Chapter 11

WATER QUALITY AND FISHERIES

Setting

Water Quality

Several small streams flow through the Plan area; Secret Ravine Creek flows through the northwest portion of the Plan area, where it is joined by Miner's Ravine Creek from the east. An unnamed tributary enters Miner's Ravine Creek from the northeast quadrant of the Plan area. Dry Creek is the name of the stream downstream of the confluence of Miner's and Secret Ravine creeks.

Surface water quality data do not exist for the creeks in the Plan area. Several water quality investigations, however, have been conducted on Dry Creek downstream of the Plan area, near the City of Roseville Wastewater Treatment Plant (Finlayson 1977; Dewante and Stowell Consulting Engineers 1980). These studies were conducted to assess water quality impacts to the aquatic biota of Dry Creek from wastewater treatment plant discharges. Dewante and Stowell Consulting Engineers (1980) measured several water quality parameters in Dry Creek upstream of the treatment plant. Measured water quality parameters were:

- pH
- Temperature
- Dissolved oxygen
- Nitrate-nitrogen
- Nitrite-nitrogen
- Ammonic nitrogen
- Total Kjeldahl nitrogen
- Total phosphate (as phosphorus)
- Orthophosphate (as phosphorus)

Monitoring results indicate good water quality exists in Dry Creek upstream of the treatment plant (Table 11-1). Because Dry Creek water quality upstream of the treatment plant is largely influenced by the water quality of Secret Ravine Creek and Miner's Ravine Creek, it is assumed that water quality in the Plan area is good also. Furthermore, shade from the riparian vegetation in the Plan area further enhances water quality by keeping stream temperatures cool.

Table 11-1. Water Quality Data from Dry Creek Upstream of the Roseville Wastewater Treatment Plant Compared with Water Quality Criteria for Freshwater Aquatic Habitat

Parameter	Date				Freshwater Aquatic Habitat
	8-29-79	9-20-79	10-3-79	10-16-79	
pH	7.4	-	7.0	-	6.5-9.0
Water temperature (°C)	21.0	20.0	18.0	19.0	-
Dissolved oxygen (mg/l)	7.2	9.2	8.7	8.5	5.0 minimum
Nitrate (mg/l as N)	0.06	-	0.02	-	-
Nitrite (mg/l as N)	<0.01	-	<0.01	-	-
Total NH_3 (mg/l as N)	0.13	-	0.30	-	1.5
TKN (mg/l as N)	0.55	-	0.61	-	-
Total phosphate (mg/l as P)	-	-	0.16	-	-
Orthophosphate (mg/l as P)	-	-	0.16	-	-
Time sampled	0625	1025	1015	1230	-

Source: Dewante and Stowell Consulting Engineers (1980).
California State Water Resources Control Board (1963).
U. S. Environmental Protection Agency (1976).

Fisheries

Fish sampling by the California Department of Fish and Game (CDFG) (Gerstung 1965) has yielded a wide variety of coldwater and warmwater species in Secret Ravine Creek (Table 11-2). Many of these fish inhabit the creek on a year-round basis. Other species use the creek seasonally; chinook salmon (Oncorhynchus tshawytscha) and steelhead trout (Salmo gairdneri) migrate upstream each fall from the Sacramento River to spawn in the clean gravel riffles of the creek. After hatching in February or March, juvenile salmon migrate downstream to the ocean. Young steelhead, however, typically remain in the creek for 1-2 years before migrating to the ocean.

CDFG surveys in 1963 and 1964 indicated that 300-800 chinook salmon successfully spawned in Secret Ravine Creek (Gerstung 1965). Spawning gravel surveys indicate there is sufficient gravel to accommodate at least 1,000 adult salmon in Secret Ravine Creek (Gerstung 1965).

Jones & Stokes Associates sampled the fish fauna found in two 50 m reaches of Miner's Ravine Creek in the Plan area in April 1986. The objective was to determine species composition by collecting fish. During approximately 1 hour of sampling, six species were found, representing both resident warmwater and anadromous fish (Table 11-3). The numerically dominant species were Sacramento squawfish (Ptychocheilus grandis), with approximately equal numbers of blue-gill (Lepomis macrochirus), green sunfish (L. cyanellus), Sacramento perch (Archoplites interruptus), brown bullhead (Ictalurus nebulosus) and steelhead (age 1+).

Chinook salmon fry were not observed during sampling; the try may have been flushed out of Miner's Ravine and Secret Ravine creeks during the extremely high flows in February 1986.

Impacts

Proposed Project

Water Quality. Potential water quality impacts from the proposed project would be of a short- and long-term nature. Short-term impacts would result from grading or construction activities; long-term impacts would occur primarily as a result of runoff from urbanized areas. Because the creeks contain fish of high value (steelhead trout), and have contained chinook salmon in the recent past (1963-64), every precaution should be taken to ensure that existing water quality is maintained.

Short-Term Impacts. Grading and construction activities would cause an increase in erosion and would transport sediment to downstream areas where sedimentation would occur.

Table 11-2. Common and Scientific Names of Fish in Secret Ravine Creek

Common Name	Scientific Name
Chinook salmon	Oncorhynchus tshawytscha
Steelhead trout	Salmo gairdneri
Rainbow trout	S. gairdneri
Lamprey	Lampetrus spp.
Bluegill	Lepomis macrochirus
Green sunfish	L. cyanellus
Redear sunfish	L. microlophus
Brown bullhead	I. nebulosus
Sacramento sucker	Catostomus occidentalis
Sacramento squawfish	Ptychocheilus grandis
Hitch	Lavinia exilicauda
Goldfish	Carassius auratus
Mosquito fish	Gambusia affinis

Source: Gerstung (1965).

Table 11-3. Fish Sampled by Electrofishing in Miner's Ravine Creek, April 5, 1986

Species	Size Range (mm)	Number
Sacramento squawfish	68-189	9
Bluegill	69-120	3
Sacramento perch	48-54	2
Green sunfish	60-65	2
Steelhead trout	88-91	2
Brown bullhead	92	1
Total		19

Source: Jones & Stokes Associates.

Note: Sampling was conducted during high flows. Two 50 m reaches were sampled to determine species composition. Approximately 1 hour of sampling was conducted. Number of fish sampled was low for 1 hour of sampling.

Streambank alteration, and construction of roads, bridges, culverts, or off-street hiking trails through the open space areas would have greater impacts than development further from the creeks. Temporary turbidity and serious siltation problems would occur, particularly if soils enter the creeks, or if heavy equipment operates in the stream channel. Increased sedimentation would adversely affect salmon and steelhead because these fish require clean gravel and clear flowing water for successful spawning and incubation. Should these gravels become covered by silt deposits, incubating eggs in the gravel would be smothered. Aquatic insects, an important food source for many stream fishes, are also dependent on a clean stream bottom for survival.

Pollutants can also be transported from construction areas to water bodies. Improper handling practices can be a significant transport mechanism. Washwater and solvents are often dumped in areas close to streams. Cement mixers, machinery, and tools may be cleaned close to waterways. Burial of oil and chemical wastes near the construction site may lead to seepage of pollutants after a period of time. Heavy construction equipment can transport pollutants from construction sites to stream systems.

The degree which construction impacts water quality is partially determined by the time of various construction activities and rainfall. Summer construction activities will decrease the sediment and other pollutant levels that may impact water quality. Likewise, construction during the winter tends to result in more erosion and sedimentation.

Several mitigation measures could be employed to reduce erosion and sedimentation impacts to a less-than-significant level. Some of these measures are described in Chapter 12, Topography, Geology, and Soils. Additional precautionary measures that could be implemented during design and construction to minimize water quality degradation and reduce impacts to a less-than-significant level are described in the Mitigation Measures section below.

Long-Term Impacts. Long-term impacts to water quality would occur primarily as a result of runoff from urbanized uses that would enter Miner's Ravine and Secret Ravine creeks. Runoff from surfaces such as streets, driveways, parking lots, and landscaped areas typically contains oil, grease, heavy metals, pesticides, herbicides, fertilizers, and sediment. The concentrations and loads of pollutants carried in urban runoff are extremely variable for a variety of reasons. Concentrations fluctuate with factors such as the volume of runoff reaching storm drains, the amount of time that has passed since the last storm, the relative mix of land uses in the watershed, and the degree to which yard and street cleaning is occurring. Because of this variability, it is difficult to assign a "typical" or "average" pollutant concentration or loading to urban runoff. The best means of characterizing runoff is to monitor it over an

extended period covering the seasonal ranges, weather conditions, and land uses of the study area. Since the quality of Placer County urban runoff has not been accurately characterized, average urban runoff quality, as compiled by the U. S. Environmental Protection Agency (EPA), is shown in Table 11-4.

Additional data on concentrations of various constituents in urban runoff, developed in Fresno as part of the Nationwide Urban Runoff Program, are also presented in Tables 11-5, 11-6, and 11-7. These data were developed from detailed sampling of urban runoff from residential, commercial, and industrial areas in the 1981-82 and 1982-83 winters in Fresno. The data illustrate differences between the types of land uses, with industrial runoff causing the greatest adverse water quality impacts of the land uses evaluated.

Stream quality depends upon the actual runoff quality, runoff rate, and stream flow. The worst-case scenario for water quality of urban runoff does not necessarily coincide with the worst-case scenario for flooding. Pollutants tend to collect during dry periods and then create a pulse of high concentration with the first storm.

The project proposes to install sewer collection lines down Miner's Ravine and Secret Ravine. The potential long-term impacts are significant because if the sewer line leaks or breaks, the resulting discharges of raw sewage would cause serious water quality problems and threaten the fish populations in the creeks. These potential long-term impacts can be mitigated to a less-than-significant level by establishing design criteria for construction in the ravines. Chapter 13, Botanical and Wildlife Resources, describes this measure in detail.

To mitigate other potential long-term adverse impacts on water quality to a less-than-significant level, a list of potential runoff reduction measures is presented in the Mitigation Measures section below.

Fisheries. Potential construction impacts to fish resources are primarily water quality-related. Sediment deposited in streams can result in the degradation of spawning, rearing, and food-producing habitat. Construction-related activities have the potential to alter stream channel morphology, thereby directly impacting fish habitat, especially of the salmon and steelhead. These impacts can be reduced to a less-than-significant level by implementing design/construction-related measures to protect water quality.

Removal of riparian vegetation along streambanks can increase stream temperatures and reduce allochthonous (leaf litter) input. Increased temperatures may preclude summer rearing of juvenile steelhead in the project area, while the loss of allochthonous material could decrease invertebrate production, thereby affecting stream productivity as a whole. These impacts

Table 11-4. Typical Urban Runoff Water Quality

Parameter	Average	Range
TSS mg/l	415	147 - 2,223
BID mg/l	20	7 - 56
COD mg/l	113	48 - 170
Total nitrogen mg/l	3.11	0.82 - 5.8
Phosphorus mg/l	0.62	0.15 - 1.00
Orthophosphate mg/l	0.46	0.15 - 1.00
Fecal coliforms (MPN/100 ml)	13,500	230 - 40,000
Arsenic mg/l	1 - 11	10 - 130
Cadmium* mg/l	11.9	0.7 - 25
Total chromium µg/l	4 - 14	10 - 110
Total copper µg/l	10 - 43	20 - 520
Lead µg/l	45 - 105	40 - 28,000
Nickel µg/l	4 - 23	20 - 120
Zinc µg/l	102 - 124	10 - 5,750

Source: U. S. EPA (1980); Galvin (1982).

* Average of Bellevue, WA; Castro Valley, CA; and Orlando, FL studies (Galvin 1982).

Table 11-5.

Ranges and Mean Concentrations of Conventional Constituents in Runoff

Constituent	Units	Concentration											
		Single-family residential			Multiple-family residential			Commercial			Industrial		
		N[a]	Range	Mean	N[a]	Range	Mean	N[a]	Range	Mean	N[a]	Range	Mean
Turbidity	NTU	49	1.7-900	57	72	2.0-320	49	71	1.6-300	31	83	1.0-800	160
Specific conductance	umhos/cm	121	15-222	56	230	17-606	66	256	8.0-808	90	285	96-9,960	404
pH	Standard units	97	6.5-8.3	7.2	169	6.4-8.8	7.1	203	6.1-8.9	6.9	221	4.9-7.5	6.7
Hardness	mg/l as $CaCO_3$	62	4.0-70	20	85	6.0-230	30	95	3.0-330	49	101	17-410	65
Alkalinity	mg/l as $CaCO_3$	65	7.0-73	19	89	5.0-150	25	96	1.0-257	36	101	5.0-221	84
Oil and grease	mg/l	11	1.0-8.0	3.0	17	0-5.0	1.5	18	0-26	4.2	15	0-80	11
Suspended solids	mg/l	64	9.0-1,540	246	86	8.0-4,300	634	94	2.0-3,720	264	100	51-2,770	684
Dissolved solids	mg/l	64	9.0-224	63	81	14-775	104	87	1.0-1,010	143	93	77-5,870	423
BOD-ultimate	mg/l	22	2.3-81	21	45	5.2-150	23	44	3.4-64	13	42	39-830	189
BOD-5-day	mg/l	22	2.1-53	15	45	3.1-110	15	44	2.7-30	8.4	42	30-330	149
COD	mg/l	34	27-290	106	58	31-1,400	157	50	12-460	95	56	150-2,580	620
Dissolved nitrogen	mg/l as N	64	0.63-21	4.8	86	0.8-33	5.5	83	0.7-66	8.1	79	4.0-54	20
Dissolved organic nitrogen	mg/l as N	62	0.19-12	2.6	84	0.10-25	3.0	85	0.01-27	3.6	86	0.01-38	12
Dissolved ammonia	mg/l as N	65	0.12-6.4	1.4	83	<0.01-7.3	1.4	87	0.22-17	2.2	86	0.90-20	6.6
Dissolved nitrite	mg/l as N	31	0.02-0.13	0.05	53	0.01-0.41	0.05	45	0.02-0.56	0.05	53	0.01-0.55	0.21
Dissolved nitrate	mg/l as N	25	0.18-2.1	0.75	45	0.10-6.6	0.89	39	0.14-4.5	0.78	42	0.01-3.3	1.2
Total phosphorus	mg/l as P	65	0.10-2.4	0.63	89	0.01-5.0	0.81	87	0.03-9.1	0.63	90	0.90-20	6.6
Dissolved phosphorus	mg/l as P	65	0.09-1.6	0.37	87	0.01-4.7	0.58	87	0.02-8.0	0.45	89	0.40-11	4.9
Dissolved orthophorphorus	mg/l as P	64	0.09-1.6	0.31	88	0.01-2.1	0.38	87	<0.02-4.8	0.28	66	0.60-9.0	3.7
Dissolved organic carbon	mg/l	36	4.4-550	75	58	4.6-460	64	47	4.4-260	54	56	20-2,300	190
Suspended organic carbon	mg/l	33	0.8-17	3.2	54	1.3-15	3.7	46	0.90-10	2.5	54	5.8-41	25
Dissolved calcium	mg/l	65	1.3-18	5.8	87	2.0-65	8.3	96	0.80-100	13.6	101	4.0-120	15
Dissolved magnesium	mg/l	65	0.01-6.2	1.3	87	0.20-16	2.1	96	0.10-22	3.5	101	1.6-26	6.4
Dissolved sodium	mg/l	65	0.70-18	3.9	87	1.0-49	6.8	96	0.60-37	6.8	102	5.7-1,800	74
Dissolved potassium	mg/l	65	0.80-9.8	3.3	87	0.8-19	3.4	96	0.30-15	2.9	99	5.2-62	24
Dissolved chloride	mg/l	64	0.60-14	3.4	88	0.60-65	5.1	95	0.20-31	5.5	102	4.8-3,000	112
Dissolved sulfate	mg/l as SO_4	61	4.2-27	8.3	88	3.6-76	12.2	95	3.1-190	21	102	<5.0-110	25
Dissolved silica	mg/l as SiO_2	44	0.34-27	3.0	68	1.5-25	4.7	64	0.50-44	3.2	74	1.6-30	5.4

[a] N = number of samples.

Source: Brown and Caldwell 1984.

Table 11-6.

Ranges and Median Concentrations of Metals in Runoff

Metals	Total recoverable metal concentration, ug/l											
	Single-family residential			Multiple-family residential			Commercial			Industrial		
	N[a]	Range	Median	N[a]	Range	Median	N[a]	Range	Median	N[a]	Range	Median
Priority pollutant metals												
Arsenic[b]	64	<1.0-8.0	1.0	87	<1.0-16	2.0	95	<1.0-17	2.0	16	1.0-67	14
Cadmium	31	<1.0-4.0	1.0	53	<1.0-6.0	1.0	49	<1.0-12	1.0	70	<1.0-4.0	1.0
Chromium	48	<1.0-40	8.5	70	1.0-62	15	68	1.0-37	11	86	<1.0-51	14
Copper	47	4.0-180	14	70	7.0-270	22	68	6.0-380	18	86	30-400	66
Cyanide[b]	5	<0.01	<0.01	5	<0.01	<0.01	6	<0.01	<0.01	3	<0.01	<0.01
Lead	63	15-2,100	170	91	25-940	170	95	9.0-1,200	100	107	16-360	74
Mercury	64	<0.10-8.6	0.10	88	<0.10-1.6	0.20	95	<0.10-0.50	0.10	107	<0.10-2.5	0.10
Nickel	62	1.0-85	11	91	2.0-310	19	94	1.0-120	10	107	4.0-98	24
Zinc	47	30-1,300	90	70	60-1,800	170	68	50-3,400	150	86	280-3,100	535
Other metals												
Aluminum	17	530-20,000	3,400	17	1,600-37,000	6,300	19	120-45,000	3,400	16	3,000-18,000	7,000
Iron	64	160-29,000	1,700	91	450-72,000	5,600	95	140-57,000	1,600	107	480-62,000	9,000
Manganese	32	20-480	110	38	40-1,600	200	46	30-1,700	280	37	170-1,600	360

[a]N = number of samples.

[b]Total arsenic and total cyanide.

Source: Brown and Caldwell 1984.

Table 11-7.

