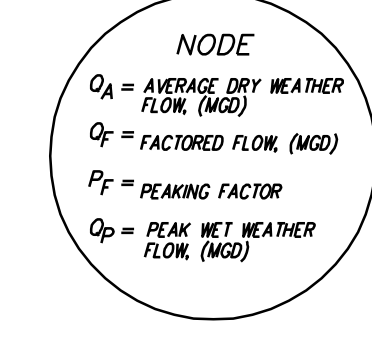
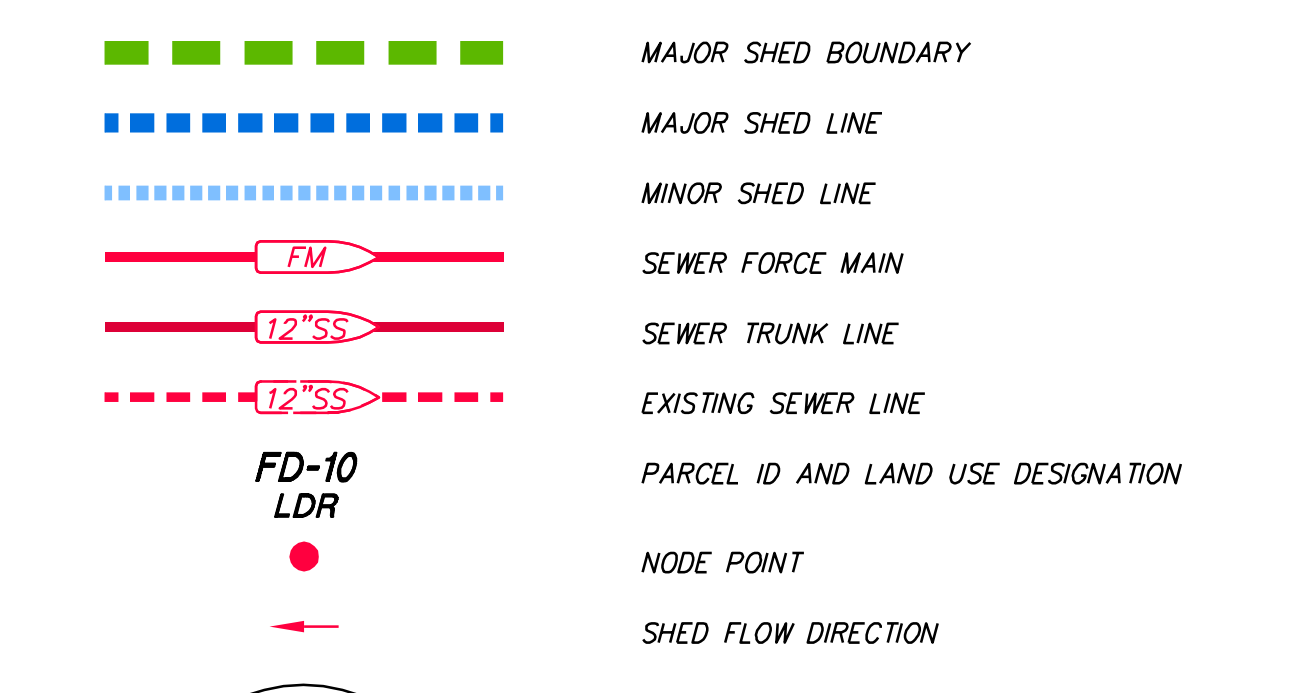
Table B-1 presents planning-level criteria for the design of pump stations and force mains within the SPWA service area; these criteria should be confirmed during design.

Table B-1: Recommended Planning Level Criteria for Pump Stations and Force Mains

Pump Stations	
Capacity	PWWF (hydraulic modeling required for pipes 18 inches and larger)
Storage	24 hours, or 8 hours with an emergency generator
Operation	Lead/lag for duty pump(s), plus 1 standby pump
Maximum Pump Cycles	6 cycles/hour
Force Mains	
Headloss	Hazen-Williams roughness coefficient (C-factor) of 120
Maximum Velocity	7-10 feet per second
Minimum Velocity	3.0 feet per second

NOTE: Hydraulic transient, surge, and odor control analyses will need to be performed during final design.

