4.14 Transportation and Traffic

This section describes the environmental consequences of the analyzed alternatives on the study intersections, roadway segments, and freeway facilities. It should be noted that USACE has statutory authority over the discharge of fill materials into waters of the U.S., including initial grading activities in waters of the U.S. The operational impacts of traffic and transportation are evaluated for purposes of assessing indirect effects; however, USACE has no authority over enforcement of the mitigation measures related to operational traffic impacts. Many of the mitigation measures are required as conditions of approval, as part of the previous County approval and CEQA process, specifically Mitigation Measures TC-1 and TC-2 of the Certified Final Environmental Impact Report. Mitigation measures are subject to refinement by the County and will be finalized through the implementation of a Development Impact Program for the Specific Plan, prepared in conjunction with the Sacramento County Department of Transportation and the County Infrastructure Finance Section.

Thresholds of Significance

Because the project alternatives under consideration would cause traffic impacts on roadways that are under State, County, and City jurisdictions, this analysis was conducted using a combination of policies and guidelines.

Signalized Intersections

Based on the applicable planning documents for each jurisdiction within the study area, a signalized intersection impact is considered significant if the addition of project-generated traffic under the alternatives would cause any of the following:

- A signalized intersection in Sacramento County within the Urban Service Area operating at an acceptable Level of Service (LOS) E or better to degrade to an unacceptable LOS F
- A signalized ramp terminal intersection within Caltrans' jurisdiction operating at an acceptable LOS E or better to degrade to an unacceptable LOS F
- A signalized intersection in Sacramento County outside the Urban Service Area, the City of Sacramento, Sutter County, or Placer County adjacent to Placer Vineyards frontage operating at an acceptable LOS D or better to degrade to an unacceptable LOS E or LOS F
- A signalized intersection in Placer County or the City of Roseville operating at an acceptable LOS C or better to degrade to an unacceptable LOS D, LOS E, or LOS F
- An increase in the average intersection delay of five seconds or more at a signalized intersection operating (or projected to operate) at an unacceptable level

Note that the average delay threshold of significance is consistent with thresholds used in various jurisdictions within California, including but not limited to Sacramento County.

Unsignalized Intersections

Based on the applicable planning documents for each jurisdiction within the study area, an unsignalized intersection impact is considered significant if the addition of project-generated traffic under alternatives would cause any of the following:

- An unsignalized intersection in Sacramento County within the Urban Service Area operating at an acceptable LOS E or better to degrade to an unacceptable LOS F
- An unsignalized ramp terminal intersection within Caltrans' jurisdiction operating at an acceptable LOS E or better to degrade to an unacceptable LOS F
- An unsignalized intersection in Sacramento County outside the Urban Service Area, the City of Sacramento, Sutter County, or Placer County adjacent to Placer Vineyards frontage operating at an acceptable LOS D or better to degrade to an unacceptable LOS E or LOS F
- An unsignalized intersection in Placer County or the City of Roseville operating at an acceptable LOS C or better to degrade to an unacceptable LOS D, LOS E, or LOS F
- An increase of five seconds or more of control delay at an unsignalized intersection operating (or projected to operate) at an unacceptable level

Note that the control delay threshold of significance is consistent with thresholds used in various jurisdictions within California, including but not limited to Sacramento County.

Roadway Segments

Based on the LOS policy in each jurisdiction's General Plan, a roadway segment impact is considered significant if the addition of project-generated traffic under the alternatives would cause any of the following:

- A roadway segment in Sacramento County within the Urban Service Area operating at an acceptable LOS E or better to degrade to an unacceptable LOS F
- A roadway segment in Sacramento County outside the Urban Service Area, the City of Sacramento, Sutter County, or Placer County adjacent to Placer Vineyards frontage operating at an acceptable LOS D or better to degrade to an unacceptable LOS E or LOS F
- A roadway segment in Placer County or the City of Roseville operating at an acceptable LOS C or better to degrade to an unacceptable LOS D, LOS E, or LOS F
- An increase in the volume-to-capacity (V/C) ratio of 0.05 or more on a roadway segment operating (or projected to operate) at an unacceptable level

Note that the V/C ratio threshold of significance is consistent with thresholds used in various jurisdictions within California, including but not limited to Sacramento County.

Freeway Segments

Based on the Caltrans 2010 SR 99 Transportation Corridor Concept Report (TCCR), a freeway-segment impact is considered significant if the addition of project-generated traffic under the alternatives would cause either of the following:

- A freeway mainline segment operating at an acceptable LOS E to deteriorate to an unacceptable LOS F
- An increase of 10 trips or more to a freeway segment that is operating (or projected to operate) at an unacceptable level (volume projections for future conditions are rounded to the nearest 10. Therefore, using this threshold is consistent with the rounding of future forecasts. This threshold is consistent with other studies conducted in the Sacramento region.)

Freeway Ramp Junctions (Merge and Diverge)

Freeway ramp junctions consist of on-ramps (merge point) and off-ramps (diverge point). Based on the SR 99 TCCR (Caltrans, 2010), a freeway ramp merge or diverge impact is considered significant if the addition of project-generated traffic under the alternatives would cause either of the following:

- A freeway ramp merge or diverge junction operating at an acceptable LOS E to deteriorate to an unacceptable LOS F
- An increase of 10 trips or more to a freeway ramp that is operating (or projected to operate) at an unacceptable LOS F (volume projections for future conditions are rounded to the nearest 10; see "Freeway Segments" above.)

Bicycle, Pedestrian, and Transit Facilities

Based on the applicable planning documents for each jurisdiction within the study area, a bicycle, pedestrian, or transit facility impact is considered significant if the alternatives would do any of the following:

- Eliminate or adversely affect an existing bikeway, pedestrian facility, or transit facility in a way that would discourage its use
- Interfere with the implementation of a planned bikeway as shown in the *2010 City/County Bikeway Master Plan* (City of Sacramento and County of Sacramento, 1995), conflict with the *Pedestrian Master Plan* (Sacramento County, 2007), or conflict with any future transit facility
- Result in unsafe conditions for bicyclists or pedestrians.
- Result in demands to transit facilities greater than there is adequate capacity to accommodate

Analysis Methodology

This section describes the methodology used to calculate the LOS for each intersection, roadway segment, and freeway facility.

Intersections

Intersections were analyzed using the methodologies in the *Highway Capacity Manual* (HCM), for signalized and unsignalized intersections (Transportation Research Board, 2000). The HCM methodology estimates the delay experienced by vehicles traveling through the intersection and

determines LOS for varying ranges of delay. Signalized intersection delay is calculated using the Synchro 6.0 software. In addition to delay, Synchro provides queue length estimates for each turning movement. For closely spaced intersections or congested locations, the queue length estimates are used to better understand traffic operating conditions and whether queuing extends between intersections. If this occurs, traffic operations may be worse than reported by conventional analysis techniques that don't consider queuing.

LOS for unsignalized intersections is based on control delay similar to the HCM methodology for signalized intersections. At all-way stop-controlled intersections, LOS is based on the average delay experienced on all approaches. At side-street stop-controlled intersections, LOS is calculated for each movement, not for the intersection as a whole. Specific delay ranges and corresponding LOS thresholds for signalized and unsignalized intersections are presented in **Appendix F.**

To determine whether traffic signals should be installed at an unsignalized intersection, signal warrants are typically reviewed. This consists of reviewing traffic volumes, proximity of the intersection to other signals and to schools, accident frequency, and other factors against a set of warrants identified in the California Manual on Uniform Traffic Control Devices (MUTCD) to identify whether installing a traffic signal would be appropriate (Caltrans, 2012).[1]

Roadway Segments

Roadway segments were analyzed by comparing the average daily traffic volume to daily volume thresholds specific to each jurisdiction in the study area. The use of daily traffic volumes for the analysis of roadway segments is the preferred methodology for the analysis of roadway segment operations. These thresholds are used as guidelines to identify the need for new or upgraded facilities based on daily traffic volumes. The daily volume thresholds for various roadway facility types in Sacramento County, Sutter County, Placer County, and the City of Sacramento are presented in **Appendix F.**

All study roadways are assumed to be arterials with moderate access control. The City of Roseville does not specify daily volume thresholds; therefore, the Placer County thresholds were used to analyze the segments of Baseline Road that run along the Placer County/City of Roseville boarder.

Freeway Facilities

Freeway mainline segments and ramp junctions (merges from on-ramps, and diverges onto off-ramps) were analyzed using HCM procedures. The HCM defines LOS for mainline segments and ramp junctions based on the density of freeway traffic in the ramp junction influence area. Detailed description freeway mainline and ramp junction LOS criteria is presented in **Appendix F.**

[1] Warrants for traffic signal installation at unsignalized intersections were evaluated based on the peak-hour volume warrant, which is a subset of eight traffic-signal warrants recommended in the MUTCD and associated Caltrans guidelines. The peak hour signal warrant analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on field-measured traffic data, and a thorough study of traffic and roadway conditions.

Project Descriptions and Alternatives

In general, all project alternatives except for the No Permit Alternative (Alternative D) have about the same number of dwellings (at different residential densities), with varying amounts of non-residential land use. The No Permit Alternative would entail a much lower level of development, with many fewer dwelling units than the other three alternatives, and no retail space, office space, or schools. See **Appendix F** for comparison of trip-generating land uses for each alternative.

Alternatives A, B and C all propose an internal loop road, which would help to distribute project traffic onto the surrounding facilities. This two-lane roadway would intersect 16th Street, Dry Creek Road, and Elverta Road. Under these alternatives, Dry Creek Road would extend north of U Street to intersect the loop road.

Trip Generation Estimates

The trip generation estimates were developed for each land use type. The estimates were developed by applying the trip rates from *Trip Generation*, 8th Edition (Institute of Transportation Engineers, 2008), then adjusted for internal and pass-by trips. An *internal trip* is one that begins and ends within the project site. A *pass-by trip* occurs when a motorist stops en route to their primary destination (typically occurring at retail-based land uses, like gas stations or grocery stores). Detailed descriptions of internal trips and pass-by trips are presented in **Appendix F**.

For Alternative A, 23 percent of all project trips would be internal to the project site. Approximately 50 percent of retail trip ends, 40 percent of office trip ends, and 80 percent of school trip ends are expected to be internalized. These rates are based on the alternative's land uses, the proximity of comparable land use, and trip purpose. The pass-by reduction is 15 percent in the AM peak hour and 25 percent for Daily and the PM peak hour. The pass-by reduction was applied after the internalization reduction. The net trip generation is developed by subtracting the internal and pass-by trips from the gross trip generation. Trip generation for Alternative A and other alternatives are presented in **Appendix F**.

As shown in **Table 4.14-1**, Alternative A would generate about 54,444 net new vehicle trips per day, with about 4,110 trips during the AM peak hour and about 5,690 trips during the PM peak hour. The estimated trip generation for the other alternatives was developed in the same manner, and is shown in **Table 4.14-2**.

Existing Plus Project Traffic Volumes

The existing plus project traffic volumes were developed by adding the trips generated by each alternative to the existing traffic volumes, based on the expected trip distribution of the alternatives. Each alternative is expected to have the same or similar trip distribution patterns. A figure showing existing plus project trip distribution is presented in **Appendix F**. The trip distribution was developed using a version of the Sacramento Regional Travel Demand Model (SACMET) base year travel demand forecasting (TDF) model that was validated to the existing conditions of this project. The validation process includes evaluating the TDF model based on the

criteria in the *Travel Forecasting Guidelines* (Caltrans, 1992). Refer to **Appendix F** for the validation results.

Regional Impacts

While most of the environmental consequences analyses in **Chapter 4** of this EIS focus on the impacts of developing the initial phase (participating parcels) of the Plan, the analyses of Transportation and Traffic (**Section 4.14**), Air Quality and Global Climate Change (**Section 4.3**), and Noise (**Section 4.12**) are considered more regional and not driven by the specific footprints of the participating parcels. This is because the 404 permit application package for the participating parcels in the Plan area includes an application for the development of the roadway infrastructure that would serve not only the participating parcels, but the entire Plan area. Because the proposed roadway infrastructure would allow for the full buildout of the Plan area, the impact analysis for these more regional resource areas (Air, Noise, and Traffic) evaluate the potential impacts of the full buildout of the Plan area in their specific impact discussions. Thus, Transportation and Traffic (Section 4.14) evaluates the potential impacts of the full buildout of the Plan area.

Cumulative Travel Demand Forecasts

The cumulative no project and cumulative plus alternative traffic volume forecasts were developed using the most recent version of the SACMET regional TDF model, which is based on the Sacramento Area Council of Governments 2035 Metropolitan Transportation Plan (MTP). A complete description of the SACMET model, land use assumptions, and future roadway improvement assumptions used for project-level application is presented in **Appendix F**.

Analysis Results

This section presents the analysis results for the Alternative A scenario. Because the other alternatives, with the exception of the No Permit Alternative, would maintain the same land use totals and vary only by density and location, analysis for the other alternatives are limited to the five intersections and ten roadway segments where variation in traffic flows between alternatives would be most substantial. Because the No Permit Alternative would develop a much lower number of residential dwelling units than the other three alternatives, and no retail space, office space, or schools, analysis for the No Permit Alternative focuses on roadway segments (with a qualitative assessment of intersections). See **Appendix F** for figures and tables showing LOS results at study intersections, roadway segments, and freeway mainline segments under the Existing Plus Project, and Cumulative, scenarios.

TABLE 4.14-1
PROJECT TRIP GENERATION – ALTERNATIVE A

Land Use (ITE Code)	Amount	Daily		AM Peak Hour				PM Peak Hour			
					Trips				Trips		
		Trip Rate [a]	Trips	Trip Rate [a]	Total	In	Out	Trip Rate [a]	Total	In	Out
Single-Family Homes (210)	5,317 units	9.57	50,884	0.75	3,988	997	2,991	1.01	5,370	3,383	1,987
Apartments (220)	873 units	6.65	5,805	0.51	445	89	356	0.62	541	352	189
Retail (820)	233,000 sq. ft.	50.54	11,755	1.09	253	155	99	4.81	1,120	549	571
Office (710)	48,000 sq. ft.	15.79	758	2.17	104	92	13	2.76	133	23	110
School (520)	1,200 students	1.29	1,548	0.45	540	297	243	0.15	180	88	92
	Gross Trip Generation		70,751		5,331	1,629	3,701		7,344	4,395	2,949
	Internalized Trip End Reduction		-14,838		-1,202	-704	-496		-1,514	-708	-806
	Pass-by Trip Reduction		-1,469		-19	-12	-7		-140	-69	-71
	Net Trip Generation		54,444		4,110	914	3,198		5,690	3,618	2,072
	Total Trip Reduction		23%		23%	44%	14%		23%	18%	30%

a Residential and school trips are based on average rates (per dwelling unit and per student), while retail and office trips are based on the best-fit equations (per 1,000 square feet of floor area). Retail and Office land use assumes a floor-to-area ratio (FAR) of 0.30.

SOURCES: RCH Group, February 2010 and Fehr & Peers, 2010, using trip rates published by the Institute of Transportation Engineers, *Trip Generation*. 8th Edition. 2008.

TABLE 4.14-2
COMPARISON OF TRIP GENERATION BY PROJECT ALTERNATIVE

Time Period		Alternative A	Alternative B	Alternative C	Alternative D [a]
AM Peak Hour	In	914	910	918	n/a
	Out	3,198	3,102	3,197	n/a
PM Peak Hour	In	3,618	3,399	3,624	n/a
	Out	2,072	1,937	2,081	n/a
Daily	Total	54,444	51,890	54,621	7,914

a. Because the No Permit Alternative's trip generation is minimal related to the other Project Alternatives, peak-hour trip generation was not deemed necessary for impact determinations at intersections.

SOURCE: Fehr & Peers, 2010.

4.14.1 Alternatives A, B and C

Impact 14.1: Deterioration or Worsening of Existing Roadway Segment LOS

Implementation of these alternatives would increase daily traffic volumes on roadway segments within the study area. Specific locations and LOS results are presented in Appendix F. This impact is considered significant and adverse.

Mitigation Measures

For the following mitigation, measures within Sacramento County are subject to County approval. It should be noted that widening to County Improvement Standards may require the addition of a median, and/or additional turn lanes as part of the mitigation. Except as noted, the cost for identified improvements to Sacramento County roadways shall be entirely the responsibility of the project proponents.

Measure 14.1a: Pay fair-share towards ~~W~~widening Baseline Road from Walerga Road to Cook-Riolo Road from two to four lanes.

Implementation of this improvement would restore operations to LOS A.

Measure 14.1b: Widen Elverta Road from SR 99 to Watt Avenue from two to four lanes.

Implementation of this improvement would restore operations to LOS A between SR 99 and Palladay Road and LOS E from 16th Street to Watt Avenue. The project site frontage is already assumed to be widened.

Measure 14.1c: Widen Watt Avenue from Elverta Road to Don Julio Boulevard from four to six lanes.

Implementation of this improvement would restore operations to LOS D or better.

Measure 14.1d: Widen Dry Creek Road from Ascot Avenue to Elkhorn Boulevard from two to four lanes.

Implementation of this improvement would restore operations to LOS A.

Measure 14.1e: Pay fair-share towards w~~W~~idening Raley Boulevard from I-80 to Ascot Avenue from two to four lanes.

Implementation of this improvement would restore operations to LOS A.

Significance after Mitigation: Significant and adverse.

If implemented, these improvements would reduce effects to less-than-significant for all but one roadway segment (Watt Avenue from Roseville Road to I-80, see **Appendix F**). However, the feasibility of these improvements is uncertain for the following reasons:

- Potential adverse effects associated with acquiring and using necessary right-of-way. These effects could include disruption, displacement, or destruction of businesses, sensitive plants or animal species, as well as increases in impervious surfaces.
- Lack of authority to implement mitigation improvements. The County of Sacramento does not have jurisdiction to make roadway improvements outside its area of governance.
- Inconsistency with the General Plan, requiring a General Plan Amendment (Measures 14.1a and 14.1e).
- Lack of secure funding for improvements beyond the 2035 MTP project list. Funding mechanisms do not currently exist to generate funding beyond the levels projected for the 2035 MTP project list.

The significant effects on Watt Avenue from Roseville Road to I-80 under existing plus project conditions could be mitigated by increasing the roadway capacity. However, these mitigations would be inconsistent with the General Plan, lack a funding source, and may cause further operational deficiencies along the Watt Avenue corridor.

Impact 14.2: Deterioration or Worsening of Existing Intersection LOS

Implementation of these alternatives would increase AM and PM peak hour intersection traffic volumes at intersections within the study area. Specific locations, mitigation measures, and LOS results are presented in **Appendix F**. This impact is considered significant and adverse. Except as noted, the cost for identified improvements to Sacramento County roadways shall be entirely the responsibility of the project proponents.

Mitigation Measures

For the following mitigation, measures within Sacramento County are subject to County approval. It should be noted that widening to County Improvement Standards may require the addition of a median, and/or additional turn lanes as part of the mitigation.

Measure 14.2a: The project proponent shall pay their fair share toward the planned construction of a grade-separated SR 99 / Elverta Road interchange.

Measure 14.2b: Install a traffic signal at SR 99 Northbound Off-Ramp / Elkhorn Boulevard.

Implementation of this improvement would restore operations to LOS D or better in the AM and PM peak hours.

Measure 14.2c: ~~Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane; and a shared through/right-turn lane on each approach at Elverta Road / East Levee Road.~~ Restrict access at the Elverta Road/East Levee Road intersection to right-in/right-out only with side-street stop control on the northbound and southbound approaches (i.e., East Levee Road). This would require construction of a raised median curb on Elverta Road (approximately 50 feet through and west of the Elverta Road/East Levee Road intersection.

Implementation of this improvement would restore operations to acceptable levels in the ~~LOS B or better in the~~ AM and PM peak hours.

Measure 14.2d: Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane, and a shared through/right-turn lane on each approach at Elverta Road / Sorento Road.

Implementation of this improvement would restore operations to LOS B in the AM and PM peak hours.

Measure 14.2e: Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane, and a shared through/right-turn lane on each approach at Elverta Road / Elwyn Road.

Implementation of this improvement would restore operations to LOS B or better in the AM and PM peak hours.

Measure 14.2f: Install a traffic signal; widen eastbound approach to include one through lane, and a shared through/right-turn lane; and widen the westbound approach to include one left-turn lane and two through lanes at Elverta Road / Rio Linda Boulevard.

Implementation of this improvement would restore operations to LOS B or better in the AM and PM peak hours.

Measure 14.2g: Install a traffic signal and install northbound and southbound left-turn lanes at U Street / Dry Creek Road.

Implementation of this improvement would restore operations to LOS B or better in the AM and PM peak hours.

Measure 14.2h: Install a traffic signal and install exclusive left-turn lanes on each approach at Q Street / Dry Creek Road.

Implementation of this improvement would restore operations to LOS D or better in the AM and PM peak hours.

Measure 14.2i: Install a traffic signal; widen the northbound approach to include one left-turn lane, one through lane, and one right-turn lane; widen eastbound approach to include one left-

turn lane, two through lanes, and one right-turn lane; widen southbound approach to include two left-turn lanes and one shared through/right-turn lane; and widen westbound approach to include one left-turn lane, one through lane, and one shared through/right-turn lane at Elverta Road / 16th Street.

Implementation of this improvement would restore operations to LOS E or better in the AM and PM peak hours.[2]

Measure 14.2j: Widen the northbound approach to include one left-turn lane and one right-turn lane; widen the eastbound approach to include two through lanes and one right-turn lane; and widen the westbound approach to include one left-turn lane and two through lanes at Elverta Road / 28th Street.

Implementation of this improvement would restore operations to LOS C or better in the AM and PM peak hours.

Measure 14.2k: Pay fair-share towards o~~O~~ptimizing~~e~~ the traffic signal (reallocate the green time by approach) at Baseline Road / Watt Avenue.

Implementation of this improvement would restore operations to LOS D or better in the AM and PM peak hours.

Measure 14.2l: Install one additional eastbound right-turn lane at Elverta Road / Watt Avenue.

Implementation of this improvement would restore operations to LOS E or better in the AM and PM peak hours.

Significance after Mitigation: Significant and adverse.

If implemented, these improvements would reduce effects to less-than-significant for all intersections; LOS results are presented in **Appendix F**. However, the feasibility of these improvements is uncertain for the following reasons:

- Potential adverse effects associated with acquiring and using necessary right-of-way. These effects could include disruption, displacement, or destruction of businesses, sensitive plants or animal species, as well as increases in impervious surfaces.
- Lack of authority to implement mitigation improvements. The County of Sacramento does not have jurisdiction to make roadway improvements outside its area of governance.
- Lack of secure funding for improvements beyond the 2035 MTP project list. Funding mechanisms do not currently exist to generate funding beyond the levels projected for the 2035 MTP project list.

---

[2] Note: some of these improvements are assumed to be installed as part of the project (see Figure 3.14-9 in **Appendix F**).

Impact 14.3: Deterioration or Worsening of Existing Freeway Mainline, Merge, and Diverge LOS

Implementation of these alternatives would increase AM and PM peak hour traffic volumes on the freeway mainline and ramp merge and diverge junctions within the study area. Specific locations and LOS results are presented in **Appendix F**.

Mitigation Measures

Measure 14.3: Pay fair-share towards w~~W~~idening SR 99 between I-5 and Elkhorn Boulevard to provide one additional lane in each direction.

Implementation of this improvement would restore freeway mainline and ramp merge/diverge operations to LOS D or better in the AM and PM peak hours.

Significance after Mitigation: Significant and adverse.

If implemented, these improvements would reduce effects to less-than-significant for all freeway facilities; LOS results are presented in **Appendix F**. However, the feasibility of these improvements is uncertain for the following reasons:

- Potential adverse effects associated with acquiring and using necessary right-of-way. These effects could include disruption, displacement, or destruction of businesses, sensitive plants or animal species, as well as increases in impervious surfaces.
- Lack of authority to implement mitigation improvements. The County of Sacramento does not have jurisdiction to make roadway improvements outside its area of governance.
- Lack of secure funding for improvements beyond the 2035 MTP project list. Funding mechanisms do not currently exist to generate funding beyond the levels projected for the 2035 MTP project list.

Impact 14.4: Deterioration or Worsening of Cumulative Roadway Segment LOS

Implementation of these alternatives would increase daily traffic volumes on roadway segments within the study area. Specific locations and LOS results are presented in **Appendix F**. This impact is considered significant and adverse. Cost for identified improvements shall be on a fair-share basis.

Mitigation Measures

For the following mitigation, measures within Sacramento County are subject to County approval. It should be noted that widening to County Improvement Standards may require the addition of a median, and/or additional turn lanes as part of the mitigation.

Mitigation Measure 14.4a: Widen Elverta Road from 16th Street to 28th Street from four to six lanes.

Implementation of this improvement would restore operations to LOS B.

Mitigation Measure 14.4b: Widen Watt Avenue from Elverta Road to Antelope Road from four to six lanes.

The roadway would continue to operate at LOS F with implementation of this improvement; however, the V/C ratio would be restored to better than cumulative "no project" levels.

Mitigation Measure 14.4c: Implement Mitigation Measures 14.1d (Widen Dry Creek Road from Ascot Avenue to Elkhorn Boulevard from two to four lanes).

Implementation of this improvement would restore operations to LOS A.

Significance after Mitigation: Significant and adverse.

If implemented, these improvements would reduce the effects to less-than-significant for all but one roadway segment (see **Appendix F**). However, the feasibility of these improvements is uncertain for the following reasons:

- Potential adverse effects associated with acquiring and using necessary right-of-way. These effects could include disruption, displacement, or destruction of businesses, sensitive plants or animal species, as well as increases in impervious surfaces.
- Lack of authority to implement mitigation improvements. The County of Sacramento does not have jurisdiction to make roadway improvements outside its area of governance.
- Inconsistency with the General Plan, requiring a General Plan Amendment (Measure 14.1c).
- Lack of secure funding for improvements beyond the 2035 MTP project list. Funding mechanisms do not currently exist to generate funding beyond the levels projected for the 2035 MTP project list.

The significant effects on Watt Avenue from Elkhorn Boulevard to Don Julio Boulevard under cumulative plus project conditions could be mitigated by increasing the roadway capacity. However, these mitigations would be inconsistent with the General Plan, lack a funding source, and may cause further operational deficiencies along the Watt Avenue corridor.

Impact 14.5: Deterioration or Worsening of Cumulative Intersection LOS

Implementation of these alternatives would increase AM and PM peak hour intersection traffic volumes at intersections within the study area. Specific locations, mitigation measures, and LOS results are presented in **Appendix F**. This impact is considered significant and adverse. Cost for identified improvements shall be on a fair-share basis.

Mitigation Measures

Measure 14.5a: Implement Mitigation Measure 14.2b (Install traffic signal at SR 99 Northbound Off-Ramp / Elkhorn Boulevard) and restripe the northbound approach to include one shared left/right-turn lane and an exclusive right-turn lane at SR 99 Northbound Off-Ramp / Elkhorn Boulevard.

Implementation of this improvement would restore operations to LOS C or better in the AM and PM peak hours.

Measure 14.5b: Implement Mitigation Measure 14.2c (Install a traffic signal and implement lane reconfiguration at Elverta Road / East Levee Road).

Implementation of this improvement would restore operations to LOS C or better in the AM and PM peak hours.

Measure 14.5c: Install a traffic signal at Elkhorn Boulevard / East Levee Road.

Implementation of this improvement would restore operations to LOS B or better in the AM and PM peak hours.

Measure 14.5d: Implement Mitigation Measure 14.2d (Install a traffic signal and implement lane reconfiguration at Elverta Road / Sorento Road).

Implementation of this improvement would restore operations to LOS B in the AM and PM peak hours.

Measure 14.5e: Implement Mitigation Measure 14.2e (Install a traffic signal and implement lane reconfiguration at Elverta Road / Elwyn Road).

Implementation of this improvement would restore operations to LOS E or better in the AM and PM peak hours.

Measure 14.5f: Implement Mitigation Measure 14.2f (Install a traffic signal and implement lane reconfiguration at Elverta Road / Rio Linda Boulevard).

Implementation of this improvement would restore operations to LOS B or better in the AM and PM peak hours.

Measure 14.5g: Install a traffic signal at Elverta Road/9th Street.

Implementation of this improvement would restore operations to LOS B or better in the AM and PM peak hours.

Measure 14.5h: Implement Mitigation Measure 14.2h (Install a traffic signal and install exclusive left-turn lanes on each approach at Q Street / Dry Creek Road).

Implementation of this improvement would restore operations to LOS C or better in the AM and PM peak hours.

Measure 14.5i: Optimize the traffic signal (reallocate the green time by approach) at Elverta Road / 28th Street.

Implementation of this improvement would restore operations to LOS E or better in the AM and PM peak hours.

Measure 14.5j: Subject to County approval, install right-turn overlap traffic signal phase for eastbound and westbound approaches at Elverta Road / Watt Avenue.

Implementation of this improvement would restore operations to better than "no project" conditions in the AM and PM peak hours.

Significance after Mitigation: Significant and adverse.

If implemented, these improvements would reduce effects to less-than-significant for all intersections; LOS results are presented in **Appendix F**. However, the feasibility of these improvements is uncertain for the following reasons:

- Potential adverse effects associated with acquiring and using necessary right-of-way. These effects could include disruption, displacement, or destruction of businesses, sensitive plants or animal species, as well as increases in impervious surfaces.
- Lack of authority to implement mitigation improvements. The County of Sacramento does not have jurisdiction to make roadway improvements outside its area of governance.
- Lack of secure funding for improvements beyond the 2035 MTP project list. Funding mechanisms do not currently exist to generate funding beyond the levels projected for the 2035 MTP project list.

Impact 14.6: Deterioration or Worsening of Cumulative Freeway Mainline, Merge, and Diverge LOS

Implementation of these alternatives would increase AM and PM peak hour traffic volumes on the freeway mainline and ramp merge and diverge junctions within the study area. Specific locations and LOS results are presented in **Appendix F**. This impact is considered significant and adverse. Cost for identified improvements shall be on a fair-share basis.

Mitigation Measures

Measure 14.6a: Implement Mitigation Measure 14.3 (widen SR 99 between I-5 and Elkhorn Boulevard to provide one additional lane in each direction).

Implementation of this improvement would restore freeway mainline and ramp merge/diverge operations to LOS D or better in the AM and PM peak hours.

Measure 14.6b: Widen SR 99 between Elkhorn Boulevard and Elverta Road to provide one additional lane in each direction.

Implementation of this improvement would restore freeway mainline and ramp merge/diverge operations to LOS D or better in the AM and PM peak hours.

Measure 14.6c: Widen SR 99 mainline between Elverta Road and Riego Road to provide one additional lane in each direction.

Implementation of this improvement would restore freeway mainline and ramp merge/diverge operations to LOS D or better in the AM and PM peak hours.

Significance after Mitigation: Significant and adverse.

If implemented, these improvements would reduce effects to less-than-significant for all freeway facilities; LOS results are presented in **Appendix F**. However, the feasibility of these improvements is uncertain for the following reasons:

- Potential adverse effects associated with acquiring and using necessary right-of-way. These effects could include disruption, displacement, or destruction of businesses, sensitive plants or animal species, as well as increases in impervious surfaces.
- Lack of authority to implement mitigation improvements. The County of Sacramento does not have jurisdiction to make roadway improvements outside its area of governance.
- Lack of secure funding for improvements beyond the 2035 MTP project list. Funding mechanisms do not currently exist to generate funding beyond the levels projected for the 2035 MTP project list.

Impact 14.7: Increased Demand for Public Transit

These alternatives would increase demand for public transit under existing and cumulative conditions. As development occurs, the alternatives would generate demand for transit service, especially commuter service to/from the project site and employment centers like downtown Sacramento, McClellan Park, and Roseville. A portion of the fees collected through the Sacramento *County Transportation Development Fee Program* (Sacramento County, 2010) are used for expanding service to new developments. Therefore, payment of the impact fee would address the increase in transit demand. However, there are no planned transit facilities or amenities within the project site. Currently, one route (Route 19) serves the project site, with a stop on Elverta Road. This impact is considered significant and adverse.

Mitigation Measures

Measure 14.7: The project proponent shall work with Sacramento County and Regional Transit (RT) to upgrade the existing transit stop and provide additional facilities, if warranted. Transit facilities would be developed by RT through coordination with Sacramento County.

Significance after Mitigation: Less than significant.

Impact 14.8: Increased Demand for Non-Motorized Travel

These alternatives would increase demand for bicycle and pedestrian facilities under existing and cumulative conditions. As discussed in **Chapter 2**, these alternatives would include Class II

(striped) and Class III (designate routes) bicycle facilities along major roadways. The impact would be less than significant.

4.14.2 Alternative D – No Permit Alternative

Implementation of the No Permit Alternative would cause the following significant adverse effects on the transportation system. Refer to **Appendix F** for technical calculations.

Impact 14.1: Deterioration or Worsening of Existing Roadway Segment LOS

Implementation of Alternative D would increase daily traffic volumes on roadway segments within the study area. LOS would be unacceptable in comparison to existing conditions along several roadways. See **Appendix F** for LOS results. This impact is considered significant and adverse.

Development of the project site would help to fund future traffic improvements through development fees and property tax revenues. Needed improvements under Alternative D would include the following (numbered measures are the same as Alternatives A, B and C):

- **Measure 14.1a:** Widen Baseline Road from Walerga Road to Cook-Riolo Road from two to four lanes.
- **Measure 14.1c:** Widen Watt Avenue from Elverta Road to Don Julio Boulevard from four to six lanes.
- **Measure 14.1e:** Widen Raley Boulevard from I-80 to Ascot Avenue from two to four lanes.
- Widen Elverta Road from E. Levee Road to Watt Avenue from two to four lanes.
- Widen 16th Street from Elverta Road to the County line from two to six lanes.

These improvements would reduce impacts to less than significant; however, the feasibility of is uncertain as discussed for Alternatives A through C. These effects could remain significant and adverse if mitigation is found infeasible.

Impact 14.2: Deterioration or Worsening of Existing Intersection LOS

Implementation of Alternative D would increase AM and PM peak hour intersection traffic volumes at intersections within the study area. The LOS would be unacceptable in comparison to existing conditions at several intersections. See **Appendix F** for LOS results. This impact is considered significant and adverse.

Development of the project site would help to fund future traffic improvements through development fees and property tax revenues. Needed improvements under Alternative D would include the following (numbered measures are the same as Alternatives A, B and C):

- **Measure 14.2a:** The project proponent shall pay their fair share toward the planned construction of a grade-separated SR 99 / Elverta Road interchange.

- **Measure 14.2b:** Install a traffic signal at SR 99 Northbound Off-Ramp / Elkhorn Boulevard.

- **Measure 14.2c:** Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane; and a shared through/right-turn lane on each approach at Elverta Road / East Levee Road.

- **Measure 14.2d:** Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane, and a shared through/right-turn lane on each approach at Elverta Road / Sorento Road.

- **Measure 14.2e:** Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane, and a shared through/right-turn lane on each approach at Elverta Road / Elwyn Road.

- **Measure 14.2f:** Install a traffic signal; widen eastbound approach to include one through lane, and a shared through/right-turn lane; and widen the westbound approach to include one left-turn lane and two through lanes at Elverta Road / Rio Linda Boulevard.

- **Measure 14.2h:** Install a traffic signal and install exclusive left-turn lanes on each approach at Q Street / Dry Creek Road.

- **Measure 14.2j:** Widen the northbound approach to include one left-turn lane and one right-turn lane; widen the eastbound approach to include two through lanes and one right-turn lane; and widen the westbound approach to include one left-turn lane and two through lanes at Elverta Road / 28th Street.

- **Measure 14.2k:** Optimize the traffic signal (reallocate the green time by approach) at Baseline Road / Watt Avenue.

- **Measure 14.2l:** Install one additional eastbound right-turn lane at Elverta Road / Watt Avenue.

- At the Elverta Road / 16th Street intersection, widen the eastbound approach to include two additional left-turn lanes (three total). Widen the southbound approach to include one additional left-turn lane (two total) and an exclusive right-turn lane with overlap phasing. Widen the westbound approach to include two exclusive right-turn lanes with overlap phasing.

- At the U Street / 16th Street intersection, install a traffic signal with exclusive left-turn lanes on each approach and an exclusive right-turn lane on the southbound approach.