Ranges and Median Concentrations of Organics in Runoff

Constituent[a]	Concentration, ug/l											
	Single-family residential			Multiple-family residential			Commercial			Industrial		
	N[b]	Range	Median	N[b]	Range	Median	N[b]	Range	Median	N[b]	Range	Median
Priority pollutant organics												
Aldrin	16	<0.1	<0.01	27	<0.01-0.02	<0.01	24	<0.01	<0.01	19	<0.01	<0.01
Chlordane	16	0.10-0.30	0.10	26	<0.10-1.2	0.10	23	<0.10-0.30	0.10	19	<0.10-0.30	<0.10
DDE	16	<0.01-0.01	<0.01	27	<0.01-0.06	<0.01	24	<0.01-0.01	0.01	19	<0.01-0.03	0.01
DDT	16	<0.01-0.01	<0.01	27	<0.01-0.01	<0.01	24	<0.01	<0.01	19	<0.01	<0.01
Dieldrin	16	<0.01-0.01	<0.01	27	<0.01-0.02	<0.01	24	<0.01-0.01	<0.01	19	<0.01-0.02	<0.01
Endosulfan	16	<0.01-0.01	<0.01	27	<0.01	<0.01	24	<0.01	<0.01	19	<0.01-0.02	<0.01
Endrin	16	<0.01-0.01	<0.01	27	<0.01	<0.01	24	<0.01	<0.01	19	<0.01	<0.01
Lindane	16	0.01-0.06	0.03	27	<0.01-0.03	0.01	24	0.01-0.03	0.01	19	0.01-0.27	0.03
PCB	16	<0.10	<0.10	27	<0.10	<0.01	24	<0.10	<0.01	19	<0.10	<0.10
Phenol	5	13-35	18	9	6.0-41	16	9	6.0-52	17	5	8.0-500	20
Other organics												
Diazinon	16	0.11-1.1	0.27	27	0.06-8.1	0.22	24	0.13-18	0.39	18	0.14-3.3	0.53
Dibromochloropropane	4	<0.003-0.003	<0.003	7	<0.003-0.004	<0.003	8	<0.003-0.01	<0.003	7	<0.003-0.005	<0.003
Malathion	16	0.19-13	0.99	27	0.08-14	0.49	24	0.08-1.4	0.23	18	0.20-3.0	0.44
Methoxychlor	16	<0.01-0.19	<0.01	27	<0.01-0.02	<0.01	24	<0.01	<0.01	19	<0.01-0.03	<0.01
Methyl parathion	16	<0.01-0.03	<0.01	27	<0.01	<0.01	24	<0.01-0.03	<0.01	18	<0.01	<0.01
Parathion	16	<0.01-0.92	0.13	27	<0.01-2.5	0.06	24	<0.01-0.90	0.09	18	<0.01-0.38	<0.01
Silvex	16	<0.01-0.03	<0.01	26	<0.01	<0.01	23	<0.01	<0.01	19	<0.01-0.07	<0.01
2,4-D	16	<0.01-1.7	0.07	26	<0.01-3.7	0.08	23	<0.01-0.63	0.01	19	<0.01-3.2	0.03
Trithion	16	<0.01	<0.01	27	<0.01	<0.01	24	<0.01	<0.01	19	<0.01-0.10	<0.01

[a]The samples were analyzed for the following organics but concentrations were always less than the analytical detection limit: polychlorinated napthalenes, DDD, heptachlor, heptachlor epoxide, mirex, perthane, toxaphene, ethion, methyl trithion, methomyl, propham, sevin, 2,4-DP, 2,4,5-T.

[b]N = number of samples.

Source: Brown and Caldwell 1984.

could be reduced to a less-than-significant level by establishing design criteria for construction in the ravines, as detailed in Chapter 13, Botanical and Wildlife Resources.

As development increases, runoff from the Plan area (which would be channeled into Miner's Ravine Creek) may become flashy, and peak flows may occur more frequently. Streambed scouring may occur in response to flashy runoff, displacing valuable spawning gravels from Miner's Ravine Creek. Furthermore, increased runoff, if not controlled, could flush salmon and steelhead fry out of Miner's Ravine Creek, most likely resulting in high mortality to young fish. These impacts could be reduced to a less-than-significant level by implementing runoff reduction measures.

Lower Intensity Alternative

The impacts would be less than those of the proposed project because of the reduced amount of development.

General Plan Alternative

The General Plan Alternative is essentially identical to the proposed Specific Plan. Therefore, the analysis in the Draft EIR is limited to the following three impact areas: Chapter 4, Land Use; Chapter 7, Transportation; and Chapter 15, Visual Quality.

No-Project Alternative

No impacts would occur.

Mitigation Measures

Proposed Project

Water Quality

Implement Precautionary Measures During Design and Construction to Minimize Water Quality Degradation. The degree of environmental degradation that would occur is greatly dependent upon the precautions taken during design and construction. The following sampling of mitigation measures would help to ensure maintenance of water quality. These mitigation measures may be modified somewhat as a result of conditions imposed by various regulatory agencies; therefore, the following list should not be regarded as including all the possible mitigation measures that would be implemented:

Design Measures

- Design stream crossings such that the approaches are at right angles.

- Design the creek crossings based on a hydrologic analysis of the contributing drainage area in conjunction with historic flow records, and size structures for the 100-year event. The crossings should be designed to minimize flow restrictions and localized high velocities. Channel bottoms above and below the crossing should be rocked.

- Design creek crossings as bridges where appropriate.

- Design culverts for creek crossings as arch culverts. The most desirable creek crossings from a fisheries standpoint have an open bottom consisting of native material (Evans and Johnston 1980). Preferably, it should retain the same bottom width as the natural channel. The following criteria should be used to select the specific location of the crossing site:

  - There should be no sudden increase in gradient or water velocity for at least 100 feet above, below, or at the crossing location.

  - The channel gradient should be as near zero as possible.

  - The stream channel should have similar alignment for at least 100 feet above and below the crossing.

- Obtain a CDFG 1601-03 Permit (Stream or Lake Alteration Agreement) in order to construct the creek crossings. If water for construction purposes is to be extracted from the creeks, the 1601-03 Permit should include permissible water volumes to be extracted on a daily basis. The site(s) for extraction should be selected to avoid siltation.

Construction Measures

- Minimize construction activities in creeks and floodplains.

- Restrict construction activities in creeks to summer low-flow periods (June-September) to minimize sediment impacts to spawning and egg stages of salmon and steelhead. Spawning for chinook is typically October-December. Spawning for steelhead is typically November-March or April.

- Prohibit operation of construction equipment in flowing water.

- Limit construction activities near streams to the smallest possible area. Final in-channel debris cleanup should be done by hand.

- Prohibit construction-related by-products (oil, cement, etc.) from discharging into stream waters.

- Minimize surface disturbance as much as possible.

- Dispose of excavated material away from water courses in an appropriate manner.

- Promptly revegetate cleared areas with native plants.

- Isolate any chemicals used and neutralize effects.

- Collect and remove pollutants such as sanitary wastes and petroleum products from the job site.

- Remove riparian vegetation only when absolutely necessary. Replace with native riparian plants.

- Prepare a spill prevention and countermeasure plan prior to project construction.

- Use chemical toilets at all construction sites to prevent further bacterial and nutrient contamination of the creeks.

- To minimize water quality impacts during construction of the creek crossings, construct a small water retention structure upstream of and beyond the construction envelope. The water retention structure should be constructed of cement sacks or other nonerosive materials. A temporary sediment detention basin should also be constructed downstream of the construction incorporating clean gravel and coarse sand to prevent downstream movement of sediment generated from construction activities. Water from the upstream impoundment should be pumped or drained by pipe to the sedimentation detention basin, thus bypassing the construction envelope and minimizing siltation problems. Before the wet season, the sediment detention basin should be cleaned of accumulated sediment. At this time, the water retention structure and sediment detention basin should be dismantled and the areas restored to their natural grade in preparation of high flows during the winter.

Prepare and Implement an Erosion and Sediment Control Plan. The following measures should be considered:

- Protective mulches and coverings should be used to prevent erosion from rainfall impact and runoff, and from the action of wind on disturbed soil such as cut

and fill slopes. Types of mulch to be considered include: straw, straw and hay, punched straw, net-anchored straw, tackifiers with straw, woodchips, sawdust, wood fiber, chemical mulch, and jute netting. Hydroseeding/hydromulching should also be considered. (Hydroseeding/hydromulching is the process of spraying seed, mulch, and fertilizer using a jet of water applied under pressure.)

- Slopes and other graded areas should be protected from runoff. Methods to be considered include: temporary diversion dikes, permanent diversion dikes, interceptor ditches, slope drains (down drains), flexible down drains, rock-lined ditches, and diversions.

- Sediment traps and detention basins should be considered as methods to trap sediment at construction areas to prevent clogging of drainage control structures and reduce sediment runoff. Types of sediment traps include filter berms, straw-bale barriers, filter inlets, vegetative filter strips, and culvert risers.

- Energy dissipators should be considered at all outlets discharging on erodible soil. The energy dissipator may be used temporarily during construction or may be permanent. Common types of energy dissipators are a level spreader, discharge apron, drop inlet, and hydraulic jump.

- When feasible, project construction should be limited to the drier months (spring and summer). During these months, construction should be minimized during adverse weather conditions (i.e., high winds).

- Dust palliatives suppress wind-borne dust to minimize the loss of topsoil and reduce erosion and sedimentation. Any topsoil removed during construction should be saved for future distribution over cut and fill areas to be revegetated.

- Grading in areas having a high erosion potential should be minimized. All cuts should be stabilized. If construction takes place during the rainy season, appropriate techniques such as covering exposed surfaces with straw, mulch, or other appropriate material should be applied.

Implement Runoff Reduction Measures to Reduce Long-Term Water Quality Impacts. Implement runoff reduction measures to trap pollutants, reduce flows, and promote infiltration and subsequent cleansing of runoff. Such runoff reduction measures include methods to: provide on-site storage; slow water flow to lengthen times of concentration; retain or retard flood flows in

storage areas such as impoundments; minimize impervious surfaces; and maximize percolation, evaporation, and evapotranspiration opportunities. Some of these methods provide water quality improvement, aesthetic enhancements, and can be less costly than conventional drainage systems. These methods are described below.

On-Site Storage. Individual parcels may provide on-site storage through a variety of methods. Commercial and industrial land uses can include retention pond capacity to lengthen the time of concentration. Conveyance of site drainage from buildings, parking lots, and retention facilities through grassy swales or meandering "natural" rock-lined channels can also slow concentration times and provide some percolation opportunities.

Design engineers should incorporate French drains (rock-filled excavations to enhance percolation) for roof drainage, with surplus flows directed over grassy areas rather than from paved areas to roadway or back-lot drainage courses. Drain pipes which help drain lots more rapidly after a rain should be discouraged or prohibited.

Runoff into Miner's Ravine Creek can be controlled by using energy dissipators and retention ponds built into the drainage system. During high winter runoff, retention ponds are not expected to contain all of the runoff; however, when combined with energy dissipators, the ponds can help dampen large fluctuations in runoff during the winter.

In-Channel Storage and Flow Retardation. Times of concentration can be slowed, and flood peaks reduced, by using roughened channels rather than smooth concrete channels. Rock linings, grassed swales, frequent check dams with short drops, and channel meanders and widening can slow flows and provide some channel storage. Such treatment is especially compatible with natural open space areas and parks.

Minimize Impervious Areas. Runoff can be reduced in quantity be reducing impervious surface. This can be accomplished by:

1. Using permeable paving materials, such as open block paving for parking areas. This paving consists of a checkerboard of small interconnected concrete squares that provide open areas for drainage yet offer adequate structural integrity for support of vehicles.

2. Minimizing paved area required for improvements, such as streets, curbs, and gutters.

Fisheries. Construction activities in creeks and floodplains affect both fisheries and water quality; recommended design/construction, erosion/sediment control, and runoff

reduction mitigation measures to reduce water quality impacts to a less-than-significant level are applicable to reducing impacts to fisheries as well.

Establish Design Criteria for Construction in the Ravines. Chapter 13, Botanical and Wildlife Resources, describes this measure in detail. In summary, this measure includes criteria to minimize disruption to riparian vegetation by eliminating sewer lines from the ravines; avoiding disturbance of the riparian corridor; and locating footpaths, bikeways, and maintenance roads to minimize impacts on trees and riparian vegetation.

Lower Intensity Alternative

The mitigation measures required for the proposed project would also be required for this alternative.

No-Project Alternative

No mitigation is required.

Chapter 12

TOPOGRAPHY, GEOLOGY, AND SOILS

Setting

Topography

The Plan area is generally bisected from east to west by Miner's Ravine. Secret Ravine joins Miner's Ravine at the northwest portion of the Plan area. Topographic relief varies from gently sloping hills in the southern portion of the Plan area to steep slopes along the ravines. North of the ravine, topography is again generally flatter. Figure 12-1 illustrates slopes on the Plan area. As shown, most of the site is 0-10 percent slopes; 11-30 percent slopes are found in the southern portion of the Plan area and near the ravines. Slopes over 30 percent are found adjacent to the ravines.

Elevations in the southern area range from about 200 to 300 feet above sea level. North of Miner's Ravine, elevations are generally 250-300 feet above sea level.

Geology

Anderson Geotechnical Consultants describe the geologic units in the Plan area in their report, Feasibility Report for 1,400 Acre Site, Roseville, CA (1984). This report, based upon field investigations, discusses the geologic units and evaluates the feasibility of developing the area from a geologic/soil engineering standpoint. The report was issued with the understanding that additional geotechnical work would be necessary before development. Following is a summary of that report.

The geologic units within the Plan area (see Figure 12-2) include volcanic rock underlain by sedimentary rock and overlain by sediments (of granitic origin). The geologic units, in order of age (oldest to youngest) include Mehrten formation (Mc and Mv), Turlock lake formation (Qtl), and terrace and stream deposits.

Mehrten Formation (Mc and Mv). The Mehrten formation consists of two separate units. Mehrten conglomerate (Mc) is a sedimentary unit composed of rounded andesitic pebbles and cobbles in a slightly- to well-cemented matrix of andesitic sand and silt. The Mehrten volcanics (Mv) is a hard, gray, mudflow

composed of angular pieces of andesite, in a highly cemented ash matrix.

The Mehrten mudflows (and underlying conglomerate) were deposited in preexisting drainages of the early Sierra's west slope. The capping mudflows are hard and erosion-resistant, and now remain as uplands since subsequent erosion removed the softer surrounding material. Reflecting its origin in stream valleys, this caprock tends to thin toward its margin.

Tension cracks several yards deep are not uncommon in the volcanic mudflow. The estimated thickness of the caprock appears to be 5-10 feet on ridgetops near the Southern Pacific Reservoir and from 25 to 50 feet on most of the other ridges (Anderson Geotechnical Consultants 1984).

Turlock Lake Formation (Qtl). The Turlock lake formation is exposed in the western and southern portions of the area. It is composed of a heterogeneous assemblage of silt and sand, interbedded with granitic and metamorphic gravel. The lower portion of the Turlock lake formation is in contact with the Mehrten formation. In some areas, the contact is gradational, with beds of nonvolcanic, micaceous Turlock lake sediments interbedded with the volcanic Mehrten conglomerate. In other areas the Turlock lake sediments directly overlie the volcanic mudflow member of the Mehrten formation.

Terrace and Stream Deposits. Unconsolidated terrace deposits (less than 1 million years old) and recent stream deposits (less than 10,000 years old) exist along the present day stream and river valleys in the Plan area. The deposits consist of gravel, sand, silt, and clay along with some cobbles of variable composition.

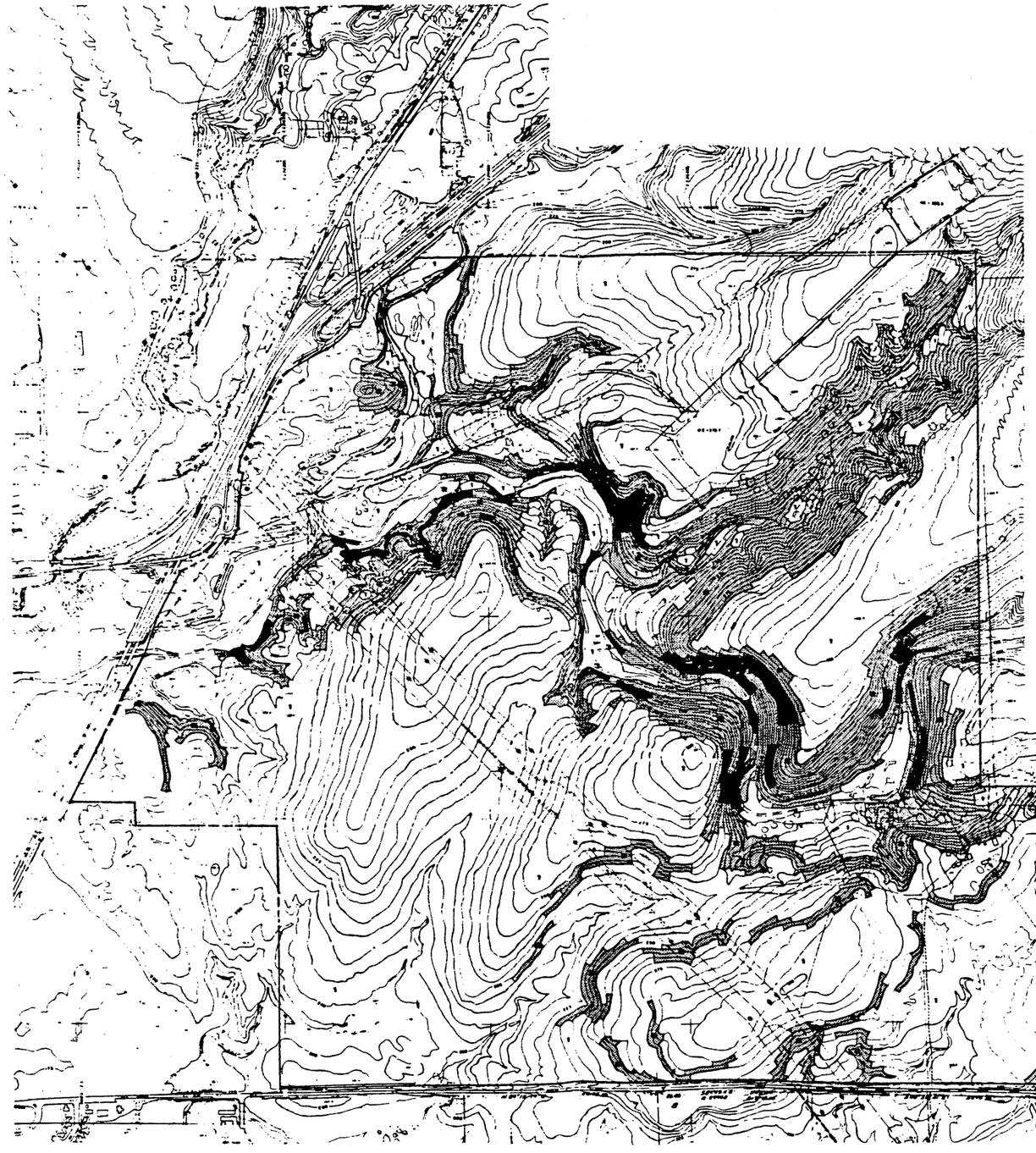
No unique geologic features exist in the Plan area. However, some Chico sandstone formations, which may contain marine fossils, were found along Sierra College Boulevard (Uhlir pers. comm.).

Seismicity

No known active faults are located within Roseville or Placer County. However, active faults are found east and north of the County, as well as to the west in the California coastal region. The nearest active fault system to the Plan area is in the Sierra Nevada foothills.

The California Division of Mines and Geology (CDMG) considers the Maximum Credible Earthquake (MCE) intensity level for Roseville as "low" on a statewide basis. The CDMG has assigned a Richter 6.5 MCE for the Sierra foothills fault system. The United States Geological Survey (USGS) has estimated Richter 7.0 as the MCE for the same area. Earthquakes originating from

FIGURE 12-1.