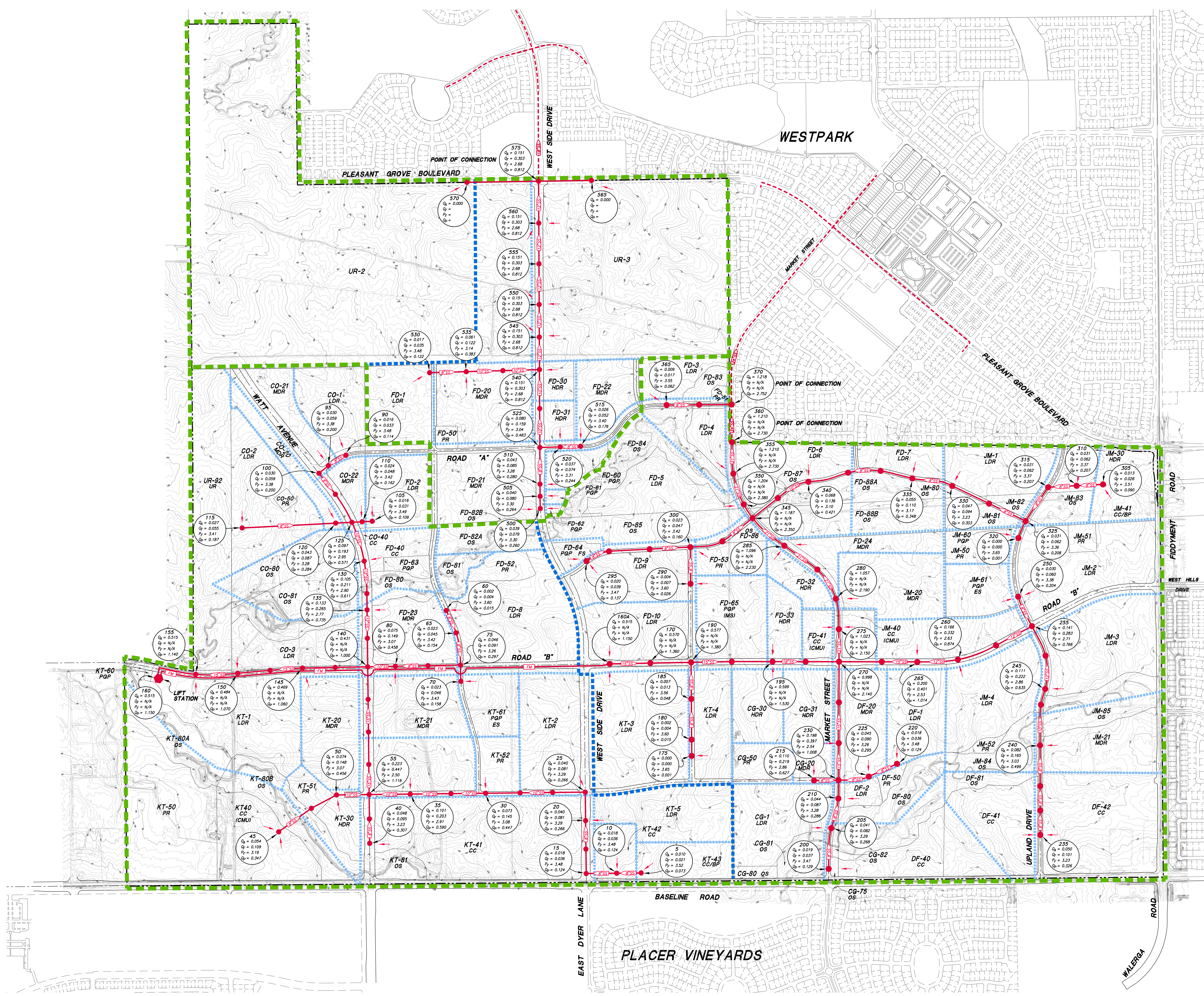
LEGEND



NODE DATA			
PARCEL	AREA	PROJECTED DU	TRIBUTARY TO NODE
CO-2	28.8	144	115
CO-1	17.3	86	90
FD-1	18.3	91	530
FD-3	9.1	45	365
FD-2	16.3	81	105
FD-5	17.4	87	350
FD-4	6.4	32	355
FD-6	13.8	69	340
FD-7	8.5	42	335
JM-1	16.9	84	350
CO-3	15.7	78	150
FD-8	32.9	164	65
FD-9	18.3	91	295
FD-10	18.7	93	170
JM-2	29.6	148	250
KT-1	32.8	164	155
KT-2	23.7	118	70
KT-3	38.6	193	170
KT-4	14.3	71	185
DF-1	18.8	94	220
DF-2	3.2	16	210
JM-4	26.3	131	260
JM-3	30.2	151	245
KT-5	23.5	117	335
CO-1	23.0	115	205
CO-20	9.4	47	120
CO-21	7.8	39	95
FD-20	25.2	126	535
FD-22	14.3	71	515
CO-22	4.6	23	110
FD-21	22.7	113	500
FD-23	15.9	79	135
FD-24	10.7	53	285
JM-20	39.9	199	265, 280
KT-20	22.5	112	145
KT-21	37.2	186	35, 80
DF-20	16.0	80	225
JM-21	18.7	93	240
CO-20	4.9	24	44
FD-30	4.1	20	540
FD-31	4.1	20	520
JM-30	6.1	30	310
FD-32	8.9	44	285
FD-33	8.6	43	195
CO-30	14.0	70	195