If implemented, these improvements would reduce impact to less than significant; however, the feasibility of these improvements is uncertain as discussed for Alternatives A through C. These effects could remain significant and adverse if mitigation is found infeasible.

Impact 14.3: Deterioration or Worsening of Existing Freeway Mainline, Merge, and Diverge LOS

Implementation of Alternative D would increase AM and PM peak hour traffic volumes on the freeway mainline and ramp merge and diverge junctions within the study area. See **Appendix F** for specific locations and LOS results. This impact is considered significant and adverse.

Development of the project site would help to fund future traffic improvements through development fees and property tax revenues. Needed improvements under Alternative D would include the following (numbered measures are the same as Alternatives A, B and C):

- **Measure 14.3:** Widen SR 99 between I-5 and Elkhorn Boulevard to provide one additional lane in each direction.

This improvement would reduce freeway facility impacts to less than significant; however, the feasibility of this improvement is uncertain as discussed for Alternatives A through C. These effects could remain significant and adverse if mitigation is found infeasible.

Impact 14.4: Deterioration or Worsening of Cumulative Roadway Segment LOS

Implementation of Alternative D would increase daily traffic volumes on roadway segments within the study area. Specific locations and LOS results are presented in **Appendix F**.

Development of the project site would help to fund future traffic improvements through development fees and property tax revenues. Needed improvements under Alternative D would include the following (numbered measures are the same as Alternatives A, B and C):

- **Mitigation Measure 14.4b:** Widen Watt Avenue from Elverta Road to Antelope Road from four to six lanes.
- **Mitigation Measure 14.4c:** Widen Dry Creek Road from Ascot Avenue to Elkhorn Boulevard from two to four lanes.
- Widen Watt Avenue from PFE Road to Black Eagle Drive from two to four lanes
- Widen 16th Street from Elverta Road to the County Line from two to four lanes.

Implementation of the identified improvements would reduce impacts to less than significant; however, the feasibility of this improvement is uncertain as discussed for Alternatives A through C. These effects could remain significant and adverse if mitigation is found infeasible.

Impact 14.5: Deterioration or Worsening of Cumulative Intersection LOS

Implementation of Alternative D would cause an increase in AM and PM peak hour intersection traffic volumes at intersections within the study area. Specific locations and LOS results are presented in **Appendix F**. This impact is considered significant and adverse.

Development of the project site would help to fund future traffic improvements through development fees and property tax revenues. Needed improvements under Alternative D would include the following (numbered measures are the same as Alternatives A, B and C):

- **Measure 14.5a:** Implement Mitigation measure 14.2b (Install traffic signal at SR 99 Northbound Off-Ramp / Elkhorn Boulevard) and restripe the northbound approach to include one shared left/right-turn lane and an exclusive right-turn lane at SR 99 Northbound Off-Ramp / Elkhorn Boulevard.
- **Measure 14.5b:** Implement Mitigation Measure 14.2c (Install a traffic signal and implement lane reconfiguration at Elverta Road / East Levee Road).
- **Measure 14.5c:** Install a traffic signal at Elkhorn Boulevard / East Levee Road.
- **Measure 14.5d:** Implement Mitigation Measure 14.2d (Install a traffic signal and implement lane reconfiguration at Elverta Road / Sorento Road).
- **Measure 14.5e:** Implement Mitigation Measure 14.2e (Install a traffic signal and implement lane reconfiguration at Elverta Road / Elwyn Road).
- **Measure 14.5f:** Implement Mitigation Measure 14.2f (Install a traffic signal and implement lane reconfiguration at Elverta Road / Rio Linda Boulevard).
- **Measure 14.5g:** Install a traffic signal at Elverta Road/9th Street.
- **Measure 14.5h:** Implement Mitigation Measure 14.2h (Install a traffic signal and install exclusive left-turn lanes on each approach at Q Street / Dry Creek Road).
- **Measure 14.5i:** Optimize the traffic signal (reallocate the green time by approach) at Elverta Road / 28th Street.
- **Measure 14.5j:** Subject to County approval, install right-turn overlap traffic signal phase for eastbound and westbound approaches at Elverta Road / Watt Avenue.
- At the Elverta Road / 16th Street intersection, install an exclusive westbound right-turn lane.
- At the U Street / 16th Street intersection, install an exclusive southbound right-turn lane.

If implemented, these improvements would reduce impact to less than significant for all intersections; however, the feasibility of these improvements is uncertain as discussed for Alternatives A through C. These effects could remain significant and adverse if mitigation is found infeasible.

Impact 14.6: Deterioration or Worsening of Cumulative Freeway Mainline, Merge, and Diverge LOS

Implementation of Alternative D would increase AM and PM peak hour traffic volumes on the freeway mainline and ramp merge and diverge junctions within the study area. Specific locations and LOS results are presented in Appendix F. This impact is considered significant and adverse.

Development of the project site would help to fund future traffic improvements through development fees and property tax revenues. Widening of SR 99 between I-5 and Riego Road, to provide one additional lane in each direction, would reduce impacts to less than significant for all freeway facilities; however, the feasibility of this improvement is uncertain as discussed for Alternatives A through C. These effects could remain significant and adverse if mitigation is found infeasible.

Impact 14.7: Increased Demand for Public Transit

Alternative D would increase demand for public transit under existing and cumulative conditions. As development occurs, Alternative D would generate demand for transit service, especially commuter service to/from the project site and employment centers like downtown Sacramento, McClellan Park, and Roseville. A portion of the fees collected through the *Sacramento County Transportation Development Fee Program* (Sacramento County, 2010) are used for expanding service to new developments, like Alternative D. Therefore, payment of the impact fee would address the alternative's increase in transit demand. Due to the reduced intensity under this alternative, the existing Route 19 stop on Elverta Road would likely be sufficient for residential demand and impacts to transit would be less than significant.

Impact 14.8: Increased Demand for Non-Motorized Travel

Alternative D would increase demand for bicycle and pedestrian facilities under existing and cumulative conditions. The impact would be less than significant.

4.14.3 References

California Department of Transportation (Caltrans), 1992. *Travel Forecasting Guidelines*, 1992.

California Department of Transportation (Caltrans), 2010. *State Route 99 Transportation Corridor Concept Report*, August 2010.

California Department of Transportation (Caltrans), 2012. *California Manual on Uniform Traffic Control Devices* (MUTCD), Part 4 (Traffic Signals), January 2012.

Institute of Transportation Engineers (ITE), 2008. *Trip Generation*, 8th Edition, 2008.

Sacramento Area Council of Governments (SACOG), 2008. *Metropolitan Transportation Plan 2035*, 2008.

Sacramento City/County, 1995. 2010 Sacramento City/County Bikeway Master Plan, April 11, 1995.

Sacramento County, 2007. Sacramento County Pedestrian Master Plan Draft Environmental Impact Report. Sacramento County Department of Environmental Review and Assessment, July 2007.

Sacramento County, 2010. Sacramento County Transportation Development Fee Program, March 2010.

Transportation Research Board, 2000. *Highway Capacity Manual (HCM).* United States National Research Council, Transportation Research Board, 2000.

4.15 Indirect Effects

The Council on Environmental Quality Regulations for Implementing NEPA define indirect effects as effects "which are caused by the action and are later in time or farther removed in the distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8(b)). **Section 4.15.1** assesses the potential for growth-inducing effects caused by the alternatives. **Section 4.15.2** assesses effects caused by off-site utility and traffic improvements. Many indirect and off-site effects are also analyzed in **Sections 4.2** through **4.14**, such as indirect effects related to off-site pollutant discharges and downstream resources, and other effects that may occur further from the project site or later in time.

4.15.1 Growth-Inducing Effects

Alternatives A, B and C

Growth-inducing effects are a subset of indirect effects. A growth-inducing effect is an effect which fosters (or removes a barrier to) economic or population growth. An example of direct growth inducement would be the construction of new housing. Examples of indirect growth inducement include establishing substantial new permanent employment opportunities and removing obstacles to population growth (e.g., the expansion or improvement of utilities which allows for more growth within the service area, such as a new water supply or additional wastewater conveyance and treatment capacity). Growth inducement itself is not an environmental effect, but it could lead to physical environmental effects such as increased demand on public services and infrastructure, increased traffic and noise, degradation of air or water quality, or degradation or loss of special-status species habitat over time.

Direct Growth

Alternatives A, B and C include the development of new residential and commercial uses. These uses are included within the project description for Alternatives A, B and C and thus the environmental effects are evaluated in **Sections 4.2** through **4.14**. For example, the traffic generated from development of new residential and commercial uses is directly evaluated in **Section 4.14**.

Indirect Growth from New Employment Opportunities

Alternatives A, B and C would create new employment opportunities which could result in additional commercial demand, but not additional housing demand. As discussed for Alternative A, B and C in **Section 4.7**, the following factors would reduce housing demands from these new jobs: employment of the local labor force; development of approximately 6,190 dwelling units under Alternatives A, B or C; development of proposed housing elsewhere in Sacramento County; and available vacant housing in Sacramento County and neighboring counties. Given these factors, Alternatives A, B or C is not anticipated to increase jobs to the extent that would create significant new housing demand within Sacramento County. Indirect growth from new employment opportunities is discussed in **Section 4.7**.

Alternative D

~~*Direct Growth*~~

Direct environmental effects of Alternative D are discussed in **Sections 4.2** through **4.14**. As identified in **Section 4.7**, Alternative D would generate fewer direct, indirect and induced jobs than Alternatives A, B and C. Alternative D does not provide new employment opportunities which could indirectly induce growth.

4.15.2 Other Indirect Effects

Alternatives A, B and C

Under Alternatives A, B and C modifications, extensions and expansions of roadway and utility infrastructure would occur both within and outside of the Plan area. **Chapter ~~2~~4.0** describes ~~those that would occur on-site~~ the impacts of developing the participating parcels (and associated roadways and infrastructure to serve the participating parcels) within the Plan area. Outside of the Plan area, roadway and wastewater infrastructure improvements are anticipated which could result in indirect effects. Water and drainage improvements to serve the participating parcels in the near-term would be limited to the project site as discussed in **Chapter 2.0**. There are currently electric and natural gas lines which serve the Plan area from existing easements and thus it is assumed that no major off-site infrastructure for electric or natural gas service would be required. The project may require upgrades to existing energy facilities which would be located in previously disturbed/developed easements or rights-of-way.

Traffic mitigation, which includes the proposed widening of some off-site roadways, is discussed in **Sections 4.14** and **4.16**. Proposed off-site traffic mitigation is summarized in **Table 4.15-1**. ~~These off-site roadway improvements may lead to indirect effects.~~

Wastewater infrastructure would include internal trunk sewer systems and a sewer pump station located at the southwest corner of the Plan area (Dry Creek Road and U Street). Wastewater would then be conveyed west from the pump station through a new off-site force main aligned within the right-of-way of U Street until it intersects the Sacramento Northern Railroad right-of-way (now Sacramento County trail right-of-way). The force main would then travel south, following the regional trail corridor alignment until Elkhorn Boulevard. At Elkhorn Boulevard the force main would connect to the existing Upper Northwest Interceptor. An alternative interim force main alignment has been investigated which would convey wastewater from the project site directly south within the Dry Creek Road right-of-way to the Northwest Interceptor at Elkhorn Boulevard.

For both roadway and wastewater improvements, impacts are assessed at a program level as final project-level detail for off-site improvements is not available.

TABLE 4.15-1
PROPOSED TRAFFIC MITIGATION – ALTERNATIVES A, B AND C

Traffic Mitigation Measures (Section 4.14)
Measure 14.1a: Pay fair-share towards ~~W~~widening Baseline Road from Walerga Road to Cook-Riolo Road from two to four lanes.
Measure 14.1b: Widen Elverta Road from SR 99 to Watt Avenue from two to four lanes.
Measure 14.1c: Widen Watt Avenue from Elverta Road to Don Julio Road from four to six lanes.
Measure 14.1d: Widen Dry Creek Road from Ascot Avenue to Elkhorn Boulevard from two to four lanes.
Measure 14.1e: Pay fair-share towards w~~W~~idening Raley Boulevard from I-80 to Ascot Avenue from two to four lanes.
Measure 14.2a: The project proponent shall pay their fair share toward the planned construction of a grade-separated SR 99 / Elverta Road interchange.
Measure 14.2b: Install a traffic signal at SR 99 Northbound Off-Ramp / Elkhorn Boulevard.
Measure 14.2c: ~~Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane; and a shared through/right-turn lane on each approach at Elverta Road / East Levee Road.~~ Restrict access at the Elverta Road/East Levee Road intersection to right-in/right-out only with side-street stop control on the northbound and southbound approaches (i.e., East Levee Road). This would require construction of a raised median curb on Elverta Road (approximately 50 feet through and west of the Elverta Road/East Levee Road intersection.
Measure 14.2d: Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane, and a shared through/right-turn lane on each approach at Elverta Road / Sorento Road.
Measure 14.2e: Install a traffic signal; install northbound and southbound left-turn lanes; and widen the eastbound and westbound approaches to include one left-turn lane, one through lane, and a shared through/right-turn lane on each approach at Elverta Road / Elwyn Road.
Measure 14.2f: Install a traffic signal; widen eastbound approach to include one through lane, and a shared through/right-turn lane; and widen the westbound approach to include one left-turn lane and two through lanes at Elverta Road / Rio Linda Boulevard.
Measure 14.2g: Install a traffic signal and install northbound and southbound left-turn lanes at U Street / Dry Creek Road.
Measure 14.2h: Install a traffic signal and install exclusive left-turn lanes on each approach at Q Street / Dry Creek Road.
Measure 14.2i: Install a traffic signal; widen the northbound approach to include one left-turn lane, one through lane, and one right-turn lane; widen eastbound approach to include one left-turn lane, two through lanes, and one right-turn lane; widen southbound approach to include one left-turn lane and one shared through/right-turn lane; and widen westbound approach to include one left-turn lane, one through lane, and one shared through/right-turn lane at Elverta Road / 16th Street.
Measure 14.2j: Widen the northbound approach to include one left-turn lane and one right-turn lane; widen the eastbound approach to include two through lanes and one right-turn lane; and widen the westbound approach to include one left-turn lane and two through lanes at Elverta Road / 28th Street.
Measure 14.2k: Pay fair-share towards o~~O~~ptimizing~~e~~ the traffic signal (reallocate the green time by approach) at Baseline Road / Watt Avenue.
Measure 14.2l: Install one additional eastbound right-turn lane at Elverta Road / Watt Avenue.
Measure 14.3: Pay fair-share towards w~~W~~idening SR 99 between I-5 and Elkhorn Boulevard to provide one additional lane in each direction.
Measure 14.4a: Widen Elverta Road from 16th Street to 28th Street from four to six lanes.
Measure 14.4b: Widen Watt Avenue from Elverta Road to Antelope Road from four to six lanes.
Measure 14.5a: Restripe the northbound approach to include one shared left/right-turn lane and an exclusive right-turn lane at SR 99 Northbound Off-Ramp / Elkhorn Boulevard.
Measure 14.5c: Install a traffic signal at Elkhorn Boulevard / East Levee Road.
Measure 14.5g: Install a traffic signal at Elverta Road/9th Street.
Measure 14.5i: Optimize the traffic signal (reallocate the green time by approach) at Elverta Road / 28th Street.
Measure 14.5j: Install right-turn overlap traffic signal phase for eastbound and westbound approaches at Elverta Road / Watt Avenue.
Measure 14.6b: Widen SR 99 between Elkhorn Boulevard and Elverta Road to provide one additional lane in each direction.
Measure 14.6c: Widen SR 99 mainline between Elverta Road and Riego Road to provide one additional lane in each direction.

Geology, Soils and Mineral Resources

The construction of off-site roadway and utility improvements would require grading and the introduction of fill material to extend existing shoulders and roadbed. Earthwork could result in erosion of soils. Sacramento County Code 16.44 requires private construction sites disturbing one or more acres or moving 350 cubic yards or more of earthen material to obtain a grading permit; the grading permit requires preparation and approval of an Erosion and Sediment Control Plan. In accordance with the Clean Water Act, construction of roadway and utility projects over one acre in area would be required to comply with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit program including preparation of a Stormwater Pollution Prevention Plan (SWPPP) that would include soil erosion and sediment control practices to reduce the extent of exposed soil, prevent runoff from flowing across disturbed areas, slow runoff from the site, and remove sediment from any runoff. With standard construction practices and specifications required by the NPDES Construction General Permit program, construction of roads and utility lines are not expected to result in significant, adverse impacts to these resources.

Hydrology, Flooding and Water Quality

The development of off-site roadway and utility improvements could affect water resources due to grading and construction activities and an increase in impervious surfaces. Potential effects include an increase in surface runoff and increased erosion that could adversely affect surface water quality due to increases in sediment and roadway pollutants such as grease and oil. As discussed above, a SWPPP would be developed to comply with the NPDES General Construction Permit Program, which includes soil erosion and sediment control practices. Drainage features along the modified roadways would be sized to accommodate increased runoff. With the incorporation of best management practices (BMPs) identified in the SWPPP, for construction projects resulting in over one acre of disturbance, effects to water resources would be less than significant.

Air Quality and Global Climate Change

Development and modification of off-site roadway and utility infrastructure would result in similar temporary, construction impacts as discussed in **Section 4.3**. Similar BMPs would be utilized to reduce construction impacts. Proposed roadway development and modifications would reduce congestion and improve traffic flow. This would reduce emissions from the idling vehicles at these intersections and roadway segments resulting in improved conditions. These impacts are therefore considered to be less than significant.

Biological Resources and Aquatic Resources

As discussed in **Section 4.4**, biological resources may be indirectly affected by development activities through the introduction of non-native invasive plant species, decreases in water quality due to erosion or sedimentation, changes in surface or subsurface hydrology, and an increase in human disturbance. Potential indirect effects to vernal pool habitats under Alternatives A, B and C are summarized in **Tables 4.4-1** and **4.4-3**. Potential indirect effects to other special-status species, including raptors, valley elderberry longhorn beetle, western spadefoot, western pond turtle, and protected tree species are also evaluated in **Section 4.4**.

Construction of Alternatives A, B and C would include the establishment of riparian and wetland habitats within the proposed Drainage Corridors. Habitats within the proposed Drainage Corridors may be indirectly affected by surrounding land uses if not carefully managed. This includes the need for a Wetland Management Plan to include measures to actively manage for the control of noxious weeds, feral animals, storm water quality, and unauthorized access.

To address potential indirect effects to sensitive habitats and species, **Section 4.4** includes a number of mitigation measures that would result in the avoidance or reduction of the magnitude of the above effects. With the implementation of these mitigation measures, indirect effects associated with onsite activities implementing Alternative A, B or C would be less than significant.

Off-site roadway and infrastructure modifications may affect aquatic resources; however proposed roadway and wastewater improvements are generally located in developed and/or disturbed right-of-ways. For off-site features the Six County Aquatic Resources Inventory (SCARI)[1] was reviewed to assess impacts at the program level to potential aquatic resources. The primary aquatic feature in the vicinity of wastewater and roadway improvements are narrow stream channels which cross under existing roadways. It is assumed with engineering that these features could be avoided.

The off-site wastewater force main if located within the Sacramento County trail right-of-way should be designed to avoid a potential wetland east of the trail and south of Elverta Rail Way. This could be achieved by aligning the force main west of the trail or further east to avoid this feature. As the force main crosses the Dry Creek flood bypass and adjacent floodplains it may veer outside of the trail alignment to cross the flood bypass and floodplain parallel and adjacent to trail bridges.

Roadway improvements were reviewed for potential to affect resources identified by SCARI and would avoid these potential resources with the exception of Measure 14.4a which involves widening Elverta Road from 16th to 28th Street from four to six lanes. This measure would affect on-site features which is analyzed under buildout conditions in the cumulative effects analysis. Outside of the Plan area there is a potential vernal pool feature located south of Elverta Road and approximately 200 feet west of Bellingrath Drive which could be indirectly or directly affected by roadway expansion. Alternatives A, B and C would provide a fair share contribution to this improvement and thus it should be noted that the project proponent would not be solely responsible for implementation of this measure.

~~habitats similar to those found on site, including vernal pools and other wetlands.~~ These improvements would be subject to environmental review under local ordinances, including the California Environmental Quality Act (CEQA), and/or additional permitting actions by the USACE and other resource agencies. Project-level impacts would be evaluated during these future reviews.

[1] Sacramento Area Council of Governments, 2011. Six County Aquatic Resources Inventory. Available online at: http://mapping.sacog.org/scari/. Note that the Six County Aquatic Resources Inventory is not a Wetland Delineation or Jurisdictional Determination. Off-site improvements would be subject to further evaluation at the project level.

Cultural Resources

Development and modification of off-site roadways and utility infrastructure has the potential to disturb previously undiscovered cultural resources. Impacts within the project site are discussed in **Section 4.6**. Similar impacts could occur off-site. Due to prior grading of existing roadways and disturbance within right-of-ways it is likely that resources remaining in these areas are highly disturbed and lack integrity, thus diminishing the significance of the remaining resources. The lead agency under any CEQA review for off-site projects would be required to mitigate potential impacts to a less than significant level or to issue a finding of fact and statement of overriding considerations of significant and adverse impacts could not be mitigated. Mitigation may include the avoidance of resources, the preservation of a key historical feature, or the removal, documentation, and curation of cultural resources.

Land Use and Agriculture

Off-site roadway and infrastructure development and modifications would typically occur within the existing right-of-ways; however small additional land acquisitions may be required adjacent to existing right-of-way. As existing uses are setback from the road, the acquisition of peripheral pieces of property is not anticipated to change existing land uses or substantially affect agricultural land or operations and thus is less than significant.

Public Services, Utilities and Recreation

Development and modification of off-site roadways and utility infrastructure could create temporary service disruptions to existing utility customers. These effects are common when upgrading and maintaining utility services, and would be temporary. Emergency access for police and fire services on roadways would be maintained throughout the construction period, and impacts would be less than significant.

Noise

Noise from development and modification of off-site roadways and utility infrastructure would be temporary and consistent with the Sacramento County Code (Chapter 6.68 Noise Control). Therefore, impacts would be less than significant.

Hazards and Hazardous Materials

Development and modification of off-site roadway and utility infrastructure could include potential hazards similar to other constructions sites. Transport of fuels would be minimized with adherence to standard operating procedures, such as refueling in designated areas, storing hazardous materials in approved containers, and clearing dried vegetation. Such procedures are commonly required by local agencies as part of a permit review and/or CEQA review for roadway and utility improvements; thus significant, adverse impacts are not anticipated.

No indirect effects related to offsite roadway and utilities improvements are expected for socioeconomic conditions, environmental justice or aesthetics.

Alternative D

Under Alternative D it is not anticipated that there would be any indirect impacts from the development or modification of offsite roadway and utility infrastructure, as existing infrastructure would be used for serving the project site.

This page intentionally left blank

4.16 Cumulative Effects

4.16.1 Methodology

The cumulative effects analysis broadens the scope of analysis to include effects beyond those directly attributable to the implementation of the Applicant's Preferred Alternative and other alternatives. Cumulative effects are defined as the effects "…on the environment which result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7). The purpose of cumulative effects analysis, as stated by the Council on Environmental Quality "is to ensure that federal decisions consider the full range of consequences" (1997).

The cumulative analysis begins with defining the geographic border(s) and time frame(s) of the analysis. Secondly, the cumulative environment is described in terms of expected growth as well as past, present and future actions and projects that may affect the status of the resources, ecosystems, and human communities within the defined geographic border and time frame.

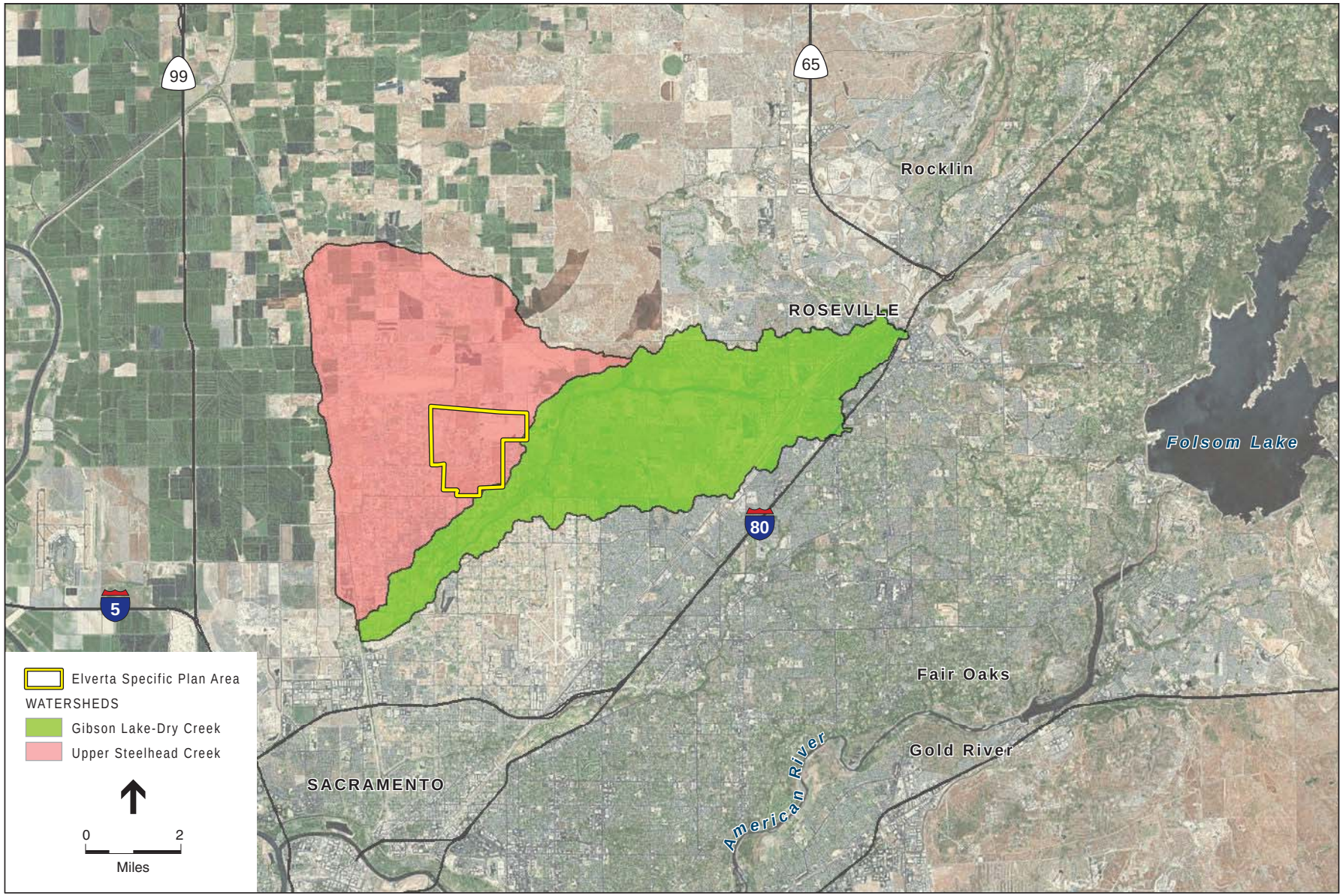
As described in Chapter 1, full buildout of the Plan Area is evaluated as a cumulative impact (i.e., future projects) for most resources, except for those evaluations that are dependent on the proposed regional roadway system for the Plan Area, including evaluations for Transportation and Traffic (Section 4.14), Air Quality and Global Climate Change (Section 4.3), and Noise (Section 4.12). For these resource areas, the potential impacts of the full buildout under each alternative are described in their corresponding resource discussions, and any additional, regional projects that would cumulatively contribute towards these effects are evaluated here. In addition, it is assumed that any future buildout in the plan area that requires a Section 404 permit would be potentially subject to the same mitigation measures described for each resource section.

Geographic Boundary

The geographic area for the cumulative analysis varies depending upon the environmental issue and the geographic extent of the potential impact. For example, the geographic area associated with construction noise impacts would be limited to areas directly affected by construction noise, whereas the geographic area that could be affected by construction-related air emissions would include a larger area. The general geographic scope for the cumulative analysis is north-central Sacramento County. Areas of southern Placer County and Sutter County were also considered as discussed under "Cumulative Projects", below. The scope of biological, aquatic and hydrologic issues is the multi-watershed area shown in **Figure 4.16-1**.

Time Frame

In addition to the geographic scope, cumulative impacts are determined by the timing of other related projects. The time frame of the cumulative effects analysis extends to 2035. Long-range planning data from the Sacramento Area Council of Governments (SACOG) is available within this time frame. Beyond this planning horizon, information on growth patterns and future



SOURCE: NHD, 2009; Bing Maps, 2009; and ESA, 2011

Elverta Specific Plan EIS . 207431

Figure 4.16-1

Watersheds in the Vicinity of the Project Area

activities becomes scarce and uncertainties increase, limiting the usefulness of a more extended analysis. The projects described below may fluctuate due to schedule changes of other unknown factors.

Cumulative Projects

The cumulative scenario includes buildout assumptions within the SACOG Metropolitan Plan 2035 and Sacramento County General Plan. Planning assumptions in the Sutter County Plan and Placer County Plan were also considered as the project site is located along the northern boundary of Sacramento County. Placer County is located adjacent to the northern boundary of the project site and Sutter County is located approximately 2 miles northwest of the project site.

For the purposes of this discussion, projects that may contribute to cumulative effects are referred as the "cumulative projects." A large number of past projects have been developed within the cumulative study area. These include a landfill, single-family homes, and agricultural land uses.

Current and future projects which are relevant to the cumulative discussion are identified in **Table 4.16-1**.

TABLE 4.16-1
PROPOSED AND LOCALLY APPROVED PROJECTS

Project Name	Description	Acreage Total	Residential Units	Jurisdiction/Status
Rio Linda/Elverta Community Plan	Community Plan	1,820±	4,500	Sacramento County
East Antelope Specific Plan	Community Plan	673±	1,655	Sacramento County
Placer Vineyard Specific Plan	Specific Plan	5,230±	14,132	Placer County
Dry Creek-West Placer Community Plan	Community Plan	9,200±	4,215 to 5,479	Placer County
Sutter Pointe Specific Plan	Specific Plan	7,525±	17,500	Sutter County

SOURCE: Sacramento County, 2010.

The Natomas Joint Vision area includes over 18,000 acres west of the project site is in the initial planning stages for future development. The Natomas Joint Vision area does not have an adopted plan for development and thus it is assumed that this area would not be built out within the cumulative time frame.

4.16.2 Cumulative Analysis - Alternatives A, B and C

Aesthetics

Alternatives A, B and C would result in a change of the project site from primarily rural, undeveloped, and agricultural land to built-out urban land uses. With the development of nearby areas, including the Placer Vineyard Specific Plan area, conversion of rural land uses would

occur. When considered along with previous, current and planned urban development in Sacramento County and Placer County, Alternatives A, B and C would result in a cumulatively considerable contribution to degradation of visual character and new light and glare effects.

Air Quality and Global Climate Change

Any project that would individually have a significant, adverse impact on air quality would also be considered to have a cumulatively significant, adverse impact. The geographic scope for air quality impacts would be the Sacramento Valley Air Basin. Activities associated with development of the Elverta Specific Plan would result in increased air emissions of ROG, NO_x, and PM10, PM2.5 and CO. Emissions of ROG and NO_x (ozone precursors) would exceed the SMAQMD thresholds for these pollutants. Thus, Alternative A, B and C, in conjunction with other planned development, would result in a cumulatively considerable contributions to long-term increases in emissions of ozone precursors. Incorporation of Mitigation Measure 3.3 would reduce operational emissions, but impacts would remain cumulatively considerable. Regional planning for foreseeable projects has been incorporated into the current ozone planning efforts including the 2009 Sacramento Metropolitan Area 8-hour Ozone Attainment and Reasonable Further Progress Plan (SMAQMD et al., 2008). The Elverta Specific Plan area was included in the Sacramento County General Plan and the Metropolitan Transportation Plan and thus project emissions were accounted for along with cumulative projects in the basin. Thus, while the project exceeds emissions thresholds it is consistent with current plans to meet ozone attainment levels which in the long-term provides strategies for emissions reductions.

Although overall GHG impacts are global in scope, as discussed in **Section 4.3**, impacts associated with GHG emissions from Alternatives A, B and C are considered to be cumulatively significant and adverse. Incorporation of Mitigation Measures 3.3, 3.7a, and 3.7b would reduce GHG emissions, but emissions would remain cumulatively significant and adverse after mitigation.

Biological Resources

Areas considered within the cumulative environment for biological resources include those watersheds discussed previously (**Figure 4.16-1**). As described in **Section 4.5**, Alternatives A, B and C would directly affect federally-listed species, including vernal pool fairy shrimp and vernal pool tadpole shrimp, through the loss of suitable habitat. These species would also be indirectly affected by Alternatives A, B and C through potential adverse effects to surface water quality, introduction of exotic species, and an increase in human presence and activities within the project site.

Full build out of the Plan Area under Alternatives A, B, and C would result in additional losses of vernal pool crustacean habitat as well as habitat for Swainson's hawk, western spadefoot, western pond turtle, and special status plant species. It is conservatively assumed based on the buildout land use plan for Alternatives A and C, that these alternatives would impact all annual grassland and aquatic resources within the Elverta Specific Plan area; this includes approximately 1,358 acres of grasslands, 21 acres of vernal pools, 39 acres of wetland swales, 13 acres of seasonal wetlands, and 14 acres of ponds, ditches, and streams. Alternative B would impact less annual grassland and wetland habitats (including approximately 6 fewer acres of vernal pool habitat) due to the inclusion of habitat "avoidance areas" within the Plan area.

Of ~~the~~ all the habitats found on the project site, the cumulative loss of vernal pool habitat is considered the most significant, followed by the other wetland habitat types (swales, seasonal wetlands, and channels). The cumulative loss of vernal pool habitat in the region has been well documented (AECOM, 2009; USFWS, 2005). It is estimated that 75% to 90% of the historic California vernal pool habitat has been lost. Losses are primarily due to land development and agricultural practices; other factors contributing to their decline include invasive species, degradation of storm water quality, and unauthorized dumping and off-road vehicle use. All of these threats are present within the region, and cumulatively have had an adverse impact on these species and habitats, contributing towards their decline. Of the specific projects considered in **Table 4.16-1**, only the Placer Vineyard Specific Plan and Sutter Pointe Specific Plan have determined impacts to vernal pool habitat. The Placer Vineyard Specific Plan would result in direct impacts to approximately 63 acres of vernal pool habitat and indirect impacts to 22 acres. Proposed mitigation includes 170 acres of preservation for direct and indirect impacts (a 2:1 preservation to impact ratio) and 63 acres of creation/restoration for direct impacts (a 1:1 creation/restoration to impact ratio). The Sutter Pointe Specific Plan does not propose to affect vernal pool habitat with the exception of minor impacts from off-site infrastructure; however, these effects have not been quantified.

To address this cumulative loss, most of the current and planned projects in the region (as listed in Table 4.16-1) include varying levels of compensatory mitigation for impacts to vernal pool habitats. Mitigation typically includes a mix of on-site preservation and on- and off-site creation and/or restoration. While there is mitigation planned to compensate for the loss of vernal pool acreage with constructed vernal pools, two major concerns remain: that off-site constructed pools may not fully replace the habitat functions of the original vernal pools, and that, even if the habitat functions were being replaced, the vernal pool complexes may still become degraded. Thus, even with mitigation, the cumulative loss of habitat for vernal pool species that would occur under Alternative A, B or C is cumulatively considerable. Currently both Placer County and Sacramento County are proposing habitat conservation plans which are still in draft form. There is the potential that both of these plans could provide mitigation strategies for the proposed development projects within the region; however, the Project is outside both plan boundaries.