NORTHEAST ROSEVILLE SPECIFIC PLAN

ROSEVILLE CALIFORNIA

SLOPE MAP

Key

1	0-10%
2	11-30%
3	+30%

0 300 600 900 1200 1500 1800

MORTON AND PITALO, INC.
CIVIL ENGINEERS
1430 ALHAMBRA BLVD
SACRAMENTO CALIFORNIA

6-12-86

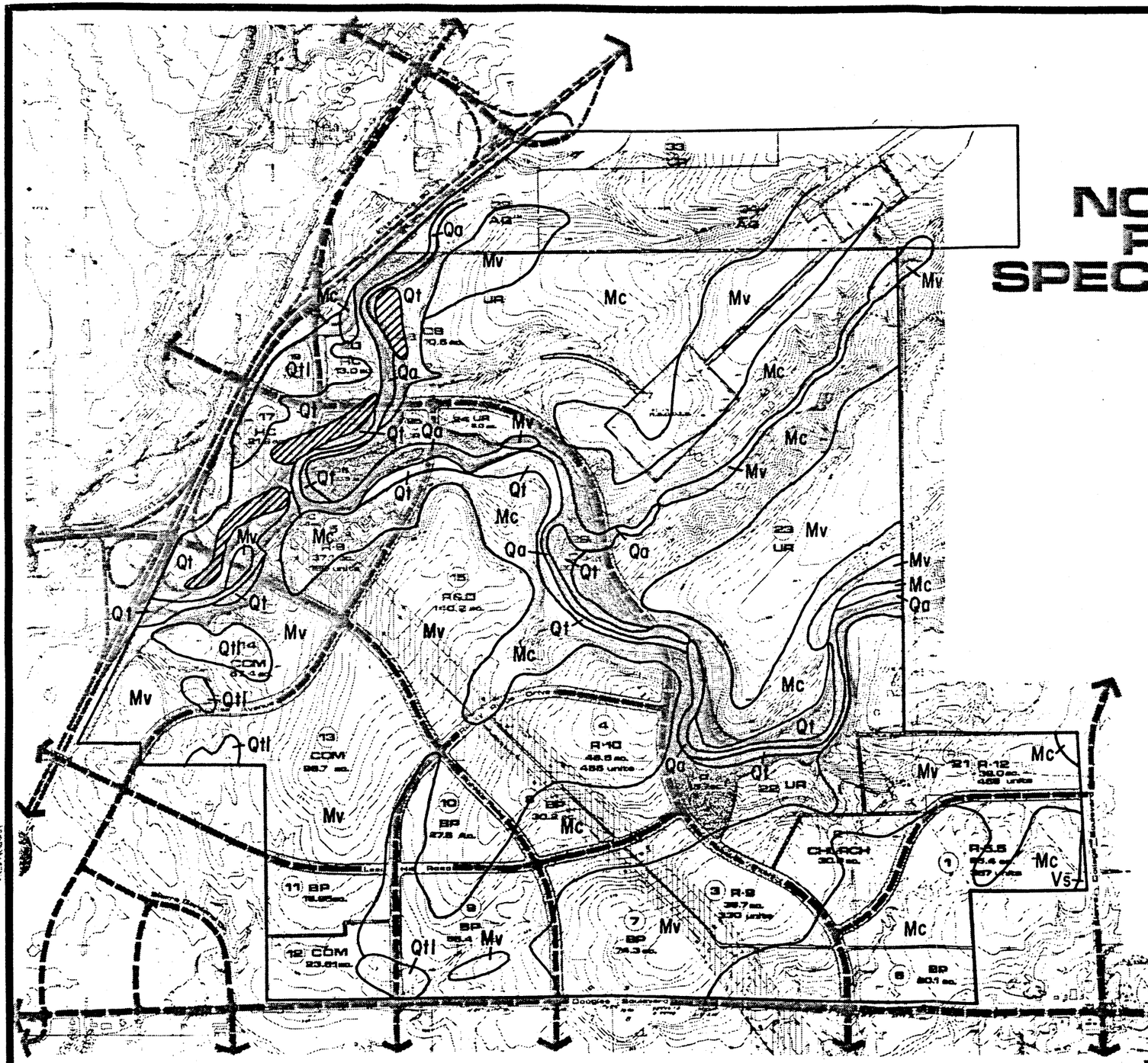
ANTHONY M. GUZZARDO AND ASSOCIATES INC.
LAND PLANNERS
838 MONTGOMERY STREET
SAN FRANCISCO CALIFORNIA

FIGURE 12-2.
GEOLOGIC MAP

NORTHEAST ROSEVILLE SPECIFIC PLAN

ROSEVILLE CALIFORNIA

LAND USE PLAN



GEOLOGIC UNITS

- **Qa** — Recent stream deposits: unconsolidated clay, silt, sand, gravel, and cobbles
- **Qt** — Terrace deposits: clay, silt, sand, gravel, and cobbles
- **Qtl** — Turlock Lake Formation: granitic sand, silt, and gravel
- **Mv** — Mehrten Volcanics: andesitic mudflow breccia
- **Mc** — Mehrten Conglomerate: andesitic siltstone, sandstone, pebble, and cobble conglomerate
- **Vs** — Valley Springs Formation: rhyolitic tuff, claystone, siltstone, and conglomerate

Dredge tailings

these distant, active faults are expected to cause only minor to moderate damage in the Roseville area (Roseville 1977). Major earthquakes occurring along the San Andreas and Hayward faults in the San Francisco Bay Area would cause less than 0.1 g bedrock acceleration in the Plan area (Greensfelder 1974).

Roseville is considered an area of low seismic risk by the CDMG, and structures must be built to meet earthquake design standards of the Uniform Building Code, set by the International Conference of Building Officials.

Effects caused by groundshaking during earthquakes including liquefaction, soil compaction, and landslides, are not considered a problem in the Plan area.

Soils

Soil Units. The U. S. Soil Conservation Service (SCS) has completed detailed soil mapping of western Placer County. Table 12-1 lists the 11 soil units found in the Plan area. This table presents physical properties of the soils, identifies the agricultural land use suitability, and identifies general soil features affecting development. Figure 12-3 illustrates the location of these soil units in the Plan area.

The two predominant soil types found in the Plan area are brown silty sands which have developed from the Mehrten conglomerate and Mehrten volcanics (soil units 144, 152, and 154): exchequer very stony loam (144) and inks exchequer complex (154). They pose development problems because of their shallow depth (11-18 inches) (SCS 1980). However, in some areas of the site, soil unit 144 (overlying the Mehrten volcanic caprock) can be less than 6 inches deep (Randall pers. comm.). These soil types are not susceptible to development problems of slump, slippage, erosion hazard, and shrink-swell in relation to drainage.

Clay (105) is found to a limited extent in the southeastern corner of the Plan area, along Sierra College Boulevard. Desiccation cracks approximately 0.5-inch wide can be observed in the clay, indicating its high potential for shrink-swell (Anderson Geotechnical Consultants 1984). Other soils with a high shrink-swell potential include 142, 180, and 182.

Rubble Land. Dredge tailings (180), found along Miner's Ravine and Secret Ravine, are remnants of placer mining activities during the 1800s (see Figure 12-2). Dredge tailings are typically stony. The soil depth, erosion hazard, and other soil characteristics are variable.

Until recently, dredge tailings were thought to be unsuitable for development. The rubble would have to be excavated and replaced with new soil in order to be developed. Without this

Table 12-1. Soil Physical Properties and Land Use Suitability

Soil Name	Soil Physical Properties						Agricultural Land Use Suitability		Building Site Development[1]		
	Number	Drainage	Erosion Hazard	Depth to High Water Table (feet)	Depth to Bedrock (inches)	Shrink-Swell Potential	Land Capability Classification[2]	Rangeland	Dwellings Without Basements	Small Commercial Buildings	Local Roads and Streets
Alamo Variant clay 2-15 percent slopes	105	Slow to medium	Slight to moderate	1.0-2.5	36	High	III	Good	Severe: Wetness, shrink-swell, low strength	Severe: Slope, wetness, shrink-swell	Severe: Shrink-swell, low strength
Cometa Ramona sandy loam 1-5 percent slopes	142	Slow to medium	Slight	>6	29-73	Low to high	III	Fair	Severe: Shrink-swell, low strength	Severe: Shrink-swell, low strength	Severe: Shrink-swell, low strength
Exchequer very stony loam 2-15 percent slopes	144	Medium	Slight to moderate	>6	11	Low	VII	Fair	Severe: Depth to rock	Severe: Slope, depth to rock	Severe: Depth to rock
Inks cobbly loam 2-30 percent slopes	152	Medium to rapid	Slight to high	>6	18	Low	IV	Good	Severe: Slope	Severe: Slope	Severe: Slope, depth to rock
Inks exchequer complex 2-25 percent slopes	154	Medium to rapid	Slight to moderate	>6	11-18	Low	VI	Good	Moderate: Slope, depth to rock	Severe: Slope	Severe: Depth to rock
Ramona sandy loam 2-9 percent slopes	175	Slow to medium	Slight to moderate	>6	70+	Low to moderate	II	Fair	Slight	Moderate: Slope	Slight
Redding and Corning gravelly loam 2-9 percent slopes	176	Slow to rapid	Slight to moderate	>6	28	Low to moderate	IV	Fair	Severe: Low strength, shrink-swell	Severe: Low strength, shrink-swell	Severe: Low strength, shrink-swell
Rubble land	180	Variable	Variable	>6	-	Low to high	VIII	Poor	Severe: Shrink-swell	Severe: Shrink-swell	Severe: Shrink-swell, low strength
San Joaquin Cometa sandy loam 1-5 percent slopes	182	Slow to rapid	Slight	>6	29-35	Low to high	IV	Fair	Severe: Shrink-swell	Severe: Shrink-swell	Severe: Shrink-swell, low strength
Sierra sandy loam 9-15 percent slopes	184	Rapid	High	>6	41	Low to moderate	IV	Good	Moderate: Low strength, shrink-swell	Severe: Slope	Severe: Low strength, shrink-swell slope

Table 12-1. Continued

Soil Name	Soil Physical Properties						Agricultural Land Use Suitability		Building Site Development[1]		
	Number	Drainage	Erosion Hazard	Depth to High Water Table (feet)	Depth to Bedrock (inches)	Shrink-Swell Potential	Land Capability Classification[2]	Rangeland	Dwellings Without Basements	Small Commercial Buildings	Local Roads and Streets
Xerofluvents, frequently flooded	194	Slow	High	2.5-4.8	-	-	IV	Fair to poor	Severe: Floods, wetness	Severe: Floods, wetness	Severe: Floods

Source: SCS (1980).

[1] Building site development identifies soil features affecting the use of the soil as a foundation material upon which structures are built. This information is general and should not be used in place of detailed investigations.

[2] The capability classifications I through VIII indicate progressively greater limitations and narrower choices for agricultural use. Class I and II soils have few or moderate limitations. Class III and IV have severe and very severe limitations, Class V through VIII soils are generally unsuited for cultivation.

procedure, the rubble land would not be suitable for development (Uhlir pers. comm.). However, recent development in Folsom has shown that compact dredge tailings generally are considered stable enough to support residential and light commercial structures. Stoniness may pose special consideration for landscaping (Tom Smith Associates 1985).

Agriculture and Rangeland Suitability. The soils of the Plan area are currently used to support livestock grazing. The SCS rates the majority of the soils in the Plan area as "good" for rangeland use. The sloping topography, shallow soil depth, and stony nature of the soils limit their use for more intensive types of agriculture. No prime agricultural land exists on the property (Heitz pers. comm.).

Impacts

Proposed Project

Topography. The Specific Plan proposes to develop approximately 850 acres and retain approximately 780 acres in open spaces, agriculture, and urban reserve. Most of the development is proposed in areas of 0-10 percent slope. Some development is proposed for areas of 11-30 percent slopes, and East Roseville Parkway crosses some areas of +30 percent slope. Impacts on topography are generally considered less than significant because the project has been designed to avoid the steeper slopes and creeks. A section of East Roseville Parkway crosses steep slopes north of Miner's Ravine. A mitigation measure is recommended to realign this section of the road, if possible. A mitigation measure to minimize grading, where feasible, is recommended.

Geology. Figure 12-2 illustrates geologic units in the Plan area. Most of the proposed development is situated on the Mehrten formation, with relatively minor amounts on the Turlock lake formation and dredge tailings. The terrace and stream deposits areas are proposed for open space.

Table 12-2 summarizes information presented in the Anderson Geotechnical Consultants' report (1984). The Mehrten conglomerate would be easier to develop than the Mehrten volcanic because it is easier to excavate. The Mehrten volcanic would present problems for grading, utility installation, and conventional foundations. In order to reduce potentially significant impacts of development on Mehrten conglomerate and Mehrten volcanic to a less-than-significant level, detailed geotechnical investigations should be conducted prior to final design.

Development on Mehrten Formations. The City General Plan Land Use Element identifies the Mehrten volcanics and Mehrten conglomerates as major constraints to development

FIGURE 12-3. SOILS

NORTHEAST ROSEVILLE SPECIFIC PLAN

ROSEVILLE CALIFORNIA

LAND USE PLAN

-LEGEND-

105	Alamo Variant clay
142	Cometa Ramona sandy loam
144	Exchequer very stony loam
152	Inks cobbly loam
154	Inks exchequer complex
175	Ramona sandy loam
176	Redding and Corning gravelly loam
180	Rubble land
184	Sierra sandy loam
194	Xerofluvents

LEGEND
Major Auto Circulation
P.G. & E. Transmission Line Easement
Out Parcel
Parcel Number

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LAND PLANNERS
6-11-68

Table 12-2. Geologic Units and Site Development

Geologic Unit	Proposed Uses	Grading	Foundations	Utility Construction	Roadway Construction
Mehrten Conglomerate (Mc)	Residential, Business Professional, Highway Commercial, Open Space, and Urban Reserve.	Ability to excavate will vary due to differences in cementation and weathering. Will be able to excavate up to 20 feet.	Good bearing support for one- to two-story structures. Single-story residential and normally loaded commercial or industrial buildings would be able to utilize conventional foundations. Heavily loaded structures might need a deep foundation.	Difficult to excavate to 10 feet. Minor blasting or jackhammering might be required.	Good support for roadways.
Mehrten Volcanics (Mv)	Residential, Business Professional, Commercial, Open Space, and Urban Reserve.	Maximum depth able to excavate, with blasting, may be 5-7 feet. If possible, development should eliminate the need for grading or utilities more than 2-4 feet deep.	Conventional shallow footings will be difficult due to problems in excavating rock. Less conventional systems, such as doweling concrete grade beams directly to the rock surface are feasible.	Excavation will be very difficult. Blasting probably required. Minimize utility installations in this material.	Excellent support for roadway construction.
Turlock Lake Formation (Qtl)	Business Professional, Commercial, Highway Commercial.	Able to excavate with conventional equipment. Possible difficulty if underlain by Mehrten Formations.	Suitable for conventional foundations.	Possible to excavate to a depth of 15 feet. If Qtl underlain by Mehrten Formations, will be difficult to excavate depending upon degree of cementation.	Moderate support for roadways.
Terrace and stream deposits	Not proposed for development.	Able to excavate with conventional equipment.	Suitable for conventional foundation if it is overexcavated and recompacted.	Excavation should not be difficult. Shoring or sloping would be necessary. Dewatering may also be necessary.	Some overexcavation and recompaction of deposits may be necessary.

Source: Anderson Geotechnical Consultants (1984).

because of high construction costs. The only successful developments in recent years have been nonresidential where high construction costs can be offset by high-valued commercial or industrial projects (Roseville 1985). In addition, the thin soils on the Mehrten formation cannot achieve the desired landscaping results that are normally expected in most residential neighborhoods. Policy 6 of the Land Use Element states:

> "Urban land use on the Mehrten formations shall be limited to nonresidential activities or high-density residential where normal landscaping amenities can be provided."

The Specific Plan proposes to develop 595 acres of nonresidential uses and 225 acres of residential use. A breakdown of the proposed residential uses is as follows:

Parcel	Units Per Acre	Units	Acres
1	R-5.5	357	65.4
3	R-9	330	36.7
4	R-10	465	46.5
5	R-9	180	37.1
21	R-12	468	39.0
Total		1,800	224.7

Clustering would be necessary on parcels 3, 4, and 5 due to constraints imposed by the PGandE transmission line corridors. Parcel 21, with a density of 12 units per acre, is considered high density. The only parcel which appears to be out of conformance with Policy 6 of the General Plan is parcel 1 because its density is considered low at 5.5 units per acre. It is possible to reduce this impact to a less-than-significant level by either increasing the number of dwelling units, changing the use from residential to nonresidential, or requiring additional attention to site design and landscaping.

Seismicity. Seismic hazards in the Plan area are no greater than in any other area of the county and are not considered to be a significant constraint to development.

Soils. The main soil limitations for urban development are related to erosion hazards, shallow soil depth, potential shrink-swell problems, and potential problems due to dredge tailings (rubble land). Increased erosion could lead to siltation of the creeks and potentially significant impacts to

land). Increased erosion could lead to siltation of the creeks and potentially significant impacts to the fishery resources. These impacts could be reduced to a less-than-significant level by following construction practices that minimize soil erosion as detailed in Chapter 11, Water Quality and Fisheries.

Shallow soil depth alone would not restrict building nor result in any significant impacts. Shallow soil depth as it relates to residential development on Mehrten formations has been discussed previously.

Shrink-swell problems (soils 105, 142, 180, and 182) are a potentially significant impact that could be reduced to a less-than-significant level by the use of precautionary engineering practices.

Construction on dredge tailings (soil 180) is a potentially significant impact that could be reduced to a less-than-significant level by using precautionary engineering and design practices that properly prepare the subgrade.

Lower Intensity Alternative

The impacts would be less than the proposed project because less grading would occur.

General Plan Alternative

The General Plan Alternative is essentially identical to the proposed Specific Plan. Therefore, the analysis in the Draft EIR is limited to the following three impact areas: Chapter 4, Land Use; Chapter 7, Transportation; and Chapter 15, Visual Quality.

No-Project Alternative

No impacts would occur.

Mitigation Measures

Proposed Project

Review the Alignment of East Roseville Parkway. The project proponent should review the alignment of East Roseville Parkway north of Miner's Ravine to see if it could be shifted slightly to avoid the steeper slopes near the confluence of the two creeks.

Minimize Grading Where Feasible. Grading should be minimized, where feasible, to maintain the natural environment, protect against erosion, maintain existing vegetation, and protect water quality. Site design should seek to minimize cuts and fills and work with the natural topography. Consideration should be given to stepping or terracing construction on slopes.

Conduct Detailed Geotechnical Investigations Prior to Final Design. Detailed geotechnical investigations would need to be completed prior to final design. These investigations can provide further information for those planners, engineers, and architects who will provide design solutions to problems of development on Mehrten conglomerate and Mehrten volcanic.

Implement Alternative Development Approaches on Mehrten Formations. City policy prohibits low-density residential development on Mehrten formations because of problems providing landscaping normally expected in residential neighborhoods. Alternative methods to reduce this impact to a less-than-significant level are listed below.

- Increase the Number of Dwelling Units. Increasing the proposed density for parcel 1 from 5.5 du per acre up to 10+ du per acre would comply with City policy.

- Change the Proposed Use to a Nonresidential Use. Changing the proposed use of parcel 1 from residential to nonresidential, which normally requires less landscaping, would comply with City policy.