CO-31	14.6	73	195
KT-30	7.5	37	50
FD-41	5.7	28	275
JM-40	5.7	28	275
KT-40	23.5	117	45
FD-60	6.9	34	510
FD-61	1.1	5	505
FD-62	0.5	2	500
FD-63	2.8	14	130
KT-61	12.0	60	60
FD-64	3.2	16	295
FD-65	21.6	108	290
JM-60	0.3	1	320
JM-61	12.0	60	250
FD-40	7.5	37	130
CO-40	0.1	0	130
KT-41	55.2	276	40
KT-42	8.8	44	10
DF-41	29.3	146	235
DF-42	40.2	201	235
JM-41	15.1	75	305
KT-43	12.2	61	5
CO-50	1.0	5	115
FD-50	1.7	8	535
FD-51	1.1	5	365
FD-52	5.5	27	60
FD-53	8.1	40	300
JM-50	8.0	40	320
JM-51	2.6	13	250
KT-52	7.6	38	80
CG-50	7.6	38	175
DF-50	1.8	9	210
JM-52	1.5	7	260
KT-50	39.9	199	45
KT-51	4.2	21	50

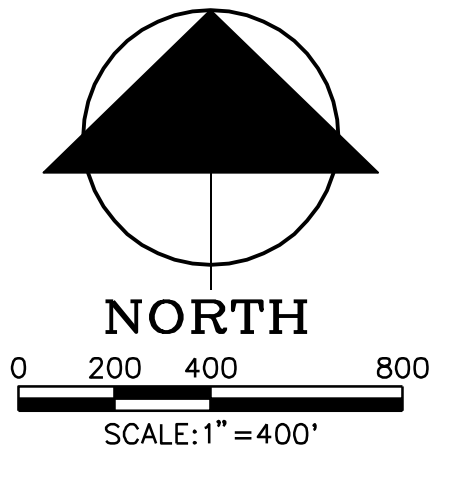
PIPE DIAMETER	MINIMUM SLOPE	0.7 FULL	1.0 FULL
6"	0.005	0.21	0.25
8"	0.0035	0.38	0.46
10"	0.0025	0.59	0.70
12"	0.002	0.86	1.02
15"	0.0015	1.35	1.61
18"	0.0012	1.96	2.35
21"	0.001	2.71	3.23
24"	0.0008	3.46	4.13

= USED FOR PRELIMINARY DESIGN



NOTES:

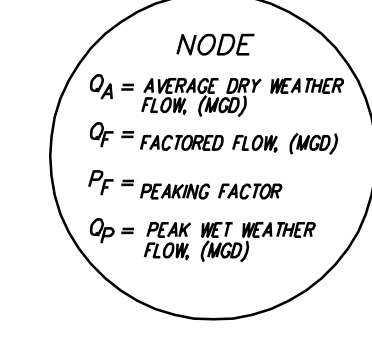
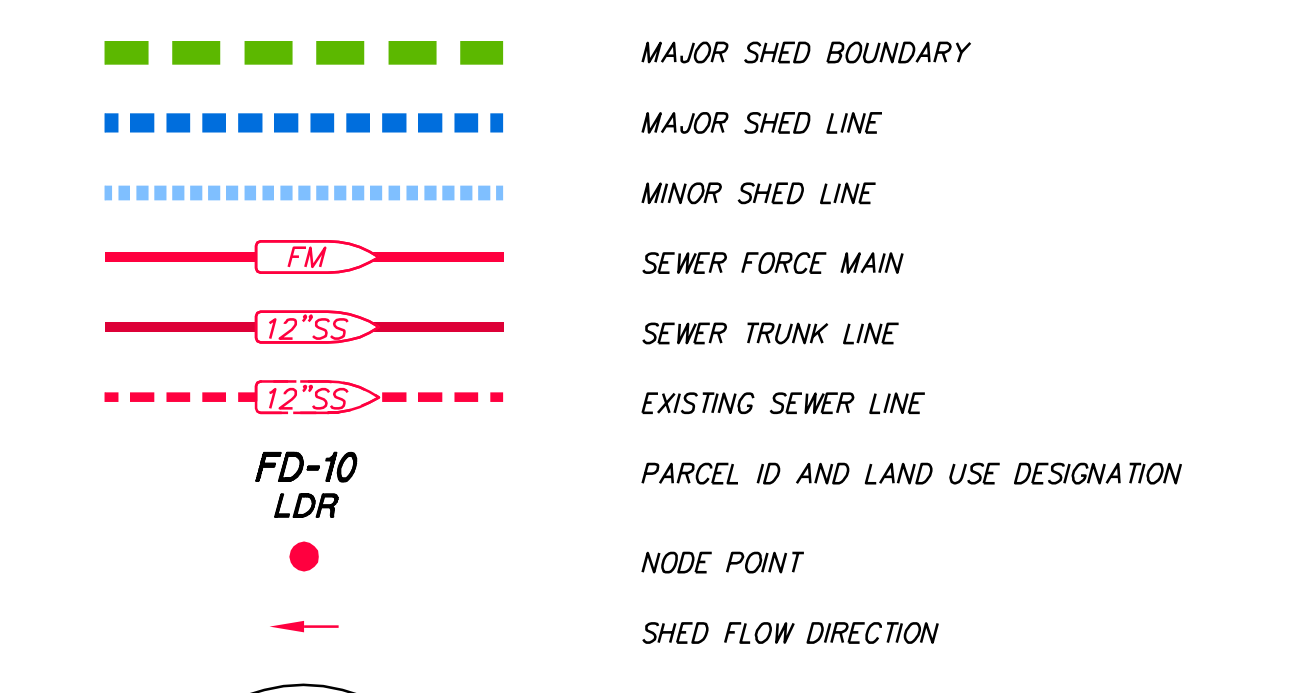
- COVER FROM TOP OF PIPE TO FLOW LINE OF CREEK CROSSINGS IS 3.0' MIN.
- PEAK WET WEATHER FLOWS AT NODES 140, 145, 150, 155, 160, 170, 190, 195, 270, 275, 280, 285, 345, 350, 355, 360, AND 370 HAVE BEEN CALCULATED BASED ON HYDRAULIC MODELING.
- PIPES DOWN STREAM FROM NODES 140, 145, 150, 155, 160, 170, 190, 195, 270, 275, 280, 285, 345, 350, 355, 360, AND 370 HAVE BEEN SIZED BASED ON HYDRAULIC MODELING.
- THE 133 UNITS OF LOW DENSITY RESIDENTIAL FUTURE LAND USE ON UR-1 ARE INCLUDED IN THE HYDRAULIC MODELING.
- MINOR WASTEWATER SHED BOUNDARY ADJUSTMENTS WILL BE ALLOWED DURING FINAL UTILITY AND GRADING DESIGN, SUBJECT TO THE REVIEW AND APPROVAL OF THE CITY OF ROSEVILLE.