Alternatives A, B and C include the development of Drainage Corridors that would contain a variety of wetland types. The amount of wetland habitat that would be developed under full buildout of the Plan area under Alternative A is summarized in **Table 4.16-2.**

TABLE 4.16-2
WETLAND CREATION AND ENHANCEMENT UNDER ALTERNATIVE A

Habitat Type	Acres[1]
Open Water (Riverine)	9.94
Seasonal Freshwater Marsh	9.99
Seasonal Wetland	20.04
Total	**39.97**

1. Totals are approximate and subject to rounding.
SOURCE: Barnett Environmental, 2011.

In addition to the above jurisdictional waters that would be created or enhanced, an additional 100.78 acres of non-jurisdictional seasonal wetland, riparian, grassland, and oak woodland habitat would be created in the Plan area under Alternative A. Seasonal wetlands and riparian habitat created areas may also be classified as jurisdictional post-construction, but were not classified so in this plan due to the uncertainty of post construction soils and hydrologic parameters. When totaled, this habitat creation would offset some of the impacts related to losses of potential nesting habitat for birds and aquatic habitat for amphibians and reptiles.

While specific acreages of wetland creation have not been calculated for Alternatives B or C, each would also include some level of wetland creation combined with riparian and upland habitat creation. Alternative B would include up to 300 acres of wetland and upland habitat creation and enhancement, while Alternative C would include approximately 100 acres of habitat creation and enhancement. Neither of these alternatives proposes the enhancement, restoration, or creation of vernal pool habitats; rather, created and enhanced habitats would be similar to that described for Alternative A.

As noted above, no vernal pool habitat would be created within the proposed Drainage Corridors. Therefore Alternatives A, B and C would result in a cumulatively considerable contribution towards the loss of vernal pool habitat in the region. Implementation of the mitigation measures listed in **Section 4.4**, including providing for the off-site compensation of vernal pool habitat, would reduce these cumulative effects. However, there are a lack of approved mitigation banks and lack of available land for restoration/creation/preservation opportunities. Additionally, it will take time to improve habitat conditions within conservation areas through enhancement activities. ~~For example, there are no available vernal pool creation credits within Sacramento County.~~ There are several regional conservation, preservation, and mitigation banks which have been approved by the USFWS and/or the Corps. These include, but are not limited to, the Clay Station Mitigation Bank (56.0 acres vernal pool preservation credits available), the Van Vleck Ranch Mitigation Bank (7.2 acres vernal pool preservation and 1.1 acres vernal pool creation credits available), Toad Hill Ranch Mitigation Bank (1.4 acres vernal pool preservation and 4.5 acres vernal pool creation credits available) and the Locust Road Mitigation Bank (4.6 acres vernal pool creation credits available) (USACE, 2015). All banks are approved to sell vernal pool credits and authorized to sell Corps wetland mitigation credits. The project is in the service area of the proposed 300+ Deer Creek Mitigation Bank in Sacramento County, which is in the entitlement process for vernal pool creation credits and wetland credits. There are potential opportunities on 646 acres at the proposed Apple Road Mitigation Property ~~Bank~~ in Sacramento County (approximately 26.1 acres for vernal pool preservation and 4.5 acres for vernal pool creation) or the Markham Ravine Property in Placer County (approximately 36 acres for vernal pool creation); however , these ~~this~~ banks have~~has~~ not been approved to sell credits by USFWS (Hemmen, pers. comm., 2015~~2012~~).

Loss of vernal pool habitat from implementation of the project alternatives in combination with projected losses from past, present and reasonably foreseeable future projects constitute a cumulatively substantial reduction in vernal pool habitat in the region. In addition, cumulative development would result in the conversion of large, open habitat landscapes to smaller patches of habitat surrounded by urban development, which would make vernal pool habitat more vulnerable to the effect of habitat fragmentation and other indirect impacts (degradation of water quality, hydrologic alterations, and reduction of habitat functions of on-site wetlands and downstream wetlands). Therefore, the

cumulative loss of vernal pool habitat that would occur under Alternatives A, B or C would remain cumulatively significant and adverse.

Aquatic Resources

Areas considered within the cumulative environment for aquatic resources include those watersheds discussed previously (Figure 4.16-1). Full buildout of Alternatives A, B and C would result in the direct loss of wetlands and other waters of the U.S. as summarized in **Table 4.16-3**. Alternative D would not contribute towards the cumulative loss of aquatic resources.

TABLE 4.16-3
EFFECTS TO WATERS OF THE U.S. UNDER FULL BUILDOUT- ALTERNATIVES A, B AND C

Alternative	Type of Jurisdictional Feature	Acres Affected
A and C	Channel	0.61
	Ditch	1.37
	Pond	14.00
	Seasonal Wetland	13.07
	Vernal Pool	20.50
	Wetland Swale	38.6
	Total	**88.21**
B	Channel	0.61
	Ditch	1.27
	Pond	14.00
	Seasonal Wetland	12.67
	Vernal Pool	14.40
	Wetland Swale	26.70
	Total	**69.04**

SOURCE: SOURCE: ESA, 2011; Barnett Environmental, 2011.

As described for biological resources, the cumulative loss of vernal pools and other wetland types in the region has been well documented. Most of the past, present, and planned projects in the region (as listed in **Table 4.16-1**) include varying levels of compensatory mitigation for wetland loss. Mitigation typically includes a mix of on-site preservation and on- and off-site creation. Typical compensation ratios approximate 2:1 preservation and 1:1 creation, but some include only preservation or creation, while others propose lesser preservation and more creation (or vice versa). While individual projects are required to mitigate for losses it is anticipated that there would be a net loss of wetland function within the project site watersheds due to lack of mitigation opportunities and available mitigation banks within the project site watersheds. Additional impacts would result from roadway and infrastructure improvements related to cumulative development. Of the specific projects considered in **Table 4.16-1**, only the Placer Vineyard Specific Plan and Sutter Pointe Specific Plan have determined impacts to aquatic resources. The Placer Vineyard Specific Plan would result in direct impacts to approximately 89 acres of wetlands and other waters. Proposed mitigation includes 89 acres of creation/restoration for direct impacts (a 1:1 creation/restoration to impact ratio). The Sutter Pointe Specific Plan does not propose to affect jurisdictional waters of the

U.S. with the exception of minor impacts from off-site infrastructure; however, these effects have not been quantified. The aquatic features on site were determined to be non-jurisdictional based on the delineation which was pending verification.

As described previously, Alternatives A, B and C would include the creation of wetland habitats within the Plan Area as depicted in the Conceptual Habitat Development Plan (Appendix K). However, even with this wetland creation and the mitigations measures included in Section 4.5, implementation of Alternatives A, B or C would contribute to the cumulative loss of wetlands and other waters of the U.S. in the region, as it will take time to improve the function and services of features within the proposed Drainage Corridors through enhancement and creation activities and the proposed Drainage Corridors may not satisfy compensation requirements for full buildout. For cumulative development there are mitigation banks with available Corps-approved credits, including the Cosumnes Floodplain Mitigation Bank which has approximately 200 credits for wetlands (Hemmen, pers comm. 20152012). The project site is within the bank's service area but is located in different watersheds.

Considering the proposed buildout area of the cumulative projects, it may not be possible to fully mitigate the loss of habitat functions and services provided by the aquatic habitats that would be lost in the project site watersheds. Therefore, the loss of aquatic resources that would occur under Alternatives A, B or C would remain cumulatively significant and adverse when combined with the effects of past, present and reasonably foreseeable future projects in the region.

Cultural and Historic Resources

No historic or prehistoric cultural resources were located during archival review or the survey of the project site. However, continued development throughout the geographic boundary runs the inherent risk of damaging or destroying previously unknown significant archaeological resources that could potentially yield information important in our history or prehistory. Mitigation measures as specified in **Section 4.6** would ensure that direct effects to cultural and historic properties are less than significant under Alternatives A, B and C. In addition, other developments within the region would be required to implement similar measures, including compliance with the National Historic Preservation Act of 1966 and its requirements to consult with and/or notify the State Historic Preservation Officer (SHPO), compliance with CEQA, and applicable City and County historic preservation guidance. Accordingly, no significant cumulative impacts to cultural resources are expected under Alternatives A, B or C.

Socioeconomics and Environmental Justice

As discussed in **Section 4.8**, Alternatives A, B and C would provide new economic opportunities which would have fiscally beneficial effects within the County. In addition, the increased population associated with Alternatives A, B, and C would be consistent with planned growth assumptions and would not increase housing demand in Sacramento County. There are no identified minority or low-income populations in the project site vicinity which would be affected. For these reasons, Alternatives A, B and C would not result in cumulatively significant and adverse impacts with respect to socioeconomic conditions or environmental justice, and may contribute towards beneficial socioeconomic effects.

Geology, Soils and Mineral Resources

Development of the Alternatives A, B, or C would not contribute to cumulative impacts related to geology, soils and mineral resources. Other development proposed in the project area would be subject to the same types of geology, soils, and mineral resource impacts as the project. However, these types of impacts represent hazards to people and property on a site-specific basis. For example, liquefaction potential at two separate developments does not result in a greater combined impact than the individual impacts do separately. Consequently, there is little, if any, cumulative relationship between the development of the project and past, present or anticipated future development. Therefore, there would be no cumulative effects related to geology, soils and mineral resources. This is considered a less-than-significant impact for all Alternatives.

Hazards and Hazardous Materials

Under cumulative conditions, implementation of Alternative A, B or C in conjunction with other planned development is not anticipated to present a public health and safety hazard. Health and safety impacts associated with past or current uses of a project site are site-specific and usually occur on a project-by-project basis, rather than in a cumulative nature. Alternatives A, B and C include mitigation measures in **Section 4.9** that reduce potential site-specific hazards and hazardous materials impacts to less-than-significant levels.

Alternatives A, B and C would involve the storage, use, disposal, and transport of hazardous materials to varying degrees during demolition, site preparation, construction, and operation. Impacts related to these activities are considered less than significant under Alternatives A, B and C because the storage, use, disposal, and transport of hazardous materials are extensively regulated by various federal, state, and local agencies, and it is assumed that other current and planned projects would comply with existing hazardous materials regulations. Therefore, Alternatives A, B or C would not contribute to cumulatively significant and adverse hazardous materials storage and transport impacts.

Other projects in the buildout of the Plan area would have site specific hazardous materials mitigations from the 2007 Elverta Specific Plan Area EIR. There include mitigations for any development on the former Monroe Landfill property (APN 202-0070-024) and in the vicinity of the former landfill (2007 EIR Mitigation Measures LA-4, LA-5, and LA-6). The buildout of the Plan area would also include hazardous materials mitigation measures related to soil testing (and appropriate remediation if unacceptable contamination is detected) for the development of parcels that historically supported livestock and orchards (2007 EIR Mitigation Measure TX-2). The buildout of the Plan area would also include mitigation for demolition activities (2007 EIR Mitigation Measure TX-3); mitigation for proper destruction of water supply wells, septic tanks, leach lines and cisterns (2007 EIR Mitigation Measure TX-4); and mitigation for further evaluation of potential hazardous material contamination (2007 EIR Mitigation Measures TS-5 and TX-6).

The buildout of the Plan area, in addition to the participating parcels would not result in any additional cumulative adverse impacts from hazards or hazardous materials.

Hydrology, Flooding and Water Quality

Examples of potential cumulative effects related to hydrology include increased erosion and sedimentation, increased pollution, and increased stormwater flows. The area considered for this assessment includes two watersheds: Upper Steelhead Creek and Gibson Lake-Dry Creek (**Figure 4.16-1**).

Stormwater discharges from residential areas are of concern in managing surface water quality. Pollutants that accumulate in the dry summer months such as oil and grease, fertilizers, pesticides, and herbicides create water quality problems due to their presence in elevated concentrations, especially during the first major autumn storm event (first flush). Alternatives A, B, or C have the potential to contribute to cumulative impacts to downstream waterways, including the Sacramento River, which eventually drains into the Sacramento-San Joaquin Delta. The waterways within the Plan area are not included on the CVRWQCB's 303(d) list of impaired water bodies. However, nearby downstream waterways included on the 303(d) list include the Natomas East Main Drainage Canal (NEMDC), into which the flows from the Plan area drain, which is listed for polychlorinated biphenyls (PCBs). Additionally, the Sacramento River, at the point where the NEMDC discharges into the Sacramento River, is listed for several water quality constituents, including chlordane (agricultural source), chlorpyrifos (unknown source), DDT (agricultural source), diazinon (unknown source), dieldrin (agricultural source), diuron (unknown source), mercury (resource extraction), PCBs (unknown source), and unknown toxicity (unknown source) (CVRWQCB 2010).

As discussed in **Section 4.10**, various mitigation measures and BMPs would be employed in order to minimize water quality emissions of Alternatives A, B, or C. No suite of BMPs and mitigation measures however, is completely effective in preventing stormwater quality impacts. Therefore, some minor degree of increase in stormwater pollution is anticipated, resulting in minor increases in sediment loading, as well as construction period emissions of oil and grease, habitation period residential herbicides and pesticides, increased nutrients associated with residential use of fertilizers, and other water quality pollutants. However, the release of these water quality pollutants from the Plan area would not contribute to existing water quality impairments for PCBs, chlordane, chlorpyrifos, DDT, diazinon, dieldrin, diuron, mercury, or PCBs, because these chemicals are either currently banned or limited to agricultural use, and because the Plan area is not anticipated to contain high levels of mercury. Other potential pollutants that could be released on site would not contribute to an existing impairment.

A watershed's runoff characteristics are altered when impervious surfaces replace natural cover. Changes in the quantity of runoff may increase stream volumes, increase stream velocities, increase peak discharges, and shorten the time to peak flows. Alternatives A, B, or C could contribute to changes in runoff characteristics (volume, velocity, and hydrograph) and water quality located near the project site as a result of development. However, the proposed LID and BMP design features, combined with the proposed multi-use drainage corridors, and other proposed features and mitigation, would offset potential deleterious changes in hydrology with respect to timing and volume of peak flows, stormwater volumes, and stream velocities.

New development can also result in the alteration of waterways and floodplain encroachment and, as a result, exacerbate flooding and flood control issues. When the flood-related effects of many projects are considered together, upstream floodplain encroachment or other substantial changes to flood flowpaths can result in increased or altered flooding conditions downstream. Alternatives A and C would be subject to mitigation requirements discussed in **Section 4.10** for direct impacts, in addition to Sacramento County regulations regarding the placement of fill in a floodplain. Therefore, while some small amount of residual change to flood flows could occur under cumulative conditions, when all projects are considered together under cumulative conditions, these changes are unlikely to result in a considerable change to flood flows downstream. Alternative B would avoid floodplain encroachment altogether.

As discussed for direct impacts to flooding, installation of any housing or commercial buildings within an area that is currently located within a 100-year floodplain would require removal of the areas where development would occur from the 100-year floodplain. This process would include completion of physical modifications to the floodplain, as proposed by the project, followed by acquisition of a Letter of Map Revision (LOMR) from FEMA, indicating that the areas in question had been removed from the floodplain and therefore that construction in these areas could meet applicable requirements for the National Flood Insurance Program, in accordance with County requirements. Therefore, installation of proposed housing or other facilities on non-participating parcels where floodplains are currently located would not contribute to a potential cumulative increase in flooding.

Climate change is expected to alter water resources availability and the characteristics of winter storm events across Northern California, including the Project area, as discussed by the California Climate Action Team Report (California EPA, 2006). Estimates vary somewhat depending on which climate model is used, and precipitation is predicted to increase or decrease slightly. Increased temperatures would also lead to a rise in sea level, from both thermal expansion and the melting of land-based glaciers. However, the Plan area is not located in a coastal region, and would not be affected by sea level rise.

Models indicate that the form in which precipitation occurs could change substantially due to climate change. Warmer winters would lead to less snow and more rain. As a result, the Sierra snowpack would be reduced and would melt earlier. Changes in Sierra snowpack would not directly affect waterways on site, because the onsite waterways originate locally. Watersheds considered in the cumulative analysis could also experience an increased frequency and/or intensity of major storm events, including flood events. However, as discussed above, Alternatives A, B, or C would not contribute meaningfully to flooding on site or downstream. While climate change could potentially exacerbate regional flooding, implementation of Alternatives A, B, or C, considered alongside other proposed development projects, would not further exacerbate the effects of climate change on the region.

Therefore, when considered in coordination with the anticipated projects considered for the cumulative analysis, Alternatives A, B, or C are not expected to result in a cumulatively considerable impact

on hydrologic resources, including hydrology, water quality, flooding, or climate change related effects on hydrologic resources.

Land Use and Agriculture

Land Use

As discussed in **Section 4.11**, full buildout of the project site is generally consistent with the adopted Sacramento County General Plan and Rio Linda/Elverta Community Plan (RLECP) including long-term goals for residential and commercial uses, and infrastructure. Buildout includes agricultural residential on the northern portion of the project site to buffer agricultural uses in Placer County. Off-site projects would be required to be consistent with the applicable General Plan or require amendments to the General Plan, which would require approval by the local jurisdiction. Thus, Alternatives A, B and C along with other planned developments are not anticipated to conflict with existing or proposed land uses or create disorderly development.

Most of the project site is located within the overflight zone of McClellan Airport. The residential, commercial and office uses envisioned are consistent with the Comprehensive Airport Land Use Plan. Buildout assumes development of school facilities within the overflight zone. Any proposed elementary school site within the overflight zone and also within two miles of an airport runway must satisfy the requirements of Section 17215 of the California Education Code. Section 17215 requires consultation between the school district, the Department of Education and the Department of Transportation to determine the suitability of such site for development with a school use.

As buildout along with cumulative projects would be consistent with planning documents, or require approvals through amendment processes, Alternatives A, B and C would not result in cumulatively considerable land use impacts.

Agriculture

The project site does not include any Prime farmlands, Farmlands of Statewide Importance or Williamson Act lands (areas where non-agricultural development is generally discouraged). As such, Alternatives A, B and C would not contribute to cumulatively considerable agriculture impacts.

Noise

Cumulative noise source impacts would be limited to traffic. The significance of project-related noise impacts can be determined by comparing estimated cumulative project-related noise levels to cumulative no-project noise levels. An increase of at least 3 dBA is usually required before most people will perceive a change in noise levels, and an increase of 5 dBA is required before the change will be clearly noticeable. A common practice has been to assume that minimally perceptible to clearly noticeable increases of 3–5 dB represent a significant increase in ambient noise levels. **Table 4.16-4** shows the cumulative difference between the 2035 without the project and 2035 with the project. No road segment would produce a change of more than 3 dBA. Cumulative traffic impacts would therefore, be considered less than significant.

TABLE 4.16-4
CUMULATIVE SUMMARY OF ROAD SEGMENTS

	2035 + Alternative – 2035 no project (dBA)			
Road Segment	**Alt. A**	**Alt. B**	**Alt. C**	**Alt. D**
Elverta from SR 99 to E. Levee Road	0.6	0.5	0.6	0.6
Elverta from E. Levee Road to Palladay Road	0.8	0.8	0.8	0.7
Elverta from Palladay Road to 16th St.	1.7	1.7	1.7	0.7
Elverta from 16th St. to 28th St.	1.5	1.5	1.5	0.3
Elverta from 28th St. to Watt Avenue	1.1	1.1	1.1	0.2
U St. from Dry Creek Road to 16th St.	-2.7	-2.4	-2.4	0.3
9th St. from Elverta Road to U St.	2.1	1.8	2.1	0.5
Dry Creek Road from Q St. to U St.	2.4	2.4	2.5	0.1
16th St. from Q St. to Elverta Road	0.0	0.0	0.1	0.5
16th St. from Elverta to County Line	1.2	1.1	1.1	1.8

SOURCE: ESA, 2010

Public Services, Utilities and Recreation

The supply of water service at buildout of the system is addressed in the RLECP Update Final EIR, the RL/ECWD, and Cal-Am Water Supply Assessments, and the DERA EIR. As discussed in **Section 4.13**, the project site is within a water service area which would have a demand at buildout between 23,420 acre-feet per year (AF/yr) and 25,960 AF/yr. Any new large scale development would contribute cumulatively to an incremental decline in groundwater levels; however adequate groundwater supplies exist in the area to serve planned growth; thus, Alternatives A, B, or C would not contribute to a significant impact to water supply in the cumulative scenario.

Wastewater service at buildout is addressed in Sacramento County Regional Sewer District's Interceptor System Master Plan (2000). The Master Plan identifies that the project site would be served by the Upper Northwest Interceptor, for which timing is uncertain. Also wastewater demand at buildout is anticipated to exceed the capacity of the existing Sacramento Regional Wastewater Treatment Plant. The proposed 2020 Master Plan for the SRWTP anticipates an expanded capacity of 218 MGD which could serve development in the long-term; however, the Master Plan has not yet been approved due to litigation (Sacramento County, 2010). With Mitigation Measure 4.13-1 the project would coordinate with SASD and SRCSD to ensure that adequate wastewater service could be provided without exceeding the capacity of wastewater infrastructure and treatment facilities. As future development would also be required to prepare design-level studies to ensure adequate wastewater service, the cumulative impact would be less than significant. However, additional regional wastewater treatment facilities would need to be developed to provide service to all development envisioned under buildout.

As discussed in **Section 4.13**, the Kiefer Landfill is anticipated to have capacity to serve future development in Sacramento County until 2035 or later. The contribution from Alternatives A, B, or C represents a small percentage of the landfill's daily capacity, which is considered less than significant.

Electricity and natural gas are supplied in accordance with approved tariffs with the California Public Utilities Commission, typically on a first-come, first-serve basis. Further coordination with SMUD and PG&E would be required to ensure that adequate service could be provided to the cumulative developments without affecting existing customers. The contribution from Alternatives A, B, or C to cumulative energy demands is considered less-than-significant.

Cumulative development would contribute a fair share to funding public services including law enforcement services, fire protection services, schools and parks through development impact/mitigation fees and increased collection of property and sales tax from new development. Additionally, some proposed developments would include sites for new public facilities such as fire stations or schools. The specific plan project would contribute through the addition of two elementary schools and parkland/recreation areas. With increased revenue for public services and the development of facilities within planned development the cumulative impact to these public services would be less than significant.

Transportation and Traffic

As described in **Section 4.14**, Alternatives A, B, and C would increase daily and peak-hour traffic volumes, resulting in a significant and unavoidable and cumulatively considerable contribution to level of service degradation at various roadway segments, intersections, freeway mainline and merge/diverge ramps in the Plan area. Detailed analyses are provided in **Section 4.14** and **Appendix F**.

4.16.3 Cumulative Analysis for Alternative D

Unless described otherwise above, it is assumed that future development within the Plan Area under the No Permit Alternative would be consistent with existing land use plans and policies and meet the legal obligations related to environmental protection. As development under this alternative would only include low-density residential that avoids wetland fill, the No Permit Alternative is not anticipated to have cumulative effects to the majority of environmental resource areas discussed above. However, as discussed in **Section 4.3**, since future residential development can generate substantial GHG and other emissions, future development under the No Permit Alternative would contribute towards significant and adverse cumulative impacts to air quality.

4.16.4 References

Hemmen, pers. comm., 2015. Phone conversation between Travis Hemmen (Westervelt) and Jen Wade (ESA) regarding available mitigation banking credits. July 13, 2015.

USACE, 2015. RIBITS (Regulatory In lieu fee and Bank Information Tracking System). Accessed July 14, 2015.

4.17 Required Disclosures

4.17.1 Irreversible and Irretrievable Commitment of Resources

NEPA requires that an environmental analysis include identification of "…any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented" (42 USC §4332). Such irreversible and irretrievable commitments are related to the use of nonrenewable resources and the effects that this use could have on future generations. Irreversible effects result primarily from the use or destruction of a specific resource (e.g., energy an474d minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural resource).

There are several resources, both natural and built, that would be expended in the construction and operation of Alternative A, B, C or D. These resources include the building materials used in construction; energy in the form of natural gas, petroleum products, and electricity consumed during construction and operation of housing and commercial land uses; and the human effort required to develop and construct various components of the development. These resources are considered irretrievably committed because their use for some other purpose than the alternatives considered in the EIS would be impossible or highly unlikely.

Development of Alternative A, B, C or D constitutes an irreversible and irretrievable commitment of the participating parcels as a land resource, thereby rendering use for other purposes infeasible. Alternatives A, B, C and D represent a permanent change of land use. Such decisions are considered irreversible when their implementation would affect a resource that has deteriorated to the point that renewal can occur only over a long period of time or at great expense, or because they would cause the resource to be destroyed or removed. The losses to habitat for vernal pool species and other aquatic habitat under Alternatives A, B and C would be irreversible. For aquatic habitat this would be minimized to some extent by proposed drainage corridors for Alternatives A, B and C. For Alternative B, losses to vernal pool species and other aquatic habitat would be minimized to some extent by the designation of the avoided, open space area in the southeast corner of the project site. While Alternative D would expend natural and build resources, there would be no USACE action. This alternative avoids direct impacts to habitat for vernal pool species and other aquatic habitat, but would result in impacts to grassland habitat used by several special-status species.

4.17.2 Significant and Unavoidable Effects

Even with implementation of proposed mitigation, Alternatives A, B and C would result in significant and unavoidable impacts related to the following:

- Degradation of Visual Character (Construction and Operation)
- Effects from Operational Emissions with Respect to SMAQMD Criteria
- Deterioration or Worsening of Existing Roadway Segment LOS
- Deterioration or Worsening of Existing Intersection LOS
- Deterioration or Worsening of Existing Freeway Mainline, Merge and Diverge LOS

Even with implementation of proposed mitigation, Alternatives A, B and C and D would result in cumulatively considerable impacts related to the following:

- Degradation of Visual Character and Light and Glare Effects
- Effects from Operational Emissions with Respect to SMAQMD Criteria
- Loss of Habitat for Vernal Pool Species
- Loss of Aquatic Resources
- Greenhouse Gas Emissions and Global Climate Change
- Deterioration or Worsening of Cumulative Roadway Segment LOS
- Deterioration or Worsening of Cumulative Intersection LOS
- Deterioration or Worsening of Cumulative Freeway Mainline, Merge, and Diverge LOS

4.17.3 Relationship between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

NEPA requires consideration of the relationship between short-term uses of the environment and long-term productivity associated with federal actions (42 USC §4332). This comparison is generally interpreted to recognize that a short-term (temporary) use of the environment may enable the advancement of long-term community needs. For example, construction of a school would negatively affect traffic and air quality in the short-term, but would fulfill a long-term community need to provide adequate educational facilities for its residents. A community might be willing to accept this trade-off.

4.17.3.1 Short-Term Uses

Implementation of Alternative A, B or C would result in temporary and short-term construction-related impacts. Temporary and short-term construction impacts would be associated predominantly with water quality, traffic, air quality emissions, and noise. The project proponent would implement mitigation measures identified in each resource section to reduce these impacts

to a less-than-significant level wherever feasible. At the same time, however, construction of Alternative A, B or C would create economic benefits during construction, in the form of jobs and the subsequent direct and indirect demand for goods and services.

4.17.3.2 Long-Term Uses

Implementation of Alternative A, B or C would fulfill a long-term need for regional housing, but would also result in long-term impacts related to increased air quality emissions, increased traffic, and a change to the existing visual character. Cumulatively, the project would also contribute to the loss of habitat for vernal pool species, the loss of aquatic resources and greenhouse gas emissions. Therefore, while the provision of housing would fulfill a long-term community need, the negative impacts to the environment would also be long-term.

This page intentionally left blank

CHAPTER 5.0
Consultation, Coordination and List of Preparers

5.1 Public Involvement

This section describes the public involvement activities that have occurred during the development of this document.

On Tuesday, June 9, 2009, the USACE published a Notice of Intent (NOI) in the Federal Register to prepare an EIS for the Elverta Specific Plan Project. The NOI provided information on the Proposed Project Alternative and EIS preparation, submitting scoping comments, and attending scoping meetings. The USACE also issued a public notice in the *Sacramento Bee* newspaper on June 20, 2009, which included the same information found in the NOI. Additionally, subsequent to the public scoping meeting, the *North Country News* (a local Rio Linda monthly periodical) published an article discussing the project and public scoping meeting and providing information on public commenting.

On June 24, the USACE held a public scoping meeting at the Rio Linda Elverta Community Center in Rio Linda to solicit input on the preparation of the EIS. The meeting was held from 4:00 p.m. to 7:00 p.m. Comments were accepted during both scoping meetings and throughout the comment period, which ended on June 29, 2009. Fifteen written comments were received during the scoping period from Federal, state, and local agencies and the general public in addition to verbal comments. Refer to Appendix B for a summary of the meeting materials and comments provided during scoping.

The key comments submitted during the scoping period were: the protection of aquatic resources, including wetlands; the protection of vernal pool grasslands and endangered species habitat; the scoping process and public involvement; the project description; air quality; alternatives screening criteria and alternatives selection process; and floodplain management building requirements.

The Draft EIS was distributed for public review and comment, and a Notice of Availability (NOA) to review and comment was issued for a 45-day public review period on December 21, 2012. On January 16, 2013 the USACE held a public meeting on the Draft EIS at the Rio Linda Elverta Community Center in Rio Linda, California to receive comments on the Draft EIS. This Final EIS provides comments received on the Draft EIS and responses to substantive comments on the Draft EIS in **Appendix N**.

5.2 Agency Coordination

The USACE, Sacramento District, is the lead federal agency under NEPA. USACE will use the EIS to make decisions for the Applicant's Preferred Alternative or alternatives. Cooperating agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife, Sacramento County, and the Sacramento Metropolitan Air Quality Management District.

5.3 List of Preparers

Lead Agency

U.S. Army Corps of Engineers

Marc Fugler, Regulatory Project Manager
Michael Jewell, Regulatory Division Chief

EIS Consultants

Environmental Science Associates (ESA)

2600 Capitol Avenue, Suite 200
Sacramento, CA 95816
Phone: (916) 564-4500

Project Director: Erich Fischer

Project Manager: Jennifer Wade

Technical Sections:

Aesthetics — Jennifer Wade

Air Quality & Global Climate Change — Matthew Morales, Paul Miller, M.S., REA

Biological Resources — Erich Fischer, Sarah Cortez, Lindsay Tisch, Jennifer Wade

Aquatic Resources — Erich Fischer, Lindsay Tisch, Jennifer Wade

Cultural & Historic Resources — Kathy Anderson

Socioeconomics and Environmental Justice — Nic Carlson, Jennifer Wade

Geology, Soils and Mineral Resources — Ben Frese, Jennifer Wade

Hazards & Hazardous Materials — Ben Frese, Paul Miller, M.S., REA, Jennifer Wade

Hydrology, Flooding and Water Quality — Robert Eckard, Michael Burns REA

Land Use & Agriculture — Jennifer Wade

Noise — Ben Frese, Paul Miller, M.S., REA, Jennifer Wade

Public Services, Utilities & Recreation — Aaron Hecock, AICP, Jennifer Wade

Traffic & Transportation — Jack Hutchison, P.E.

Word Processing and Report Production – Logan Sakai , Joe Billela

GIS and Graphics – Dave Beecroft , Thomas Wyatt

Subconsultants

Fehr and Peers Transportation Consultants

Project Manager: David Robinson

This page intentionally left blank

New and Revised Appendices

(Appendices from the Draft EIS
are available on the CD
attached to the back cover)

ESA

Appendix A
Revisions to the Storm Drainage Master Plan

ESA

REVISION OF THE

STORM DRAINAGE MASTER PLAN

FOR THE

ELVERTA SPECIFIC PLAN

SACRAMENTO COUNTY
CONTROL #99-SFB-0351

Prepared For:

Elverta Owners Group

Prepared By:

MacKay & Somps
Civil Engineering, Planning & Surveying

1552 Eureka Road, Suite 100
Roseville, CA 95661

October 18, 2013

M&S Project #7501-30

Revision to the

STORM DRAINAGE MASTER PLAN

for the

ELVERTA SPECIFIC PLAN

Sacramento County, California

TABLE OF CONTENTS

Tables Index		**iii**
Exhibits Index		**iii**
Appendices Index		**iv**
Preface		**v**
1.0	**Executive Summary**	**1**
2.0	**Introduction**	**7**
	2.1 Study Purpose	**7**
	2.2 Project Description	**8**
	2.3 Existing Site Conditions	**10**
	2.4 Soils Information	**17**
	2.5 FEMA Setting	**20**
3.0	**Hydrology & Hydraulics For Existing & Proposed Conditions**	**23**
	3.1 Previous Studies	**23**
	3.2 Sac Calc Watershed Runoff Analysis	**24**
	3.3 HEC-RAS 4.1.0 Unsteady State Hydraulic Analysis	**30**
	3.4 Hydromodification Management Plan	**40**
4.0	**Development Phasing**	**43**
5.0	**Water Quality**	**49**
6.0	**Miscellaneous Drainage System Components**	**52**
7.0	**Natural Resources Impact & Restoration**	**55**
8.0	**Regional Drainage Basin Impact Considerations**	**61**
9.0	**Appendices**	**63**
10.0	**Electronic Files**	

TABLES INDEX

Table 1: Pre- and Post-Development 100-yr Peak Runoff Comparison 3
Table 2: Pre- and Post-Development (Buildout) Peak Runoff Comparison (2-, 10-, & 100-yr Design Storm Events) 33
Table 3: Flow Duration Controls 42
Table 4: Pre- and Post-Phase 1 Development Peak Runoff Comparison 44
Table 5: Preliminary Water Quality Treatment Basin Sizing 51
Table 6: Elverta Specific Plan Proposed Post-Project Wetland Acreage 57

EXHIBITS INDEX

Exhibit 1: Land Use Plan "Plan 4, As Revised 4
Exhibit 2: Current/Preferred Land Use Plan 5
Exhibit 3: Elverta Owners Group (Participants, Phase 1 Development) 6
Exhibit 4: Regional Drainage Shed 11
Exhibit 5: Existing Regional Topography 12
Exhibit 5-b: Major Proposed Watersheds 14
Exhibit 6: Soils Map 19
Exhibit 7: FEMA Regional Floodplain Delineation 22
Exhibit 8: Existing Conditions Watershed Map 26
Exhibit 9: Proposed Ultimate Conditions Watershed Map 29
Exhibit 10a: Existing Conditions 100-YR Floodplain (B, C, & D-Corridors) 34
Exhibit 10b: Buildout Conditions 100-YR Floodplain (B, C, & D-Corridors) 35
Exhibit 10a-2: Existing Conditions 100-YR Floodplain (600-Series Shed) 36
Exhibit 10b-2: Buildout Conditions 100-YR Floodplain (600-Series Shed) 37
Exhibit 11: Cross-Channel Berm Detail 38
Exhibit 12: FEIR Plate HY-14 Dry Creek Road / U-Street Intersection Improvements for Flood Mitigation 39
Exhibit 13: Proposed *Phase 1 Conditions Watershed Map* 48
Exhibit 14: Trunk Drainage Shed Map 54
Exhibit 15: Inundation Levels Due to Summer Nuisance Flows 59
Exhibit 16: Inundation Levels Due to 2-YR Design Storm Runoff 60

LIST OF APPENDICES

9.1 Drainage Model Data Files, Result Summary, Profile, & Sections
- 9.1.1 SacCalc Hydrologic Calculator & Input Data Files
- 9.1.2 HEC-RAS 4.1.0 Hydraulic Model Data Files
- 9.1.3 Modeling Results Summary (SacCalc & HEC-RAS)
- 9.1.4 B-Corridor Sections (on disc)
- 9.1.5 C-Corridor Sections (on disc)
- 9.1.6 D-Corridor Sections (on disc)
- 9.1.7 Trunk Drainage Pipe System Analysis (Hydrology & Hydraulics)

9.2 Hydromodification Analysis (cbec)
9.3 Soils Analysis (David B. Kelley)
9.4 Duripan Profiles
9.5 Drainage Corridor Habitat Development Plans (Restoration Resources)
9.6 Large-Scale Exhibits
9.7 Electronic Files

PREFACE

The 1,744+/- acre Elverta Specific Plan is a proposed master-planned community consisting of a diverse mix of land uses located in the northwestern part of Sacramento County. In 1998 the Sacramento County Board of Supervisors initiated the planning process for this community at the request of the Elverta Specific Plan Property Owners Group[1]. Through a collaborative effort of the County Planning Department and its consultants, the Elverta Specific Plan Property Owners Group, and a Board of Supervisors' appointed Citizen's Advisory Committee, a draft land use plan known then as the "Preferred Land Use Concept Plan" was developed, for which an Administrative Draft Specific Plan text document and various supporting technical studies were subsequently completed in 2000 and 2003, respectively[2].