- Require Additional Attention to Site Design and Landscaping. The Specific Plan proposes that actual construction of the residential areas be done in building clusters to reduce costs. It also states that City staff will encourage cluster development.

Prepare and Implement an Erosion and Sediment Control Plan. This measure is explained in detail in Chapter 11, Water Quality and Fisheries.

Use Precautionary Engineering Practices for Shrink-Swell Soils. On clay-like soils that have a high shrink-swell potential, engineering practices that provide reinforced, over-sized foundation footings should be utilized.

Use Precautionary Engineering and Design Practices for Dredge Tailings. Construction on dredge tailings would need detailed geotechnical investigation prior to final design. The geotechnical investigation needs to address the bearing capacity of the dredge tailings.

Lower Intensity Alternative

The mitigation measures required for the proposed project would also be required for this alternative.

No-Project Alternative

No mitigation is required.

Chapter 13

BOTANICAL AND WILDLIFE RESOURCES

Setting

Botanical Resources

Methods. Descriptions of the botanical resources of the Plan area are based upon a literature review, a record search of the California Department of Fish and Game's (DFG) Natural Diversity Data Base (CNDDB), and reconnaissance-level field surveys. The purpose of the record search was to determine if any special-status plants (listed or candidate state and federal endangered or threatened taxa and California Native Plant Society [CNPS] rare and endangered taxa) or significant natural communities are known on or near the Plan area.

Field surveys were staggered throughout the spring season on March 6 and 19, April 14, and May 6 and 7, 1986. The timing and sites of these surveys were optimal for locating populations of the special-status plants currently known to exist in the general vicinity of the Plan area. Floristic surveys (i.e., surveys in which every plant encountered is identified) were conducted to ensure that no special-status plant taxa were overlooked because they were not previously known from the region.

The entire Plan area was surveyed, and habitats known to support the special-status plants of the region (such as vernal pools) were searched a minimum of two times. The survey effort focused on those portions of the Plan area south of Miner's Ravine Creek that are planned for development. The area north of Miner's Ravine Creek, designated as urban reserve, was surveyed at a lesser intensity. Additional surveys of the urban reserve area will be necessary whenever development of these areas is proposed.

A list of the vascular plant taxa observed on the site is available upon request from Jones & Stokes Associates. See Appendix 13-1 for the scientific names of plant species identified in the text.

Plant Communities. The Plan area supports a mosaic of four communities: annual grassland, northern volcanic vernal pools, oak woodland, and riparian woodland (see Figure 13-1).

Annual Grassland (approximately 1,323 acres). Annual grasslands dominate the Plan area, occurring on all flat to gently sloping areas not within the canyons of Miner's Ravine and Secret Ravine creeks. These grassland areas probably do not support woodlands because of the thin rocky soils and apparent lack of sufficient subsurface water to sustain growth.

The Plan area's annual grasslands are characterized by a diverse mix of native and introduced grass and forb species. Introduced grasses dominate except on microsites with extremely thin or rocky soils and on sites seasonally inundated by standing or flowing water. Common grass dominants include brome grasses, oat grass, fescues, and foxtail grass. Numerous forb species are intermixed. The more common forbs include members of the following genera: clover, popcorn flower, lupine, brodiaea, owls clover, goldfields, and larkspur.

The Plan area grasslands are well-managed rangelands. The plant community is fairly intact and natural, not showing evidence of abusive grazing or overuse.

Northern Volcanic Mudflow Vernal Pools (acreage estimates of microwatershed areas are not available). Vernal pools are depressions that retain surface water during the winter and spring seasons due to the presence of an impervious subsurface layer that prevents percolation of water into the soil. Vernal pools have a very strict moisture regime that includes inundation during winter and spring contrasting with a dry state during summer and fall. Some pools are inundated throughout the wet season while others retain water for short periods following rainfall events. Individual pool water regimes depend upon pool size and depth and the size and nature of its watershed. Vernal pools each have their own small watershed that includes all lands that contribute surface runoff to a pool.

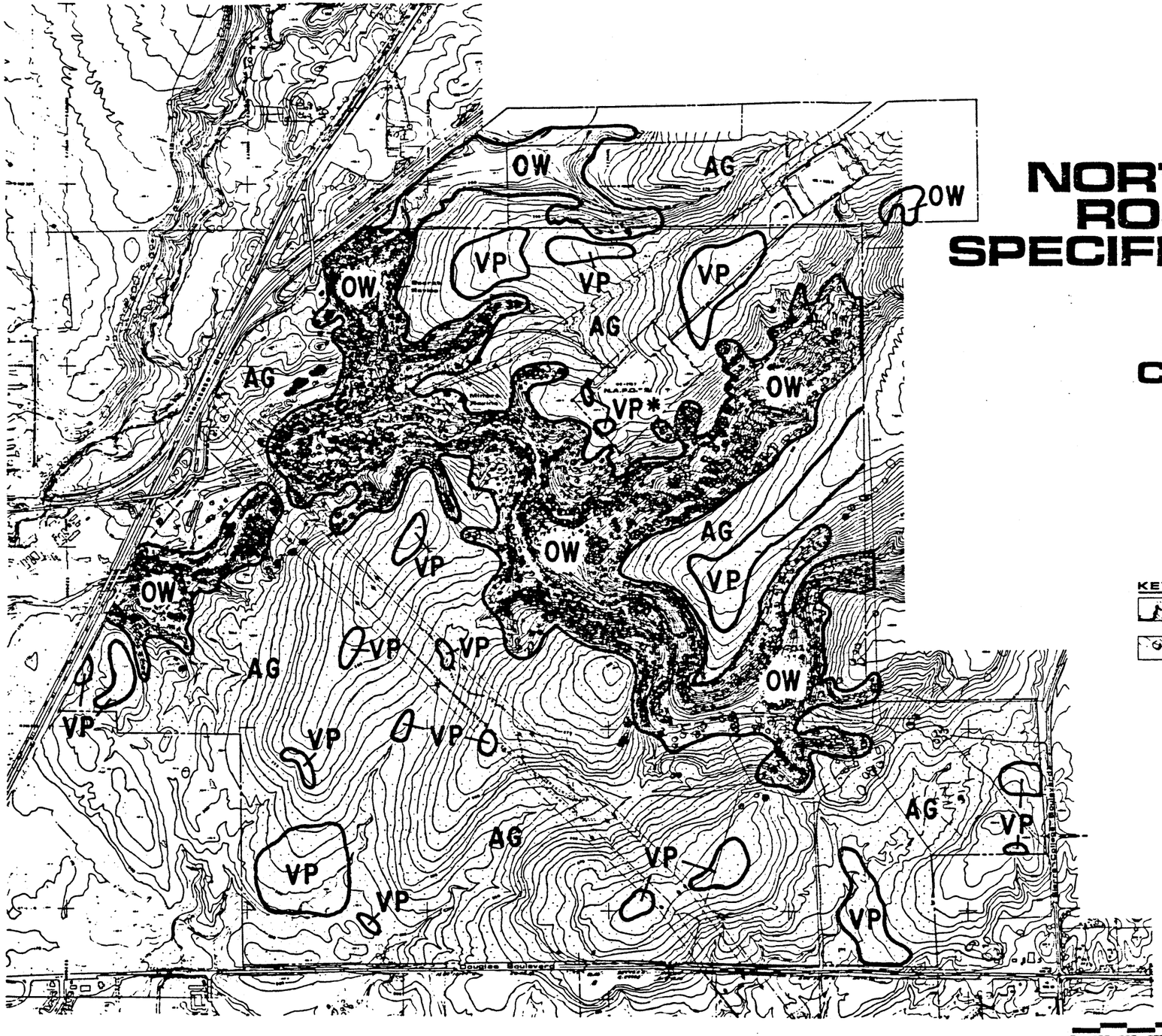
Vernal pools are monitored and "tracked" statewide by the CNDDB. Based on aerial photographs of the early 1970s, it is estimated that less than 5-30 percent of California's vernal pools remain intact (Holland 1978).

Several different vernal pool types in California are categorized by the CNDDB. Type differences stem from geographic location, plant species composition, and the nature of the impervious layer.

The impervious layer in northern volcanic mudflow vernal pools is bedrock of volcanic mudflow origin. Volcanic mudflow vernal pools are uncommon. In addition to their uncommon substrate origin they may have floristic characteristics that warrant separate recognition as a distinct vernal pool community. Presently, the CNDDB records five occurrences of volcanic mudflow vernal pools, all in the Roseville-Rocklin-Lincoln area (Holland pers. comm.). Although other mudflow

FIGURE 13-1.

EXISTING VEGETATION MAP



NORTHEAST ROSEVILLE SPECIFIC PLAN

ROSEVILLE CALIFORNIA

EXISTING VEGETATION MAP

KEY

FOOTHILL/OAK WOODLAND

OPEN GRASSLAND

AG = Annual grasslands

VP = Mosaic of annual grasslands and northern volcanic vernal pools. Boundaries encompass significant concentrations of pools. Polygon boundaries do not include watershed boundaries.

VP*= Vernal pools that support Gratiola heterosepala.

OW = Oak woodland; the riparian woodland has not been mapped separately, but falls within the polygons encompassing oak woodlands.

Note: The source map for this figure is the "Existing Vegetation Map" contained in the Draft Specific Plan. Additions to this map have been made by Jones & Stokes Associates to show the general locations of plant communities.

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0 300 600 900 1200 1500 1800

vernal pools probably remain to be found, the number may be low because mudflow formations are rarely level enough to allow vernal pools to develop.

An inventory and analysis of vernal pool resources in the greater Roseville area was conducted in 1981-82 (Wesco and Holland 1982). Review of aerial photos taken in 1971 indicated 54 areas potentially containing vernal pools. Field surveys confirmed the presence of vernal pools in 23 of the 54 areas. Although none of Roseville's vernal pools were deemed to be critically significant, all of the remaining areas were recommended to be given priority consideration for protection. Suggested measures included conservation easements, restricted land uses, preserve status, and/or as dedicated parkland to remain in their natural state.

According to Holland (pers. comm.), of the five known volcanic mudflow vernal pool occurrences, those in the Plan area are the best remaining representatives of the volcanic mudflow vernal pool.

Detailed site-specific surveys of the Plan area's vernal pools were conducted to augment the Wesco and Holland report. Vernal pools in the Plan area are interspersed in the annual grasslands. The pools are typically small (less than 400 square feet), shallow, and only retain standing water for short periods after rainfall events. They support a herbaceous flora that establishes the vernal pool habitat type. The vernal pool flora is composed of a diverse mix of native grass and forb species dominated by annuals that include coyote thistle, hair grass, alopecurus, popcorn flowers, downingia, pogogyne, wooly marbles, water starwort, goldfields, and navarretia.

The largest, most diverse pools in the Plan area occur on two ridges north of Miner's Ravine Creek (see Figure 13-2). Site number 34 north of Miner's Ravine, and site 35, partially included in the Plan area, south of Miner's Ravine, are identified as high quality by Wesco and Holland (1982). Both are included in the City of Roseville General Plan as sites warranting special planning consideration. The urban reserve area supports the highest concentration of vernal pools in the Plan area. Pools south of Miner's Ravine Creek are generally smaller and have a lower diversity of plant species.

Oak Woodland (approximately 258 acres). A well-developed oak woodland occurs along Miner's Ravine and Secret Ravine creeks in small valleys created by these waterways. This community also occurs at limited areas on the flat ridges in the northwest portion of the Plan area. The oak woodland is dominated by sparse to dense mixed stands of blue oak and interior live oak. Blue oak dominates the woodlands occurring on the more arid upper valley slopes, while interior live oak is more prevalent in the protected ravines and lower valley slopes.

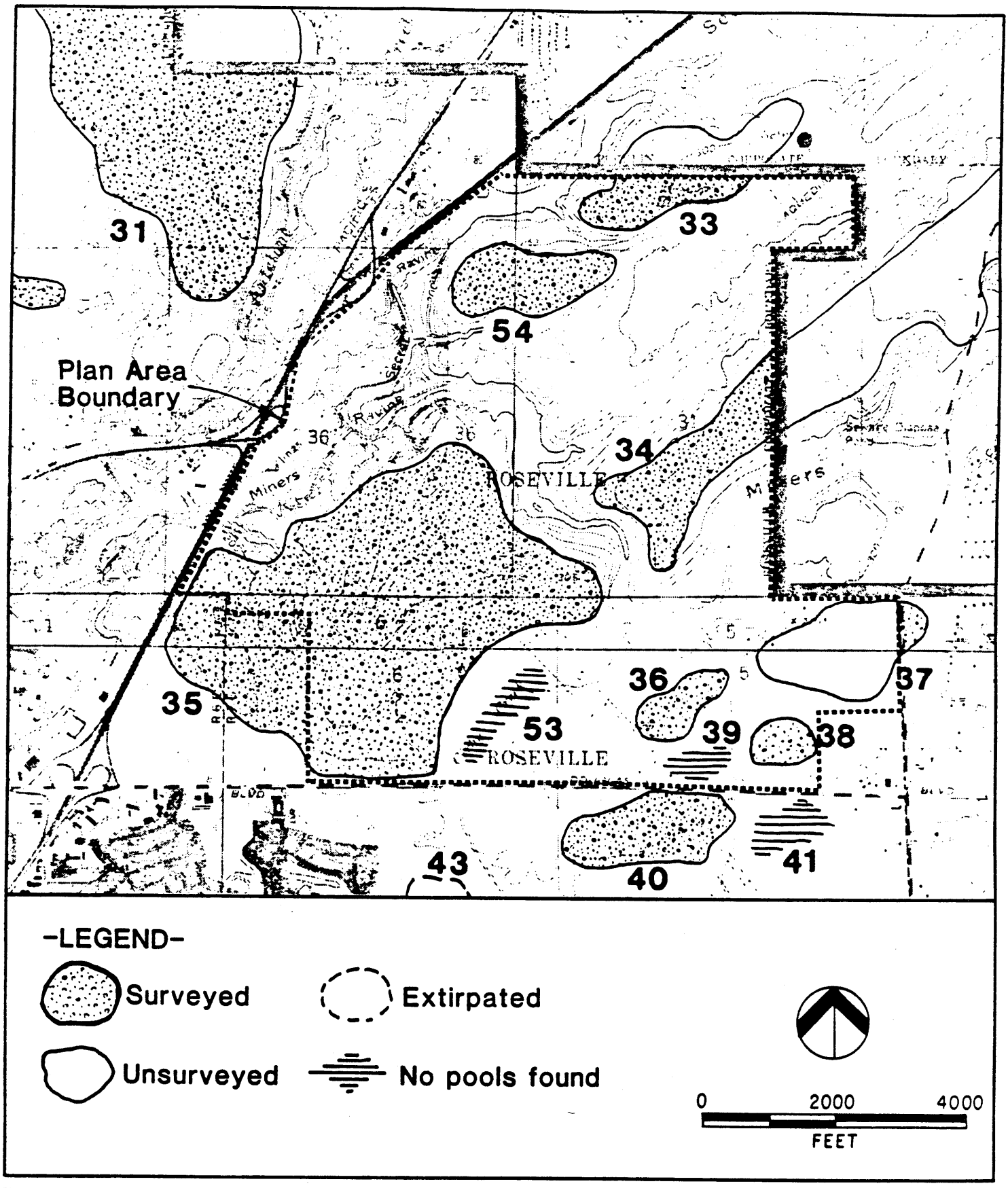


FIGURE 13-2. GENERALIZED VERNAL POOL LOCATIONS

Source: WESCO and Holland (1982)

The oak woodland community has an annual grassland understory with low forb cover dominated by introduced grasses. Shaded and more mesic slopes of the oak woodland support a sparse shrub understory that includes buckeye, poison oak, buckbrush, honeysuckle, and toyon. At one site along Secret Ravine Creek, a closed-canopied forest of pure interior live oak has developed. This oak woodland community is distinctive because it does not include a shrub or herbaceous understory.

Portions of the oak woodland have a sparse tree overstory with cover not exceeding 10-20 percent. These areas lack a shrub understory and are savanna-like in physiognomy. Because no clear distinction or boundary exists between the savanna and woodland phases, they are not recognized separately in this EIR.

Riparian Woodland (approximately 310 acres). A typical riparian woodland occurs along both Miner's Ravine and Secret Ravine creeks. It varies in species composition and overstory density across the Plan area. The riparian woodland is not mapped on Figure 13-1 because of its narrow width.

The riparian woodland is characterized by a narrow strip of trees and shrubs along the creeks. Overstory cover is typically not continuous over the creek, nor along the creek edges. Instead, a patchy sparse to dense discontinuous overstory has developed. The shrub understory is equally variable depending upon the amount of overstory shading. Shrub cover is highest under sparse to open canopies and along the creek's edges. An herbaceous layer is also present and consists of two groups of plants; those growing in the creek and those growing on alluvial deposits of lower terraces adjacent to the creeks.

Two different riparian associations are present and may relate to historical land use differences. Miner's Ravine Creek shows evidence of past placer mining and appears to be more heavily impacted by livestock grazing, while Secret Ravine Creek appears less disturbed. Miner's Ravine Creek supports riparian species typical of earlier successional stages. The overstory is considerably less dense and continuous and is dominated by black willow, interior live oak, and Oregon ash, with few valley oak and cottonwood. Miner's Ravine Creek has more understory cover of young black willow and buttonbush, and areas lacking trees and shrubs are common. In contrast, the riparian woodland along Secret Ravine Creek is denser, more continuous, and supports "climax" riparian tree species. Valley oak, fremont cottonwood, and interior live oak dominate the overstory along this creek. Both creeks and their tributaries support large dense patches of himalaya berry and arroyo willow.

Special-Status Plant Taxa. Special-status plants have been defined to include:

1) California rare, threatened, or endangered species (California Department of Fish and Game 1985),

2) Federal listed, proposed, and candidate threatened or endangered species (U. S. Fish and Wildlife Service 1985), and

3) California Native Plant Society rare and endangered species (Smith and York 1984).

Using the data and information provided by the CNDDB record search, Smith and York (1984), California Native Plant Society (1985), Jones & Stokes Associates, and Wesco and Holland (1982), a list of the special-status plants known or thought to occur in the Roseville region was compiled. This list served as a target list for the rare plant searches. Target species and a brief summation of their geographic ranges and habitat associations are provided in Table 13-1.

Placer and El Dorado counties support an ensemble of special-status plant taxa restricted to serpentine soils (such as Calystegia stebbinsii, Ceanothus roderickii, Chlorogalum grandiflorum, Fremontodendron decumbens, Galium californicum ssp. sierrae, Senecio layneae, Wyethia reticulata). Serpentine substrates do not occur in the Plan area (U. S. Department of Agriculture 1980); consequently, these taxa were not included on the target species list (Table 13-1).

Table 13-1 lists seven special-status plants that could occur in the study area. Field surveys revealed a population of one of these taxa. It is important to note that many of California's special-status plants exhibit drastic fluctuations in population size from year to year. This phenomenon makes it difficult to make definitive statements about the presence or absence of particular special-status plants based upon one field season's survey.

Nearly all of the vernal pools in portions of the Plan area proposed for development (area south of Miner's Ravine Creek) are not deep or large enough to support any of the target species listed in Table 13-1. None of the target species was found in surveys of this portion of the Plan area. It can, therefore, be stated with reasonable assurance that no rare, threatened, or endangered species (or potential or candidate species) occur in portions of the Plan area presently proposed for development.