SIERRA VISTA SPECIFIC PLAN
SANITARY SEWER MASTER PLAN
 SVSP BASE CONDITION

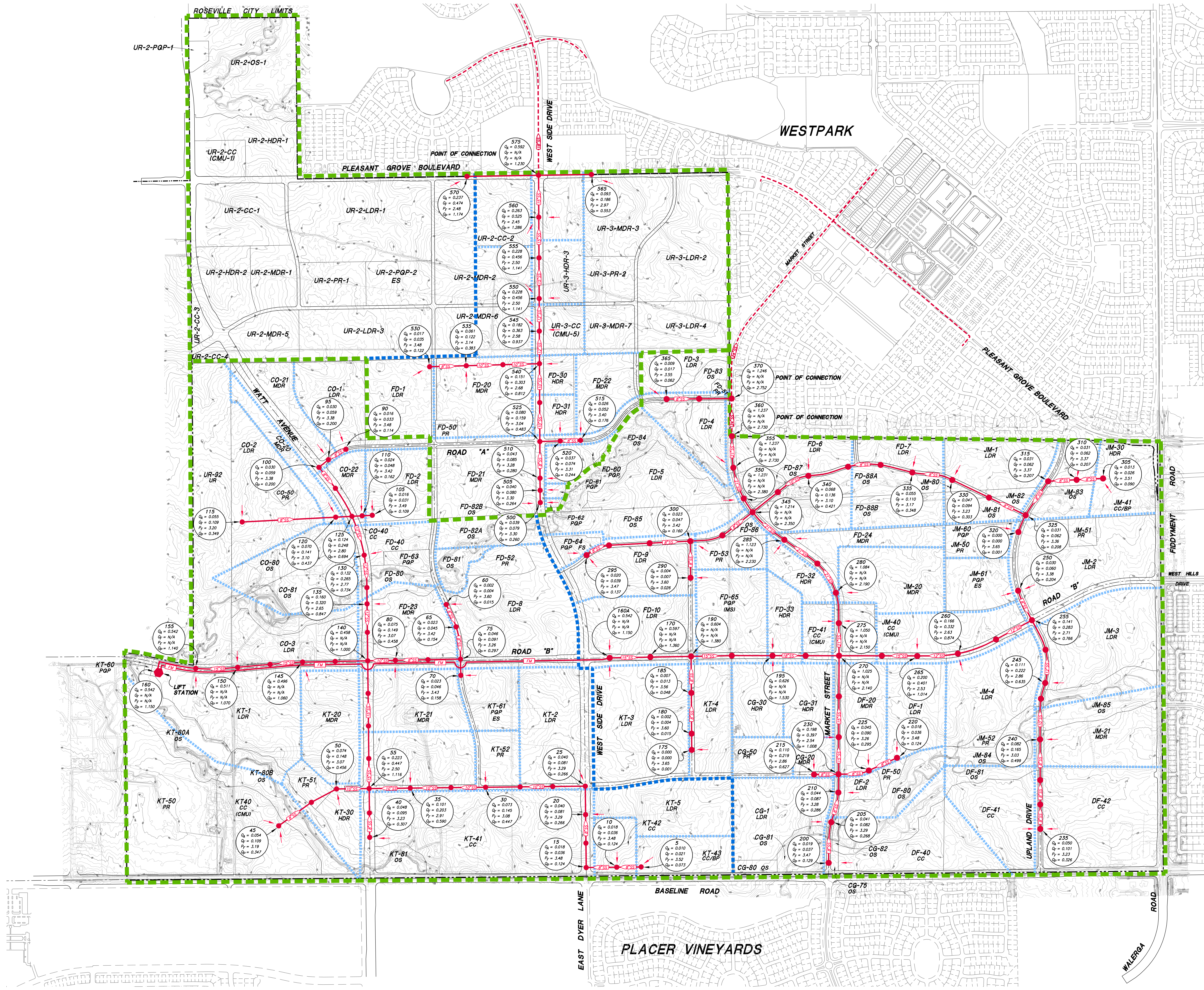
SCALE: 1"=400' **Mackay & Somp** JULY 2, 2009
 ENGINEERS PLANNERS SURVEYORS
 1920 Evans Road, Suite 100, Roseville, CA 95678 (916) 775-1188