In May of 2003, the County of Sacramento acting as the Lead Agency published and circulated a Draft Environmental Impact Report for public review and comment pursuant to CEQA requirements. After a lengthy public outreach and hearing process and in response to comments received during this process, the original draft land use plan was revised, resulting in the land use plan known as "Plan 4, as Revised" and "Refined Plan, Land Use Plan #4" as shown in Exhibit 1.

This revised and updated land use plan, supporting technical studies, and several other documents were incorporated into the Final EIR published by the County in May of 2007, which then served as the basis for multiple public hearings before the County Board of Supervisors, before eventually being certified on August 8, 2007[3].

Participating land use ownership has changed significantly subsequent to that date, driven mostly by economic conditions of the last few years. This new Elverta Owners Group (see Exhibit 3) has since initiated consultation with the natural resources agencies in pursuit of U.S. Clean Water Act, Section 404 permits needed for implementation of the project as approved by the Board of Supervisors. The 404 permitting involves the eventual issuance of one overall County-sponsored permit associated with the construction of the backbone infrastructure necessary to serve the Phase 1 development within the Plan Area, as well as 14 additional individual permits for the various landowner based development plans of the Elverta Owners Group constituting Phase 1 development. As part of this process, the federal resource agencies have required a NEPA Environmental Impact Statement (EIS) for the project.

---

1 The Elverta Specific Plan Property Owners Group, also known as the "participating property owners", consists of those Specific Plan area land owners who participated financially in the Specific Plan Process and received rezoning for their properties subsequent to the Specific Plan approval and FEIR certification.

2 Source: Final Environmental Impact Report, Volume 1 (of 4), Elverta Specific Plan, Sacramento County Control #99-SFB-0351 and State Clearinghouse #SCH 2000092026.

3 For the complete time line and full description of the lengthy environmental review process and associated public hearings, please refer to the County of Sacramento records. To facilitate review of this study, some portions of the FEIR and original drainage master plan text and information have been incorporated into this study verbatim as indicated.

In an effort to create a more environmentally sound proposal, the Elverta Owners Group revised the original drainage corridor alignments approved in the Specific Plan. The revised alignments reflect more natural alignments that largely follow the existing drainages. The design of the revised corridors was also modified significantly to allow enhancement and restoration of natural resources within these corridors, while at the same time managing potential impacts due to hydromodification caused by the proposed urbanization of the project.[4] Additionally, the Elverta Owners Group decided to create the flexibility for potential future densification of the Project in accordance with a density bonus provision contained in the approved Specific Plan text that allows for an increase in residential densities of up to 25% based on a concurrent energy efficiency increases above a given threshold. As a result, a revised land use plan reflecting increased densities was created to be processed for approval by the County as a Specific Plan Amendment. This latest land use plan as reflected in Exhibit 2 is consistent with current trends in urban land use planning leaning toward denser urban development on smaller footprints.

The following study updates the hydrologic and hydraulic analysis for these revised drainage corridors and a potential residential density increase of up to 25%[5]. The completed analysis is being incorporated into the EIS being prepared for the Specific Plan.

4 Due to increases in the overall width of drainage corridors B and C on account of addressing the allowed for 25% density bonus, the developable residential acreage within the Specific Plan decreased, resulting in the total holding capacity of the Specific Plan as reflected in the proposed Specific Plan Amendment to decrease from an approved 4,950 DU to 4,807 DU, not counting the potential 25% density bonus allowed for. As the drainage modeling is based on the higher approved holding capacity of 4,950 DU (not counting the allowed for 25% density bonus), it furthermore increases the conservative nature of this Specific Plan drainage analysis.

5 As a result of this drainage master plan analysis accounting for the allowed for 25% density bonus (4950 DU + 25% = 6,188 DU), calculated runoff rates and volume are slightly higher than they would be, had the calculations been based on a total of 4,950 DU or the even lower proposed Specific Plan Amendment holding capacity of 4,807 DU. The results and associated facility requirements (mitigation measures) are thus considered to be conservative when compared to results based on the lower density.

1.0 EXECUTIVE SUMMARY

On August 8, 2007, nearly 14 years after initiation of the Rio Linda/Elverta Community Plan update, subsequent Specific Plan land use planning, technical study and EIR preparation, and public outreach/public hearing processes, the Sacramento County Board of Supervisors certified the Environmental Impact Report (EIR) for the Elverta Specific Plan (ESP). A few weeks later, various entitlements including a General Plan Amendment, Specific Plan, Financing Plan, and related documents were approved, the basis of which was a land use plan known as the "Plan 4, as revised" and "Refined Plan, Land Use Plan #4" (see Exhibit 1). The technical studies for the Specific Plan EIR were completed between 2002 and 2003, including a "Storm Drainage Master Plan for the Elverta Specific Plan, Sacramento County", completed on October 16, 2002.

Said Storm Drainage Master Plan for the Elverta Specific Plan analyzed the referenced land use plan (Exhibit 1) consisting of:

1. Residential land uses ranging from rural-type agricultural-residential densities of 1 to 5-acre minimum sized parcels (AR 1-5) through low, medium, and high density residential apartment-style zoning at up to 20 dwelling units per acre (RD 1-2, RD 3-5, RD 6-7, RD 10, and HDR-20, respectively). The holding capacity of the approved Specific Plan was limited to 4,950 residential dwelling units (DU). This consists of 450 rural density ag-res DU and 4,500 DU of more urban-style density;
2. Commercial uses;
3. A community center;
4. Two elementary schools, and
5. Supporting backbone infrastructure, including major roads, parks, drainage corridors, a power line corridor, and other ancillary land uses.

Since approval of the Specific Plan, the Elverta Owners Group, i.e. those property owners seeking development entitlements and funding ongoing natural resource permitting efforts, has undergone a change in participation, driven largely by the economic malaise of the last four to five years. The current Owners Group initiated consultations with the US Army Corps of Engineers (USACOE) in pursuit of U.S. Clean Water Act, Section 404 permits required for implementation of the approved project. Based on feedback the group received during the consultation meetings, a more biologically sound alternative to the approved land use plan was developed. In this new, preferred alternative, the proposed drainage corridors for drainage sheds B, C, and D (the three southernmost drainage sheds in the Specific Plan area containing a majority of the urban land uses proposed for the Project) were realigned to largely coincide with the underlying existing drainages. These new proposed drainage corridors were widened significantly to manage the potential impacts of hydromodification due to urbanization of the Project area. The resulting wide drainage corridors allow for habitat creation and enhancement within these corridors much superior to that found in the Plan Area today.

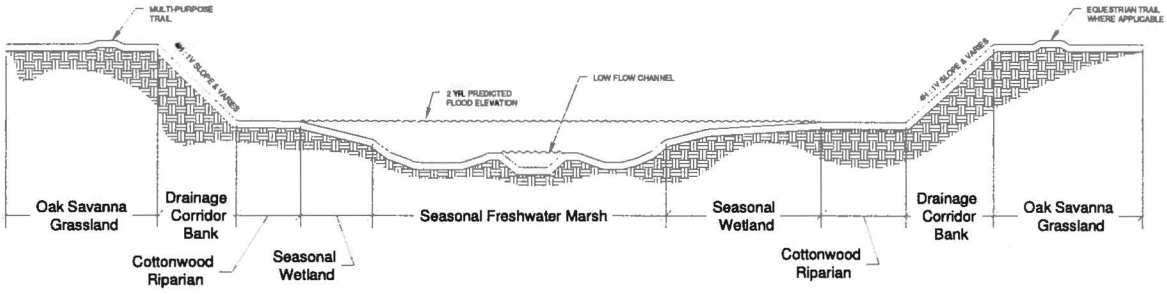
This current 2013 Drainage Master Plan for the Elverta Specific Plan analyzes drainage impacts resulting from updates to the Elverta Specific land use plan and associated

drainage corridor realignments depicted in Exhibit 2. The analysis defines how the proposed revised development can occur in a responsible and safe manner and how potential impacts on existing downstream drainages can be fully mitigated to existing or better than existing conditions. It further defines how a portion of the Plan Area made up of parcels owned or controlled by the Elverta Owners Group (Phase 1 development area as reflected in Exhibit 3) may develop in a safe and responsible manner consistent with all applicable standards and regulations. The analysis is being incorporated into a NEPA Environmental Impact Statement (EIS) for the Specific Plan, required by the resource agencies to support the U.S. Clean Water Act, Section 401 and 404 permitting processes.

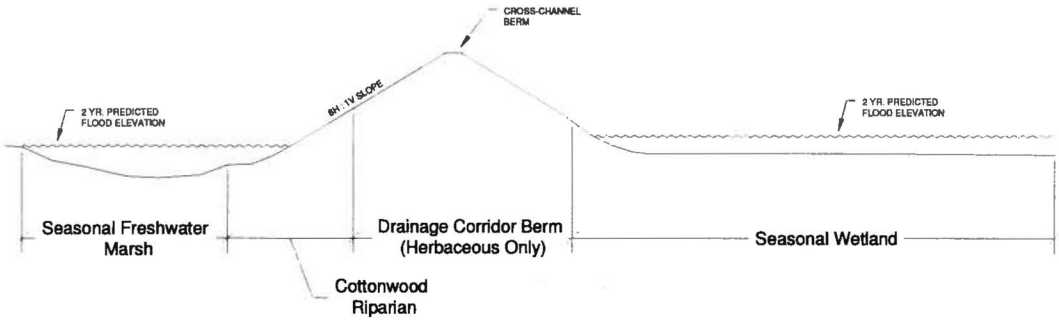
The revised project as proposed can be implemented in a safe and responsible manner that appropriately mitigates all development impacts on stormwater runoff to existing or better than existing conditions at the downstream end of the project and upstream of non-participating properties for both buildout conditions and Phase 1 interim conditions. This is clearly demonstrated in the following Table 1, which compares peak runoff rates resulting from the 100-year design storm for both existing conditions and developed conditions (with full implementation of identified drainage improvements).

Development impacts to water quality will be fully mitigated by the implementation of a combination of Low Impact Development (LID) measures, Best Management Practices, and point-of-discharge water quality treatment basins as discussed in Chapter 5.0 of this study. Hydromodification management will occur in-stream through the attenuation of frequently occurring storm events via a number of cross channel berms that discharge runoff into the downstream drainages through calibrated vertical openings in these berms (see Chapter 3.5 and Appendix 9.2 of this study). The width and slope of the proposed drainage channels cause runoff to flow very slowly through the channels, further helping to reduce the erosion potential within the defined on-site channel limits.

The drainage corridor sections shown below depict the conceptual layout of the proposed drainage channels within the Project limits. Wetland and riparian habitat will be restored, created, or enhanced within these expanded drainage corridors to exceed the functional value of the habitat that currently exists within the degraded drainages on-site. This is further discussed in Chapter 7.0 of this report, with conceptual habitat development plans appended (Appendix 9.5).



Proposed Channel Cross Section

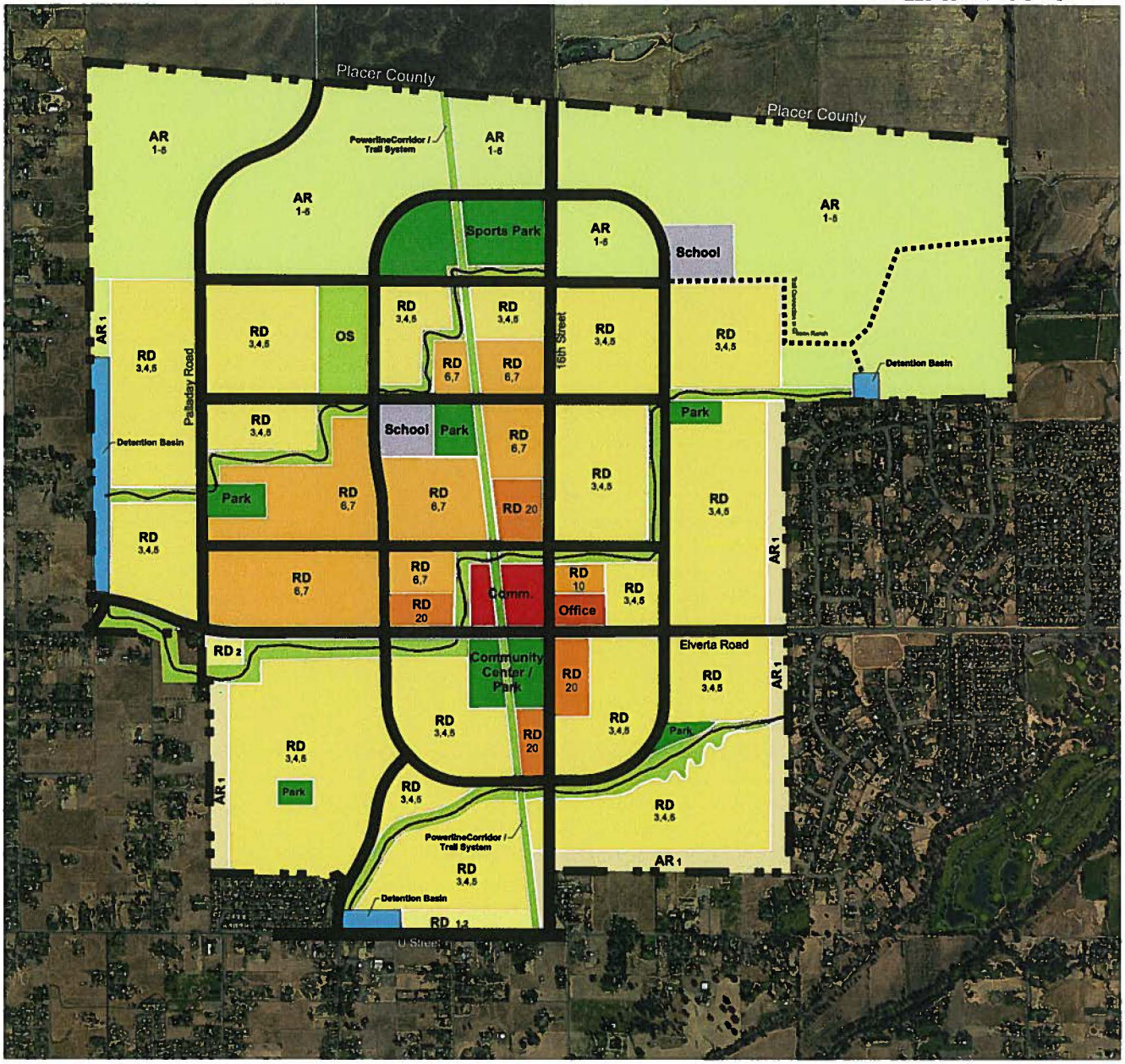


Proposed Longitudinal Channel Section

TABLE 1:
PRE- AND POST-DEVELOPMENT 100-YR PEAK RUNOF COMPARISON

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)		
			Existing	Phase 1	Developed
600- and 700-Series Sheds:					
Node B-2 (downstream compliance)	n/a		296	n/a	311
Node 600UP (downstream compliance)	n/a		27	n/a	39
Node 702UP (downstream compliance)	n/a		29	23	26
Note: 600- Series shed analysis results based on 2002 Storm Drainage Master Plan					
Shed AA:					
Node A (downstream compliance)	n/a		95	94	88
Note: Shed A analysis results based on 2002 Storm Drainage Master Plan					
Corridor B:					
Downstream of Phase 1 compliance	38+46	38+46	184	183*	n/a
Downstream Compliance	11+50	11+50	173	n/a	138
(*based on temp. interim on-site mitigation by Phase 1 participants as modeled)					
Corridor C:					
Non-participant	180+20	181+41	283	216	262
Downstream Compliance	162+22	162+21	316	265	286
Corridor D:					
Downstream of U-Street	0+98	15+00	146	n/a	68.00

EXHIBIT 1



Land Use	Acreage
Agricultural Residential (AR) 1-5	502.3
Agricultural Residential (AR) 1	49.5
Residential Development (RD) 2	3.2
Residential Development (RD) 1, 2	6.9
Residential Development (RD) 3, 4, 5	662.7
Residential Development (RD) 6,7	161.7
Residential Development (RD) 10	7.0
Residential Development (RD) 20	38.8

Land Use	Acreage
Office / Professional	4.4
Commercial	15.0
Community / Sports / Neighborhood Parks	73.3
Elementary School	20.2
Drainage / Trails Detention / Joint Use	101.3
Powerline Corridor*, and Trail System	16.3
Open Space	18.4
Major Roads - Other	74.3
Total	1,744.6

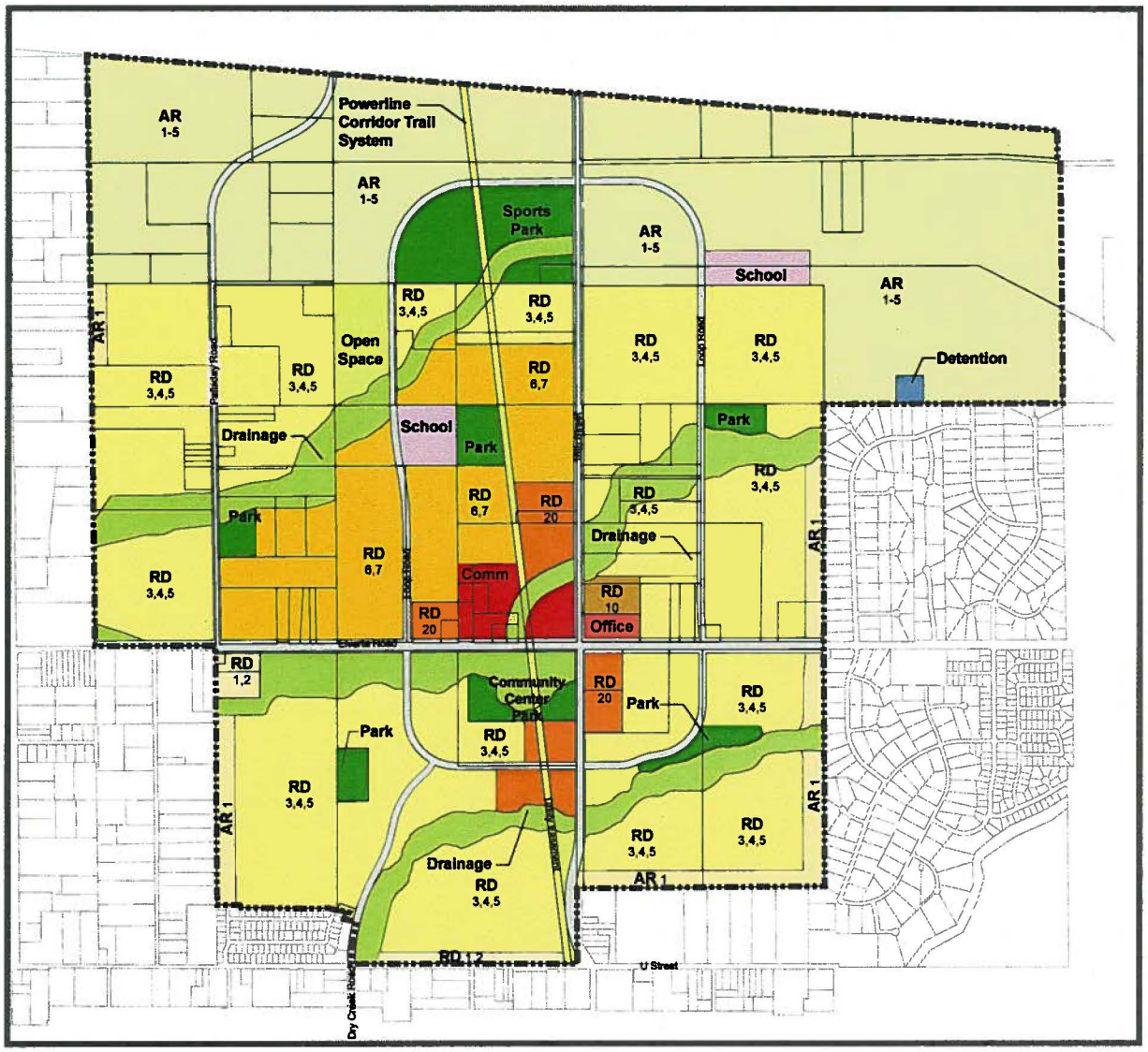
*Includes 10.68 acres of powerline corridor acreage in park, RD 20 and Commercial landuse statistics where corridor is adjacent to or within said landuse designations. (Total acreage nets out these 10.68 acres)

Total Plan Holding Capacity of 4,950 Dwelling Units

④ *1-30-04*

ELVERTA SPECIFIC PLAN
(PLAN 4, AS REVISED)

LFR LEVINE • FRICKE
Planning & Development Services



Land Use / Acreage

Land Use	Acreage
Agricultural Residential (AR) 1-5	506.5
Agricultural Residential (AR) 1	44.5
Residential Development (RD) 1,2	11.0
Residential Development (RD) 3,4,5	606.9
Residential Development (RD) 6,7	165.2
Residential Development (RD) 10	5.7
Residential Development (RD) 20	42.5
Office / Professional	4.4
Commercial	17.5
Elementary School	20.2

Parks / Trails / Open Space / Recreation

Community / Sports / Neighborhood Parks	71.3
Drainage / Trails Detention / Joint Use	152.7
Powerline Corridor / Trail System / Open Space	25.8
Total	249.8
Major Roads - Other	70.4
Total*	1,744.6

*Includes 10.68 acres of powerline corridor acreage in park, RD 20 and commercial land use statistics where corridor is adjacent to or within said land use designations (total acreage nets out these 10.68 acres).

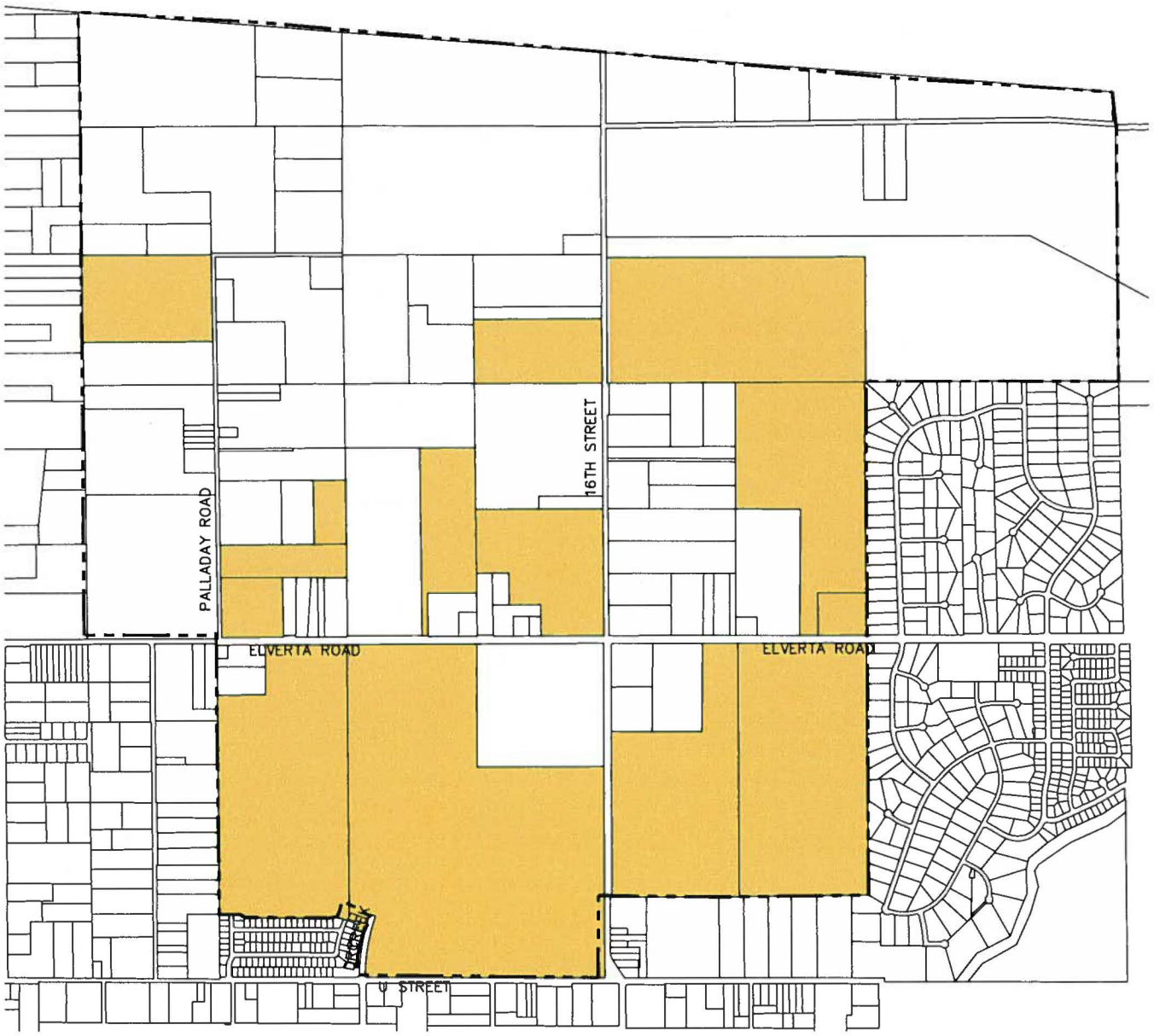
FIGURE 2: AMENDED SPECIFIC PLAN

ELVERTA SPECIFIC PLAN AMENDMENT

Updated Date: 10/01/13

Plan Scale: 1" = 500'

RCH GROUP



LEGEND:

PROJECT BNDY.

PARTICIPATING PARCELS

Exhibit 3
Elverta Owners Group
(Participants, Phase 1 Development)

Elverta Specific Plan

Sacramento County, California

Scale: 1"=1500' October, 2013

0 1500 3000

drietkerk SCALE:1"=1500' P:\7501\master plans\Elverta DMP\Exhibits\Exhibit 3 - Elverta Owners Group.dwg

MacKay & Somps ENGINEERS PLANNERS SURVEYORS 1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 772-1100

7501-30

10-18-2013 13:52:48[1] P:\7501\master plans\Elverta DMP\Exhibit Bases\Elverta_Participating_Parcels.dwg [2] P:\7501\master plans\Elverta DMP\Exhibit Bases\Elverta LUP_Updated 11-17-1

2.0 INTRODUCTION

2.1 STUDY PURPOSE

A Storm Drainage Master Plan (dated October 16, 2002) was prepared for the Elverta Specific Plan (the Plan Area) and approved by the Sacramento County Department of Water Resources early in 2003 for inclusion in the project's Environmental Impact Report, certified in 2007. The drainage analysis studied existing conditions and determined what facilities would be required to allow buildout of the proposed "Plan 4, as Revised" land uses (Exhibit 1) to occur in a responsible and safe manner and to fully mitigate the Plan Area's development impacts on downstream properties. The hydraulic analysis of the major drainages completed for the 2002 plan relied on the US Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC RAS), Version 3.0 Steady State computer modeling software.

The current (2013) Drainage Master Plan for the Elverta Specific Plan analyzes drainage impacts resulting from updates to the Elverta Specific land use plan and associated drainage corridor realignments made since Project approval in 2007 - changes made in response to feedback received from federal regulatory resource agencies (see Exhibit 2). The analysis defines how the proposed revised development can occur in a responsible and safe manner and how potential impacts on existing downstream drainages can be fully mitigated to existing or better than existing conditions. The outcome of this analysis will be incorporated into a required NEPA Environmental Impact Statement (EIS) for the Specific Plan and to support of the U.S. Clean Water Act, Sections 401 and 404 permitting processes.

This study adheres to specific requirements for the planning and analysis of drainage facilities as set forth in:

1. the Storm Drain Design Standards of the Municipal Services Agency of Sacramento County Department of Water Resources,
2. the Sacramento County Water Agency Drainage Ordinance,
3. the Sacramento City/County Drainage Manual Volume 2: Hydrology Standards,
4. the Sacramento County Water Agency Code Titles 1 and 2,
5. the Sacramento County Floodplain Management Ordinance,
6. the Stormwater Quality Design Manual for the Sacramento and South Placer Regions,
7. the Sacramento County Department of Water Resources Plan Submittal Take-In Check List, and
8. the draft Sacramento Stormwater Quality Partnership Hydromodification Management Plan, dated January 28, 2011.

The study was prepared under the responsible supervision of Ken Giberson, a State of California registered Civil Engineer.

2.2 PROJECT DESCRIPTION

The Elverta Specific Plan underwent rigorous technical and environmental analysis through the early part of this past decade, culminating in the preparation of a Draft Environmental Impact Report (EIR)[6] by the County in May of 2003. The EIR was then the subject of a lengthy public review and hearing process, concluding with its certification by the Sacramento County Board of Supervisors on August 8, 2007. Shortly thereafter, the Specific Plan, land use plan (known as "Plan 4, as Revised" and "Refined Plan, Land Use Plan #4", see Exhibit 1), associated Public Facilities Financing Plan, and other related documents were approved.

The land use plan subject of the EIR contains a broad range of land uses, including:

1. Residential land uses ranging from rural-type agricultural-residential densities of 1 to 5-acre minimum sized parcels (AR 1-5) through low, medium, and high density residential apartment-style zoning at up to 20 dwelling units per acre (RD 1-2, RD 3-5, RD 6-7, RD 10, and HDR-20, respectively);
2. Commercial uses;
3. A community center;
4. Two elementary schools; and
5. Project backbone infrastructure, including major roads, parks, drainage corridors, a power line corridor, and other ancillary land uses.

Though the holding capacity of the approved plan was limited to 4,950 residential dwelling units (450 rural density ag-res units and 4,500 units of more urban-style density), the Final (2007) EIR notes that "*...the holding capacity for each property may increase [...] in cases where additional units are allowed in conformance with the density bonus provisions of the Elverta Specific Plan Affordable Housing Plan or other applicable state laws or local ordinances.*"[7] Under the County's density bonus provisions regarding energy efficiency, overall density may also be increased by up to 25% consistent with a commensurate energy efficiency increase. The Elverta Owners Group thus calculated the overall land use capacity to potential increase to 6,188 DU, which would result in a net weighted average percent impervious cover increase of 4.4 percent (from 26.9% to 31.3%).

The current Elverta Owners Group initiated consultations with the US Army Corps of Engineers (USACOE) in pursuit of U.S. Clean Water Act, Section 401 and 404 permits required for implementation of the approved project. Based on feedback the group received during the consultation meetings, a more biologically sound alternative to the approved land use plan was developed. In this new, preferred alternative, the proposed drainage corridors for drainage sheds B, C, and D (the three southernmost drainage sheds in the Specific Plan area, containing a majority of the urban land uses proposed for the Project) were realigned to largely coincide with the underlying existing drainages. Additionally, these proposed drainage corridors were widened significantly to manage

6 County of Sacramento Control Number 99-SFB-0351; State Clearinghouse Number SCH 2000092026

7 Elverta Specific Plan FEIR, Land Use Chapter 4, Page13.

the potential impacts of hydromodification due to urbanization of the Project area. The resulting wide drainage corridors allow for habitat creation and enhancement within these corridors much superior to that found in the Plan Area today[8].

Modifying the alignment and width of the drainage corridors required some minor land use changes to the Approved Project, most notably a rearrangement of the Town Center, as the drainage corridor now bisects the site rather than following an alignment along its edge. In addition, portions of the Loop Road to the south of Elverta Road were re-aligned to provide for more efficient land use configurations to accommodate the widened corridor to the south. RD-20 sites were also moved and reconfigured in order to get close to the necessary acreage requirements associated with the Project's Affordable Housing Plan - reference Exhibit 2 for the revised land use plan and drainage corridor alignments. This 2013 Drainage Master Plan revision contains updated analyses reflecting these revised drainage corridor alignments in addition to the potential 25% land use density increases and minor land use changes associated with the revised corridor alignments.

On-site shed areas 702UP and AA located just north of shed area B were also analyzed as part of this drainage master plan update, as runoff from these sheds combines downstream of the project area with runoff from the B and C sheds. Based on this downstream confluence of these sheds, it is necessary to ensure that cumulatively on-site development does not cause an exceedance of existing downstream conditions past their confluence.

The northernmost shed areas designated in the original drainage study as 600B, C, and 600UP, did not experience any land use or drainage corridor changes, nor does their runoff combine with that from the southern sheds until they reach the Natomas East Main Drainage Canal. As such, they were not re-analyzed in this drainage master plan update. Additionally, none of the properties located within those drainage sheds have expressed any development interest at this time, nor are they participating financially in the ongoing entitlement and environmental permitting processes. The flood control analysis of these northern sheds is contained in the original drainage study dated October 16, 2002 as included in the FEIR for the Elverta Specific Plan dated May 2007 referenced under the County Control Number 99-SFB-0351 and the State Clearinghouse Number SCH 2000092026. Should any properties within these northernmost sheds wish to develop, additional drainage analysis of these new development proposals will be required by the County to address not only updated flood control drainage analysis standards, but also potential impacts to hydromodification, which were not analyzed in the original 2002 study.

8 Wetland Functions And Values Assessment, Elverta Specific Plan, dated December 2010

2.3 EXISTING SITE CONDITIONS

The 1,744± acre Elverta Specific Plan (ESP) is located within the watershed of the Natomas East Stream Group (NESG)[9] as shown on Exhibit 4: *Regional Drainage Sheds.* The NESG consists of 13 tributaries that drain approximately 27 square miles and outfall to Steelhead Creek (formerly known as the Natomas East Main Drainage Canal, aka the NEMDC). ESP area runoff drains to Tributaries F, G, and I of the NESG.

Historically, the drainage within the ESP area have flown from northeast to southwest through a series of both natural and improved, but mostly ill-defined small intermittent drainages with minimal, primarily grassy vegetation. These existing drainages intersect Steelhead Creek about 2.3± miles downstream (west) of the project. Steelhead Creek then drains to the south and then westerly, eventually outfalling to the Sacramento River at the confluence with the American River (see Exhibit 5: Existing Regional Topography)[10].

9 Natomas East Stream Group (NESG), Hydraulic & Hydraulic Study prepared by Borcalli & Associates for the Sacramento Area Flood Control Agency (SAFCA) dated September, 1994.