The urban reserve portion of the Plan area contains larger, deeper, and more diverse vernal pools than the southern area. These pools show greater potential to support the target species. The urban reserve areas should be surveyed again prior to development.

Each of the special-status plants from Table 13-1 is discussed below.

Table 13-1. Special-Status Plant Taxa Known or Suspected from the Roseville Region. Target Special-Status Plants for the Northeast Roseville Specific Plan Botanical Survey

Species	Status[1] Fed/State/CNPS	Known Geographic Range	Habitat Associations	Presence/Absence[2]
Chamaesyce hooveri Hoover's spurge	C1/--/1b	Eastern fringe of Sacramento and San Joaquin valleys from Tehama to Tulare counties	Large vernal pools below high water mark	Not found in vernal pools south of Miner's Ravine but potentially present in vernal pools in urban reserve
Cordylanthus mollis subsp. hispidus Hispid birds-beak	C2/--/1b	San Joaquin Valley from Kern, Merced, Placer, and Solano counties	Alkaline and saline soils of marsh, seep, and meadow habitats	Not present throughout the Plan area
Gratiola heterosepala Boggslake hedge-hyssop	C2/CE/1b	Widely scattered but infrequent from Fresno, Lake, Madera, Sacramento, and Shasta counties, and Oregon	Vernal pools and seasonally inundated margins of receding lakes and meadows	Not present in vernal pools south of Miner's Ravine; present in vernal pools in urban reserve
Legenere limosa Green's legenere	C2/--/1b	Widespread but infrequent from Lake, Napa, Placer, Sacramento, San Mateo, Solano, Sonora, and Stanislaus counties	Vernal pools and seasonally flooded lake margins, ditches, etc.	Not found in vernal pools south of Miner's Ravine but potentially present in vernal pools in urban reserve
Orcuttia tenuis Slender orcutt grass	C1/CE/1b	Sacramento Valley, inner North Coast Range, and eastern Shasta County	Volcanic-based vernal pools below high water mark	Not found in vernal pools south of Miner's Ravine but potentially present in vernal pools in urban reserve
Orcuttia viscida Sacramento orcutt grass	C1/CE/1b	Very uncommon in Sacramento County	Large vernal pools below their high water mark	Not found in vernal pools south of Miner's Ravine but potentially present in vernal pools in urban reserve
Tuctoria greenei Green's tuctoria	C1/CE/1b	Widespread but currently uncommon along eastern fringe Sacramento and San Joaquin counties from Tehama to Tulare counties	Large vernal pools below their high water mark	Not found in vernal pools south of Miner's Ravine but potentially present in vernal pools in urban reserve

Table 13-1. Continued

[1] Status explanations:

Federal = U. S. Fish and Wildlife Service (1980, 1983)

C1 = In "Category 1" of the list of species under review for federal protection. This includes species for which the Fish and Wildlife Service "presently has enough information on hand to support the biological appropriateness of their being listed as endangered or threatened species. Because of the large number of such species, and because of the necessity of gathering data concerning the environmental and economic impacts of listings and designations of Critical Habitats, it is anticipated that the development and publication of proposed and final rules concerning such species will require several years."

C2 = In "Category 2" of the list of species under review for federal protection. This includes species for which the Fish and Wildlife Service presently has information that "indicated the probable appropriateness of listing as endangered or threatened, but for which sufficient information is not presently available to biologically support a rule. Further biological research and field study will usually be necessary to determine the status of taxa included in this category."

State = California Department of Fish and Game

CE = Designated "Endangered."

CNPS = California Native Plant Society (Smith and York 1984)

1b = Rare or endangered in California and elsewhere. Although most of these species are not yet designated rare or endangered by the State of California, all meet the criteria for eventual listing.

[2] Presence/Absence:

Species are those with a potential to occur in unsearched portions of the Plan area's urban reserve. Species with a high probability are known from near the Plan area in habitats similar to those that occur in the Plan area. Refer to Methods section for details concerning surveys and results.

See "1" above.

Chamaesyce hooveri. None of the Plan area vernal pools south of Miner's Ravine Creek are considered large or deep enough, nor do they remain flooded long enough following rainfall to support the Chamaesyce. North of Miner's Ravine Creek, in the proposed urban reserve, pools that support Gratiola heterosepala (see below) could possibly support Chamaesyce. However, because Chamaesyce hooveri is not identifiable until mid- to late summer, additional surveys for this species would be necessary to ascertain its status on the site prior to development.

Cordylanthus mollis ssp. hispidus. No suitable alkaline (or saline) meadow, marsh, or seep habitats occur in the Plan area. Populations of this species were not observed nor are any expected to occur.

Gratiola heterosepala. This species was discovered in three vernal pools in the urban reserve area (Figure 13-1) southwest of the Southern Pacific Reservoir. It is possible that other pools in the urban reserve areas also support this species.

This newly discovered population of Gratiola heterosepala is large and healthy, consisting of many hundreds of plants (during 1986). It is the first occurrence of this species reported for Placer County. It occurs in the larger vernal pools in the proposed urban reserve area; the largest of three pools supporting Gratiola heterosepala population is approximately 60 x 40 feet.

Legenere limosa. This species was considered a very likely inhabitant of the Plan area based upon its geographic range and habitat associations. The area south of Miner's Ravine Creek was carefully and intensively searched for this species but none was found. The preliminary surveys north of Miner's Ravine Creek also did not reveal any populations.

Orcuttia tenuis, O. viscida, and Tuctoria greenei. Observations by Holland (pers. comm.) and file information of CNDDB and the CNPS indicates these orcutt grass species require large vernal pools that retain surface water throughout most or all of the winter and spring season (as opposed to those which dry shortly after rain). Most pools supporting these orcutt grasses typically have water to late April or early May during years of normal precipitation. These orcutt grasses are not associated with small, shallow, ephemeral pools like those that occur in the Plan area.

The field surveys found that none of the Plan area vernal pools retained surface water late in the season, and no orcutt grass seedlings (having diagnostic leaf bases) were present. A potential, however, exists for orcutt grasses to occur in larger pools in the urban reserve that also support Gratiola heterosepala. Pools elsewhere in the Plan area, including all

pools in areas planned for development, do not have any apparent potential for supporting the orcutt species.

Other Important Species. A number of plant species that the CNPS (Smith and York 1984) identifies as rare, but not endangered, are known to occur in the Roseville area. Although species in this category are not subject to federal or state protection, they are of both scientific and social interest and should be protected when feasible.

Five CNPS-designated rare, but not endangered, species may occur in the Plan area: Cuscuta howelliana, Dichelostemma lacuna-vernalis, Downingia humilis, Juncus leiospermus, and Plagiobothrys scriptus. Field surveys revealed populations of Dichelostemma lacuna-vernalis and Plagiobothrys scriptus throughout the Plan area.

Wildlife Resources

Methods. Descriptions of the wildlife resources in the Plan area are based on field surveys conducted on April 14 and May 1, 1986. Appendix 13-2 provides a list of birds, mammals, reptiles, and amphibians observed during these surveys. The scientific names of species mentioned in the text are included in the appendix.

Animal Communities Within Habitat Types

Annual Grassland. The grazed grassland covering much of the Plan area offers relatively little in the way of bird roosting or nesting habitat, but does provide productive foraging grounds for a number of species. Birds like western meadowlarks, horned larks, and lark sparrows forage in these grasslands year-round, and savannah sparrows and water pipits search for seeds and insects during the fall and winter. In spring, the insects of the grassland attract rough-winged swallows, western kingbirds, and western wood pewees.

The shallow hard soils that characterize the Plan area are generally inhospitable to burrowing rodents like pocket gophers and ground squirrels, and the short, grazed grasses offer little cover for deer mice and voles. As a result, rodent-eating predators like black-shouldered kites, northern harriers, and red-tailed hawks are probably less abundant here compared to grasslands with plentiful small mammals. Rattlesnakes, common kingsnakes, and gopher snakes, which similarly prey on rodents, are also likely to be sparse in these grasslands.

Northern Volcanic Vernal Pools. Although vernal pools are an ephemeral aquatic habitat, tiger salamanders and a number of invertebrates have adapted their life cycles to use this resource. When standing water is available in winter and early spring, tiger salamanders may use the pools for egg-laying and

development of young. In winter, mallards, cinnamon teal, killdeer, and California gulls may use vernal pools for resting and foraging grounds.

Oak Woodland. The broad bands of oak woodland in the Plan area are very important sources of food for wildlife. Oak acorns are a prominent item in the diets of acorn woodpeckers, scrub jays, northern flickers, gray squirrels, and mule deer. Insects in the oak foliage and bark attract birds like white-breasted nuthatches, plain titmice, bushtits, and ash-throated flycatchers. Oak-dependent fungi, lichen, mistletoe, and galls provide food for mammals like voles, ground squirrels, raccoons, and mule deer.

Oak trees also offer shade, shelter, and nesting substrate for many species. Woodpeckers excavate nest-holes in live and dead oaks, and these cavities are subsequently used by other hole-nesting species like western bluebirds, house wrens, American kestrels, and white-breasted nuthatches. Bird species that use the annual grassland for foraging in the day return to oaks at night to roost. Deer and many birds spend the hottest part of summer days resting in the shade of densely-canopied oak groves.

Riparian Woodland. The riparian corridors supported by Secret Ravine, Miner's Ravine, and Dry creeks are the most productive wildlife habitats in the Plan area. Despite disturbances associated with mining and grazing, the diverse and productive riparian zone offers food, cover, and nesting resources to many species of wildlife. The structurally complex canopy and understory of the riparian zone provides nesting habitat for birds like California quail, Bewick's and house wrens, Nuttall's woodpecker, and Cooper's hawks. Migrant warblers and flycatchers in spring and fall also find food and cover in the thickets of willow, cottonwood, poison oak, and blackberry brambles. Opossums, raccoons, striped skunks, long-tailed weasels, and mule deer use the riparian corridor for foraging, cover, and for a shady refuge during summer days. Smaller mammals like woodrats, shrews, bats, and harvest mice also inhabit this streamside community. It is also possible that beaver may be found in the creeks.

Where the creeks are broad and slow-moving, wood ducks, western pond turtles, Pacific tree frogs, and bullfrogs can be found. The adult frogs and their tadpoles are important prey items for garter and ringneck snakes, and also attract opossums, skunks, and raccoons.

Special-Status Wildlife Species. Tiger salamanders are a species of special concern in California and are listed as a candidate category 2 species (see Table 13-1 for a definition of this designation) by the U. S. Fish and Wildlife Service (USFWS). These salamanders lay their eggs in vernal pools during January and February when the pools are water-filled

(Stebbins 1985). Tiger salamanders occur only sparsely in Placer County and have not been reported in the Plan area, but their presence cannot be ruled out without surveying the vernal pools during the breeding (January-February) and larval-rearing (February-March) season (Brode pers. comm.).

The western pond turtle, designated a candidate category 2 species by USFWS, was observed in Miner's Ravine Creek in the Plan area. This aquatic reptile inhabits marshes, creeks, and irrigation ditches that are lined with emergent vegetation (Stebbins 1985). Western pond turtles have declined due to loss of aquatic habitat from agricultural development, water diversion, stream channelization, and urbanization.

The Cooper's hawk, is a bird "species of special concern" (Remsen 1978) in California. Bird species of special concern are in a declining state due to low population levels. Although they have no legal status under endangered species legislation, they do warrant consideration under CEQA and may, in the future, become eligible for state listing. Cooper's hawk may nest along the riparian zones in the Plan area. During the April 14, 1986 field survey, a Cooper's hawk was observed in the eastern portion of the Plan area, and an unidentified accipiter hawk, probably a Cooper's hawk, was heard calling near the confluence of Secret Ravine Creek and Miner's Ravine Creek. The presence of a calling Cooper's hawk in spring suggests that it may nest in the Plan area. On May 1, the area near the confluence was searched for raptor nests. No evidence of breeding Cooper's hawks, or any other nesting raptor, was found during this survey.

The golden eagle, a California species of special concern, might infrequently forage at the Plan area. Peregrine falcons, a state and federally listed endangered species, and prairie falcons, a California species of special concern, might very rarely be seen at the Plan area. These falcons do not nest at or near the Plan area.

Impacts

Proposed Project

Botanical Resources

Plant Communities. Implementation of the proposed Specific Plan would result in the elimination of annual grassland, northern volcanic mudflow vernal pools, oak woodland, and riparian woodland (see Figure 13-2). Impacts to the urban reserve area are generally indirect and unspecifiable.

Annual Grassland. A majority of the area proposed for development supports annual grasslands. Approximately

867 acres of grassland is proposed for development. From a floristic standpoint, these grasslands do not represent a resource listed for protection statewide; therefore, their removal is considered to be less than significant. From a local perspective, however, this conversion contributes to a decline in the amount of the local intact lowland grassland community.

Northern Volcanic Vernal Pools. Developing the area south of Miner's Ravine Creek would result in the loss of northern volcanic vernal pools identified in Figure 13-3. This particular type of vernal pool is uncommon statewide, and occurs mainly in the Roseville/Rocklin/Lincoln area. Although the historic extent and abundance of volcanic mudflow vernal pools is unknown, it is presumed that very little remains in an intact, well-preserved condition.

The project as presently described proposes to remove all of the vernal pools south of Miner's Ravine Creek. The exact acreage of vernal pools involved is not available, but a very rough estimate can be provided. Approximately 130 vernal pools totaling 55,000 square feet, or 1.3 acres, would be eliminated by the project south of Miner's Ravine Creek. Approximately 20 of these are large pools each averaging roughly 1,500 square feet; the remaining 100 smaller pools average 250 square feet. This estimate does not include the microwatersheds that support the vernal pools, which are a critical element in the occurrence of the pools. A realistic estimate of the extent of this rare habitat type would have to also include the microwatershed and the intervening lands in vernal pool clusters.

Vernal pools within the urban reserve area (north of Miner's Ravine) would not be directly affected by the proposed project.

The elimination of approximately 130 vernal pools is a significant impact because:

1) the biological importance of vernal pools on this area is recognized and specifically identified as resources requiring special consideration in the City of Roseville General Plan (1984c);

2) the local, regional, and statewide significance of vernal pools as a sensitive and diminishing natural resource is actively supported by the Department of Fish and Game and other agencies;

3) a large number of pools are involved; and

4) the loss of northern volcanic mudflow vernal pools could contribute to the reduction of an uncommon specific plant community associated with this type of pool.

The proposed development south of Miner's Ravine could convert all the vernal pool and grassland habitat to urban uses. This is an unavoidable significant adverse impact that cannot be fully mitigated if the proposed development proceeds. Mitigation to a less-than-significant level could only occur with implementation of the No-Project Alternative.

Two measures are discussed which would reduce the impacts but not to a less-than-significant level. First, during site design, the project proponent proposes to determine the feasibility of protecting and preserving vernal pool habitat that may occur in an area not developable for other reasons, e.g., land in the power transmission line corridor. If technically feasible and reasonable within the context of the development, some on-site vernal pools may be set aside as open space.

Second, as mitigation for habitat converted to urban uses in the area south of Miner's Ravine, land containing a vernal pool complex north of Miner's Ravine should be offered to an established agency prepared to own and maintain such land in perpetuity for the purpose of conservation of the vernal pool habitat.

Developing lands south of Miner's Ravine Creek could increase the feasibility and desirability of developing lands in the proposed urban reserve area by providing easier access to roads and other public facilities. Development of the urban reserve area in addition to the project area could potentially eliminate all of the vernal pools in the study area. The total loss of all vernal pools in the Plan area represents an impact considerably more significant than the one resulting from the development proposed in this EIR. This growth-induced impact may occur in the future and could be reduced by setting aside, in permanent nondevelopable open space, vernal pool concentration areas north of Miner's Ravine Creek as discussed above.

Oak Woodland. It is not possible, given the existing level of design detail, to determine the site-specific impacts the proposed project would have on the oak woodland. The majority of the oak woodland is proposed to be preserved in open space, although construction of bridges and roads would require removal of some oak trees. Construction of sewer lines and hiking and bike trails also would require the removal of oak trees. These potentially significant impacts to the oak woodland could be mitigated to a less-than-significant level by establishing a tree preservation management plan as part of the specific site development plan.

Riparian Woodland. The riparian woodland would be directly impacted by construction of the bridges, roads, hiking trails, and sewer lines. Impacts to the riparian communities are considered significant. Impacts from bridge, road, and hiking and bike trail construction could be mitigated by

FIGURE 13-3.

PLANT COMMUNITIES RELATIVE TO LAND USES

NORTHEAST ROSEVILLE SPECIFIC PLAN

ROSEVILLE CALIFORNIA

LAND USE PLAN

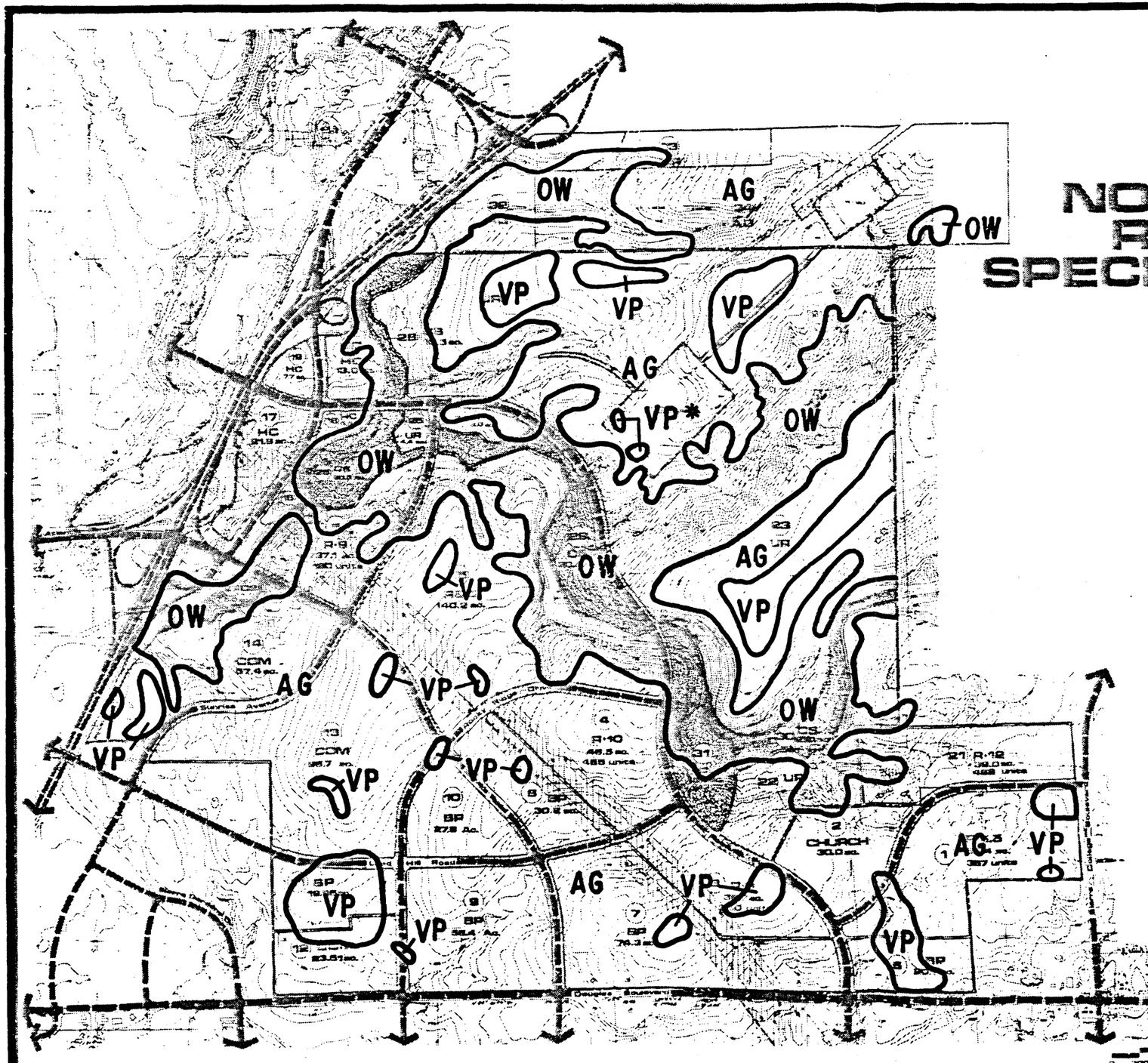
AG = Annual grasslands

VP = Mosaic of annual grasslands and northern volcanic vernal pools. Boundaries encompass significant concentrations of pools. Polygon boundaries do not include watershed boundaries.