LEGEND



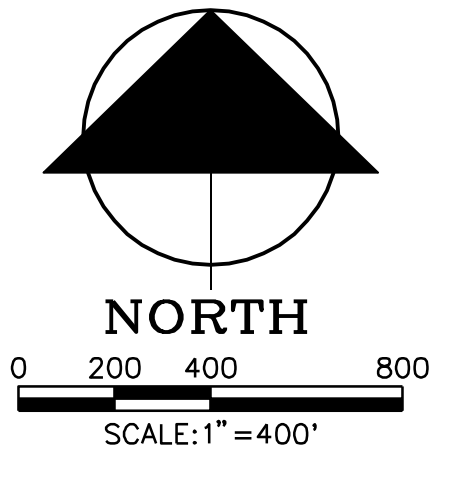
NODE DATA

PARCEL	AREA	PROJECTED DU	TRIBUTARY TO NODE
CO-2	28.8	144	115
CO-1	17.3	86	90
FD-1	18.3	91	530
FD-3	9.1	45	365
FD-2	16.3	81	105
FD-5	17.4	87	350
FD-4	6.4	32	355
FD-6	13.8	69	340
FD-7	8.5	42	335
JM-1	16.9	84	330
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CO-30	9.4	47	120
CO-21	7.8	39	95
FD-20	25.2	126	535
FD-22	14.3	71	515
CO-22	4.8	24	110
FD-21	22.7	113	500
FD-23	15.9	79	135
FD-24	10.7	53	285
JM-20	39.9	199	265, 280
KT-20	22.5	112	145
KT-21	37.2	186	35, 80
DF-20	16.0	80	225
JM-21	18.7	93	240
CO-20	4.9	24	215
FD-30	4.1	20	540
FD-31	4.1	20	520
JM-30	6.1	30	310
FD-32	8.9	44	285
FD-33	8.6	43	195
CO-30	14.0	70	195
CO-31	14.6	73	230
KT-30	7.5	37	50
FD-41	5.7	28	275
JM-40	5.7	28	275
KT-40	23.5	117	45
FD-60	6.9	34	510
FD-61	1.1	5	505
FD-62	0.5	2	500
FD-63	2.8	14	130
KT-61	12.0	60	70
FD-64	3.2	16	295
FD-65	21.6	108	290
JM-60	0.3	1	320
JM-61	12.0	60	250
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JM-50	8.0	40	320
JM-51	2.6	13	250
KT-52	7.6	38	80
CO-50	7.6	38	175
DF-50	1.8	9	210
JM-52	1.5	7	260
KT-50	39.9	199	45
KT-51	4.2	21	115
UR-32	28.6	143	570
UR-2-LDR-1	37.5	187	570
UR-2-LDR-3	23.7	118	570
UR-2-MDR-1	9.5	47	570
UR-2-MDR-2	28.2	141	550, 570
UR-2-MDR-5	9.7	48	570
UR-2-MDR-6	16.7	83	545, 570
UR-2-HDR-1	14.5	72	570
UR-2-HDR-2	12.3	61	570
UR-2-POP-1	1.6	8	570
UR-2-POP-2	10.0	50	570
UR-2-CMU-1	6.4	32	570
UR-2-CC-1	19.7	98	570
UR-2-CC-2	13.6	68	570
UR-2-CC-3	2.4	12	570
UR-2-CC-4	2.0	10	570
UR-3-LDR-1	31.4	157	565
UR-3-LDR-4	15.9	79	565
UR-3-MDR-3	20.0	100	565
UR-3-MDR-7	8.4	42	565
UR-3-MDR-8	17.5	87	550, 560
UR-3-CMU-5	6.9	34	545
UR-3-PR-2	8.0	40	565



NOTES:

- COVER FROM TOP OF PIPE TO FLOW LINE OF CREEK CROSSINGS IS 3.0' MIN.
- PEAK WET WEATHER FLOWS AT NODES 140, 145, 150, 155, 160, 170, 190, 195, 270, 275, 280, 285, 345, 350, 355, 360, AND 370 HAVE BEEN CALCULATED BASED ON HYDRAULIC MODELING.
- PIPES DOWN STREAM FROM NODES 140, 145, 150, 155, 160, 170, 190, 195, 270, 275, 280, 285, 345, 350, 355, 360, AND 370 HAVE BEEN SIZED BASED ON HYDRAULIC MODELING.
- MINOR WASTEWATER SHED BOUNDARY ADJUSTMENTS WILL BE ALLOWED DURING FINAL UTILITY AND GRADING DESIGN, SUBJECT TO THE REVIEW AND APPROVAL OF THE CITY OF ROSEVILLE.



**SIERRA VISTA SPECIFIC PLAN
SANITARY SEWER MASTER PLAN
SVSP BASE + URBAN RESERVE CONDITION**

SCALE: 1"=400' **Mackay & Soms** JULY 6, 2009

Mackay & Soms
ENGINEERS PLANNERS SURVEYORS
1900 Evans Road, Suite 100, Roseville, CA 95747 (916) 775-1188

TABLE 1 - PIPELINE CAPACITY SUMMARY

PIPE DIAMETER	MINIMUM SLOPE	0.7 FULL	1.0 FULL
6"	0.005	0.21	0.25
8"	0.0035	0.38	0.46
10"	0.0025	0.59	0.70
12"	0.002	0.86	1.02
15"	0.0015	1.35	1.61
18"	0.0012	1.96	2.35
21"	0.001	2.71	3.23
24"	0.0008	3.46	4.13