10 Elverta Specific Plan FEIR, Volume 1, Chapter 7, Page 1.

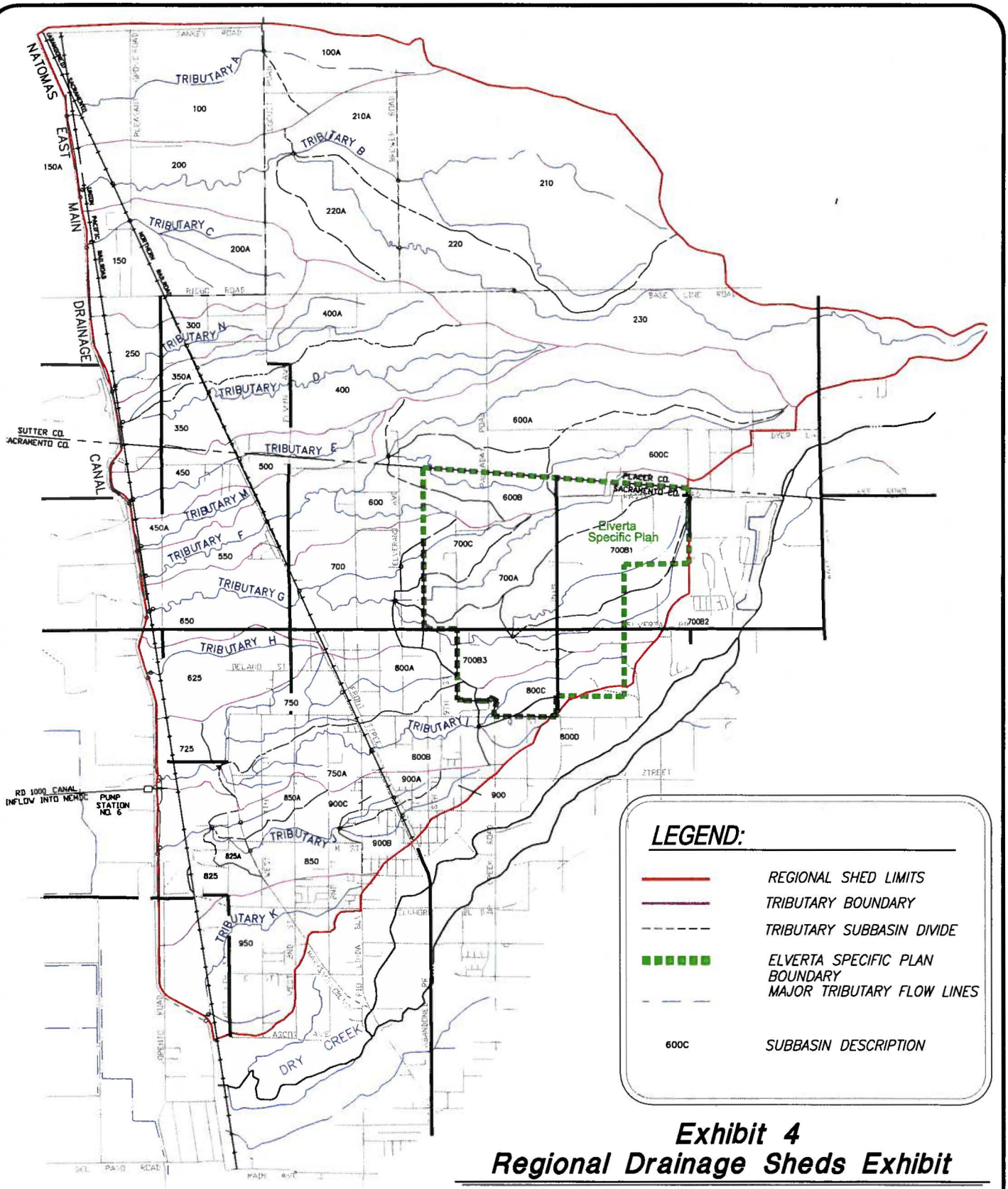


Exhibit 4
Regional Drainage Sheds Exhibit

Elverta Specific Plan

Sacramento County, California

Scale: 1"=5000' **October, 2013**

MacKay & Somps
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1130

7501-30

10-18-2013 14:12:15 drietkerk P:\7501\master plans\Elverta DMP\Exhibits\Exhibit 4 - Regional Drainage Shed Exhibit.dwg

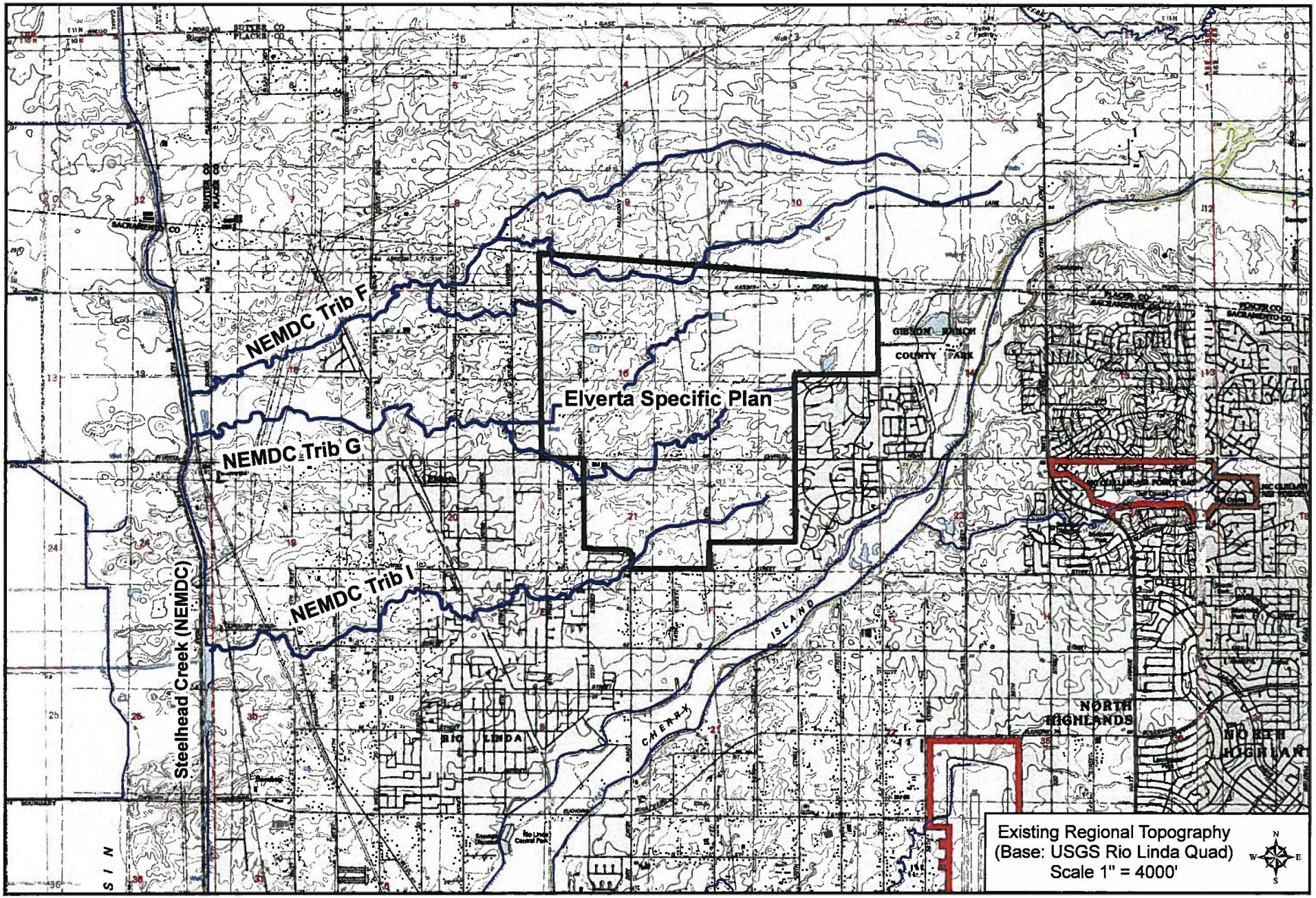


Exhibit 5 : Existing Regional Topography

The Plan Area's topography varies from an elevation of 89 feet at the northeast corner to approximately 50 feet on the west side near Elverta Road. Current land uses within the project consist of small agricultural operations and grazing fields, with roughly a dozen residences scattered across the Plan Area. Roadside ditches and cross-culverts intersect the more-or-less natural drainages at various locations and as such, form part of the existing drainage network at the site.

Based on existing topography, the ESP area is divided into five existing major drainage basins, which are further divided into smaller sub-basins (see Exhibit 8: *Existing Conditions Watershed Map*). The northern on-site basin (600 series) includes 237± acres of existing open fields and agricultural land. It is designated by the Specific Plan for rural-type development of Ag-Res zoning with minimum parcel sizes of 1 to 5 acres. This basin drains to the northwest and is tributary to the NESG Tributary "F". Its drainage is isolated from the more urban development, which drains to the southwest.

The other four existing basins are designated as A, B, C and D, in a north to south progression, with on-site basins A, B, and C making up the upstream end of the NESG Tributary "G" and on-site basin D being the headwater of the NESG Tributary "I". Under existing conditions, drainage is collected and conveyed through these basins in often ill-defined, meandering, and branching shallow drainages formed through decades of agricultural operations. Some segments of these drainages have been confined to small man-made, linear ditches to better align with property lines and other physical features.

Significant urban development is proposed to occur within these basins as depicted in the revised land use plan (see Exhibit 2). Only basins B, C, and D are proposed to contain major open space drainage corridors that will convey drainage from their tributary sheds totaling several hundred acres each. Basin A is isolated to approximately 88 acres (developed conditions) located along the western Plan Area boundary. Under existing conditions, runoff from this shed is conveyed in a southwesterly direction across Palladay Road and then off-site in very shallow, ill-defined drainages.

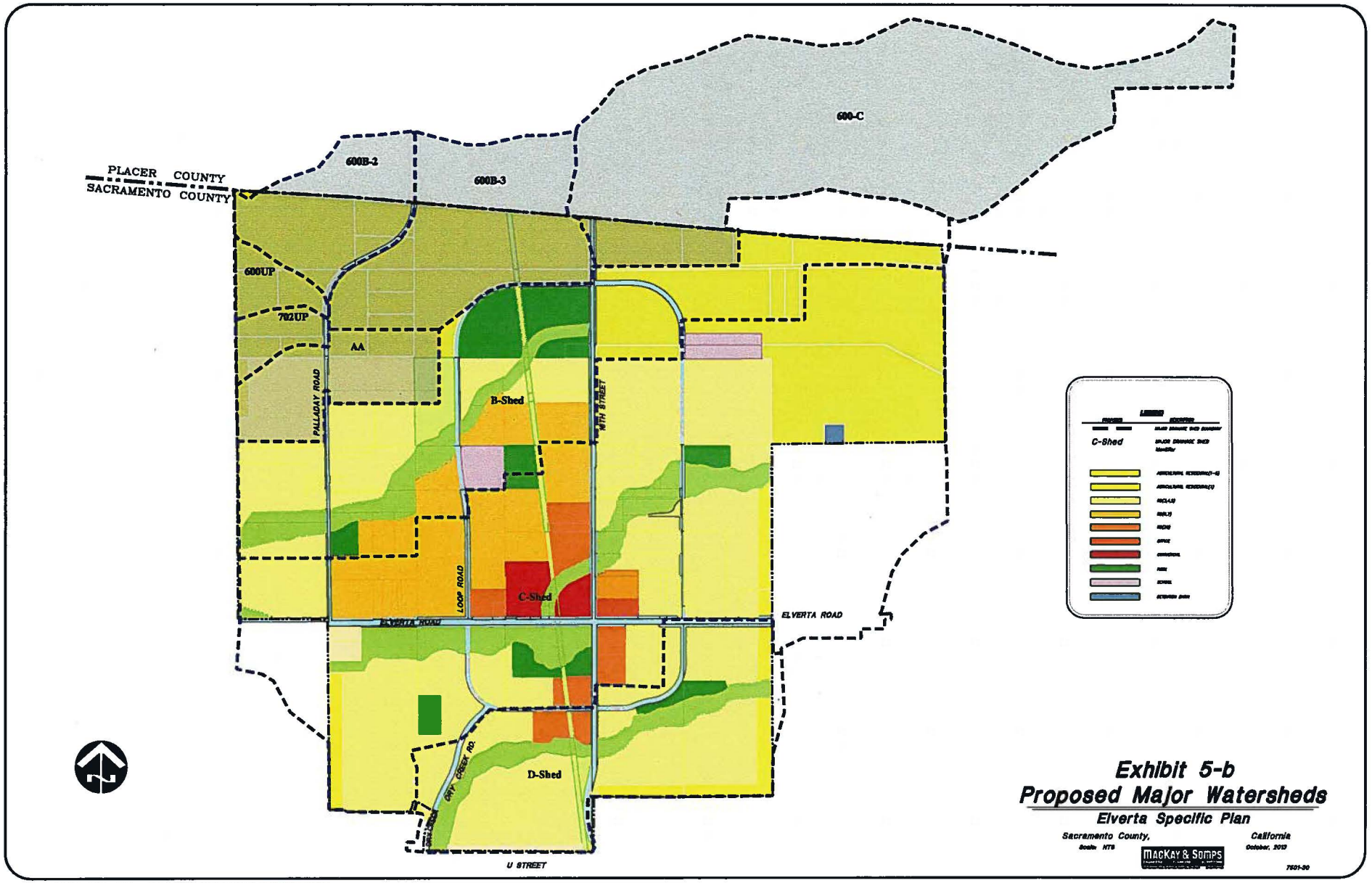


Exhibit 5-b
Proposed Major Watersheds
Elverta Specific Plan

Sacramento County, California

Scale: NTS

October, 2013

MacKay & Somps

7601-30

"B" Shed:
The "B" drainage basin originates upstream of the Plan Area in Placer County. Approximately 45 acres of the basin are located in Placer County in the proposed Placer Vineyards project. Based on said project's drainage master plan, it was determined that runoff leaving Placer County under developed conditions had to be reduced to no more than 90% of its existing runoff rate. To be conservative, this drainage analysis thus assumed 'existing conditions' runoff rates for both existing and developed conditions.

Downstream of the County line, the "B" drainage runs across a couple of rural properties, crosses Kasser Road through a small culvert and then flows across the western portion of the proposed Countryside Equestrian Estates project into an existing agriculture pond just upstream of 16th Street. Runoff then crosses 16th Street through a small culvert and continues in a southwesterly direction in an ill-defined meandering channel to Palladay Road. The low-lying nature of the tributary shed upstream of 16th Street coupled with a culvert of inadequate capacity to convey peak runoff rates is causing ponding to occur upstream of 16th Street, with 16th Street likely being flooded at this location during major storm events. Though a detailed analysis of this existing condition is beyond the scope of this drainage master plan, the analysis contained herein is based on the assumption that 'existing conditions' flows are being conveyed from the shed area upstream of 16th Street under both existing and developed conditions. In an effort to make assumptions that would yield conservative results and thus a safe design, "in situ" attenuation under existing conditions has been accounted for in the hydrology through a long time of concentration. The applicant for the Northborough project (called the "Countryside Equestrian Estates project" in the 2007 FEIR) will have to submit to the County a project-specific drainage analysis prior to submittal of improvement plans, which details existing conditions runoff and proposed development mitigation which mitigates development impacts on storm drainage to match existing conditions.

Toward the western Plan Area boundary, the existing "B" shed drainage conveyance consists of a small, man-made, linear drainage ditch flowing in a westerly direction. It crosses beneath Palladay Road through a small culvert and continues to the Plan Area boundary confined to a small, man-made, low-capacity drainage swale. At the Plan Area boundary it then drains through a small agriculture pond before discharging unimpeded into a more natural downstream drainage across an undeveloped parcel. About 1,120 feet downstream of the project area and just west of El Verano Ave., runoff from the B-shed combines with that from the C-shed.

"C" Shed":
The original headwaters of the "C" basin originates upstream of the Specific Plan Area in Placer County and then drains into Gibson Ranch Park immediately to the east of the Plan Area and the proposed Countryside Equestrian Estates project. As detailed in the FEIR for the Elverta Specific Plan[11], the drainage runoff from this 135-acre sub-shed is then diverted by an existing berm and directed to flow into Dry Creek. Based on comments received from Sacramento County Department of Water Resources (DWR), this drainage study includes a number of analysis alternatives with and without the

11 Elverta Specific Plan FEIR, Volume 1, Section 7, Page 43

diversion berm in place. It is our understanding that mitigation pertaining to the berm specific to the Northborough project is being addressed by the applicant for said project.

The next sub-shed immediately downstream of the aforementioned Gibson Ranch Park diversion berm comprises the eastern portion of the Northborough project. It drains into an existing agricultural irrigation pond, before discharges into a small existing open concrete channel located on developed properties in the Rifle Ridge Estates subdivision. This channel then discharges into the "C" corridor within the boundary of the Specific Plan area. Based on discussions with Wood Rodgers, the consultant for the Northborough project, the developed conditions models included herein assume full post-development mitigation to 'existing conditions' runoff rates entering the upper end of the C-corridor drainage channel within the project boundary.

Given the limited conveyance capacity of the existing concrete channel leaving the Northborough project under existing conditions, the applicant for said project is proposing to construct a bypass channel through their project past the existing Rifle Ridge Estates subdivision to the upper end of the C-corridor channel. The hydrology of the tributary Northborough shed, as modeled, accounts for flat terrain and a long time of concentration sufficient for regional modeling at the Specific Plan level. Consistent with County DWR standards, it is our understanding that the applicants for the Northborough project has submitted project-specific drainage modeling, which entail a higher degree of detail specific to said subdivision than this master plan study contains.

After re-entering the Plan Area, the "C" drainage continues in ill-defined, meandering, and multi-branched drainages in a southwesterly direction to 16th Street. It crosses beneath 16th Street through a small 36"x22" arch culvert, continues in an ill-defined drainage in a southwesterly direction toward Elverta Road, and then crosses beneath Elverta Road through another culvert, before turning in a westerly direction.

An existing branch of the "C" drainage headwaters originates within the Existing Rifle Ridge Estates subdivision. Its runoff is discharged at the ESP boundary to a drainage ditch paralleling the north side of Elverta Road. It crosses beneath Elverta Road through a small culvert located just east of 16th Street, then crosses 16th Street, flows through a large depressional wetland feature, before combining with the main branch of the existing "C" drainage. The flow entering the wetland at the southwest corner of Elverta Rd. and 16th was calculated based on the hydrology of the sub-shed upstream of its discharge location described above. The hydraulics of the roadside ditch conveyance were accounted for in the SacCalc routing of the runoff hydrograph from the tributary sub-shed.

Near the downstream Plan Area boundary, the existing "C" basin drainage flows in a shallow, winding alignment along the south side of Elverta Road, before being confined to a narrow man-made ditch just east of the Specific Plan boundary. It continues on to 9th Street, crosses beneath said street through four 48" culverts, parallels the south side of Elverta Road for approximately 215+/- feet and then crosses to the north side of Elverta Road though another set of four 48" culverts. Both of these sets of culverts have insufficient capacity to freely convey the existing 100-year peak runoff, thus causing backwater conditions.

The confluence of the "B" and "C" drainage swales is located approximately ¼ mile downstream of the Plan Area boundary, just to the west of El Verano Avenue. The confluence was deemed to not affect the hydraulic grade line within the study area. The combined drainages continue on as single meandering swale known as NESG Trib "G". 5,427 feet downstream of the confluence of the B- and C-drainages, Trib "G" flows through a breach in a former railroad track embankment. The size of the breach acts as a flow construction under high-flow events, causing backwater conditions upstream of the embankment, with approximately a 3-foot drop of the hydraulic grade line (HGL) across the embankment under the 100-yr design storm event. Downstream of the embankment, Trib "G' flows into Steelhead Creek roughly 2.1 miles west of the Plan Area.

"D" Shed:
The "D" basin is located entirely south of Elverta Road. It originates upstream of the Plan Area, where 4.2 acres of the existing rural Quail Ranch development convey runoff in roadside ditches adjacent to Class "C" streets to the existing "D" basin swale. This swale then flows through a man-made agriculture pond, through a small culvert beneath 16th Street, and onward in a southeasterly direction toward the intersection of Dry Creek Road with U-Street.

Just north of this intersection, runoff from the "D" basin flows through a 24-inch CMP culvert beneath Dry Creek Road, parallels U-Street in a man-made ditch for about 270', before turning southward beneath U-Street through an elliptical 24-inch by 30-inch CMP culvert. These existing culverts are of insufficient capacity to convey peak runoff rates, causing the intersection to flood during major storm events.

Downstream of Dry Creek Road, the drainage continues on as NESG Trib "I" toward Steelhead Creek about 2.8 miles (along a meandering path) downstream of the Plan Area.

2.4 SOILS INFORMATION

According to USDA NRCS soils mapping and the Sacramento County soil type maps included in the City/County Drainage Manual (see Exhibit 6), Type D soils are predominant within the study area limits. As these soils exhibit less infiltration than the Type B soils that occur infrequently within the project area, storm drainage runoff calculated using SACPRE intermediate files based on Type D soils will be slightly greater than would otherwise have been the case had the few occurrences of Type B soils been incorporated. This theoretically results in more conservative calculations, though the difference would likely be very minor, given the predominance of Type D soils within the study limits.

The results of the published data review have been corroborated by actual field work and subsequent laboratory analysis as described in a report titled *Soil Landscape of the [...] Elverta Project, [...], Sacramento County, California* prepared in November 2010 by Kelley & Associates Environmental Sciences, Inc. (see Appendix 9.3). Due to limited access rights, said field exploration had to be limited to those properties owned by

participants in the Elverta Owners Group. Additional analysis may have to be undertaken on other properties wishing to develop in the future.

The purpose of the field work was to analyze the soil characteristics within the limits of the proposed drainage corridors B, C, and D so as to inform the proposed detailed design of the corridors and drainages. Beyond the basic water quality treatment and flood control/mitigation that are the main focus of this drainage master plan, considerations for the creation of natural resources habitat within these corridors and drainages such as the depth of the existing duripan below ground (see Appendix 9.4) have been incorporated into the overall analysis. The viability and long-term sustainability of the proposed naturalized corridors are extremely important considerations in the overall drainage facilities design and have thus been studied much more extensively than might otherwise traditionally have been the case. Further discussion on corridor design details and natural resources restoration can be found in Chapter 7.0 of this master plan.

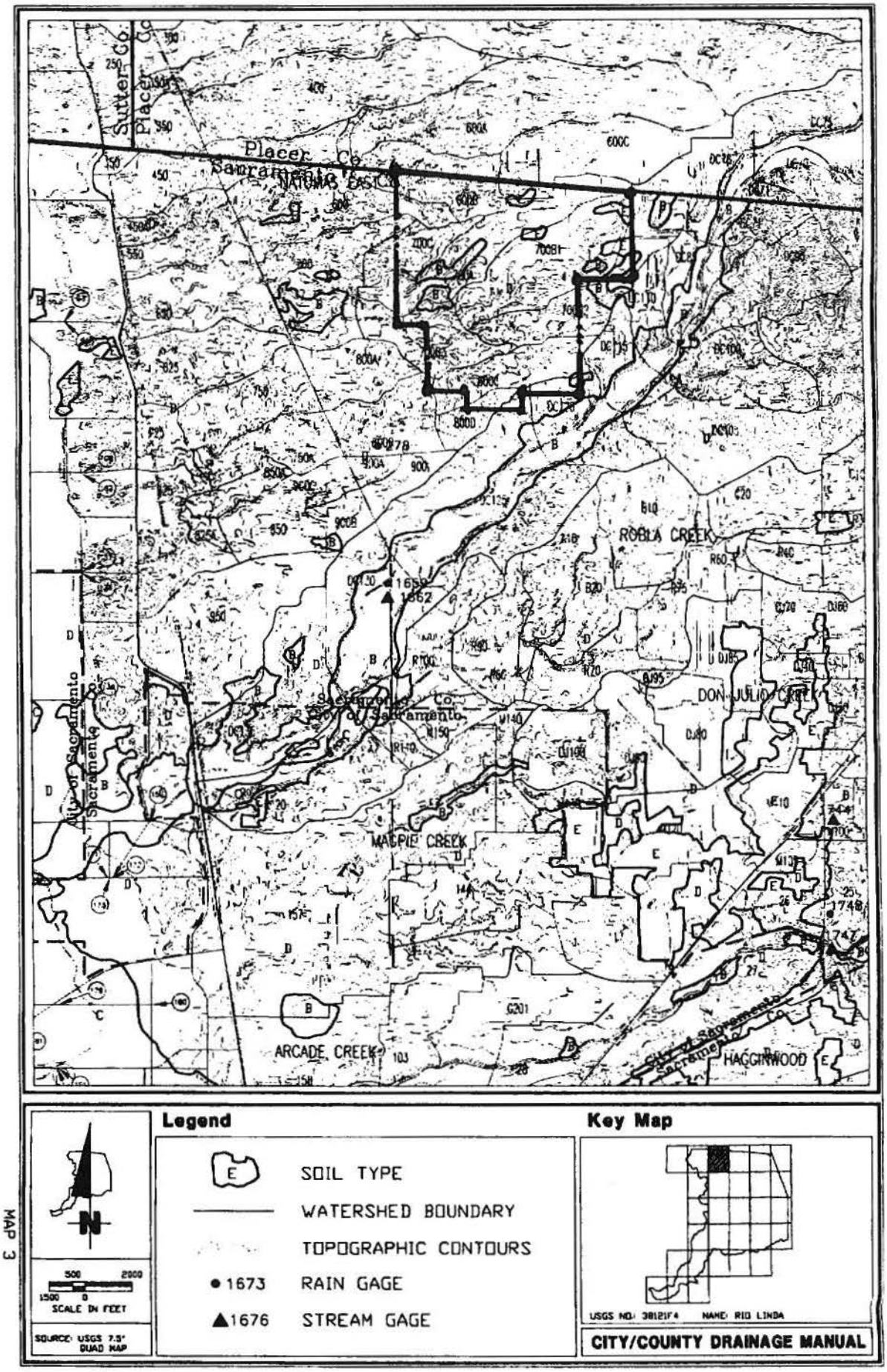


EXHIBIT 6 - ELVERTA SOILS MAP

2.5 FEMA SETTING

Exhibit 7 excerpted from the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) No. 0602620055F and No. 0602620060D depicts the extent of the mapped 100-yr floodplain in the vicinity of the Plan Area. As depicted, the entire 1,744+/- acre ESP area is located outside the 500-year floodplain; however, a small portion of about 5 +/- acres near the intersection of Elverta Road and 9th Street is within the mapped 100-year floodplain of NESG Tributary G.

The detailed FEMA study limits for Tributary G extend into the ESP area just south of Elverta Road east of 9th Street. For NESG Tributary I, the FEMA-mapped floodplain does not extend into the ESP area. The limits of the existing detailed FEMA study stop at U-Street.

The analysis and preparation of the floodplain mapping noted above was prepared by Borcalli & Associates in 1997 under contract with the County of Sacramento. The resulting body of work is entitled the *FLOOD INSURANCE STUDY FOR NATOMAS EAST STREAM GROUP TRIBUTARIES AND THE NATOMAS EAST MAIN DRAIN CANAL, SACRAMENTO COUNTY, CALIFORNIA.* A portion of the "effective model" and associated cross section data used to map the floodplain up to and downstream of the Elverta Specific Plan was imported into the model prepared by MacKay & Somps as part of this study to allow a) the Elverta Specific Plan models to be calibrated to the existing floodplain mapping and b) the extension of the Elverta Specific Plan analysis downstream to the former railroad embankment to ensure no negative impacts on the existing railroad embankment backwater conditions due to development within the Elverta Specific Plan area.

It should be noted that the 1997 model by Borcalli & Associates did not include or consider the 135 acre sub-shed upstream of the Northborough project currently being diverted to Dry Creek ("existing conditions"). The analysis contained within this study shows that the addition of the currently-diverted 135-acre sub-shed under "existing conditions" (i.e. elimination of the exist. berm) has only an insignificant impact on the 100-yr HGL upstream of the railroad tracks, raising the HGL_{100} from 45.29' to 45.31', i.e. by 2/100th of a foot. Under fully developed mitigated conditions within the Elverta Specific Plan however, the HGL_{100} upstream of the railroad embankment drops to 45.12'.

The Elverta Owners Group will have to file a CLOMR (Letter of Map Revision) for existing conditions with FEMA in accordance with the County's flood plain ordinance, extending the limits of the detailed 100-yr floodplain analysis and resulting existing conditions floodplain mapping across the ESP area. As individual rezone entitlements for participating properties have already been approved for the ESP, DWR has indicated that the existing conditions CLOMR for the entire ESP area will have to be filed prior to submittal of the first of any large-lot or small-lot tentative parcel maps (whichever occurs first).

Subsequent to approval of the existing conditions LOMR, yet prior to any fill being placed within the mapped existing conditions 100-yr floodplain and ahead of construction of the Phase 1 drainage corridor improvements identified in Chapter 4 of this drainage

study, the Elverta Owners Group will need to file a Conditional Letter of Map Revision (CLOMR) with FEMA for approval. Consistent with Rio Linda/Elverta Community Plan policies PF-10/DR-1 and PF17, any associated loss in floodplain storage resulting from such fill will need to be mitigated to the satisfaction of the County Department of Water Resources to prevent downstream flooding impacts. The hydrologic and hydraulic analyses contained within this report will eventually form the basis of the required floodplain mapping for FEMA submittals.

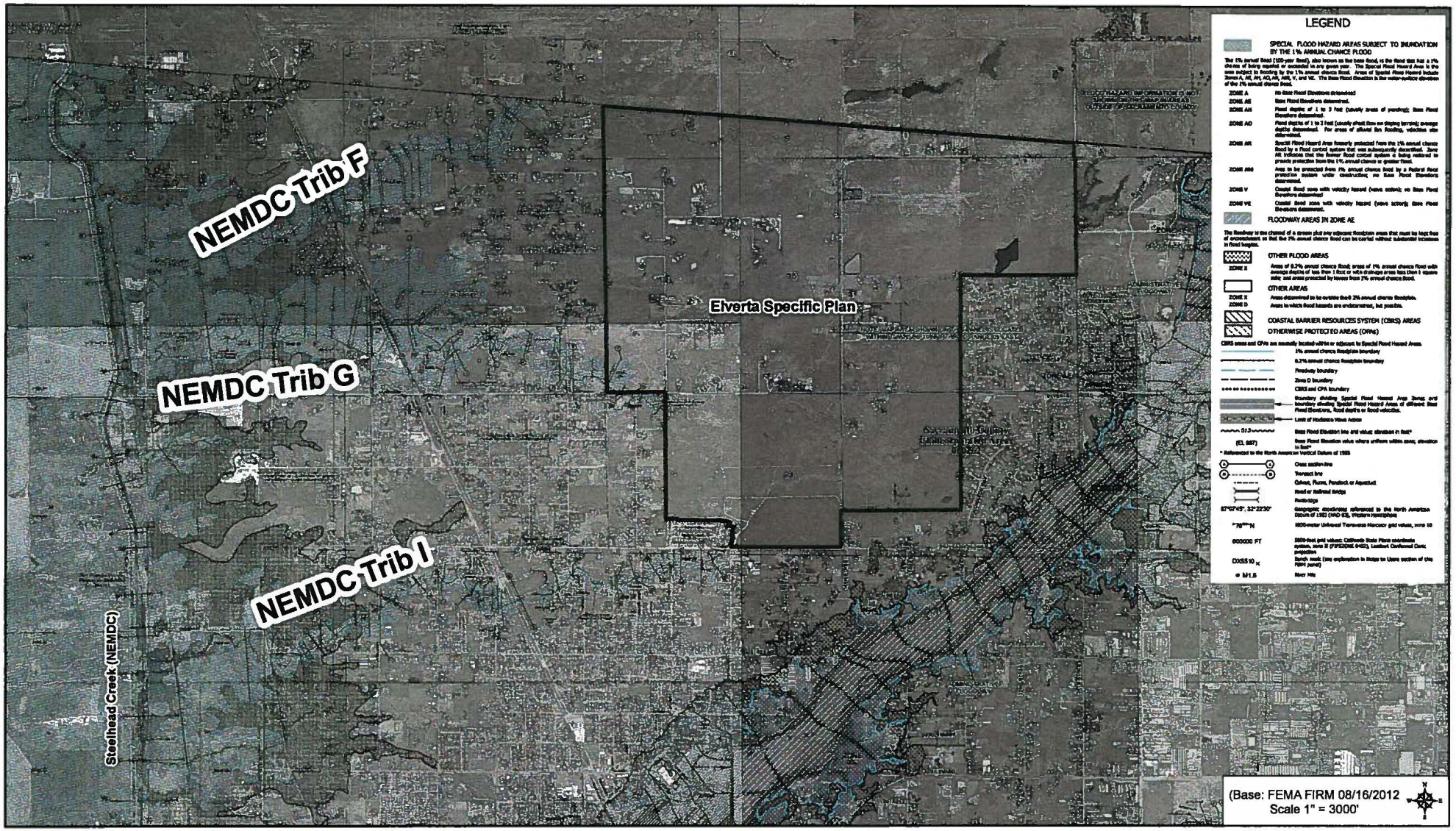


Exhibit 7 : FEMA Regional Floodplain Delineation

(Datum : NGVD88)

3.0 HYDROLOGY & HYDRAULICS FOR EXISTING & PROPOSED CONDITIONS

3.1 PREVIOUS STUDIES

The nature of the existing drainages and topography of the NESG, consisting of basically uncontrolled drainages that at numerous locations have been modified or realigned by agricultural operations, draining through a gently undulating, but mostly flat terrain, has contributed historically to the frequent flooding in the Rio Linda/Elverta community. This regional problem is exacerbated not only by backwater conditions in the NESG tributaries caused by high flood stages in the Sacramento and American Rivers, but also by local conditions caused by roadside ditches and driveway culverts of inadequate capacity to convey local runoff away from structures and streets, as well as constrained conveyances through and across other man-made structures such as the afore-mentioned former railroad embankment on Trib G. Additionally, local drainage swales through private properties are also subject to flooding due to obstructions placed or constructed in the swales, causing diversion or ponding of stormwater runoff.

As referenced in the FEIR for the Project, in an effort to master plan flood control facilities, in the early 1990 the Sacramento County Department of Water Resources undertook comprehensive analyses of the three largest NESG tributaries for existing conditions as well as to formulate a plan to mitigate future development impacts. A plan based on the results of the County's analysis that focused on NESG Tributary "I" which flows through the most developed area of the Rio Linda/Elverta community was met by strong opposition from the community and thus dropped by the County.

In 1994 the Sacramento Area Flood Control Agency (SAFCA) through their consultant Borcalli & Associates conducted the *Natomas East Stream Group Hydrology and Hydraulics Study* to determine alternatives to the channelization project previously pursued by the County. That study concluded that detention in reaches of the NESG tributaries upstream of Rio Linda Boulevard would be the most effective solution to mitigating future development impacts in the NESG[12].

In the late 1990's SAFCA then undertook various NESG watershed flood control improvement projects as part of their North Area Local Project. These included construction of a new pump station (known as the D15 pump station) and construction of a new levee on the north side of Dry creek between the D15 pump station and Rio Linda Boulevard. Implementation of all of these improvements has resulted in lowering of the 100-year water surface elevation in Steelhead Creek north of the pump station by approximately 3-4 feet[13].

The afore-mentioned 1997 Flood Insurance Study undertaken by Borcalli & Associates for the County of Sacramento took into consideration the various NESG watershed flood control improvement projects undertaken by SAFCA in the preceding years.

12 ESP Final EIR, Volume 1, Chapter 7, Page 5

13 P. Ghelfi, SAFCA, December 2002

The Final EIR for the Rio Linda / Elverta Community Plan Update contained further drainage analyses assessing the impacts associated with buildout of four different community plan land use alternatives being considered. As stated in the ESP Final EIR *Because the currently proposed Elverta Specific Plan land uses fall within the range of land use densities/intensities analyzed in the drainage studies for the RLECP Final EIR, the conclusions of those drainage studies as set forth in the Final EIR would apply to the currently proposed [Elverta] Specific Plan as well.*[14]

Subsequent to the completion of the original drainage master plan for the Elverta Specific Plan on October 16, 2002, SAFCA responded to questions raised by the County regarding impacts to the Steelhead Creek (formerly known as NEMDC) D15 pump station. With the help of MBK engineers, SAFCA utilized the Elverta drainage master plan modeling results to analyze the project's potential impacts. SAFCA's consultant concluded that rather than causing an environmental impact, buildout of the Elverta Specific Plan as proposed would cause an economic impact that could easily be mitigated with an impact fee. Based on this, the County Infrastructure Finance Section recommended that rather than have the Project pay an impact fee equivalent to $55/acre (gross), the Project should annex into the operations and maintenance district that funds ongoing operations of the pump station and associated facilities.[15]

The northernmost portion of the Specific Plan area is located in the 600-series sub-sheds tributary to a drainage originating north of the project in Placer County. This drainage enters the Elverta SP area just west of 16th Street, flows through ag-res zoning designated land uses west thereof, before leaving the Plan area near its northwest corner, flowing back into Placer County. This drainage originates in a proposed project in Placer County known as Placer Vineyards. That project, a master planned community of roughly 5,000 +/- acres abuts the Elverta Specific Plan area along its entire northern boundary. As part of the Placer Vineyards project, a drainage analysis was prepared by Civil Solutions, Inc. to address the impacts and required facilities of said project. Their analysis is contained in a document titled "Master Project Drainage Study, Placer Vineyards, Placer County, CA; Revised August 7, 2006". Flood plain mapping of this 600-series drainage for existing and developed/proposed conditions was completed for the Placer Vineyards project. As said flood plain mapping covers the portion of the drainage located within the boundary of the Elverta Specific Plan, the pertinent exhibits thereof have been included in this drainage master plan for the Elverta Specific Plan as Exhibits 10a-2 and 10b-2 for reference purposes.