VP*= Vernal pools that support Gratiola heterosepala.

OW = Oak woodland; the riparian woodland has not been mapped separately, but falls within the polygons encompassing oak woodlands.

Note: The source map for this figure is the "Existing Vegetation Map" contained in the Draft Specific Plan. Additions to this map have been made by Jones & Stokes Associates to show the general locations of plant communities.



complying with design criteria that protect sensitive resources during construction in the ravines. Strict adherence to such criteria could reduce impacts to a less-than-significant level. Impacts of sewer line construction could be mitigated to a less-than-significant level by placement of the lines outside the ravines; alternatively, if sewer line relocation is not feasible, impacts could also be mitigated by complying with design criteria that protect sensitive resources in the ravine areas; the level of significance after mitigation would depend on the nature and amount of protection afforded by adherence to the criteria.

Special-Status Plant Taxa. Impacts to special-status plant taxa can be divided into direct and indirect impacts. No special-status plant taxa occur in the areas proposed for development; therefore, no potential for direct adverse impacts to special-status plants exists. One special-status plant species, Gratiola heterosepala, occurs in the urban reserve; it could be subject to indirect impacts stemming from adjacent development. Development, for example, may cause greater trespass on open land by off-road vehicles.

Project development would eliminate populations of two plant species of concern to the CNPS, Plagiobothrys scriptus and Dichelostemma lacuna-vernalis. Impacts sustained by these species are less than significant due to their relative abundance and wide distribution.

Wildlife Resources

Animal Communities

Annual Grassland and Northern Volcanic Vernal Pools. The proposed project would eliminate large tracts of annual grassland, resulting in the loss of invertebrates, small mammals, reptiles, amphibians, and other animals living and associated with the habitat type on-site. Species such as red-tailed hawks, American kestrels, western meadowlarks, and horned larks would lose the area as a foraging ground. The proposed project would also eliminate vernal pool habitat and associated aquatic species. Impacts to wildlife resources are considered less than significant on a regional basis (see also the Special-Status Wildlife Species section below).

Oak Woodland and Riparian Woodland. The proposed project would degrade or eliminate portions of the oak woodland and riparian habitat in the Plan area. Riparian habitats are a habitat of statewide concern because of their high wildlife value and reduced amount of acreage. Construction of bridges, roads, and hiking and bike trails across the riparian zone could fragment the streamside corridor thereby impeding movements of wide-ranging species such as deer. The greatest impact could be the permanent loss of unbroken tracts of riparian wildlife habitat for breeding, cover, and foraging. Impacts from bridge,

It is unknown if tiger salamanders occur in the Plan area. Loss of vernal pool habitat could adversely affect tiger salamanders if they do occur in the Plan area.

Although western pond turtles could be adversely affected by construction activities in creeks, this species is relatively mobile and would be able to avoid direct impacts from construction activities. If creek flows are restored to normal conditions after construction, Western pond turtles would not suffer any significant impacts as a result of this project.

Golden eagles, prairie falcons, and peregrine falcons may infrequently use the Plan area for foraging. Because the grassland habitat lost as a result of this project represents only a minute fraction of their foraging range, potential impacts to these raptors is considered less than significant.

Lower Intensity Alternative

The acreage of annual grassland and northern volcanic vernal pools eliminated under this alternative would be lessened and the impacts correspondingly reduced. The loss of the vernal pools could still be considered potentially significant. Approximately 685 acres of grassland and an estimated 30 vernal pools of approximately 0.84 acre would be lost. The impacts to oak woodland, riparian woodland, and special-status plant taxa would be similar to the proposed project.

General Plan Alternative

The General Plan Altenative is essentially identical to the proposed Specific Plan. Therefore the analysis in the Draft EIR is limited to the following three impact areas: Chapter 4, Land Use, Chapter 7, Transportation, and Chapter 5, Visual Quality.

No-Project Alternative

No impacts would occur.

Mitigation Measures

Proposed Project

Mitigation measures for botanical resources complement those for wildlife, and vice versa; therefore, mitigation measures for both botanical and wildlife resources are presented together in the following section.

road, and hiking and bike trail construction could be mitigated by establishing wildlife crossings, a tree preservation management plan, and design criteria for construction in the ravines. Strict adherence to a carefully drafted set of criteria that protect wildlife could reduce the impacts to less-than-significant levels.

Construction of the sewer lines in Miner's Ravine and Secret Ravine would impact substantial amounts of riparian habitat, resulting in significant impacts to wildlife. Wildlife mitigation for construction of the sewer lines would be the same as for botanical resources.

The development proposes to preserve most of the Plan area's riparian habitat in open space. Even if the riparian habitat is left largely intact, the wildlife value would be reduced for some species because of disturbances from the adjacent development. The intrusion of roads, bridges, hiking and biking trails into the riparian zone increases the accessibility of this habitat to people, dogs, and cats. This accessibility, associated with a large increase in the number of nearby residents, increases use and disturbance of the streamside corridor and predation on riparian wildlife by dogs and cats. In addition to disturbance by pedestrians and pets, vehicular traffic on new and existing area roads could increase roadkills of squirrels, skunks, raccoons, opossums, and other wildlife. Routine maintenance and clearing of vegetation along paths and roads would also reduce the wildlife value of this habitat. Some species breed in the riparian zone but forage in the adjacent grasslands. Loss of the nearby grasslands would therefore adversely affect such riparian species. These numerous impacts collectively could have a significant impact on wildlife resources of the riparian zone. Mitigation of impacts to a less-than-significant level could be achieved during site design to include open space with features that protect wildlife. The retention of grasslands in adjacent open space would also help to reduce the impacts to riparian wildlife by providing a bordering ecotone.

Special-Status Wildlife Species. Because of the sighting of a Cooper's hawk in the riparian woodland of Miner's Ravine, it is a species of concern in this case. If they nest along the creek, and if trees containing their nests were cut down during the breeding season, Cooper's hawks in the Plan area would suffer significant impacts. After the development of a specific site plan, spring nest searches should be conducted in riparian zone areas that might be subject to tree-cutting and construction. If a Cooper's hawk nest is found, disturbance of the nest-bearing tree should be avoided until the young birds have fledged. Leaving nests undisturbed until after the spring breeding season would reduce any potential impacts to Cooper's hawks to a less-than-significant level (Clemons pers. comm.).

The proposed project reduces or eliminates annual grassland and northern volcanic mudflow vernal pool habitats in the area south of Miner's Ravine. The loss of vernal pool habitat is considered an unavoidable significant adverse impact. Conversion of grassland is considered a less-than-significant impact.

Several alternative mitigation measures for vernal pools were evaluated but found to be infeasible relative to implementation of the proposed project. The principal measures evaluated and rejected are as follows.

- o Avoidance of disturbance of all vernal pool habitat in the development area
- o Development of additional vernal pools on-site
- o Purchase of vernal pool lands outside the Plan area and dedication of such lands for perpetual use as vernal pools
- o Location and upgrading of existing vernal pools outside the Plan area

Determine the Feasibility of Protecting and Preserving Vernal Pool Habitat in the Area Proposed for Development. The project proponent has proposed to determine the feasibility of protecting and preserving vernal pools south of Miner's Ravine. During the development of the specific site plans, areas that can be retained as vernal pools, within the context of the site plans, will be studied as potential open space lands. Land within the power transmission corridor offers the greatest opportunity as mitigation lands. The size of the vernal pools and microwatersheds would need to be determined with the assistance of a qualified biologist.

Dedicate a Vernal Pool Complex in the Urban Reserve Area to Perpetual Open Space. A vernal pool complex in the urban reserve area should be offered to an established agency prepared to own and maintain the land in perpetual open space for vernal pool preservation. The expectation is to donate land to an agency that can accept and manage such conservation land in perpetuity. The size of the vernal pool area would be chosen with the assistance of a qualified biologist to assure the viability of the habitat type.

Develop Tree Preservation Management Plan. To reduce impacts upon native oaks to a less-than-significant level in the project area, the applicant should submit development plans, including a tree preservation management plan, to the Planning Department for review and analysis. Such a plan would include all measures that ensure the preservation of the oak trees

during and after construction and would be subject to approval by the Planning Director prior to the issuance of grading or building permits in oak woodland areas. The plan should contain the following:

- Chain link fencing or a similar protective barrier should be installed around the driplines of oak trees in or near impact areas prior to project construction, to avoid damage to the trees and their root systems.

- Signs, ropes, cables, and other items should not be attached to oak trees.

- No employee vehicles, construction equipment, mobile offices, supplies, materials, or facilities should be parked, stockpiled, or located within the driplines of oak trees.

- Soil surface removal greater than 1 foot should not occur within the driplines of oak trees, and no cuts whatsoever should occur within 5 feet of their trunks.

- Earthen fill greater than 1 foot deep should not be placed within the driplines of oak trees, and no fill whatsoever should be placed within 5 feet of their trunks.

- If extensive cuts or fills are made near oak trees beyond the dripline, adequate drainage and/or supplemental irrigation should be provided to mitigate the adverse effects caused by elevation changes.

- No trenching whatsoever should be allowed within the driplines of oak trees. If it is absolutely necessary to install underground utilities within the dripline of oak trees, the trench should be either bored or drilled but not within 5 feet of tree trunks.

- Where soil compaction occurs within the dripline of an oak tree, measures should be taken to restore soil condition and integrity.

- Paving within the driplines of oak trees should be stringently minimized. When it is absolutely necessary, porous materials should be used with consideration given to the need for aeration.

- No artificial irrigation within the driplines of oak trees should be permitted.

- Landscaping beneath oak trees may include nonplant materials such as boulders, cobbles, wood chips, etc. The only plant species which should be planted within the driplines of oak trees are those which are tolerant

of the natural semi-arid environs of the trees. Limited drip irrigation approximately twice per summer is recommended for the understory plants.

- All tree limbs damaged during construction, or removed for other reasons, should be sawed flush to the tree trunk and painted with "tree paint."

- In the event that tree removal is necessary, based on approved plans, the applicant should plant an equal or larger number of replacement oak trees of the same species within the landscaped portions of the project and provide for their maintenance. Other replacement plants should be replanted if necessary.

Establish Wildlife Crossings Under Bridges Crossing the Creeks. To reduce the number of roadkills and to minimize the fragmenting effects of roads cutting across creeks, bridges built over creeks should permit free movement of wildlife beneath them. The design and placement of these wildlife crossings should be made with input from a wildlife biologist. Fencing along roads near the creeks would also reduce the incidence of roadkills. These measures and the design criteria below would mitigate the adverse effects of fragmenting the riparian corridor and could, under the best circumstances, reduce impacts to less-than-significant levels.

Establish Design Criteria for Construction in the Ravines. To mitigate potential impacts of placing sewer lines within the ravines to a less-than-significant level, the project should be designed to eliminate sewer lines from the ravine wherever possible. Biological impacts of development within the ravines could be mitigated by developing specific plant and wildlife protection criteria for construction of sewer interceptors, roads, and bridges in the ravines. Strict adherence to a carefully drafted set of plant and wildlife protection criteria may reduce biological impacts to a less-than-significant level. These criteria should be implemented at the site design stage with the assistance of a qualified wildlife biologist. These should include:

- Accurate mapping of riparian vegetation to determine areas of significance to avoid, and to determine areas of lesser significance.

- Use of temporary fencing and/or flagging to clearly identify construction and avoidance areas.

- Minimization of the number of trees removed and no removal of any large older trees.

- Placement of creek crossings and sewer interceptors so that they avoid disrupting or eliminating riparian

vegetation along the creeks within 100 feet of either creekbank as recommended by Clemons (pers. comm.).

- o Replacement of any native trees, requiring removal, with the same species on a one-for-one basis.
- o Minimization of the number of foot and bike paths.
- o Placement of foot and bike paths so that snags and trees favored by raptors and other birds can be avoided.
- o Prohibition of access (enforced as necessary) by unleashed dogs and cats.

These measures supplement those found in Chapter 11, Water Quality and Fisheries.

Conduct Raptor Nest Surveys in Riparian Areas to be Subject to Construction. Trees that are to be eliminated because they are in the path of roads, bridges, or trails should be examined for Cooper's hawks' nests. These surveys should be conducted sometime during the peak breeding season, from late April through July. If a nest is discovered in a tree, and the tree cannot possibly be retained by reconfiguring the project feature, removal of the tree and construction activities in the immediate vicinity of the nest should be postponed until after the young have fledged in August. This mitigation measure would reduce any potential impacts to Cooper's hawks to less-than-significant levels.

Lower Intensity Alternative

Mitigation measures required for the proposed project would also be required for this alternative.

No-Project Alternative

No mitigation is required.

Chapter 14

HAZARDOUS MATERIALS

Setting

Introduction

The area designated Research and Development (R&D) within the Plan area may include businesses that handle hazardous materials. The word "handle" refers to activities such as manufacturing, storing, treating, disposing, or using such materials in any way. Such businesses would be required to comply with federal, state, and local regulations designed to protect the public from unsafe manufacture, storage, treatment, transport, and disposal of hazardous substances. These government regulations are discussed below.

Federal Regulations

The principal federal legislation is the Resource Conservation and Recovery Act (RCRA), which is administered by the U. S. Environmental Protection Agency (EPA). RCRA places reporting, permitting, and operational control requirements on those who generate, treat, store, or dispose of hazardous waste. The federal Hazardous Materials Transport Act, administered by the U. S. Department of Transportation, requires detailed manifesting and reporting of hazardous materials shipped on the U. S. highway system; it also contains packaging requirements for shipped materials. The Clean Water Act, also administered by EPA, controls the discharge of hazardous materials or hazardous waste to waters of the U. S. or to local wastewater treatment plants.

State Regulations

At the state level, there are a number of similar pieces of legislation that allow state agencies to accept delegation of federal responsibility for hazardous materials/hazardous waste management. The Porter Cologne Water Quality Control Act allows the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) to accept implementation responsibility for the Clean Water Act. The Hazardous Waste Control Act of 1977, and recent amendments to its implementation regulations, have placed the California Department of Health Services in a position to assume the lead role in administering

the RCRA program. The Hazardous Substances Highway Spill Containment Act gives the California Highway Patrol the authority to react to and control responses to spills of hazardous materials on the state's highway system.

Local Regulations

Introduction. Businesses that handle hazardous materials must comply with the Roseville Municipal Code, Chapter 9.60, regarding hazardous materials and Chapter 14.26 regarding industrial wastewater.

The City of Roseville also evaluates the siting of businesses that handle hazardous materials, on a case-by-case basis, through the environmental review process. There are no specific City plans that address this subject (Dameron pers. comm.). The City's zoning ordinance regulates the siting of facilities to avoid areas of incompatible land uses.

The Roseville Fire Department inspects all new business facilities that propose to handle hazardous materials to determine if these facilities meet design standards of the Uniform Building Code. If above-ground storage tanks are proposed, the Fire Department is unlikely to approve a tank located in an area that is not zoned "industrial" (White pers. comm.).

The City does not officially designate hazardous materials transport routes. However, the City prefers the use of main thoroughfares that avoid residential areas (Barnett pers. comm.).

Roseville Municipal Code, Chapter 9.60. The purpose of Chapter 9.60 is to protect those who live and work in the City from hazardous substances that may pose acute and chronic health hazards. Exposures could result from fire, spills, industrial accidents, or other types of releases. It recognizes that people have a right to know of the use and potential hazard of hazardous materials in the community. This chapter requires that basic information on the location, type, and the health risks of hazardous materials used, stored, or disposed of in the City be made available to firefighters, health officials, planners, elected officials, and residents.

This chapter requires businesses that handle hazardous materials to annually submit a completed disclosure form to the Fire Chief. A material may be added to the list of hazardous materials upon a finding by the Fire Chief that it satisfies the following criteria: the material, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if it is released into the community. The Fire Department maintains files of all disclosure forms. If the statutory privilege of trade secrecy is not abridged, disclosure files are open to the public.

The content of disclosure forms includes the following:

- o A listing of the chemical name, any common names, and the chemical abstract service number of any hazardous substance used.

- o Maximum amount of each hazardous material handled or used at any one time by the user over the course of a year.

- o How and where hazardous materials are handled to allow fire and safety personnel to prepare adequate emergency response to potential releases of hazardous materials.

- o Information on releases of hazardous materials into the air, water, sewers, or land to permit the City to understand the sources and content of hazardous material releases.

Exemptions from Disclosure. Any person handling less than 500 pounds, or 55 gallons a month (whichever is less), of a hazardous material is exempted from the requirements of disclosure. However, the ordinance allows the fire department to lower the weight or volume limits of the exemption for a specific hazardous material in response to public health concerns. This does not apply to carcinogens.

Roseville Municipal Code, Chapter 14.26. Chapter 14.26 enables the City to comply with all applicable state and federal laws required by the Clean Water Act of 1977 and the General Pretreatment Regulations (40 CFR, Part 403). The objectives of the Chapter include:

- o To prevent the introduction of pollutants into the municipal wastewater system that would interfere with the facilities operation.

- o To prevent untreated pollutants from passing through the facility into receiving waters or the atmosphere.

- o To improve the opportunity to recycle and reclaim wastewaters and sludge.

- o To provide for equitable distribution of the cost of the municipal wastewater system.

Under Chapter 14.26, pretreatment standards are stricter for some materials than those set by EPA (Jackson pers. comm.). The City may at any time amend the regulations to establish more stringent limitations or requirements on discharges, as necessary to comply with the Chapter. Under these regulations, it is unlawful for any significant industrial user to discharge wastewater to any natural outlet within the City, and/or to the treatment works without a City permit. Application for a permit must include a description of activities, facilities and plant

processes on the premises, including all materials which will or could be discharged; site plans, floor plans, mechanical and plumbing plans, and sewers and sewer connections; and other general information. Users subject to pretreatment standards must submit compliance records to the Director of Public Works twice a year. Monitoring facilities are also required (usually located on the user's premises) to allow inspection, sampling and flow measurement of the building sewer and/or internal drainage systems. Unless the user can demonstrate that the release of all information required by the City would harm trade secrets, the information may be made available to the public or other governmental agencies without restriction.