* USED FOR PRELIMINARY DESIGN

LEGEND

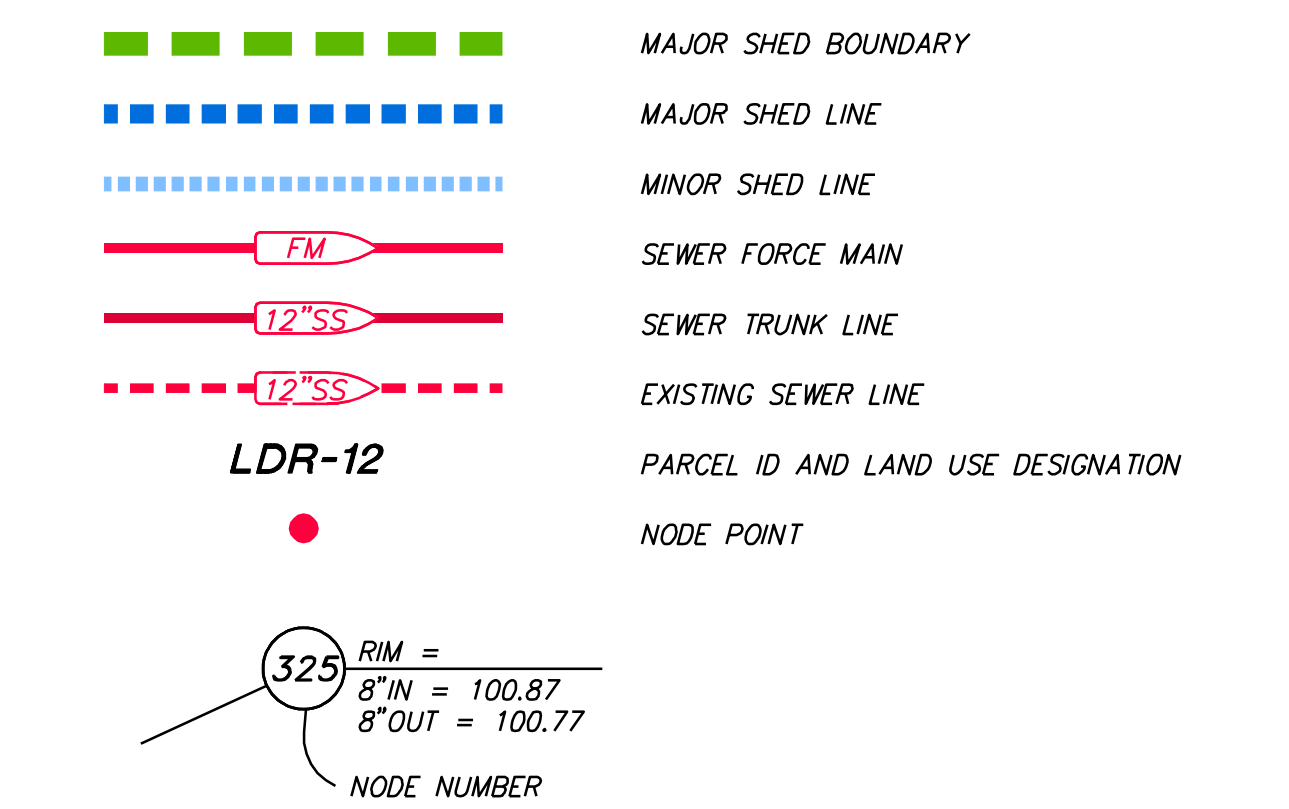


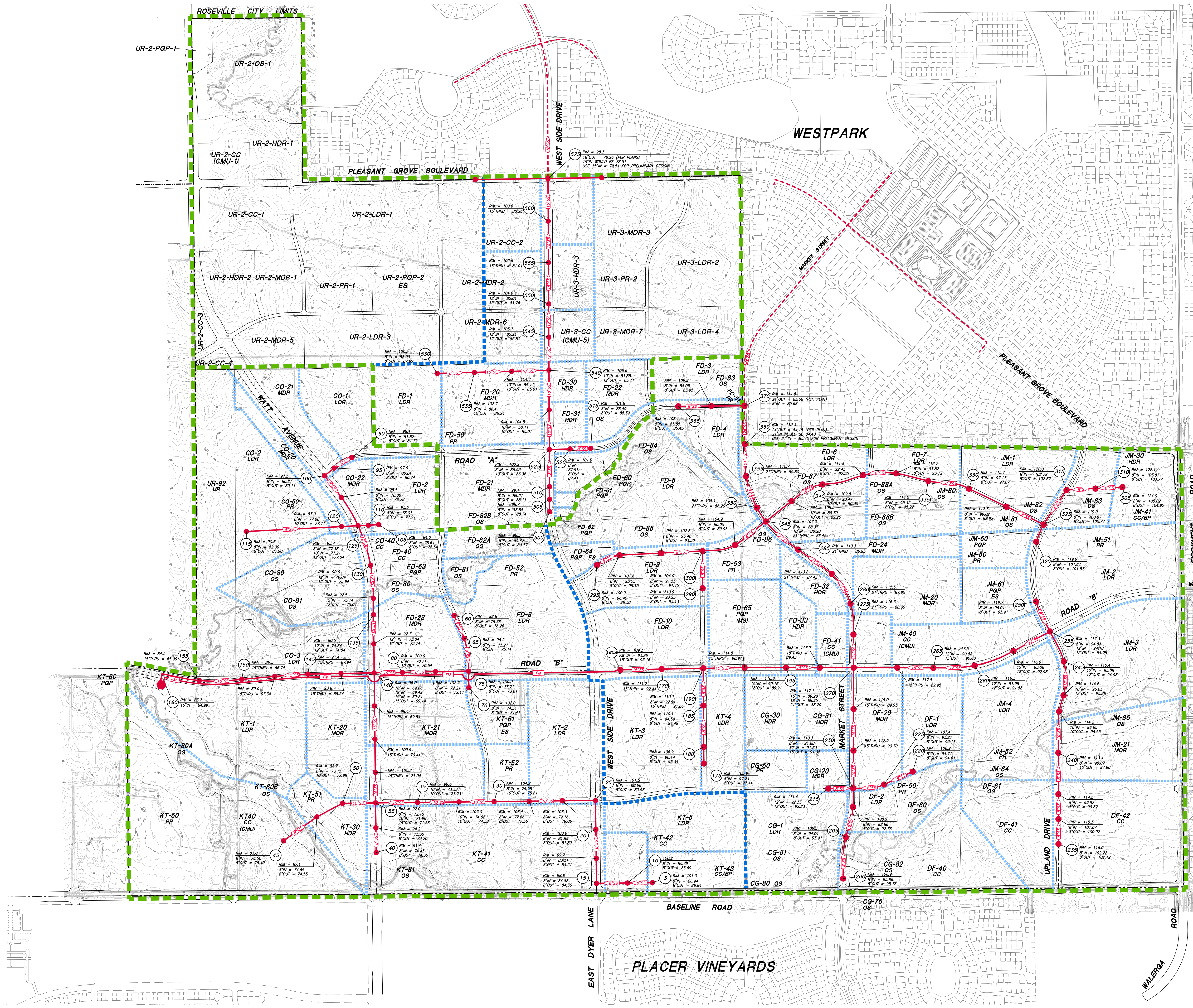
TABLE 1 - PIPELINE CAPACITY SUMMARY

PIPE DIAMETER	MINIMUM SLOPE	0.7 FULL	1.0 FULL
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18"	0.0012	1.96	2.35
21"	0.001	2.71	3.23
24"	0.0008	3.46	4.13

= USED FOR PRELIMINARY DESIGN

NOTES:

- COVER FROM TOP OF PIPE TO FLOW LINE OF CREEK CROSSINGS IS 3.0' MIN.
- PIPES 15" AND LARGER, AND FORCE MAINS, HAVE BEEN SIZED BASED ON HYDRAULIC MODELING.
- RM GRADES ARE BASED ON A PRELIMINARY CONCEPTUAL GRADING PLAN FOR THE SIERRA VISTA SPECIFIC PLAN AREA AND ARE SUBJECT TO CHANGE DURING THE IMPROVEMENT PLAN DESIGN AND APPROVAL PROCESS.