3.2 SAC CALC WATERSHED RUNOFF ANALYSIS

As mentioned in Section 2.2 of this study, new drainage analyses contained within this drainage master plan are limited to analyses of those on-site shed areas where the Elverta Owners Group is proposing drainage corridor re-alignments and associated land use plan revisions. Affected corridors thusly included are the B, C, and D corridors within the B, C, and D sheds, draining into NESG Tributaries "G" and "I", respectively, as well as on-site sheds A and 702UP, as there is proposed Phase 1 development located in shed A and

14 ESP Final EIR, Volume 1, Chapter 7, Pages 5-8

15 ESP Final EIR, Volume 1, Chapter 7, Pages 25-29; and Volume 3, Chapter HY-2

because both of these sheds contribute to the existing backwater condition at the downstream former railroad embankment. For the 600 series within which no changes to the originally proposed land use and design are being proposed by the current Elverta Owners Group, the drainage analysis that was reviewed and approved by the County DWR in the fall of 2002 and subsequently incorporated into the certified FEIR for the Elverta Specific Plan is still applicable. Future development proposals within these sheds may have to update the 2002 study to bring it current with new drainage design standards, as well as to address any hydromodification impacts these developments might otherwise cause.

In accordance with the current Sacramento City/County Drainage Manual – Volume 2 (Hydrology Standards), runoff hydrographs for existing and developed conditions have been calculated using a Windows based application called the Sacramento Calculator (SacCalc) with what is commonly referred to as "the Sacramento Method". Using the SacCalc preprocessor within HEC-1 to process local hydrologic parameters and precipitation to create HEC-1 input data, HEC-1 was then run to calculate, route, and combine runoff hydrographs. The Elverta Specific Plan watershed is located in Rainfall Zone 2 of the Sacramento Method rainfall zone designations.

Though the previous models completed in 2002 using SacCalc required the same input data, the current effort reviewed all 'existing conditions' model input parameters for the analyzed shed areas and updated them, as necessary, to reflect up-to-date information. Starting with revisiting shed delineations, soil type data, and existing land use, lengths and slopes of each water course, centroid locations, and distance thereof to the associated water course were determined as part of developing the hydrology map for each shed (see Exhibit 8: *Existing Conditions Watershed Map*). Additionally, as described in Section 2.5 "FEMA Setting", the analysis of the B- and C-corridors was extended downstream by a little over 1 mile to allow for a flood analysis at the former downstream railroad embankment. Furthermore, a number of alternative scenarios were run with respect to the existing diversion berm at Gibson Ranch Park upstream of the Northborough project in the C-shed. The alternatives include a) the berm being in place (i.e. no upstream inflow into the C-shed occurring), b) the berm having been removed (i.e. the addition of a 135-acre sub-shed area to the C-corridor, and c) the berm breaking during a peak flow event.

For developed conditions, the existing conditions shed boundaries were laid on top of the proposed land use and adjusted, as appropriate, to account not only for the proposed drainage corridor alignments, but also to reflect implementation practicalities such as ownership boundaries, while avoiding major shed diversions. Percent Impervious Cover was then calculated utilizing the automatic routines in SacCalc (see Appendix 9.1). For the B-, C-, and D-corridors, lengths and slopes of the proposed drainage corridors, as well as the location of centroids and their distance to the proposed water courses were determined for input into the model (see Exhibit 9: *Proposed Ultimate Conditions Watershed Map*).

Within the smaller A and 702UP sheds, storm runoff will be conveyed within standard subdivision drainage pipes directly into its proposed combined water quality treatment, detention, and flow duration control facility to be located at the western project boundary.

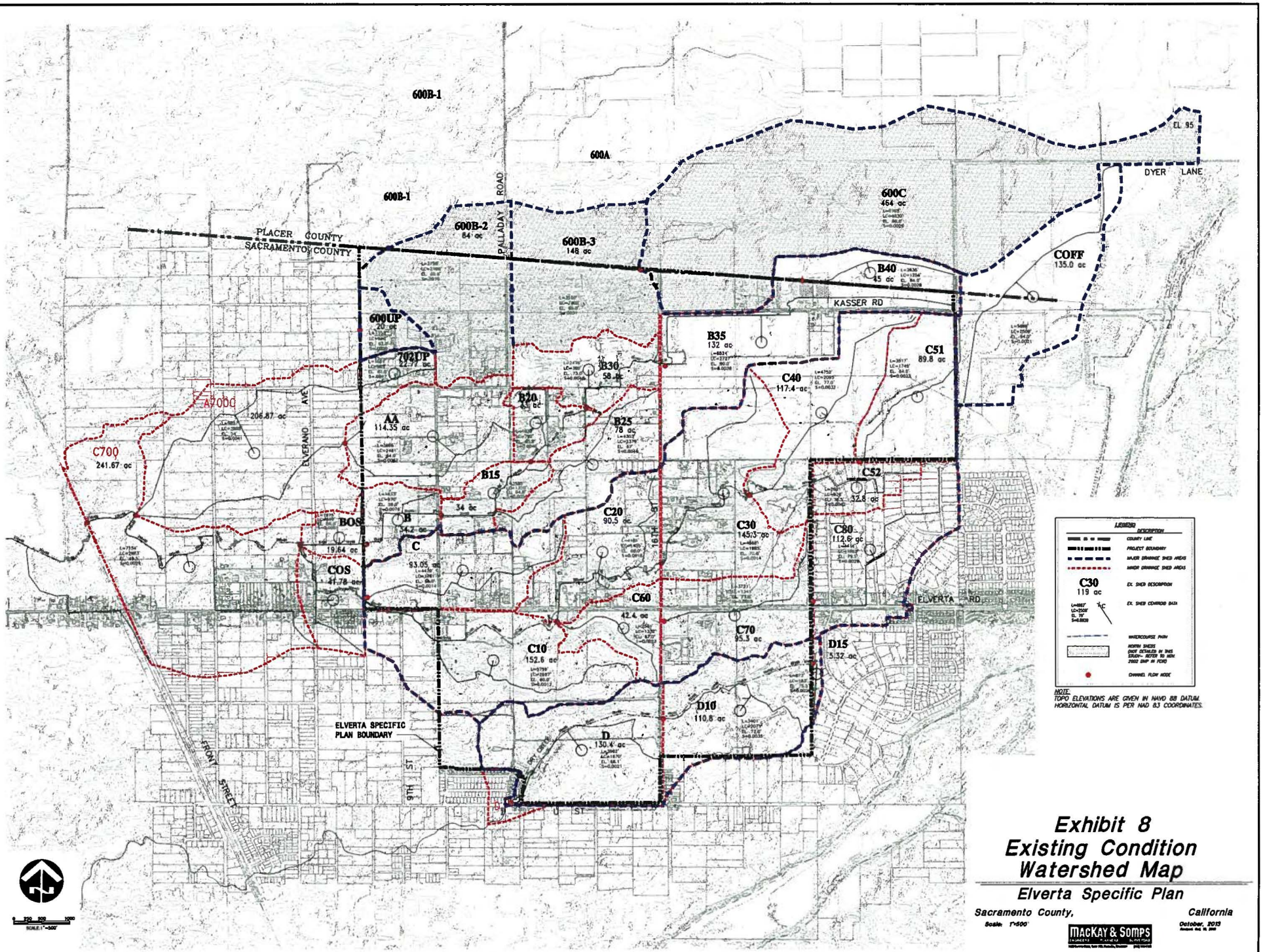


Exhibit 8
Existing Condition Watershed Map

Elverta Specific Plan

Sacramento County, California

Scale: 1"=500'

October, 2013

MacKAY & SOMPS

7601-30

The northern portion of the SP area drains west into Tributary F of NEMDC. As previously stated, the proposed zoning for this portion of the ESP is Ag-Res at 1 to 5 acres per unit. Such rural low-density development will have only slight impacts on existing storm drainage runoff, much less than urban densities in other parts of the plan area. Once development plans are known for these areas additional project-specific analysis will need to be provided to the County DWR to show how project-specific impacts will be mitigated to existing conditions (or better). These mitigation requirements will be project-specific and not a responsibility of the ESP as a whole. For this reason they are not addressed in this Drainage Master Plan.

Routing parameters of the main reaches the hydrographs were routed through include reach length, slope, channel shape, and Manning's roughness coefficient "n". For the existing conditions model, the reach length, slope, and channel length used are based on an analysis of the aerial topography of the site with a 1-foot contour interval. A site assessment of the existing drainage swales within the B-, C-, and D-sheds yielded a Manning's "n" of 0.06 for existing conditions.

It should be noted that the assumed roughness coefficient of the existing drainages swales in the northern sheds (600 series) equal to a Manning's "n" of 0.08 is consistent with the larger parcel sizes and associated less-intense agricultural land uses that exist within those sheds, thus leading to slightly heavier vegetated drainage swales. Nonetheless, given the proposed ag-res land use densities within the 600 series sheds and the fact that the existing drainages within the AA shed are not proposed to be preserved, any slight variation in the roughness coefficient used in the existing conditions analyses of these sheds is not going to have any notable impact on required drainage impact mitigation and associated drainage facilities to be implemented upon development. Project-specific drainage analysis to be submitted to DWR for review and approval for any project wishing to move ahead will allow the County to make the appropriate determination at the project level at that time.

For developed conditions for the B-, C-, and D-corridors, routing parameters are based on the proposed channel alignments and shape thereof. Preliminary earthwork analysis targeting a balanced site not requiring soil import, coupled with existing flow line constraints at the Project's boundary were used to establish proposed channel grades. Basic trapezoidal cross sections of varying depth with 4:1 side slopes and incorporating small, 1-foot deep low flow channels were used in the modeling runs to establish basic channel geometrics.

A Manning's "n" of 0.06 for developed conditions reflecting unmaintained, naturally overgrown channels was incorporated into the model runs for the proposed realigned channels within the B-, C-, and D- sheds. The natural habitat restoration planting proposal discussed further in Chapter 7.0 is consistent with this roughness coefficient. It should be noted that a high channel roughness leads to greater flow attenuation within a channel than a lower roughness coefficient based on a well-maintained channel or one in which vegetation has not yet matured. However, by utilizing cross-channel berms with carefully calibrated openings/notches to control flow through the berms, coupled with a very flat channel slope causing low runoff velocities, downstream conveyance is not very sensitive to changes in the channel roughness coefficient.

Design storms for the 2-, 10-, 100-, and 200-year recurrence interval were modeled; the 2-yr event to determine low flow event inundation levels to support proposed wetland and riparian habitat within the channels; the 10-year event to determine the water surface elevations in the channel used in the design of the piped trunk drainage system discharging into the channels; the 100-year design storm event for flood management and mitigation purposes; and the 200-yr event to analyze the proposed project against the Draft Urban Level of Flood Protection Criteria developed by the California Department of Water Resources. Tables that summarize peak flows from the various sub-sheds for existing, Phase 1, and Buildout conditions are included in Appendix 9.1.3.

At this point it should be noted that the County is in the process of evaluating the effect of flow duration control structures for purposes of hydromodification management on flood control analyses. In order to simulate the effect of the very long drain times through these flow duration control structures, much of the volume contained by these structures would likely not be available for effective flood control. The same would hold should a large 100-yr design event be preceded by a smaller, more frequently occurring event. To simulate this, the County has requested that a 10-yr scenario be analyzed whereby the peak water surface elevations resulting from a 2-yr design storm event under developed conditions was used as the starting water surface elevations for the 10-yr design storm event analysis. This "modified" 10-yr design hydrograph was thus run in addition to the standard (without preceding storm event/"dry") 10-yr design storm hydrograph. Much in the same way, for the 100-yr design storm analyses, an alternative scenario was run whereby the peak water surface elevations resulting from a 10-yr design storm event under developed conditions was used as the starting water surface elevations for the 100-yr 24-hr design storm event analysis. This "modified" 100-yr design hydrograph was thus run in addition to the standard (without preceding storm event/"dry") 100-yr 24-hour design storm hydrograph. Additionally, a standard 100-yr 10 day design storm hydrograph was run for developed conditions to ensure that the study did include an analysis of the design storm event yielding the highest potential runoff-rates and associated water surface elevations.

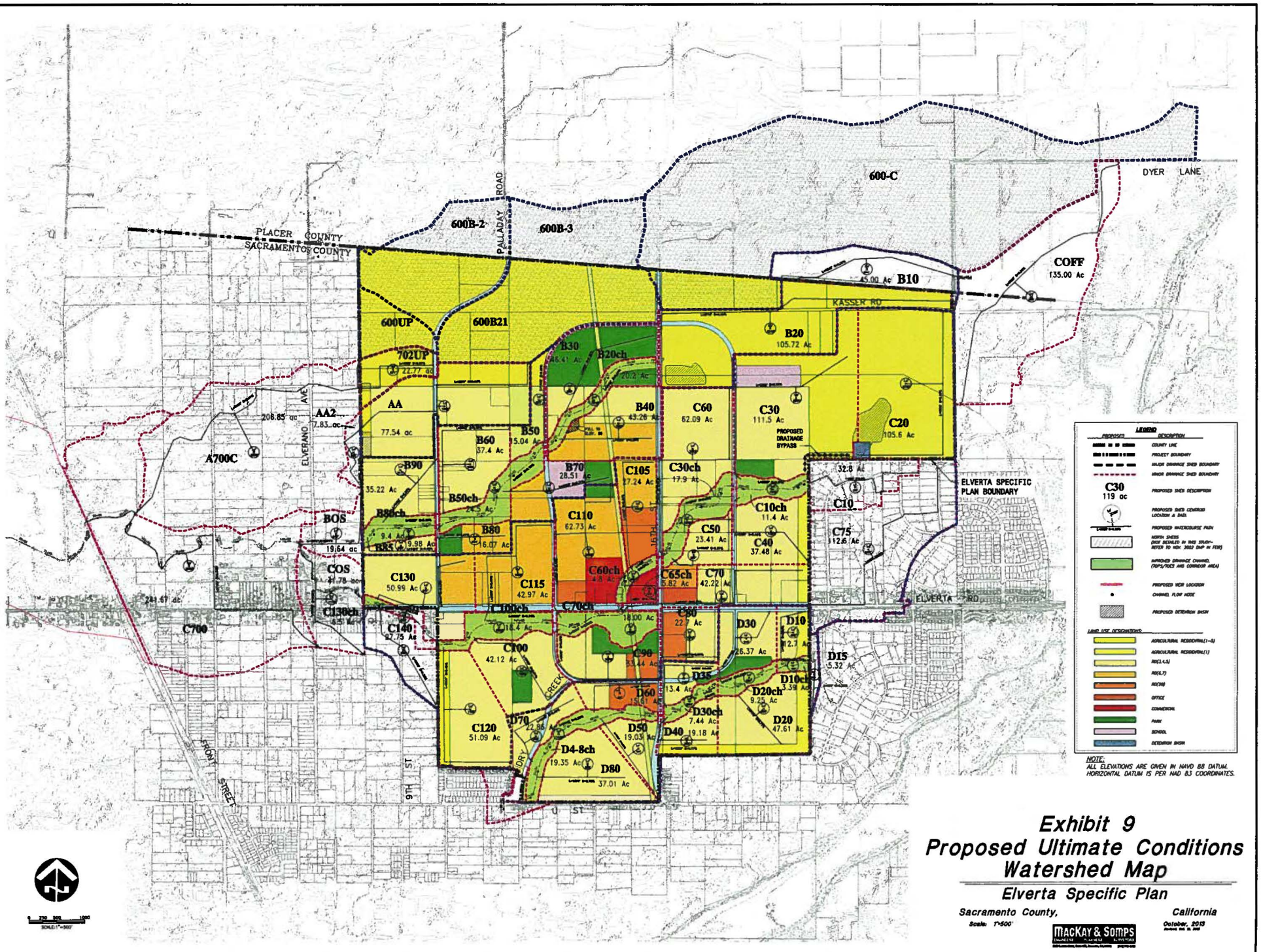


Exhibit 9
Proposed Ultimate Conditions Watershed Map

Elverta Specific Plan

Sacramento County, California

Scale: 1"=500'

October, 2013

MacKay & Somps

3.3 HEC-RAS 4.1.0 UNSTEADY STATE HYDRAULIC ANALYSIS

The 2002 drainage master plan analysis relied on the then-current Army Corps of Engineers Hydrologic Engineering Center (HEC) – River Analysis System (RAS), Version 3.0 computer modeling software to analyze the existing and proposed major drainage conveyance channels to serve the Elverta Specific Plan Area. The updated HEC RAS Version 4.1.0 software was utilized in the current analysis to model the existing and proposed "B", "C", and "D" drainage channels within the Elverta Specific Plan area. Both the old and new software versions allow one to perform one-dimensional unsteady flow simulation of natural and constructed channels.

Drainage alignments and locations of cross sections spaced in accordance with the County's requirements are determined in AutoCAD. For 'existing conditions', the software generates the channel geometry based on the terrain model of the Project Area's topography. For 'developed conditions', the modeler defines the basic channel geometry and "daylights" the top of the channel to the existing ground model or proposed top-of-bank elevations, where available. The program then exports geospatial data sets that are input into HEC RAS to define the conveyance geometry. The modeler then enters parameters for in-stream structures such as berms and culverts, before running the model. Model output files in GIS format are then imported into ArcMap's HEC GeoRAS extension. Using the channel geometry and computed water surface profiles, inundation depth, and floodplain boundary data sets are then created through HEC GeoRAS. (It's worth noting that the 2002 analysis did not utilize geo-referenced cross sections, but required the modeler to manually plug channel cross section parameters defining channel geometry into the RAS model. This approach does not change the modeling results, however, when compared to the current approach).

The proposed "702UP"- and "A"-shed, "B", "C", and "D" Corridor drainage conveyance channels and the following plans (design studies) were analyzed as part of the current analysis update (note that due to their downstream convergance, corridors B and C where analyzed in combined "B/C" models):

702UP-Shed	SacCalc analysis of 702UP Shed and detention basin
A-Shed	SacCalc analysis of AA Shed and detention basin
B/C Corridors	**Developed Conditions** Hydraulic Analysis of Drainage Channels B & C with diversion berm in place – (2 Yr, 10 Yr, 10 Yr on 2 Yr, 100 Yr-24 Hr, 100 Yr-24 HR on 10 Yr, 100 Yr-10 Day, & 200 Yr)
B/C Corridors	**Developed Conditions** Hydraulic Analysis of Drainage Channels B & C without diversion berm (FEMA) – (100 Yr-24 Hr)
B/C Corridors	**Developed Conditions** Hydraulic Analysis of Drainage Channels B & C with berm break – (100 Yr-24 HR on 10 Yr, & 200 Yr)
B/C Corridors	**Phase 1 Interim Conditions** Hydraulic Analysis of Drainage Channels B & C with diversion berm in place – (2 Yr, 10 Yr, 10 Yr on 2 Yr, & 100 Yr-24 Hr)
B/C Corridors	**Existing Conditions** Hydraulic Analysis of Drainage Channels B & C with diversion berm in place – (2 Yr, 10 Yr, 100 Yr-24 Hr,100 Yr-10 Day, & 200 Yr)

B/C Corridors	**Existing Conditions** Hydraulic Analysis of Drainage Channels B & C without diversion berm (FEMA) – (100 Yr-24 Hr)
D Corridor	**Developed Conditions** Hydraulic Analysis of Drainage Channel D – (2 Yr, 10 Yr, 10 Yr on 2 Yr, 100 Yr-24 Hr, 100 Yr-24 HR on 10 Yr, 100 Yr-10 Day, & 200 Yr)
D Corridor	**Existing Conditions** Hydraulic Analysis of Drainage Channel D – (2 Yr, 10 Yr, 100 Yr-24 Hr, 100 Yr-10 Day, & 200 Yr)

The study identifies 100-yr runoff rates and hydromodification potential at key "compliance points", i.e. locations at which proposed conditions have to meet existing conditions under the referenced scenarios. In Table 2, modeling results for pre- and post-development (with drainage improvements implemented) conditions for the 2-, 10-, and 100-year design storms are listed opposite of each other to allow a verification of design objectives to meet existing conditions at these specific nodes.

Of note is that at the detailed project design stage, fine-tuning of the cross-channel berms acting as in-stream flow duration control structures at the downstream project limits will allow for post-development conditions 100-yr peak flow rates to more closely match existing conditions runoff rates, if so desired by the County. Alternatively, the increased attenuation of such peak flows on-site below the existing conditions runoff rates as modeled would help reduce potential downstream flooding occurring under existing conditions. On Corridor D, 100-yr peak runoff reductions as modeled serve to eliminate the existing conditions flooding occurring at the intersection of Dry Creek Road with U-Street when coupled with proposed intersection improvements as depicted in Exhibit 12, as well as help reduce potential downstream flooding occurring during such peak rainfall events.

Projected flood plain limits for both existing and buildout conditions as calculated by HEC RAS are depicted in Exhibits 10a and 10b, respectively, full-sized copies of which can be found in the Appendix. These exhibits also reflect the peak stages occurring at each of the identified cross sections due to the 100-yr storm event. As previously mentioned, flood plain mapping for the 600-series shed area and associated drainage was completed by Civil Solutions, Inc. as part of the Placer Vineyards project located in Placer County immediately to the north of the Elverta Specific Plan. See Exhibits 10a-2 and 10b-2 included herein for reference purposes.

Note that runoff from the "D" basin leaving the site at Node D0 under developed conditions is approximately 45% of the calculated runoff under existing pre-development conditions. At present pre-development conditions, the intersection of Dry Creek Road with U-Street will flood under peak flow conditions. Limiting developed conditions runoff as noted and improving the intersection and downstream drainage conveyance as identified in the FEIR will eliminate this flooding under design storm peak runoff conditions (see Exhibit 12: *FEIR Plate HY-14 Dry Creek Road/U Street Intersection Improvements for Flood Mitigation*).

For the submittal of a CLOMR to FEMA, the on-site floodplain mapping will need to tie into the existing "detailed study" limits as mapped on the previously referenced FEMA FIRM Panel No. 0602620055F. Any remaining modeling discrepancies will have to be addressed at that time. Upon development of the ESP area, including buildout of the

proposed drainage corridors, peak post-development runoff from the B-, C, and D-sheds leaving the Plan area as modeled for the 100-yr storm event will be significantly less than under existing pre-development levels. This will have a positive impact on downstream flood elevations.

Also, any potential loss of floodplain storage due to the proposed fill of the FEMA mapped floodplain extending into the Plan Area at the downstream end of the C-corridor is being more than compensated for by the extensive upstream channel excavation being proposed. This is evidenced by the reduction in peak 100-yr runoff rates from 315.79 cubic feet per second (cfs) to 279.57 cfs. This is consistent with Rio Linda Elverta Community Plan Policy PF10/DR-1 which states:

> *"Significant increases in peak flows within the NESG, specifically NEMDC Tributaries F, G, and I, shall be mitigated through the implementation of regional detention facilities. In addition, restoration of any lost floodplain storage within the NESG (particularly Tributary G) shall require in-kind replacement, preferably on-site."*

The 'engineered' cross sections modeled in HEC RAS will be 'naturalized' as discussed in Chapter 7 and reflected in the Habitat Development Plans (Appendix 9.5) through the creation of habitat benches and depressional features within the drainage channel bottom and by varying the steepness of the side slopes of the channel along the length of each channel. The fine-grading and naturalization of each channel will occur in a way that either maintains or increases the hydraulic cross section defined in HEC RAS and depicted in Appendix 9.1, thereby ensuring that flood control as designed will either be maintained or enhanced. Implementation of the Habitat Development Plans will ensure that the created drainages not only look natural and function as designed from a flood control and hydromodification management perspective, but that they become functional and sustainable habitat forming an integral part of the community that surrounds them.

Flood mitigation and hydromodification management is designed to occur in-channel to the maximum extent practicable by means of flow retardation and attenuation behind cross-channel berms. These berms then release water at a specified rate through carefully calibrated V-notches in the berms. Details of these shallow cross-channel berms are shown in Exhibit 11.

TABLE 2:
PRE- AND POST-DEVELOPMENT (BUILDOUT) PEAK RUNOFF COMPARISON

Northern Sheds (results based on 2002 Drainage Master Plan analysis)

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)		10yr Flow (cfs)		2yr Flow (cfs)	
			Existing	Developed*	Existing	Developed	Existing	Developed
B-2	Project boundary		296	311	176	187	79	87
600UP	Project boundary		27	39	16	23	7	10

(*Note: project-specific drainage analysis to identify detailed mitigation resulting in peak flow mitigation to existing conditions flows (or better)

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)		10yr Flow (cfs)		2yr Flow (cfs)	
			Existing	Developed	Existing	Developed	Existing	Developed
702UP	Project boundary		29	26	17	11	n/a	n/a
A	Project boundary		95	88	57	49	n/a	n/a

Corridor B

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)**		10yr Flow (cfs)**		2yr Flow (cfs)	
			Existing	Developed	Existing	Developed	Existing	Developed
Downstream Compliance	11+50	11+50	173	138	89	69	42	35

Corridor C

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)**		10yr Flow (cfs)**		2yr Flow (cfs)	
			Existing	Developed	Existing	Developed	Existing	Developed
Upstream of 9th Street	18+020	181+41	283	262	169	154	80	84
Downstream Compliance	162+21	162+21	316	286	191	168	96	91
Downstream of UPRR	81+20	81+20	601	578	355	351	187	185

Corridor D

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)**		10yr Flow (cfs)**			
			Existing	Developed	Existing	Developed	Existing	Developed
Downstream of U-Street	0+98	15+00	146	68.00	98	59	41	31

(**Note: Developed Conditions hydrographs modeled 10-yr on 2-yr and 100-yr 24-hr on 10-yr)

Complete HEC-RAS model result summary tables are located in Appendix 9.1 of this study. The tables provide summaries of the specific HEC-RAS model design information used in the hydraulic model setup. The tables also summaries the projected water surface elevations that were calculated by the HEC-RAS model as part of the hydraulic analysis.

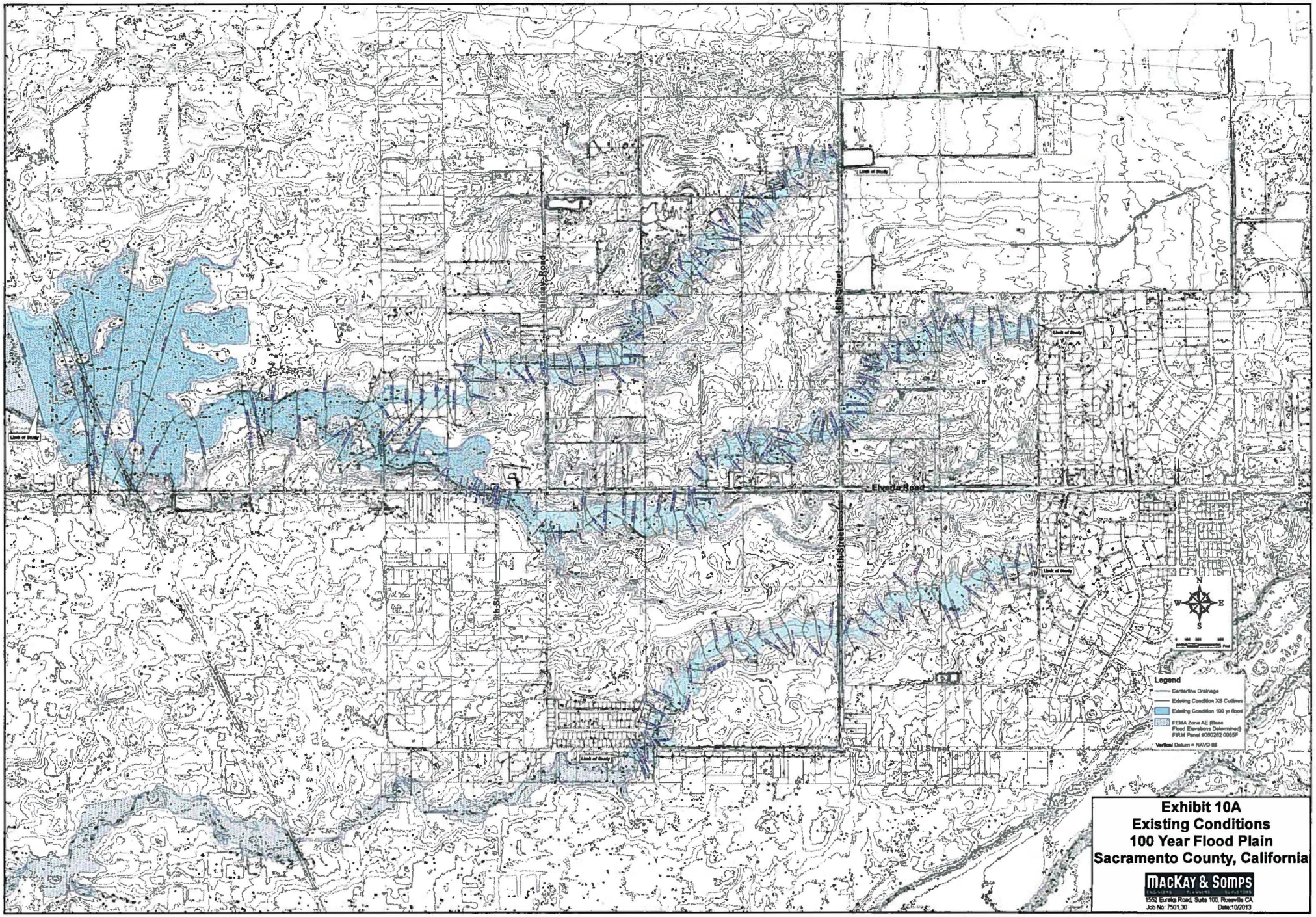
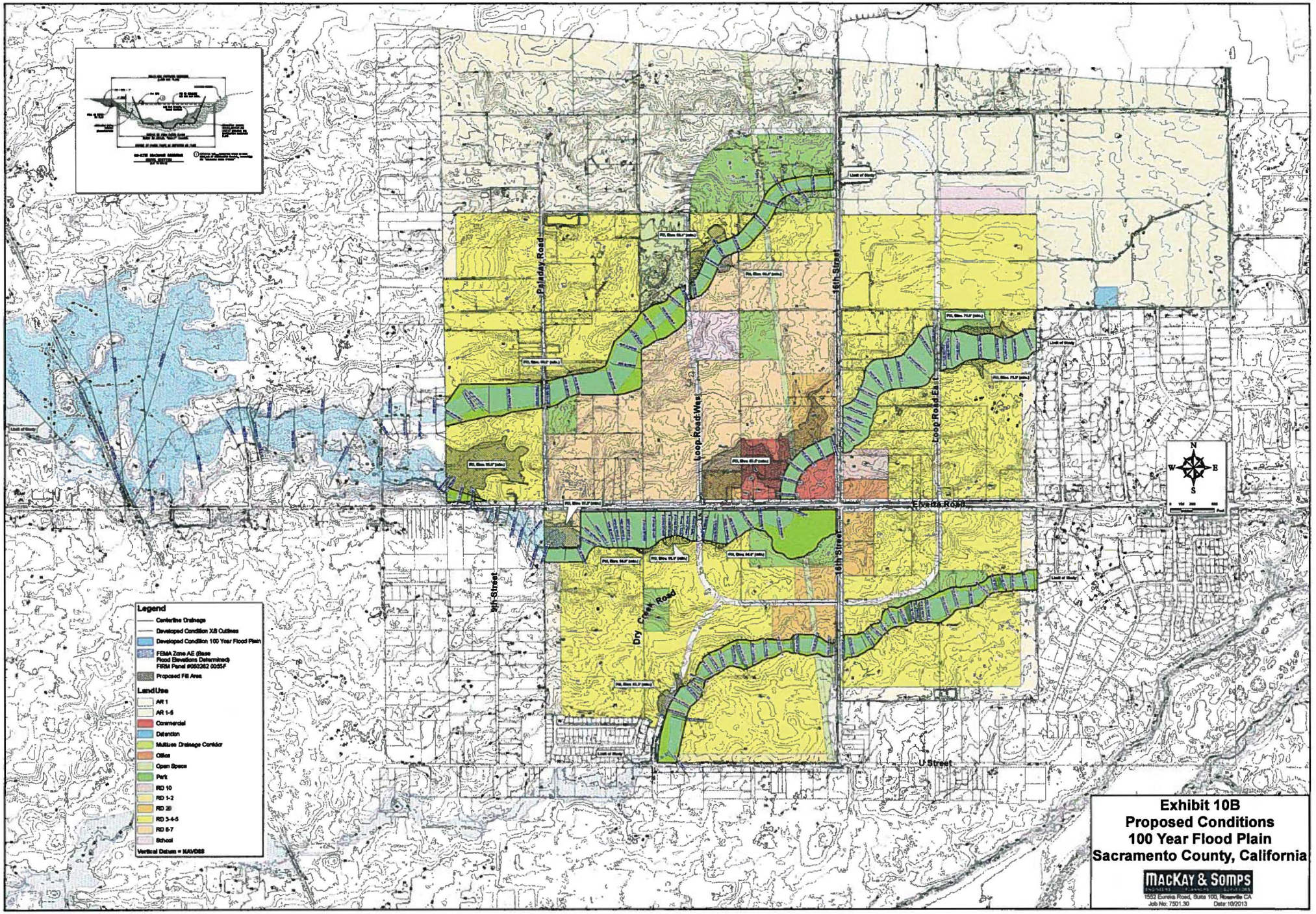


Exhibit 10A
Existing Conditions
100 Year Flood Plain
Sacramento County, California

MacKay & Somps
1552 Eureka Road, Suite 100, Roseville CA
Job No: 7501.30 Date:10/2013


Paladay Road
16th Street
Loop Road West
Loop Road East
Eureka Road
11th Street
16th Street
Dry Creek Road
U Street
N
W
E
S
Legend
Centerline Drainage
Developed Condition XS Cutlines
Developed Condition 100 Year Flood Plain
FEMA Zone AE (Base Flood Elevations Determined) FIRM Panel #060262 0055F
Proposed Fill Area
Land Use
AR 1
AR 1-5
Commercial
Detention
Multiuse Drainage Corridor
Office
Open Space
Park
RD 10
RD 1-2
RD 20
RD 3-4-5
RD 6-7
School
Vertical Datum = NAVD88
Exhibit 10B
Proposed Conditions
100 Year Flood Plain
Sacramento County, California
MacKay & Somps
1552 Eureka Road, Suite 100, Roseville CA
Job No: 7501.30
Date: 10/2013