Impacts

Proposed Project

It is not currently known which specific users would locate in the project site; however, it is likely that businesses at the R&D Park may use hazardous materials. If hazardous materials are stored or used on-site, a potential for soil, air, or water contamination exists. This would include a risk due to the shipment of hazardous materials along the surface streets and highways in Roseville.

The public is put at risk by hazardous materials only when there is an uncontrolled or undetected release of material to the environment. This can occur from rupture or leakage of storage tanks, uncontrolled fires, improperly treated liquid or gaseous waste discharges, or accidental spills during transport. These types of uncontrolled releases would create a health hazard to people working within the area and to residents and passersby in adjacent areas. Contamination through the soil and into the groundwater or surface water could pose a threat to a much larger population.

The federal/state framework of hazardous materials and clean water laws and regulations provides some protection to the general public from unsound hazardous materials management practices. The City's Municipal Code provides a good local base on the types and locations of hazardous materials in the area, and helps to protect proper functioning of the municipal wastewater facility. Finally, the City's zoning ordinance provides some assurance that incompatible industrial/manufacturing uses are segregated from residential and public service uses (schools, parks, libraries). However, to ensure that hazardous wastes are disposed of safely, and to mitigate potential impacts to a less-than-significant level, a site-specific Hazardous Waste Management Plan should be developed if hazardous waste-generating processes occur on the Plan area.

Lower Intensity Alternative

The impacts would be similar to the proposed project.

General Plan Alternative

The General Plan Alternative is essentially identical to the proposed Specific Plan. Therefore, the analysis in the Draft EIR is limited to the following three impact areas: Chapter 4, Land Use; Chapter 7, Transportation; and Chapter 15, Visual Quality.

No-Project Alternative

No impacts would occur.

Mitigation Measures

Proposed Project

Comply with all Requirements of the Roseville Municipal Code.

Prepare and Implement a Site-Specific Hazardous Waste Management Plan. A site-specific Hazardous Waste Management Plan should be prepared if hazardous waste-generating processes are proposed for the R&D Park. The Plan should include the following:

- A description of the types and quantities of waste that would be produced.
- A description of the processes that would be used to reduce, recycle, or treat hazardous waste on-site.
- Clean-up procedures for responding to chemical spills or liquid fires.
- Provisions for a routine self-monitoring program, when wastewater or solid waste is suspected of having high contamination concentrations.
- The need for buffers from adjoining land uses.
- The need for backflow prevention activities/hardware to protect the domestic water supply serving the R&D Park.

The development should be required to meet the most stringent discharge standards currently in force at similar projects in California and around the country. The most cost-effective way to meet these standards is by incorporating state-of-the-art

Chapter 15

VISUAL QUALITY

Setting

Regional

Northeast Roseville lies in a transitional zone between the Sacramento Valley and the Sierra Nevada foothills. Terrain ranges from gently sloping hills to wooded ravines containing perennial and intermittent streams. Thus, the region provides considerable visual diversity. The predominant visual appearance in the region is urbanization in the valley, a mixture of urban land uses and natural areas in the foothills, and scattered development closer to the Sierra Nevada.

Natural areas in the vicinity share characteristics common to one of three ecosystem types: grasslands, oak woodland, or riparian floodplain. Grasslands cover most of the flat to gently rolling hills. Oak woodland is found along the ravines; to a limited extent, the number of oaks increases as one travels from the valley to the foothills. The riparian floodplain is generally shielded from most views.

Specific Plan Area

On-Site Views. The Plan area is undeveloped; therefore, all of the visual resources are natural areas which fall into two categories: grassland plateau or ravines. Grassland plateau refers to approximately 85 percent of the Plan area including all of the southern and northeastern portions. The remaining 15 percent of the Plan area lies within the ravines which separate the plateaus. A PGandE transmission line easement with high voltage lines and towers crosses the Plan area in a southeast-northwest direction.

In general, typical views from the plateau areas are of grassland and include occasional rock outcroppings and scattered oaks, primarily along the bluffs overlooking the ravines. The hills are green from the beginning of fall rains in October or November until early May. From May on, the grasses dry and the hills appear yellow as is typical for the Central Valley. Specific vegetation is discussed in Chapter 13, Botanical and Wildlife Resources. Typical views from the grassland plateau are shown in Figure 15-1.

treatment technologies and management practices into the plant design.

Lower Intensity Alternative

The mitigation measures required for the proposed project would also be required for this alternative.

No-Project Alternative

No mitigation is required.

Figure 15-1.

Photo 1. Standing near the top of the ridge on parcel 31 (park) near the proposed alignment of East Roseville Parkway. Looking back towards parcel 2 (church). Note gently rolling topography.

Photo 2. Standing on parcel 31 (park site) looking northwest. Miner's Ravine Creek is narrowing. East Roseville Parkway would be constructed near the top of the ridge.

From atop the plateaus, looking across the Plan area, riparian, woodland, and the previously mentioned grassland vistas can be seen. Miner's Ravine bisects the site from east to west. Miner's Ravine Creek is a perennial stream serving as a visual focus from the bluffs on both the north and south sides of the ravine. Water serves as a dominant visual reference because of its contrast with predominantly solid land, diversity of pattern, and ability to reflect light or color (Litton et al. 1974). The stream varies from about 5 to 15 feet in width during most of the year. Riparian vegetation along the streambanks and through portions of the floodplain includes cottonwoods, willows, and honeysuckle. During winter rains, the stream rises and covers much more of the floodplain. Secret Ravine Creek, with associated riparian habitat, is also present and runs north-south near the northwestern boundary of the Plan area.

Trees near the ravines include both blue oak and interior live oak. Remaining native oak woodland is generally considered a valuable visual resource in the Central Valley (Sacramento County Heritage Oaks Committee 1976). In addition to adding diversity to grassland-type habitat, they provide shade and a cooler micro-climate. All of these contributions make them a particularly valuable aesthetic resource of the Plan area. The oaks are a dominant visual feature in the ravine. The blue oaks lose their leaves in the winter while the interior live oaks do not. This blend of species at the site combines for a rich visual contrast in winter months.

Typical views within the ravine include the presence of Miner's Ravine Creek and Secret Ravine Creek, associated riparian habitat, and oak woodland habitat (Figure 15-2). In addition, the grassland bluffs are also visible from portions of the ravines.

Off-Site Views. Views of the Plan area from off-site are possible from Douglas Boulevard to the south, Lead Hill Road, and Sunrise Avenue, and I-80 to the west. Views from Sierra College Boulevard to the east are limited due to distance and rising topography. Those views are predominantly of grassland bluffs. Some scattered oaks along Miner's Ravine Creek can also be seen in the distance. Views from Douglas Boulevard are most accessible to the public because that road is immediately adjacent to most of the Plan area's southern border. Those views are predominantly of grassland fields with oak woodland being visible in the distance (see Figure 15-3). Steep road cuts block portions of the view of the Plan area. The transmission line towers are also visible from Douglas Boulevard.

Views from I-80 are also accessible to the public. These views include woodland bluffs, grassland hills with scattered oaks, and some limited views of riparian woodland habitat in Miner's Ravine Creek and Secret Ravine Creek. Some tailings

Figure 15-2.

Photo 3. Standing at the edge of Miner's Ravine Creek on parcel 22 (urban reserve) looking downstream (west). Note relatively wide creek and oaks. Parcel 23 (urban reserve) is on the right of the photo.

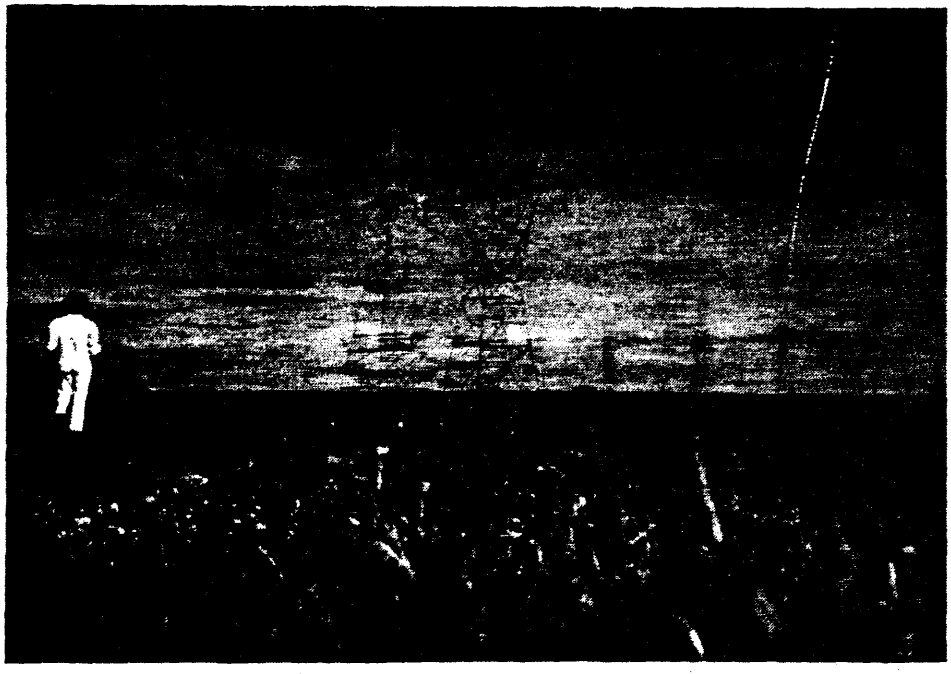


Photo 4. Standing on Plan area near PGandE transmission line corridor. Note gentle topography.

Figure 15-3.

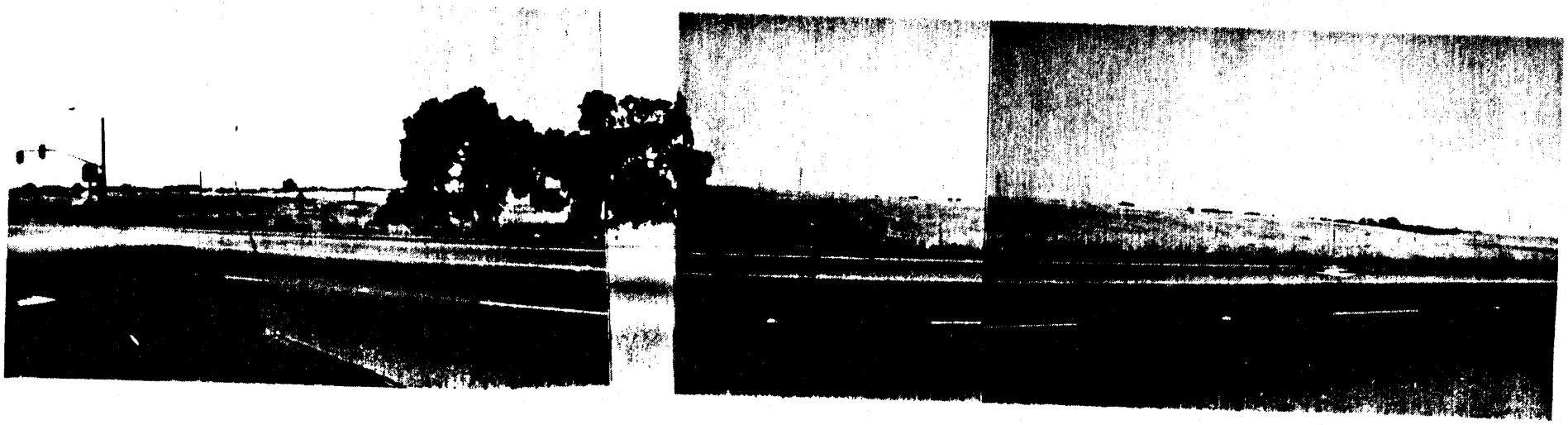


Photo 5. Standing at bus stop on Douglas Boulevard just east of Rocky Ridge Drive. Note generally flat topography. The southern portion of the Plan area is primarily grassland with only isolated stands of oaks. Transmission line towers are visible in the distance.

from past mining are visible from I-80 near Secret Ravine Creek. Finally, the transmission line towers are also visible from I-80.

Viewshed Analysis. A viewshed analysis (see Figure 15-4) has been prepared for the Plan area. The map graphically portrays which portions of the Plan area are visible from the major adjoining roadways. As shown, views from Douglas Boulevard into the Plan area are the longest. Views from I-80 and Sierra College Boulevard are much shorter due to blockage by topography and vegetation. The map also depicts the wide range of views provided at the higher elevation points in the area proposed for development. Generally, an individual standing at one of the three locations depicted on the map would be able to see for miles in almost any direction on a clear day.

Scenic Highways Element. The Scenic Highways Element of the General Plan designates major corridors which should serve as corridors to preserve community identity. These corridors include Douglas Boulevard, Sunrise Avenue, Rocky Ridge Drive, and I-80 in the vicinity of the Plan area. The element states that development adjacent to a community identity corridor shall not be permitted until a specific plan for development is adopted. The following factors are identified as guidelines in developing specific plans for each of the corridors in the Plan area.

Douglas Boulevard:

a. Use of volcanic flows to define minimum limits of corridor.

b. Need for unique design when developing on or adjacent to volcanic flow area.

c. Preservation of broad vistas between Sierra College and the extension of the regional park arterial.

d. Provide bicycle path link with Folsom Lake recreation area.

e. Use topographic relief to screen development.

f. Maintain minimum noise corridor for residential development.

g. Use of consistent site review and subdivision standards.

h. Consider low intensity of future land use.

i. Maintain consistent sign control.

Sunrise Avenue:

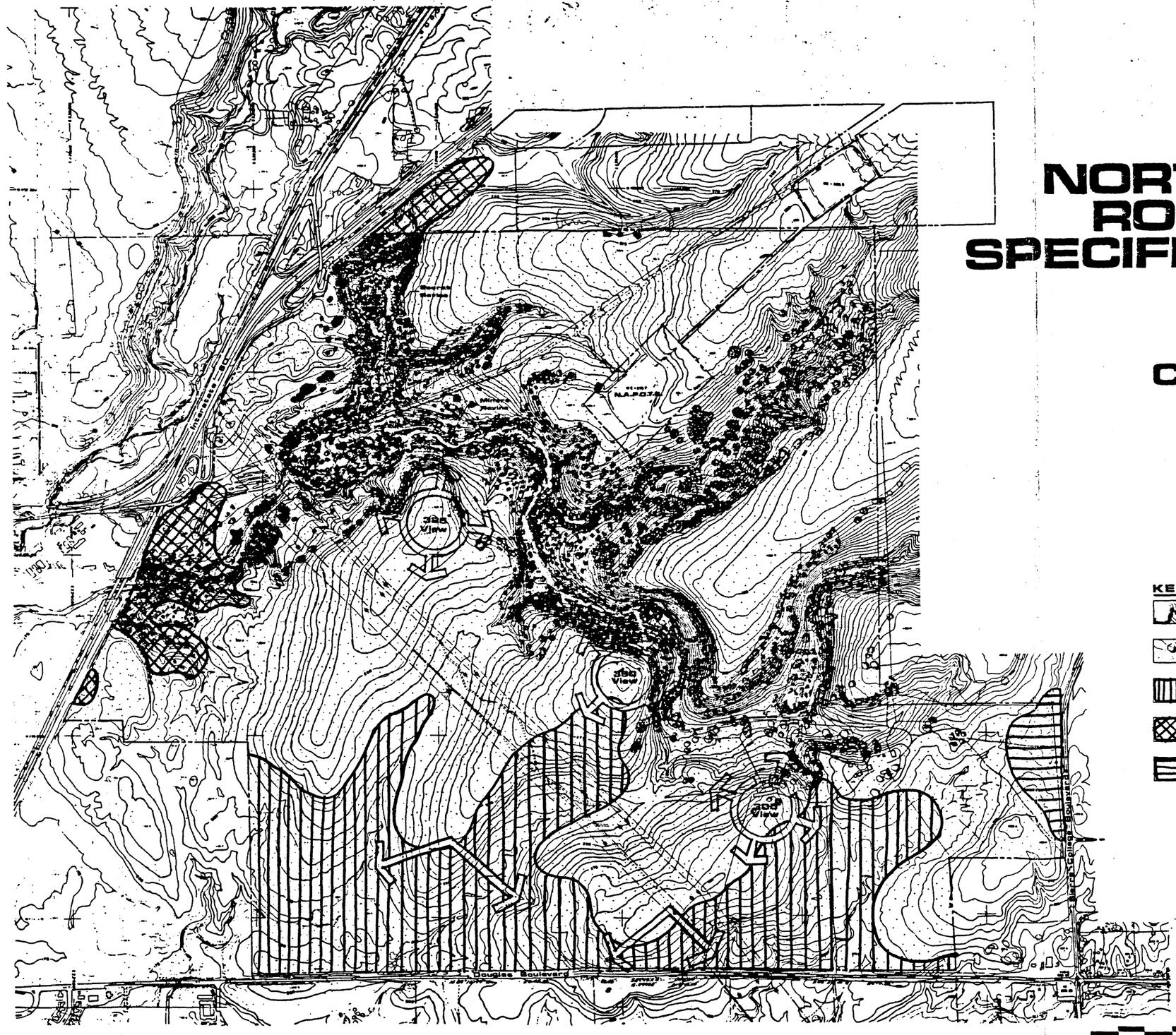
a. Consider intensity of future land use along corridor.

FIGURE 15-4.

NORTHEAST ROSEVILLE SPECIFIC PLAN

ROSEVILLE CALIFORNIA

VIEWSHED ANALYSIS



KEY

- FOOTHILL/ OAK WOODLAND
- OPEN GRASSLAND
- VIEWSHED From Douglas Boulevard
- VIEWSHED From Interstate 80
- VIEWSHED From Sierra College Boulevard

MORTON AND PITALO, INC.
CIVIL ENGINEERS
1430 ALHAMBRA BLVD SACRAMENTO CALIFORNIA

ANTHONY M. GUZZARDO AND ASSOCIATES INC.
LAND PLANNERS
526 MONTGOMERY STREET SAN FRANCISCO CALIFORNIA

10-1-86

0 300 600 900 1200 1500 1800

b. Use topographic relief to screen development between the County line and Cirby Way.

c. Maintain minimum noise corridor for residential development.

d. Maintain consistent site review and subdivision standards for new development.

e. Preserve existing trees along corridor, especially adjacent to Cirby and Linda creeks.

f. Maintain consistent sign control.

Rocky Ridge Drive:

a. Consider intensity of future land use.

b. Maintain minimum noise corridor for residential development.

c. Maintain consistent site review and subdivision standards for new development.

d. Consider regional park use adjacent to corridor.

e. Preserve existing trees, especially adjacent to Linda Creek.

f. Consider possible bicycle/pedestrian link with the regional park.

g. Maintain consistent sign control.