- PIPE INVERTS HAVE BEEN CALCULATED BASED ON MINIMUM SLOPES TO MAXIMIZE THE AREA WHICH CAN BE SERVED BY GRAVITY FLOW AND TO MAXIMIZE THE SEPARATION BETWEEN THE TOP OF PIPE AND SWALE FLOWLINES AT CREEK CROSSINGS.
 PIPE INVERTS ARE SUBJECT TO CHANGE DURING THE IMPROVEMENT PLAN DESIGN AND APPROVAL PROCESS. PIPE INVERTS MAY BE RAISED TO REDUCE PIPE DEPTHS. PROVIDED WASTEWATER SHEDS ARE NOT AFFECTED AND GRADE SEPARATIONS ARE MAINTAINED AT CREEK CROSSINGS.
- MINOR WASTEWATER SHED BOUNDARY ADJUSTMENTS WILL BE ALLOWED DURING FINAL UTILITY AND GRADING DESIGN, SUBJECT TO THE REVIEW AND APPROVAL OF THE CITY OF ROSEVILLE.



SIERRA VISTA SPECIFIC PLAN
PRELIMINARY SANITARY SEWER MANHOLE DATA
 SVSP BASE + URBAN RESERVE CONDITION

SCALE: 1"=400'



JULY 1, 2009