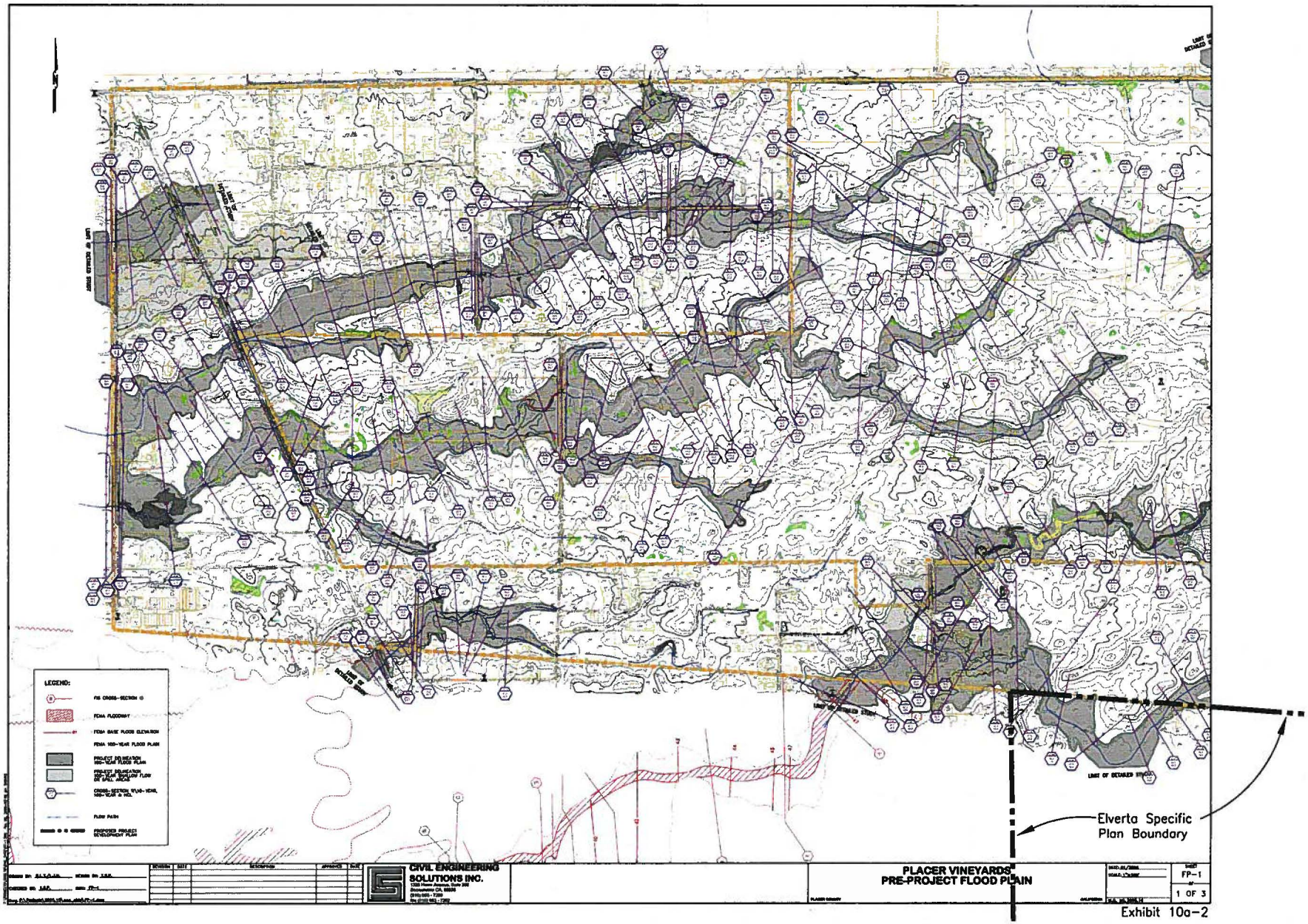


Exhibit 10a-2

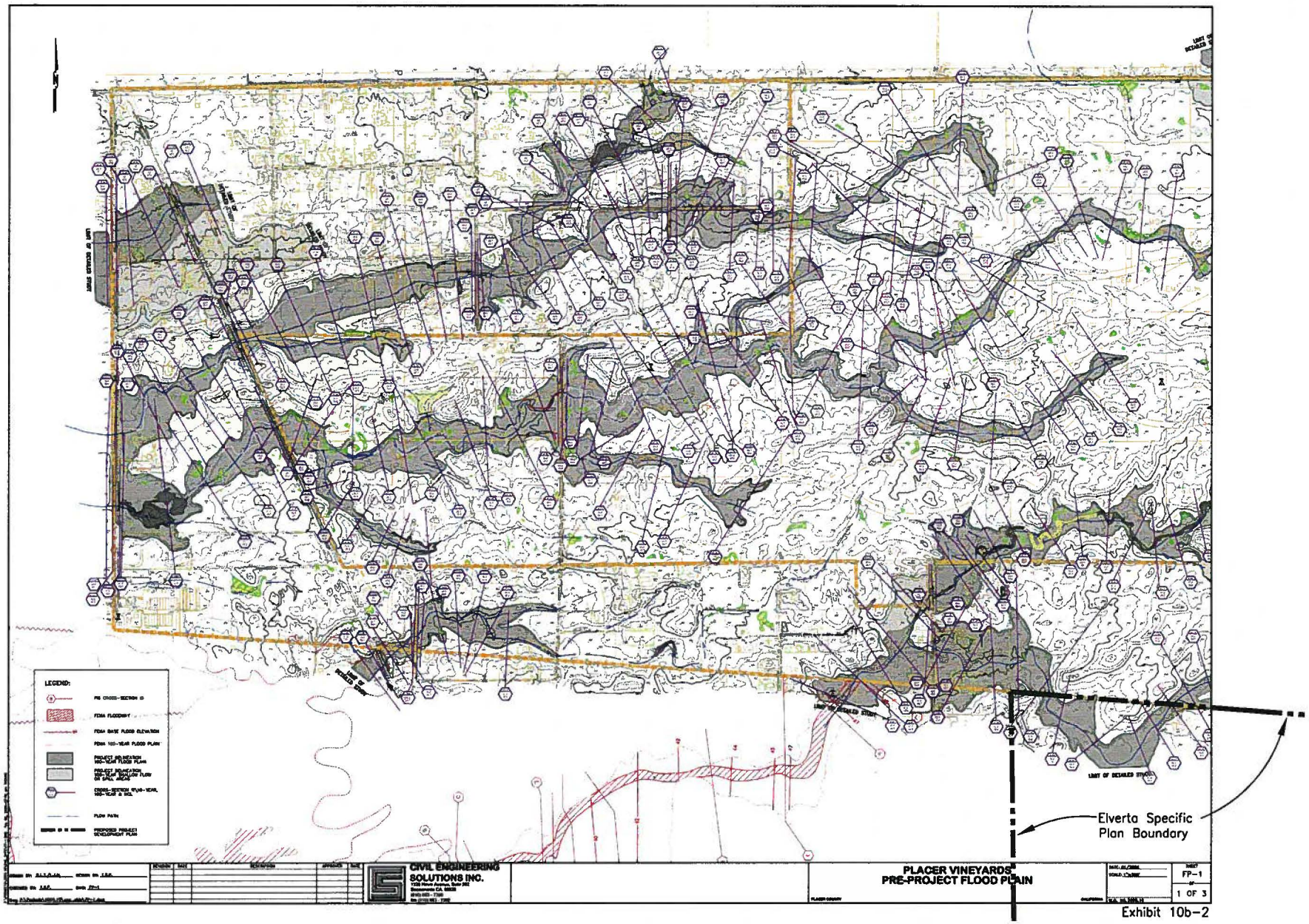
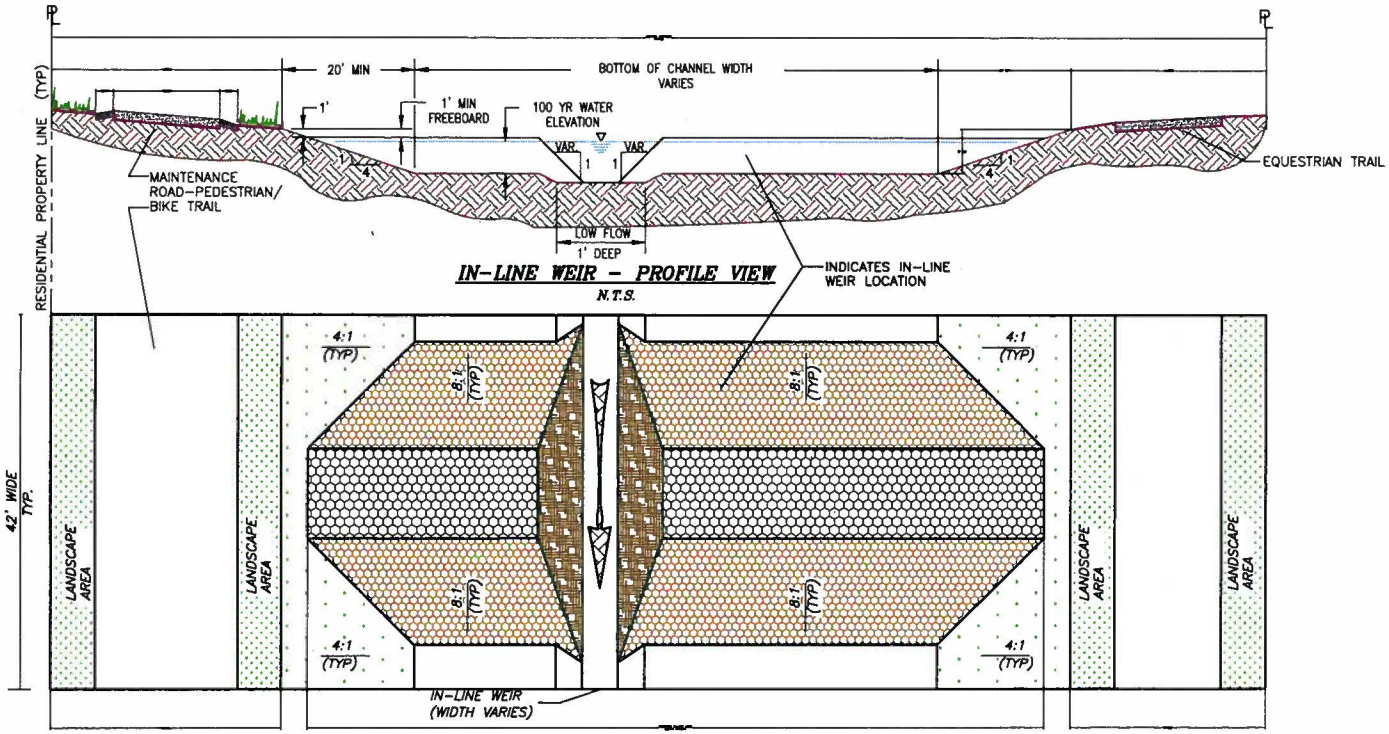
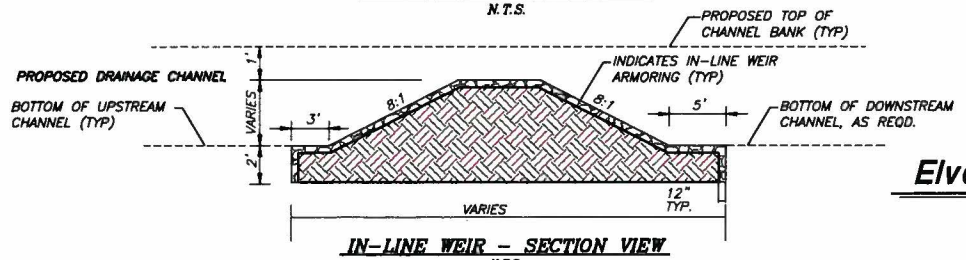


Exhibit 10b-2



IN-LINE WEIR - PROFILE VIEW
N.T.S.

IN-LINE WEIR - PLAN VIEW
N.T.S.



IN-LINE WEIR - SECTION VIEW
N.T.S.

Exhibit 11
Elverta Cross-Channel Berm Detail

Elverta Specific Plan

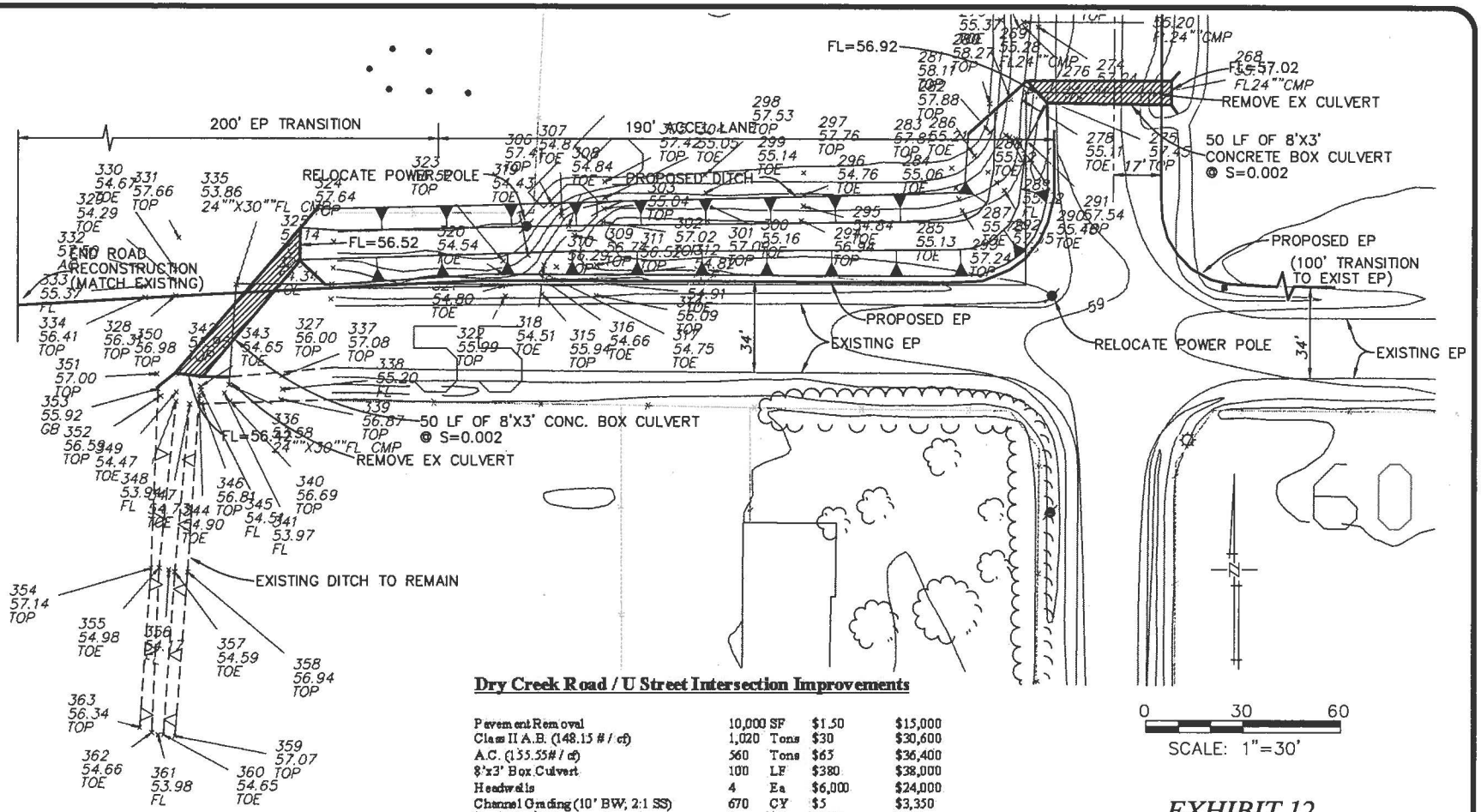
Sacramento County, California

Scale: 1"=NTS October 2013

MacKay & Somps
ENGINEERS PLANNERS SURVEYORS

7501-30

10-18-2013 14:26:27 drellark P:\7501\master plans\Elverta DMP\Exhibits\Exhibit 11 - Cross-Channel Berm Details.dwg
There are no xreferences in this drawing.



Dry Creek Road / U Street Intersection Improvements

Pavement Removal	10,000	SF	$1.50	$15,000
Class II A.B. (148.15 # / cf)	1,020	Tons	$30	$30,600
A.C. (135.55# / cf)	560	Tons	$65	$36,400
8'x3' Box Culvert	100	LF	$380	$38,000
Headwalls	4	Ea	$6,000	$24,000
Channel Grading (10' BW, 2:1 SS)	670	CY	$5	$3,350
Roadside Ditch Regrading	1	LS	$500	$500
Power Pole Relocation	2	Ea	$5,000	$10,000
Erosion Control	1	LS	$4,000	$4,000
			Sub-Total	$161,850
			35% Contingency	$56,648
			Grand Total	$218,498
			Use	$219,000

Project Description:

Improvements entail placement of 50 lf of 8'x3' box culvert across Dry Creek Road, placement of 50 lf of 8'x3' box culvert at an angle across U Street and interconnection of these culverts with 300 lf of trapezoidal ditch. The west leg of the intersection on U Street will need to be raised 1' to 1.5' to accommodate the culvert; the north leg (Dry Creek Road) by about 6" for the same purpose. Additionally, east and west bound intersection legs will be widened to 34' to allow for 5' shoulders each way. Dry Creek Road widening is part of the proposed Dry Creek Road project identified elsewhere in the C.I.P. Road project elsewhere in the C.I.P.

EXHIBIT 12
DRY CREEK ROAD
U STREET
INTERSECTION IMPROVEMENTS

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
ROSEVILLE, CALIFORNIA (916) 773-1189
JOB NUMBER: 7501-30 DATE: 10/18/2013

3.4 HYDROMODIFICATION MANAGEMENT PLAN

An assessment of potential hydromodification impacts due to development of the Elverta Specific Plan on the receiving waters within and downstream of the SP area was made by cbec ecoengineering, Inc. to inform the overall design of the planned multi-function open space corridors traversing the Project. These multi-function open space corridors are designed to provide drainage conveyance, flood control, water quality treatment, natural resources habitat, recreational opportunities, and aesthetic appeal, as practicable. The primary mechanism for attenuating urbanized runoff from the developed areas is through the integration of flood control measures into the design of the corridors, with the potential to also provide flow duration control of runoff due to the more frequently occurring storm events. The proposed flood control measures, as described in greater detail in Chapter 3.3, included a series of in-line cross channel berms spanning the width of the corridors with notches of varying dimensions.

The purpose of this assessment was to determine what additional controls or strategies were needed to minimize potential hydromodification impacts to the downstream receiving waters. Two possible strategies exist within the context of this project to achieve necessary flow duration control. First, it is possible to achieve the required flow duration control at the downstream end of each of the drainage corridors by creating additional low-flow attenuation (detention) behind the most-downstream in-line berms and integrating additional flow duration controls, i.e. specialized orifice plates, into these berms. An alternative strategy would be to implement additional incremental flow duration control at each in-line berm along the entire length of each of the corridors.

With the first option, significant amounts of additional detention storage and flow duration controls would be needed at four locations, one at the downstream limit of each of the three corridors as well as at the upstream compliance point at the Loop Road in Corridor C. With the second option, flow duration controls would be needed at each cross channel berm within the proposed limits of the corridors to achieve a similar degree of incremental flow duration control upon urbanization of the SP area.

This hydromodification assessment evaluated both options, i.e. the downstream attenuation option and the feasibility of implementing incremental flow duration control at each of cross-channel berm/weir locations for each of the corridors within the Specific Plan Area described above. The "incremental" approach seeks to fairly and evenly distribute the hydromodification impact mitigation requirements across the tributary sheds within each corridor, minimizes the overall land that has to be identified and preserved as open space for drainage purposes, and maximizes the habitat creation potential within the limits of the proposed drainage channels.

The results of the current hydromodification assessment identified the need for additional low-flow event detention storage and flow duration controls within each of the three channels to minimize potential hydromodification impacts to the downstream receiving waters beyond what would be required only for flood control. This necessitated additional widening of the drainage channel downstream of the Loop Road on the B-

corridor and throughout the on-site segments of the C-corridor (with the exception of the segment traversing the commercial center at the intersection of Elverta Road and 16th Street. Within the D-corridor, the significant flood attenuation to roughly 50% of existing peak flow rates as required to eliminate the flooding of the intersection of Dry Creek Road with U-Street also serves to reduce the hydromodification potential downstream of the project area to less than existing levels without requiring any further on-site channel excavation or widening.

Typical flow duration controls integrated into each cross-channel berm were simplified for modeling purposes and generally include a low flow orifice (e.g., 12 inches) and a V-notch weir of varying dimension (see Table 3 for the configuration of the modeled low and high flow orifices). The simplification of a specialized orifice plate as a low flow orifice plus V-notch weir for modeling purposes could be transformed into an appropriately sized orifice plate by replication of the stage-discharge relationship of each control structure.

Due to the rural nature of the ag-res densities approved within the on-site 600- and 700-series northern shed areas with lot sizes ranging from 1 to 5 acres per lot, it is anticipated that implementation of LID measures concurrent with development will mitigate for any increases in runoff both at the low flow and high flow events, thus not requiring further flood control or hydromodification mitigation. Alternatively, or in the case of the A-shed, previously identified flood control detention basins may be increased as modeled by Sacramento County's Sacramento Area Hydrology Model (SAHM) modeling software (see Appendix 9.1.1), along with implementation of flow duration control detention basin outlet works to mitigate the projected hydromodification impacts. Project-specific development proposals at the small-lot tentative map stage will have to be submitted to DWR for review and approval to demonstrate appropriate mitigation.

TABLE 3:
Flow Duration Controls

C-Corridor			
Condition	**River Station**	**Low Flow Orifices**	**High Flow Orifices**
Interim	119+00	3 x 11.5 inch	160° V notch w/ IE = 72.30 ft
Buildout	119+00	3 x 12.0 inch	6 x 5.0 ft x 1.0 ft box w/ IE = 71.60 ft
Buildout	97+90	2 x 12.0 inch	6 x 5.0 ft x 1.5 ft box w/ IE = 66.00 ft
Buildout	72+25	3 x 13.0 inch	60 ft x 1.5 ft culvert w/ IE = 60.50 ft
Buildout	57+50	3 x 12.0 inch	170° V notch w/ IE = 54.70 ft
B-Corridor			
Condition	**River Station**	**Low Flow Orifices**	**High Flow Orifices1**
Buildout	49+50	1 x 12.0 inch	2 x 3.5 ft x 1.6 ft box w/ IE = 61.40 ft
Buildout	23+70	1 x 15.0 inch	2 x 7.0 ft x 0.5 ft box w/ IE = 57.79 ft
Buildout	14+00	1 x 12.0 inch	120° V notch w/ IE = 54.25 ft
D-Corridor			
Condition	**River Station**	**Low Flow Orifices**	**High Flow Orifices [1]**
Buildout	73+20	-	114° V notch w/ IE = 66.88 ft
Buildout	61+77	-	113° V notch w/ IE = 64.20 ft
Buildout	43+70	-	3-ft wide parallel notch w/ IE = 59.92 ft
Buildout	36+75	-	113° V notch w/ IE = 58.40 ft
Buildout	24+74	-	2 ft wide parallel notch w/ IE = 58.4 ft
Buildout	18+90	1 x 48 inch	120° V notch w/ IE = 61.4 ft, 50 ft weir, crest El. = 62.82

4.0 DEVELOPMENT PHASING

As property ownership and/or developer involvement in ESP changes over time, the projected Phase 1 development area may change along with it. The following conceptual Phase 1 development plan was prepared on information available at the time this study was prepared, with the goal of providing flexibility in terms of which properties participate in the 1st phase of development. Phase 1 drainage and corridor habitat improvements have been designed in such a way that they will function in perpetuity on a stand-alone basis, as there is no way to predict if and when current non-participating properties will develop.

Each of the major drainage basins, including drainage Sheds B, C, and D addressed in this study, function independent of each other and as such, may present their unique phasing opportunities as well as constraints. The same applies to the individual properties within the ESP area. When modifications to the phasing plan are being proposed, the proponents thereof will need to provide the County DWR sufficient information in support thereof in accordance with the Agency's requirements to allow DWR to make the determination that proposed revised development phasing can occur in a responsible and safe manner and that potential impacts on existing downstream drainages are going to be fully mitigated to existing or better than existing conditions. Such information to be submitted will need to address the various DWR regulatory objectives within the drainage shed the subject property is located in, including appropriate flood control (mitigation of peak runoff volumes and stages), hydromodification management, and water quality treatment.

The current Elverta Owners Group is comprised of those property owners and developers with controlling interests in properties within the ESP area seeking U.S. Clean Water Act, Section 404 permits in order to be able to develop. In aggregate, they comprise the Phase 1 development area of the project. Of the total 1,744+/- acre Specific Plan area, the Elverta Owners Group owns or controls approximately 563+/- acres with the project as depicted in Exhibit 3.

As it is financially infeasible for less than 1/3rd of the land holdings to pay for the construction and associated mitigation of all drainage facilities in their entirety, including those located on non-developing non-participating properties, a facilities phasing plan had to be developed that would allow Phase 1 participants to develop in a safe and responsible manner consistent with all applicable requirements and regulations. This includes mitigation of any and all development impacts to existing or better than existing conditions not only at the downstream Plan Area boundary, but also at each location were drainage runoff flows from a developing property and/or drainage corridor onto a non-developing property.

To that end, this analysis has identified "compliance points" at each of those locations, points at which the analysis compares existing conditions impact with those projected to occur upon Phase 1 development after implementation of the drainage improvements stipulated in this study. "Compliance" with existing conditions, i.e. mitigation of all

projected impacts due to development, including increases to peak runoff rates, hydromodification, and water quality to existing or better than existing conditions can thus be evaluated. The following Table 4 compares peak flow conditions occurring under 'existing conditions' to those under 'proposed/developed conditions with mitigation' at each of the "compliance points".

As noted in Chapter 2.5 of this drainage study, a CLOMR for the existing conditions 100-yr floodplain will have to be filed with FEMA by the Elverta Owners Group (EOG) prior to submittal of any large-lot or small-lot tentative parcel maps (whichever comes first). Then, prior to placement of any fill within the mapped 100-yr floodplain, the EOG will need to process a CLOMR for the proposed conditions 100-yr floodplain with FEMA for approval.

TABLE 4:
PHASE 1 PRE- AND POST- DEVELOPMENT PEAK RUNOFF COMPARISON

Shed AA

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)		
			Existing	Phase 1	Developed
Downstream Compliance	-	-	95	94	88

Shed 702UP

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)		
			Existing	Phase 1	Developed
Downstream Compliance	-	-	29	23	26

Corridor B

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)		
			Existing	Phase 1*	Developed
Downstream of Ph1 Compl.	38+46	38+46	184	183*	n/a
Downstream Compliance	11+50	11+50	173	n/a	138

*Note: Phase 1 participants within B-shed modeled as fully mitigating their Phase 1 impacts on-site on an interim basis - future site-specific analysis to be submitted to DWR for approval.

Corridor C

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)		
			Existing	Phase 1	Developed
Non-participant	180+20	181+41	283	216	262
Downstream Compliance	162+22	162+21	316	265	286
Downstream of RR Levee	81+20	81+20	601	552	578

Corridor D

Location	Ex. Sta.	Dev. Sta.	100yr Flow (cfs)		
			Existing	Phase 1**	Developed
Downstream of U-Street	0+98	15+00	146	n/a	68
**Note: Phase 1 consists of buildout of Shed D					

(Phase 1 and Dev. Conditions results based on 100-yr 24hr storm with 10-yr storm starting WSE)

As noted in Table 4 above, peak flow conditions at all of the "compliance points" are mitigated to equal or better than existing conditions upon buildout of Phase 1 properties and associated drainage improvements described as follows and depicted in Exhibit 13: Proposed *Phase 1 Conditions Watershed Map*).

Shed "702UP and "A" improvement requirements under Phase 1:
Phase 1 development in these particular sheds is limited to a single 27-acre property, APN 202-0070-015, straddeling the common shed boundary between Shed 702UP and Shed AA. The property is zoned for up to 113 single-family residences under the 25% density bonus provision. As there are no distinct open channel drainages to be preserved or created within these sheds for flood conveyance, mitigation of drainage impacts incl. flood attenuation, hydromodification management, and water quality treatment is proposed to be handled by construction of a 0.41 ac-ft multi-purpose basin near the downstream boundary of Shed 702UP and another 3.5 ac-ft multi-purpose basin near the downstream boundary of Shed AA within the project area. The volumes of these basins may be constructed in phases over time, with each individual tributary project having to identify it's project-specific mitigation requirement and thus share of the ultimate basin to fully mitigate its impacts. Associated project-specific drainage studies will have to be submitted to Sacramento County DWR for review and approval prior to subdivision improvement plan submittal. Additionally, at the tentative map submittal stage, a location suitable for the ultimate basins will have to be identified.

Drainage Corridor "B" improvement requirements under Phase 1:
Currently, there are only 2 properties within the B-corridor shed area wishing to develop as part of Phase 1. APN 202-0080-58, a 6-acre parcel designated for up to 35 single-family residential dwellings under the 25% density bonus provision, is located between Loop Road west and Palladay Road. The northern portion of said parcel contains 0.7 acres of the proposed drainage corridor. Due to the effects of peak flow hydrograph timing, runoff from this property only needs to be treated for Water Quality impacts once hydromodification impacts are addressed. Without interim flood control as part of development of this parcel in Phase 1, combined peak flow downstream of this parcel on non-participating properties is less than under existing conditions.

The second Phase 1 participant within the B-corridor shed area is APN 202-0070-013, a 20-acre parcel designated for up to 130 single-family residential dwellings under the 25% density bonus provision. It is located immediately to the west of 16th Street, just south of the proposed drainage corridor. For it to develop, the applicant would have to construct an interim 1.5 ac-ft multi-use drainage basin on-site and then obtain off-site drainage easements to convey mitigated runoff to the existing natural channel. A project-specific drainage studiy will have to be prepared by the applicant and submitted to Sacramento County DWR for review and approval prior to subdivision improvement plan submittal. Additionally, at the tentative map submittal stage, a location for the needed temporary on-site basin will have to be identified.

Drainage Corridor "C" improvement requirements under Phase 1:
The proposed development phasing of properties within the "C" shed creates a more fragmented patchwork of properties wishing to develop as part of Phase 1 and those that are not participating in the Elverta Owners Group's efforts and thus not projected to develop in the foreseeable future.

Downstream of the proposed future Northborough development and the existing Rifle Ridge Estates subdivision, an existing concrete channel discharges onto a proposed Phase 1 development property in the ESP area. The proposed "C" corridor as modeled starts at this location. Approximately 1,300 LF of the "C" corridor will be constructed downstream of the Plan Area boundary at this location as part of Phase 1. It then crosses the proposed Loop Road and enters non-participating properties. As this upstream segment of the drainage corridor construction is intended to be permanent, the proposed culverts beneath Loop Road east to be constructed in Phase 1 are sized based on the mitigated peak flow rate. This 1,300 LF segment of the permanent drainage channel has sufficient capacity to fully mitigate the drainage impacts created by development of the tributary Phase 1 properties depicted on Exhibit 13.

The "C" drainage channel then continues in a southwesterly direction to its intersection with 16th Street in an existing unimproved condition. Assuming that a portion of 16th Street north of Elverta Road incl. the C-corridor culverts beneath 16th Street will be constructed as part of overall Phase 1 development, on the upstream side of 16th Street, there will be a step in grade down into the proposed culverts and the Phase 1 segment of the "C" corridor across the commercial center to be located at the northwest corner of the intersection of 16th Street with Elverta Road. To prevent scour and erosion, this grade differential will have to be armored as part of the proposed improvements.

Between 16th Street and Elverta Road the proposed "C" corridor turns southerly across the proposed commercial center, rather than following its natural alignment. This segment is a part of Phase 1 drainage improvements. The reasons for this proposed re-alignment are two-fold. First, the existing alignment snakes between two existing residences located on non-participating properties to the west of the proposed commercial center. Aligning the proposed channel on this course would require acquisition and condemnation of at least one of these structures. Second, although neither alignment alternative is ideal for the design of the commercial center, a crucial component of the overall land use master plan, the applicant's planner indicated the proposed alignment to nonetheless be a better land use fit. It does, however, require the acquisition of a couple of small, undeveloped non-participating properties just upstream of Elverta Road when the commercial center whishes to develop in order to avoid having to relocate a high-voltage power line tower as part of the center's drainage impact mitigation.

At Elverta Road, the proposed channel enters a temporary 54-inch diameter bypass pipe to be located within the Elverta Road right of way. It will carry upstream runoff from up to the 100-year event downstream to the west about 1,500 feet to avoid Phase 1 drainage impacts on the non-participating property (APN 202-0170-025) at the southwest corner of the intersection of Elverta Road and 16th Street.

The easternmost portion of sub-shed C70 located adjacent to the north side of Elverta Road is proposing to develop as part of Phase 1. Under existing undeveloped conditions, runoff from this property flows overland into a roadside ditch running westward along the north side of Elverta Road. Just east of the intersection with 16th Street, the ditch enters a small culvert and crosses Elverta Road to the south. After continuing westward for a very short distance in an open ditch, it enters another small culvert that crosses 16th Street. It then discharges onto the aforementioned non-participating property owner.

For this Phase 1 property in sub-shed C70 to develop and not cause drainage impacts on non-participating downstream properties, it will have to construct a small temporary on-site detention basin with an approximate flood control volume of 1.1 ac-ft. Under interim Phase 1 conditions, this basin will discharge into the existing roadside ditch along Elverta Road at existing conditions runoff rates. At buildout, the interim basin can be eliminated, as drainage mitigation will be provided within the ultimate C-corridor. At that time, drainage conveyance will be achieved by a permanent trunk drainage pipe to be located in Elverta Road. It will take the place of the existing roadside ditch when Elverta Road is widened as part of overall development. This trunk drainage pipe will run westerly within Elverta Road and ultimately discharge into the proposed drainage canal west of 16th Street.

Downstream of non-participating property APN 202-0170-025, the remaining on-site section of the "C" corridor is proposed to be constructed to its ultimate condition as part of Phase 1 improvements. Just downstream of the aforementioned non-participating property, the proposed channel widens significantly on account of attenuation requirements to manage hydromodification impacts. A cross-channel berm with a notched opening located just upstream of the Plan Area boundary will allow peak flow mitigation to existing conditions as well as hydromodification management through flow duration control so as to not cause downstream flood and erosion impacts. The proposed drainage channel will discharge through this flow duration control structure to the existing downstream drainage at existing grade. No additional downstream off-site improvements will be required on this corridor under either phased or built out conditions.

Buildout of this segment of the C-corridor provides sufficient hydromodification management volume and flood control attenuation to allow all additional participating Phase 1 properties located west of 16th Street to develop without requiring further interim drainage facilities. See Exhibits 3 and 13 for a depiction of these Phase 1 properties.

Drainage Corridor "D" improvement requirements under Phase 1:
The "D" corridor will be constructed in its entirety as part of Phase 1 improvements, as its entire length is located on participating properties. This includes downstream culvert and improvements at the intersection of Dry Creek Road with U-Street as depicted on Exhibit 12.

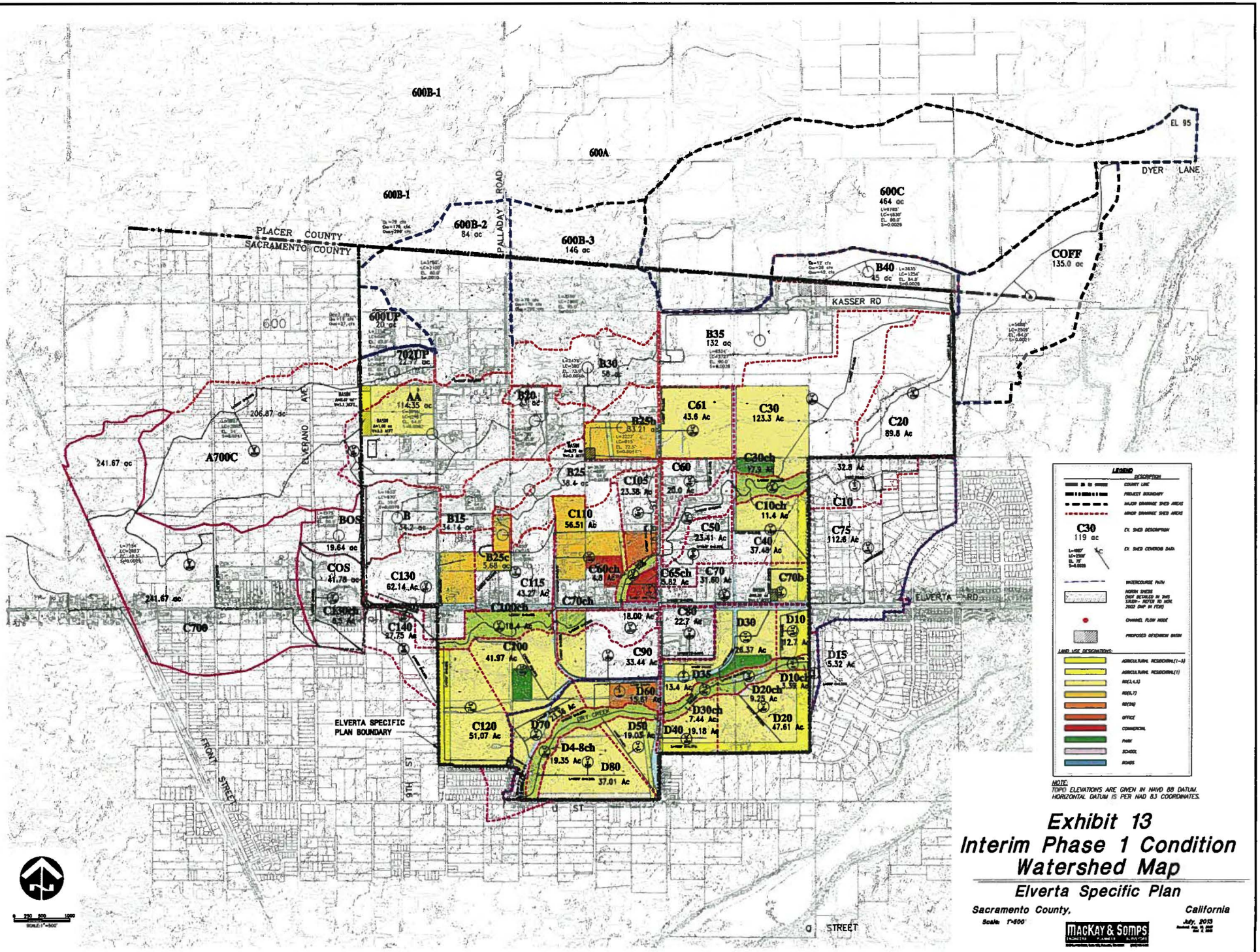


Exhibit 13
Interim Phase 1 Condition Watershed Map

Elverta Specific Plan

Sacramento County, California

Scale 1"=500'

July, 2013

MacKay & Somps

5.0 WATER QUALITY

In an urban environment, untreated post-development stormwater runoff may include a number of pollutants, including, but not limited to sediment, nutrients, trash, metals, bacteria, oil and grease, and organics/pesticides. Such pollutants have documented harmful effects on the natural environment. Under the federal Clean Water Act, stormwater discharges are therefore regulated through the National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permits. Regionally, the Central Valley Regional Water Quality Board issues and enforces NPDES stormwater permits. Through the Phase 1 Sacramento Areawide NPDES Municipal Stormwater Permit the local agencies regulate and manage the quality of urban runoff throughout their jurisdiction, including runoff from new development such as the Elverta Specific Plan.

The general purpose of the proposed water quality treatment features to be implemented in the Elverta Specific Plan is to reduce the urban runoff pollution from the proposed development to the maximum extent practicable (MEP). It is intended to satisfy the regulatory requirements of the Sacramento Areawide NPDES Permit. The goal of the identified treatment measures is to protect the quality of the proposed drainage corridors and the restored and enhanced wetland and riparian habitat being created within them.

At buildout of the various individual development proposals contained within the Plan Area, the network of water quality treatment facilities proposed will function in aggregate to reduce the projected pollutants to the maximum extent practicable. The network of envisioned facilities will include site-specific source control measures such as small-scale Low Impact Development (LID) measures, Best Management Practices (BMPs), point-of-discharge water quality treatment basins, and vegetated swale discharges there from.

Low Impact Development (LID) emphasizes the conservation and use of available on-site natural resources to protect the environment – especially water. Small-scale LID projects dispersed throughout the watershed combine with point-of-discharge water quality treatment basins, in-channel flood control and hydromodification management to manage post-development stormwater runoff and maintain or restore pre-development watershed conditions.

In general, LID replaces the traditional development approach of conveying runoff through miles of costly pipes to acres of expansive detention ponds with an approach that mimics nature, using natural vegetation and small-scale treatment systems to retard, treat, evaporate, and infiltrate stormwater runoff close to where it originates. LID reduces the effective imperviousness of development, thereby increasing stormwater infiltration and thus helping to recharge groundwater resources when the on-site soil profiles can accommodate such infiltration. Typically, reducing the amount of runoff at the source in the first place not only reduces the need for point-of-discharge facilities (detention and water quality basins), but reduces impacts on receiving waters carrying stormwater.

Based on the on-site soil types and as noted in the soils report, however, *the soil landscape of the project area is mostly treeless and is underlain by soils with strong*

rooting and permeability constraints (reference Section 2.4 *Soils* and the *Elverta Soils Report* included in the Appendix). Additionally, the proposed wetland and riparian restoration proposed for the open space drainage corridors would benefit from the increased recurrence of low volume runoff typical of urban development during summer months due to over-irrigation and washing of cars. Whereas developments typically seek to prevent such summer runoff from entering the receiving waters, in this Plan Area, the proposed landscape and planting palette of the open space drainage corridors has been designed specifically with the intent of receiving such runoff. Projected inundation levels within the D-corridor based on summer nuisance flows and 2-yr design storm runoff are depicted in Exhibits 15 and 16 included in Chapter 7 of this study.

Note: the D-corridor was designed in 3D contouring to allow a more detailed hydraulic analysis and subsequent resources restoration design than would be required at this level of entitlement. This was done so that the D-corridor might be used as a prototypical example of how the trapezoidal cross sections incorporated into the 2-dimensional hydraulic HEC RAS model for the B- and C-corridors might be shaped and "naturalized" as part of the final design thereof.

As previously mentioned, it is not yet known what individual project-specific LID proposals will be forthcoming. The LID toolbox provides for of a variety of environmentally sound and cost-effective techniques including green infrastructure, conservation design, and sustainable stormwater management practices. New development will typically be able to maximize the benefit of advanced stormwater management through the implementation of a number of these tools in combination to replicate the predevelopment hydrology of the site.

The numerical benefits of actual BMPs and LID features specific to land use and site layout have not been considered in the analysis of point-of-discharge water quality basins required to fully mitigate the water quality impacts of this project on the receiving drainage channels. It is projected that these benefits will be calculated and accounted for prior to actual design of the water quality treatment basins, thus allowing these basins to be reduced in size and possibly even be eliminated (depending on the level of LID implementation).

The following Table 5 identifies water quality basin design parameters for each pipe outfall into the proposed drainage corridors based on the Stormwater Quality Design Manual for the Sacramento and South Placer Regions. The proposed dry-extended basins were designed to release 75% of the water quality volume in a minimum of 24 hours and 100% within 48 hours total. It is anticipated that they will be incorporated into the upland drainage channel buffers where feasible. In any case, the water quality treatment basins are to be integrated seamlessly into the adjacent landscape design so that they may become community amenities rather than fenced off nuisances that the community would rather turn its back to. Additional basin detail regarding the dry weather treatment in the form of specifically designed vegetation beds suitable to such an environment is described further in the Conceptual Habitat Development Plan (see Appendix 9.5).

Water Quality Flow (WQF) volume noted in Table 5 as calculated in accordance with the requirements of the referenced design manual ($WQV=P_0 \cdot A/12$) will be split off in specially designed flow separation structures located upstream of each basin, in-line with the drainage pipe conveying runoff from the development to the open drainage channel. Peak flows in the pipe system will thus bypass the water quality treatment basins, preventing larger runoff volumes from washing pollutants that have collected in the treatment basins into the receiving waters. The treatment basins will be discharged by gravity through calibrated structures into vegetated swales draining into the drainage channels. A typical conceptual configuration of a water quality treatment basin and grassy swale outfall channel is shown in the Conceptual Habitat Development Plans (see Appendix 9.5).

Table 5: Prelim. Water Quality treatment Basin Sizing

SHED	AREA [ac.]	WT. PI	STORAGE (FT.) (from Fig. E-3)*	VOL. (AC.FT) DRY	"C"	WQF (CFS)	Inflow Pipe (IN.)
AA	77.5	37.9	0.023	1.78	0.27	3.74	21
702UP	22.8	15	0.013	0.30	0.14	0.58	12
B10	45.0	25.0	0.018	0.81	0.20	1.61	15
B20	105.7	26.2	0.019	2.01	0.20	3.89	21
B30	46.4	23.7	0.018	0.84	0.19	1.60	15
B40	43.3	56.9	0.035	1.51	0.39	3.01	18
B50	15.0	17.6	0.014	0.21	0.16	0.42	12
B60	37.4	50.0	0.031	1.16	0.34	2.28	15
B70	28.5	49.2	0.031	0.88	0.33	1.71	15
B80	16.1	47.7	0.029	0.47	0.32	0.94	12
B85	10.0	50.0	0.031	0.31	0.34	0.61	12
B90	35.2	51.0	0.031	1.09	0.35	2.19	15
C10	32.8	10.0	0.01	0.33	0.11	0.65	12
C20	105.6	24.5	0.018	1.90	0.20	3.71	21
C30	111.5	37.2	0.023	2.56	0.26	5.30	24
C40	37.5	46.9	0.03	1.12	0.32	2.16	15
C50	23.4	60.4	0.038	0.89	0.41	1.74	15
C65	5.8	90.0	0.065	0.38	0.73	0.77	12
C60	62.1	55.6	0.035	2.17	0.38	4.21	24
C70	42.2	62.9	0.039	1.65	0.43	3.28	21
C75	112.6	10.0	0.01	1.13	0.11	2.24	15
C80	22.7	62.7	0.039	0.89	0.43	1.76	15
C90	33.4	46.3	0.03	1.00	0.32	1.90	15
C100	42.1	53.3	0.032	1.35	0.36	2.74	18
C105	27.2	64.7	0.04	1.09	0.45	2.19	15
C110	62.7	64.2	0.04	2.51	0.44	5.00	30
C115	43.0	63.7	0.04	1.72	0.44	3.39	21
C120	51.1	48.1	0.03	1.53	0.33	3.01	18
C130	51.0	48.6	0.03	1.53	0.33	3.03	18
C140	27.8	10.0	0.01	0.28	0.11	0.55	12
D10	12.7	43.1	0.027	0.34	0.30	0.68	12
D15	5.3	10	0.01	0.05	0.11	0.11	12
D20	47.6	38.5	0.024	1.14	0.27	2.33	15
D30	26.4	50.3	0.031	0.82	0.34	1.62	15
D35	13.4	57.7	0.035	0.47	0.39	0.94	12
D40	19.2	42.8	0.027	0.52	0.30	1.02	12
D50	19.0	46.5	0.03	0.57	0.32	1.09	12
D60	15.6	63.5	0.04	0.62	0.44	1.23	12
D70	22.9	60.5	0.038	0.87	0.41	1.70	15
D80	37.0	45.1	0.028	1.04	0.31	2.06	15

Another key benefit of extensive LID implementation is the reduction of Stormwater runoff, specifically during the more frequently occurring low flow events. The numerical benefits of such runoff reduction may eventually be accounted for in the final design of the drainage conveyance channels, possibly resulting in reduced hydromod. attenuation

requirements. However, concrete development proposals that include specifics on proposed LID implementation are required before any resulting benefits thereof can be accounted for. Absent these specifics, the design included in this storm drainage master plan does not provide for any numerical credits for such features.

6.0 MISCELLANEOUS DRAINAGE SYSTEM COMPONENTS

Piped Trunk Drainage System:

The Trunk Drainage Shed Map (Exhibit 14) depicts a conceptual trunk (30 acres) pipe storm drainage system. In absence of proposed small-lot subdivision layouts, the Drainage Shed Map delineates the relative location of the trunk storm drainage pipe outfalls based on current interpretations of the proposed land use plan and drainage shed boundaries. Pipes were sized based on flows determined using the Nolte design method. To evaluate the hydraulic grade line elevations (HGL's) within the proposed pipe system, starting water surface elevations at the pipe outfall locations was based on the 10-yr storm event within the major drainage channels. Average pipe slopes of 0.2 percent (S=0.002) were then extended up the length of each pipe system. Based on the County's design standards regarding unimproved lands with no current development plans, the future gutter flow line is assumed at one and on-half feet (1.5') below the natural ground elevation for purposes of pipe hydraulics calculations.

Backwater elevations due to submerged outlet conditions of the furthest-downstream weirs near the western (downstream) Plan Area boundary were incorporated into the on-site drainage analysis of the open channels. The pipe outfalls incorporated these elevated starting water surface elevations into the HGL analysis to verify adequate cover on proposed schematic trunk drainage facilities. Lower-lying areas within the Plan Area, especially near the intersection of U-Street and Dry Creek Road will ultimately require some fill to be placed over the site and the piped system to provide adequate HGL cover. Plenty of usable fill dirt should become available as a result of the required channel excavations, but it is not yet known exactly if and how much fill may actually be needed. Future tentative map layouts and additional site-specific detailed grading and drainage analyses will be needed to establish actual needs.

The trunk storm pipe outlet locations, and drainage basin boundaries are considered to be schematic in nature, and are subject to future revisions based on the detailed lotting and development plans that will be prepared as part of the Tentative and Final Mapping process for individual projects within the ESP project area. Ultimately, it will be the responsibility of the future Tentative Map applicants to prove substantial compliance or reasonable alternatives to the approved Master Storm Drainage Study.

Drainage Corridor Maintenance Access:
Many areas of the drainage channels are adjacent to streets. In these locations, maintenance access is available from the adjacent street. A separate joint-use recreational/maintenance path subject to the County's and Rio Linda Park District's approval will be provided elsewhere. At appropriate intervals yet to be determined, maintenance access ramps will be provided to the drainage channel bottoms as required by County Water Resources Division improvement standards.

Trails:
The Elverta Specific Plan's Community Advisory Council has stressed their desire for a significant recreational trail system within the Plan Area. The drainage corridors are major components of that system. They will include an improved surface for a multi-use pedestrian/bike path on one side of the corridor. Separate equestrian trails may be provided on the opposite site where practicable. As described above, the pedestrian/bike path may be combined with the County's service/maintenance access path, while equestrian trails would be kept separate from both.

Along the edges of the B- and C-corridors where hydromod. attenuation requirements dictated extensive channel widening out to the edges of the open space corridor, there will be limited upland open space buffer available beyond the top of bank to locate the trail in. In such cases, the trail is proposed to be located on a terrace to be incorporated into the channel bank above the 2-yr event water surface elevation. During infrequent storm events with a recurrence interval less than the 2-yr event, such trails would be allowed to flood. The flooding, however, is projected to last at most, a couple of days, before once again receding below the trail elevations. Alternatively, the trails may become part of the adjacent roadway frontage improvements, as may be allowed based on future subdivision layout.

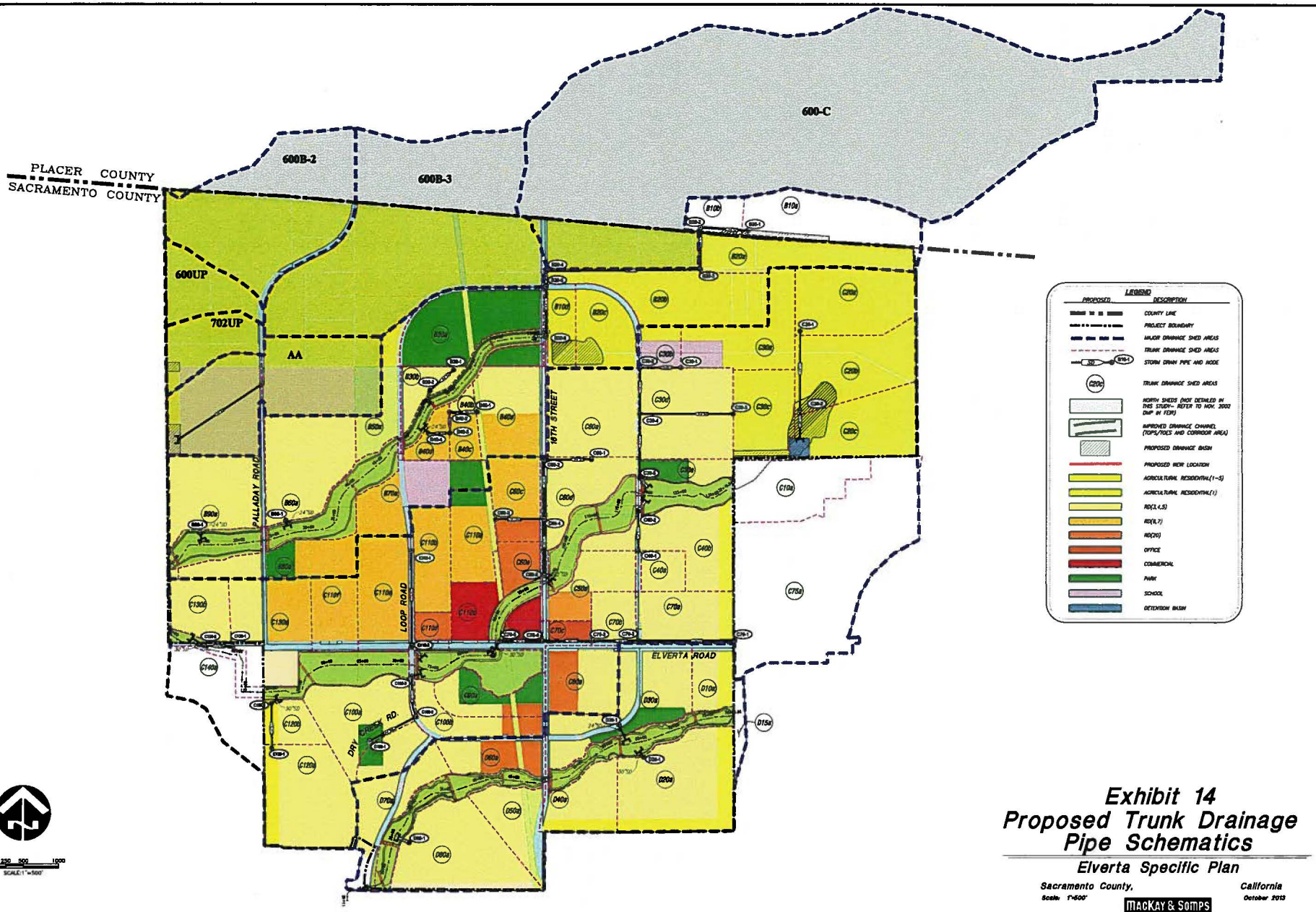


Exhibit 14
Proposed Trunk Drainage Pipe Schematics

Elverta Specific Plan

Sacramento County, California

Scale: 1"=500'

October 2013

MacKay & Somps

7601-30

7.0 NATURAL RESOURCES IMPACT & RESTORATION

The hydrologic connectivity of the historic vernal pool and swale system in the Elverta Specific Plan area has been dramatically altered since at least the 1930s by extensive modification of the historic drainage network via topographic and land use changes. The present-day system of channels and swales in the ESP area clearly exhibits various stages of hydrologic, geomorphic and ecologic degradation. Land use modifications for grazing and urbanization continue to cause geomorphic degradation in the form of channel incision.

Two approaches to stormwater management have traditional been followed, including: (1) construction of *an engineered stormwater channel* consisting of either trapezoidal or rectangular concrete- or grass-lined waterways; or (2) setting aside *a "preserved" channel* that responds to regulatory resource concerns. An alternative to either of these approaches is being proposed in the ESP, where existing ill-defined and degraded drainage corridors would be modified, stabilized, rehabilitated, and re-contoured in place to function more resiliently under future urbanized conditions and hydrology. As such, the D-corridor was designed and modeled in 3D contouring to allow a more detailed hydraulic analysis and subsequent resources restoration design than would normally be required at this level of entitlement. This was done so that the D-corridor might be used as a prototypical example of how the trapezoidal cross sections incorporated into the 2-dimensional hydraulic HEC RAS model for the B- and C-corridors might be shaped and "naturalized" as part of the final design thereof.

The enhanced, multiple use drainage corridors being proposed will incorporate hydromodification measures such as flow duration control structures and low impact design (LID) source control features. Upland buffers will feature multi-use pedestrian/bicycle trails on one side and, where practicable, equestrian paths on the other. Additionally, water quality/sedimentation basins at end-of-pipe discharge locations will be located within or near the limits of the drainage corridors, yet outside the limits of the actual drainage channels. At locations where the upland buffer area within the drainage corridors is insufficient to accommodate the required water quality basin footprint, they will be incorporated seamlessly in to adjacent landscaping as part of the adjacent subdivision design. (Full WQ treatment in accordance with the NPDES permit requirements of Sacramento County will result from a combination of LID measures and off-channel WQ treatment basins - see Chapter 5). These multi-objective drainage corridors will thus not only provide additional stability and resiliency for the channel system, but also improved water quality, habitat, recreational, and aesthetic function. "*Elverta Specific Plan - Drainage Corridors B, C, and D – Conceptual Habitat Development Plan*" by Restoration Resources (see Appendix 9.5) provides further details of this proposal.

The design of these conceptual plans allows for a complex of valley floor upland, riparian, and wetland habitats appropriate to the proposed site conditions and is based upon extensive soils studies, combined with models of future topographic and hydrologic conditions. In addition to the designed habitats, the plan requires the salvaging of

existing vernal pool inoculums and clay soils for later reapplication to proposed restored pools and other wetland features.

Using base maps of the overall corridor extents, the excavated drainage corridor, cross-channel berms, hydrologic models displaying frequency and depth of flooding, and soil profiles, Restoration Resources developed diverse habitats with species in each palette capable of adapting to wetter or drier conditions than what was originally modeled. The corridor excavation operations will, in many locations, cut through the existing duripan and into more readily drainable sub-soils, allowing for the establishment of wetland and transitional riparian vegetated habitats (reference the duripan profiles, Appendix 9.4). Salvaged topsoil from excavation operations will be reapplied to over-excavated channel and bank habitats to meet proposed finished grades and create a 6 inch planting medium. Seasonal wetland basins and terraces designed within the corridor bottom will provide valuable wetland species habitat and will be excavated below the modeled corridor bottom. The fill generated from this habitat construction activity will be used on the side slopes of the excavated channel, creating gentler slopes and increased habitat diversity while maintaining or increasing the minimum hydraulic cross section of the drainage channel determined utilizing HEC RAS modeling. This method of maintaining the average channel cross section reflected in the calculations this drainage master plan is based on, while undulating the channel bottom and side slope to create natural looking drainages capable of supporting sustainable habitat of a wide variety, will ensure the hydraulic integrity of the flood control as modeled (increasing the hydraulic cross section without modifying the proposed cross-channel berms and outlet structures/notches will enhance the storage capacity of the drainage channels, thus increasing conveyance attenuation and thus overall flood control).

The plan is designed to create naturalistic perennial drainage patterns with varying channel widths and depths and off-channel seasonal and perennial wetland basins that will support seasonal wetland and freshwater marsh habitats. To that end, very detailed 2-dimensional hydraulic analyses of low flow conditions occurring during summer nuisance and 2-year design storm events were prepared by cbec, Inc. for the D-corridor drainage channel using SRH2D modeling software. Exhibits 15 and 16 depict the resulting inundation levels calculated by the model. These inundation depths calculated for the D-corridor drainage channel were then extrapolated to the B and C corridor drainage channels using the water surface elevations (and thus inundation depths) calculated for the 2-year design storm event using HEC RAS as described in Chapter 3.4, thus allowing Restoration Resources to design appropriate habitat mosaics for these channels as well. (Note: the habitat restoration design for the B- and C-corridors as currently reflected in the plans by Restoration Resources as includes in Appendix 9.5 of this study has yet to be adjusted to reflect the latest channel widening based on the latest hydraulic modeling design. These adjustments will be made as part of the 404-permit processing and well ahead of any final drainage design).

The regularly inundated corridor bottom outside of the low flow channel and created wetland basins and terraces, but still within the 2 year flood zone, will support seasonally flooded riparian habitats such as riparian grassland, willow riparian woodland, and some

cottonwood riparian woodland. Less frequently inundated riparian habitats within the corridor and along the corridor side slopes are designed with appropriate plant species associated with cottonwood riparian woodland, oak riparian woodland, and the drainage corridor bank habitat types. On the upland grassland buffer outside the drainage corridor banks, the soils and depth to duripan were analyzed to determine the location of proposed vernal pools, grasslands, and oak plantings for the creation of oak savanna grassland and vernal pool grassland habitats. The overall goal of the restoration plan is to create a mosaic of upland and wetland habitats so that over time, a person walking through the drainage corridors on one of the designed trails 10 years after establishment will see a complex and dynamic system of diverse habitats, encompassing a wide variety of plants and animals interacting with each other and the surrounding environment.

The re-construction and enhancement of existing, ephemeral drainages within the ESP area will result in an initial loss of approximately 29 acres of seasonal wetlands, swales, and vernal pools. Ultimately, however, approximately 33 acres of wetlands (willow riparian, seasonal wetland, seasonal freshwater marsh, and vernal pools and swales) will be created and enhance in the proposed, multi-use corridors. An additional approximately 26 acres of transitional wetlands (cottonwood riparian, oak riparian, and riparian grassland) may be created dependent on year-to-year rainfall fluctuations or an increase in total water conveyance within the corridors. Consequently, there could be a net gain of up to almost 59 acres of wetlands associated with creation of the proposed drainage corridors, including creation of new freshwater emergent marsh, willow riparian scrub, and riparian woodland habitats where none currently exist. (Note: the habitat numbers listed will need to be updated based on the final design for the B- and C-corridors).

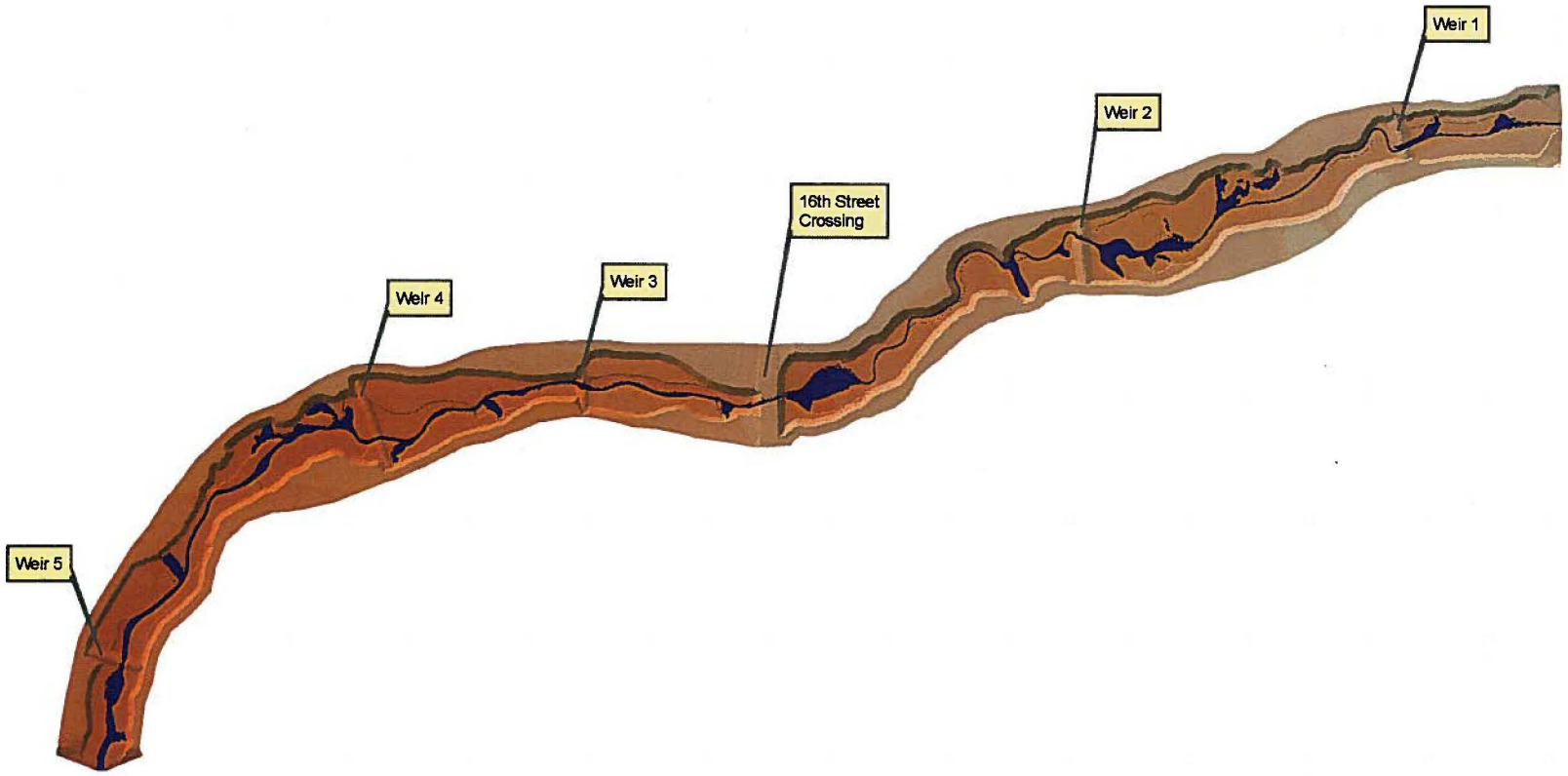
Table 6:
Elverta Specific Plan Proposed Post-Project Wetland Acreage

Drainage Corridor	Wetland Acres	Transitional Wetland Acres*
B (Northern)	7.94	11.07
C (Central)	17.51	3.16
D (Southern)	7.14	12.01
Total	**32.59**	**26.24**

* Dependent on yearly rainfall or increase in drainage runoff conveyance

Extant wetlands in the ESP provide minimal hydrologic input to the Sacramento River watershed (via the Natomas East Main Drainage Canal); transform and cycle elements; retain and remove dissolved substances; accumulate and retain inorganic sediments; and maintain plant communities and some level of energy flow within the system. However, these services are extremely limited as a result of the impacts of historic anthropogenic changes to the surrounding landscape, including the complete extirpation of pre-settlement natural communities via land use (e.g. agricultural) conversion, alteration and/or truncation of natural drainage patterns and hydrologic regime, and elimination of critical species habitat for a number of plant and wildlife species. While the ESP area is

not small, increasing urban build-out will eventually result in even more fragmentation of remaining wildlife habitat, contributing to the overall decline of native biodiversity within the area. Some of these impacts to local and regional wildlife resources can be mitigated to a great extent by the proposed creation of three perennial drainage corridors within the framework of the Elverta Specific Plan, thereby resulting in more ecologically complex and diverse habitats than presently exist.



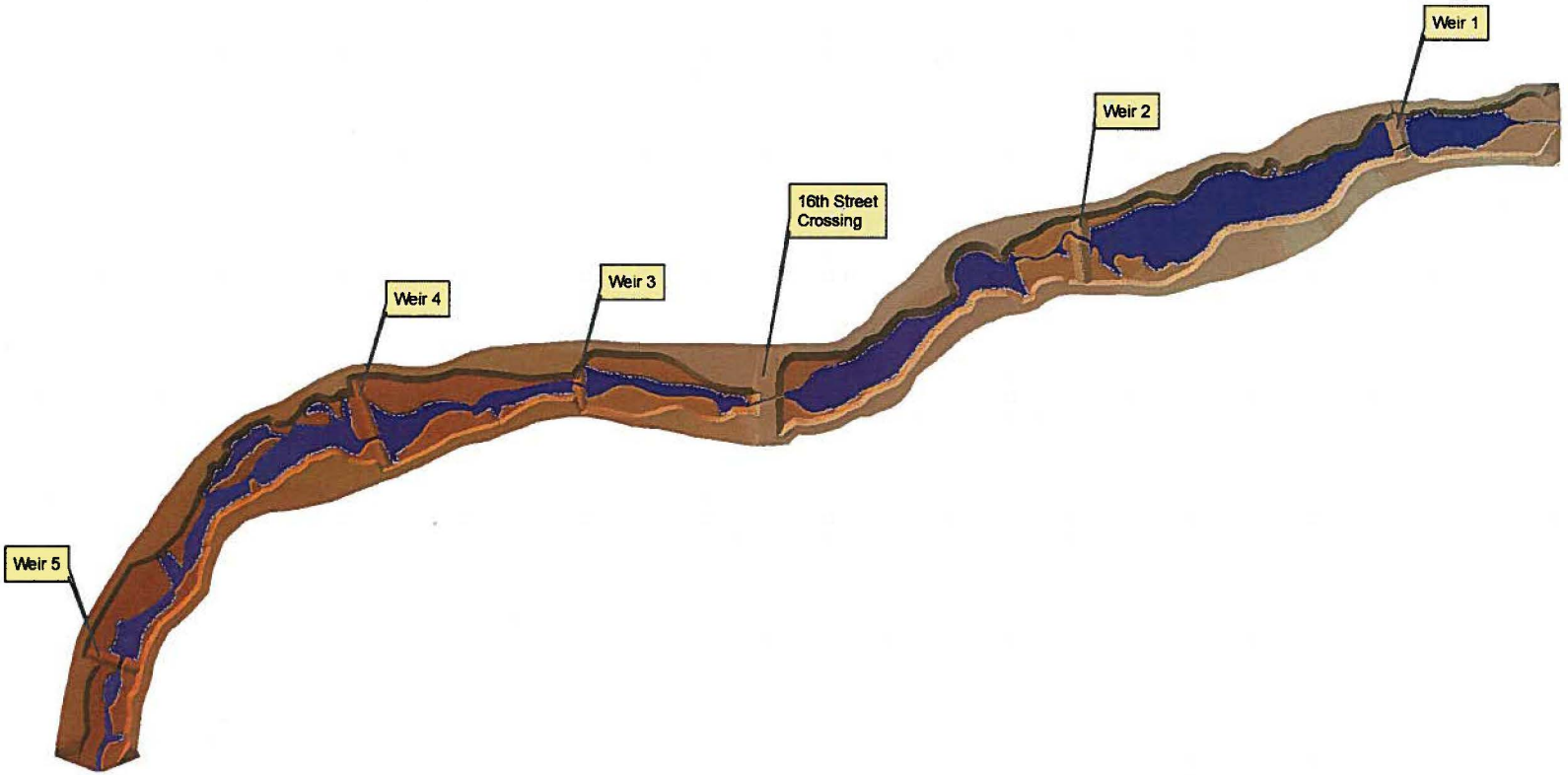
Notes:

cbec

Elverta Specific Plan

D Corridor Summer Flows Maximum Inundation

Project No. 09-1036	Created By: SLD	**Exhibit 15**



Notes:

cbec

Elverta Specific Plan

D Corridor 2-Year Maximum Inundation

Project No. 09-1036	Created By: SLD	**Exhibit 16**

8.0 REGIONAL DRAINAGE BASIN IMPACT ANALYSIS

As concluded in the Rio Linda Elverta Community Plan (RLECP) Update Final EIR and by the Sacramento Area Flood Control District, regional buildout of the NESG drainage basin has the potential to cause significant increases in the runoff volumes the receiving water of Steelhead Creek has to deal with and pump out to the American and Sacramento Rivers. This may cause adverse backwater conditions, exacerbating local flooding conditions. However, the RLECP Update Final EIR also concluded that the Rio Linda Elverta Community of which the Elverta Specific Plan is a part of makes up such a small share of the overall NESG drainage basin that buildout of the community alone *would have little impact on NEMDC* [Steelhead Creek] *flooding*.

According to the County of Water Resource Division's own analysis, buildout of the Elverta Specific Plan may cause an increase in the water surface elevation of Steelhead Creek of about 0.2 feet. At the same time the County acknowledged that the receiving water's 100-yr water surface elevations are not only controlled by peak flows, but also by the performance of the D15 pump station and the storage in its very wide floodplain.

As described in Chapter 3.1 of this study, SAFCA had a consultant analyze potential impacts on the D15 pump station. SAFCA's consultant concluded that rather than causing an environmental impact, buildout of the Elverta Specific Plan as proposed would cause an economic impact [on the D15 pump station] that could easily be mitigated with an impact fee. ended that rather than have the Project pay an impact fee equivalent to $55/acre, the Project should annex into the operations and maintenance district that funds ongoing operations of the pump station and associated facilities.[16]

As directed by the County of Water Resources Division staff, an existing backwater condition on Tributary G downstream of the confluence of the B- and C-channels at the former UP railroad embankment was analyzed under pre-and post-development conditions to ensure that any increases in the runoff volumes caused by development of the Elverta Specific Plan area would not negatively affect this existing backwater condition, i.e. that it would not cause an increase in the existing floodplain elevations upstream of the railroad embankment.

For the existing conditions analysis downstream to the former railroad embankment MacKay & Somps utilized information contained in the County's flood analysis prepared by Borcalli & Associates entitled the "Flood Insurance Study For Natomas East Stream Group Tributaries And The Natomas East Main Drain Canal, Sacramento, California" prepared in 1997. MacKay & Somps converted the original analysis into an HEC RAS model and then calibrated the existing conditions model to the results of the Borcalli study.

For the analysis reflecting buildout of the Elverta Specific Plan area, MacKay & Somps modeled a number of different scenarios to ensure compliance with existing FEMA

16 ESP Final EIR, Volume 1, Chapter 7, Pages 25-29; and Volume 3, Chapter HY-2

floodplain mapping, i.e. no negative impact on existing floodplain elevations. As shown in the summary table contained in the digital files of the appendix, under none of the developed conditions scenarios analyzed by MacKay & Somps do the floodplain elevations upstream of the former railroad embankment increase over mapped conditions. Instead, current modeling shows a slight decrease of the floodplain elevations by 1 to 3 inches, depending on the model scenario.

Section 9.0 and 10.0 of the Storm Drainage Master Plan include large electronic files and modeling data. These files are available upon request from the USACE, Sacramento Regulatory Office. Please contact Marc Fugler at (916) 557-5225 to request more information.