I-80:

a. Maintain minimum noise corridor for residential development.

b. Use of topographic relief to screen development from freeway.

c. Preserve existing trees, especially adjacent to stream crossing and paralleling the corridor.

d. Maintain consistent sign control.

Impacts

Assessment of the significance of visual impacts is by its very nature subjective. Visual impacts affect individuals directly, yet differently, depending on each individual's

sensitivity to an aesthetic stimulus (U. S. Environmental Protection Agency 1973). This chapter discusses visual impacts in terms of disturbance of viewsheds. Disturbance of viewsheds would impact individuals both on- and off-site. On-site viewsheds include the vistas atop the southern plateau and those within the ravine and floodplain. Off-site viewsheds includes vistas from the south such as from Douglas Boulevard, I-80, and from property to the east adjoining Sierra College Boulevard. For purposes of analysis, the grassland plateau in the northern portion of the Plan area would not be impacted because no development is proposed north of Miner's Ravine; therefore, no one would be in the urban reserve area looking at the area proposed for development.

Proposed Project

The Specific Plan (August 1986) has a design element which establishes design standards for setbacks and streetscapes. The design element is intended to be compatible with the standards established within the Southeast Area Plan. The standards also assure retention of valuable trees and open space areas. The standards in the design element are as follows:

Use	Landscape Area Required (percent)	Tree Preservation
Commercial	10-12	Preserve, if possible
Office	15	Preserve, if possible
R&D	15	Preserve, if possible
Open space	--	Preserve

The design element also includes the following standards for landscape requirements along the streets.

Street Name	Average Width of Landscaping
Taylor Road	10 feet
Rocky Ridge Drive	25 feet
Lead Hill Road	25 feet
Eureka Road	35 feet
East Roseville Parkway	35 feet
Douglas Boulevard[1]	50 feet

[1] The portion west of Rocky Ridge Drive shall conform to the Roseville Center Site Plan.

Urban development is proposed in the southern portion of the Plan area primarily on the grassland plateau. The change from vacant grasslands to urban development would be the primary visual impact. The significance of the impact would depend upon the location from which a view is perceived (i.e., the viewshed), and the individual's perception of the change.

On-Site Views. On-site viewsheds would be significantly impacted as a result of the change in visual resource. This impact cannot be reduced to a less-than-significant level without implementing the No-Project Alternative. However, partial mitigation could be achieved by developing and adopting landscape design guidelines for the Plan area.

The most aesthetically sensitive areas in the Plan area are the ravines. These ravines contain most of the riparian habitat and most of the woodlands including the native oaks. No commercial, industrial, or residential structures are proposed to be developed in the ravine area. Construction of Eureka Road, East Roseville Parkway, and the other roads which would cross over the ravines would interrupt viewsheds within the ravines and cause visual impacts. These impacts are considered less than significant because most of the ravine area would be retained as natural open space.

Off-Site Views. Off-site viewsheds from Sierra College Boulevard would not be significantly impacted because a north-south ridge west of the road would block most of the proposed development from view.

Off-site viewsheds from Douglas Boulevard would be significantly impacted. Though not a pristine grassland, because of road and transmission line disturbance, the Plan area nevertheless is an expanse of predominantly undeveloped land. Commercial and office development would eliminate the open, rural nature of the visual resource. This impact cannot be reduced to a less-than-significant level without implementing the No-Project Alternative. However, partial mitigation could be achieved by developing and implementing landscape design guidelines for the Plan area.

Off-site viewsheds from I-80 would not be significantly impacted because most of the Plan area is not visible from I-80.

Lower Intensity Alternative

Impacts of this alternative are similar to those of the proposed project. However, less development would occur along Douglas Boulevard than under the proposed project; therefore, impacts would be somewhat less.

General Plan Alternative

Visual impacts of this alternative would be the same as described for the proposed project. The General Plan Alternative is similar to the proposed project except that parcel 12 in the southwest of the Plan area is designated business professional rather than commercial. This difference will not alter the significance of the visual impact of development. This difference in land use is consistent with the Douglas Boulevard corridor established as part of the Southeast Roseville Specific Plan.

No-Project Alternative

No impacts would occur.

Mitigation Measures

Proposed Project

Develop and Implement Landscape Design Guidelines for the Plan Area. Proponents of the Southeast Roseville Specific Plan prepared Landscape Design Guidelines in cooperation with the City of Roseville. Supplementing the Design Element in the Specific Plan to develop a similar compatible plan for Northeast Roseville would partially mitigate for both on- and off-site impacts to the open space visual resource.

The design guidelines should incorporate the use of native grassland and woodland vegetation where appropriate. Chapter 13, Biological Resources, discusses the need for development of a tree preservation management plan and design criteria for construction in the ravines. The design guidelines should also include earth tone color schemes compatible with the hillsides and setback standards, where appropriate.

The City of Roseville has guidelines for designated roadway corridors. These should be incorporated into the design guidelines, where appropriate.

Lower Intensity Alternative

The mitigation measure required for the proposed project is also required for this alternative.

General Plan Alternative

The mitigation measure required for the proposed project is also required for this alternative.

No-Project Alternative

No mitigation is required.

No-Project Alternative

No mitigation is required.

Chapter 16

CULTURAL RESOURCES

A complete cultural records search and field survey was conducted for the Plan area and is included as Appendix 16-1. The following is a summarization of that report.

Setting

Ethnographic Background

The Plan area was occupied in historic and late prehistoric times by the ethnographically described Nisenan, who represented a regional subdivision of the larger Maidu cultural and linguistic group. Although the entire stretch of land from the Sacramento River to the High Sierras is included within the Nisenan territory, regional subdivisions are known, and the most important of these, in terms of the present project, was the separation of the Valley and Foothill Nisenan. In general, it must be assumed that the Roseville area was very close to the easterly boundary of the general Valley Nisenan area of influence and, as such, may have been used by both hill and valley groups.

Previous Archeological Investigation

It is possible to identify two regions within the Nisenan territory, in the general vicinity of Roseville, for which some archeological data are available. The first includes the Dry Creek drainage from an area upstream from the present City of Roseville to a point near its present terminus within the floodplain of Sacramento County. The second local region is that along Linda Creek in Sacramento County.

Palumbo (1966) reported some 31 archeological sites for the Dry Creek drainage, of which 23 are in Placer County. Overall, it seems reasonably clear that most sites represent evidence of temporary camps and special activity stations. The Evelyn Site (Site 31-86 in the Palumbo series; see Appendix 16-1) seems to have been the only major village in the Roseville area (at least on the Dry Creek drainage).

For the Linda Creek area, Johnson (1976a) notes the presence of one large camp or village location and a smaller campsite along with scattered artifacts and/or isolates in several nearby contexts.

Record Search of Archeological and Historic Sites

Portions of the Plan area have been surveyed in the recent past as part of previous projects. The following sites have been recorded in the Plan area. These sites are shown on Figure 16-1.

Prehistoric Sites

CA-Pla-48. An examination of the site record for CA-Pla-48 indicates that it consisted of bedrock mortars and a few artifacts. Its location is described as the north side of Secret Ravine, and southwest of the dredge tailings near the Atlantic Street overcrossing. The site was examined in 1960, 1979, and again in 1980. The 1980 survey describes 21 bedrock mortars (with measurements, situated on four outcroppings). No midden was noted and the possibility of mining-related disturbance was mentioned.

CA-Pla-514. This site is described as an open site (no bedrock mortars) characterized by a flake scatter. Several attempts to relocate this site were unsuccessful.

Historic Sites. No National Register sites will be impacted by the project. The following historic site has been recorded and has minor significance.

CA-Pla-510H. This site consists of an old wooden stave pipeline. The pipeline is of interest, but there is not much point in further field work, nor is it considered practical to try and preserve or protect it. Therefore, this site is not discussed further.

Field Survey

Approximately 1,000 acres of the Plan area were examined in April 1986 by professional archeologists looking for artifacts, features, soil alteration, and/or faunal remains. The field survey concentrated on potentially sensitive areas of the Plan area, including the floodplain, streams, and ravines. The areas designated urban reserve and agricultural were not surveyed, with the exception of areas proposed for roadway improvements. The survey involved transects ranging from 10-30 meters (m) depending on location and circumstances. All outcrops were examined and special attention was given to the sensitive areas along the drainages, as well as other places deemed likely spots for habitations or other activities. See Figure 16-1.

The field survey discovered two unreported prehistoric sites, which are described below.

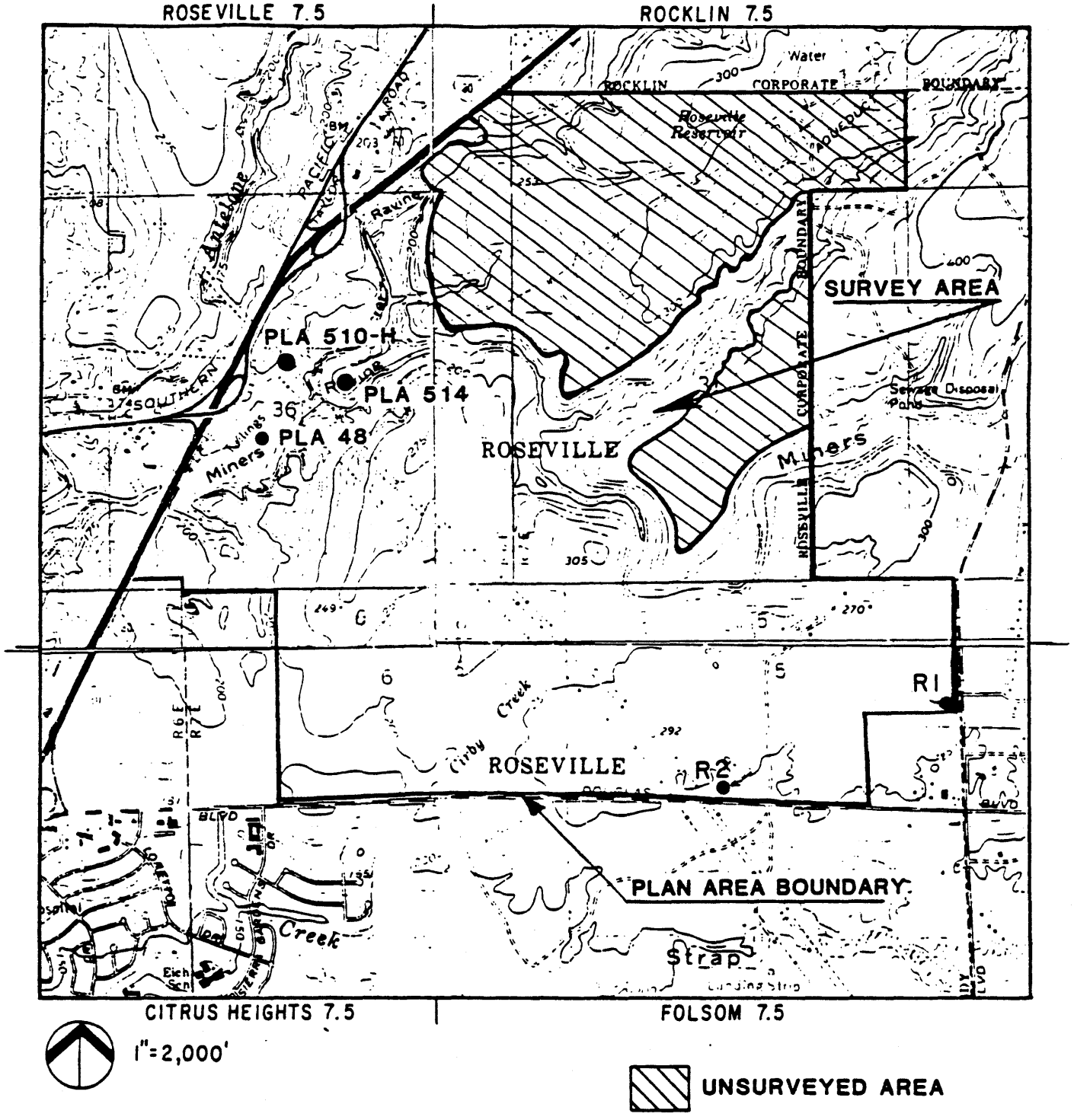


FIGURE 16-1. ARCHEOLOGICAL SITES

Site R-1. This is a small processing station consisting of four bedrock mortars on two adjacent outcrops. No associated artifacts were noted and there was no obvious midden visible.

Site R-2. This is also a small processing station. It includes two bedrock mortars on one small outcrop. No artifacts were noted and no obvious midden was visible.

Impacts

Proposed Project

Site R-1. This site is situated about 25 m from Sierra College Boulevard at the southeast corner of parcel 1. Impacts to this site could be mitigated to a less-than-significant level by either avoiding the site or providing detailed photodocumentation and testing.

Site R-2. This site is situated on parcel 7 about 45 m from Douglas Boulevard at the eastern edge of where the PGandE easement crosses Douglas Boulevard. Impacts to this site could be mitigated to a less-than-significant level by either avoiding the site or providing detailed photodocumentation and testing.

CA-Pla-48. This site is located between parcel 27 and I-80 just south of Eureka Road. It appears that the site would be impacted by construction of the new freeway interchange at Atlantic Street. Construction of this interchange is not a part of this project.

CA-Pla-514. This site is located in parcel 26, which is designated as open space. Impacts would be less than significant.

Lower Intensity Alternative

Impacts to Sites R-1, CA-Pla-48 and -514 would be the same under this alternative as under the proposed project. These impacts could be mitigated to a less-than-significant level by avoiding the sites or testing. Site R-2 would not be impacted by development of parcel 7 because, under this alternative, parcel 7 is designated urban reserve. Site R-2 may be impacted, however, by the widening of Douglas Boulevard. These impacts could be mitigated to a less-than-significant level by avoiding the site or testing.

General Plan Alternative

The General Plan Alternative is essentially identical to the proposed Specific Plan. Therefore, the analysis in the

Draft EIR is limited to the following three impact areas: Chapter 4, Land Use, Chapter 7, Transportation; and Chapter 15, Visual Quality.

No-Project Alternative

No impacts would occur.

Mitigation Measures

Proposed Project

Site R-1 - Avoid Site R-1 or Provide Detailed Photodocumentation and Testing. If possible, given design and engineering constraints, avoid this site and protect it with some kind of open space easement. If this option is deemed impractical, the impacts could be mitigated by providing detailed photodocumentation and measure of the bedrock features, supplemented by no less than two 1 m by 1 m test excavation in the vicinity of each of the outcroppings (four units total). If the test excavations determine that the site has additional significance, additional mitigation could be needed.

Site R-2 - Avoid Site R-2 or Provide Detailed Photodocumentation and Testing. If possible, given design and engineering constraints, avoid this site and protect it with some kind of open space easement. If this option is deemed impractical, the impacts could be mitigated by providing detailed photodocumentation and measure of the bedrock features, supplemented by no less than two 1 m by 1 m test excavations in the vicinity of the one small outcropping (two units total). If the test excavations determine that the site has additional significance, additional mitigation could be needed.

Stop Work if Cultural Resources are Discovered During Construction. It is possible that vegetation, siltation, or historic activities may have obscured surface evidence of additional sites in the Plan area. If artifacts or unusual amounts of charcoal, bone, or shell are uncovered during construction, work should be halted within 100 feet of the find and a qualified archeologist should be consulted for an on-site evaluation. If bone is discovered and it appears to be human, California law requires that the County Coroner be contacted. If remains are found of Native American origin, the Native American Heritage Commission should be informed so that they can assist in protecting such remains.

Lower Intensity Alternative

The mitigation measures identified for the proposed project are also required for this alternative.

No-Project Alternative

No mitigation is required.

Chapter 17

CUMULATIVE IMPACTS

Introduction

The State CEQA Guidelines require that EIRs include a discussion of cumulative impacts when they are significant. The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as much detail as required for specific individual projects. The discussion should be guided by the standards of practicality and reasonableness.

The cumulative impact analysis must include a list of projects producing related or summary cumulative impacts, or a summary of projections designed to evaluate regional or area-wide conditions, and a reasonable analysis of the cumulative impacts of the relevant projects.

The cumulative analysis contained in this EIR discusses the key issues of land use, population, housing, and employment, transportation, air quality and noise. The analysis is based on growth projections prepared by the City by Angus McDonald and Associates (1986). The focus of the analysis is the year 2005 because analyzing beyond that point of development is considered impractical.

Growth Projections

City of Roseville

The City of Roseville adopted revised growth and development policies as part of its General Plan revision program on November 6, 1985. Recognizing that these policies implied substantial changes for the City, a multi-year capital improvements program and financing plan was authorized.

Angus McDonald & Associates prepared several growth forecasts for Roseville as part of the Roseville Public Facilities Financing Plan. The growth forecasts were prepared for the following major planning areas in the City: City-wide Infill, Foothills Infill, North Central, Northeast, North Industrial, Northwest, and Southwest. A separate planning area titled "Regional Commercial" was used to identify a regional shopping center site at an unspecified location.

The growth forecasts for the major planning areas in Roseville are shown in Tables 17-1 and 17-2. The locations of the major planning areas are shown in Figure 4-1. The City of Roseville is projected to have a population of 76,087, with 29,928 dwelling units, and 57,682 employees by 2005. At expected buildout, in an undetermined year beyond 2005, the City is projected to have a population of 91,479 people, with 35,848 dwelling units, and 80,345 employees.

South Placer Region

Roseville is one of the member jurisdictions of the South Placer Policy Committee. Given the local governments' commitment to act cooperatively to accommodate growth in the region, the South Placer area is considered the logical basis for analysis of regional impacts.

Land use forecasts for the year 2005 and the expected buildout are based on projections made by Fehr & Peers Associates as part of the traffic analysis for this EIR. The forecasts are based on growth projections prepared for the City of Roseville in May 1986 by Angus McDonald & Associates and current information from the City of Rocklin and Placer County. Data from Rocklin included the Stanford Ranch EIR which covered cumulative development of the Northwest Rocklin Plan area. This area was assumed to develop at the same pace as the major Roseville plan areas. The development assumptions for Placer County included Treelake Village and other cumulative development in the southeastern part of the County, as well as projections by County staff on growth in other parts of the County.

Growth projections for Roseville and anticipated development in Rocklin and Placer County were analyzed by Fehr & Peers Associates to determine the jobs/housing balance. The preliminary assessment concluded that there were too many jobs and not enough housing resulting in a jobs/housing imbalance. To achieve a jobs/housing balance of 0.5 employed residents per capita and meet the South Placer Policy Committee policy of providing housing in sufficient numbers such that the home-to-work commute need be no more than 6 miles for 60 percent of the workers, nor more than 8 miles for 80 percent of the workers, housing was assigned to various planning areas outside of Roseville to achieve this balance.

Growth forecasts for the South Placer area for the year 2005 and expected buildout are shown in Table 17-3. By the year 2005, development in the region is projected to reach about two-thirds of its expected buildout levels. The region's population would reach approximately 213,230 and its employment level would be approximately 96,590. To achieve the jobs/housing balance it is necessary to assume that 31,500 Sacramento residents living in the Antelope area would commute to jobs in

Table 17-1. Growth Forecasts for Roseville for the Period Through January 1, 2005

	Residential (Acres)	Dwelling Units	Population	Business/ Prof./ R&D (Acres)	Commercial (Acres)	Light Industrial (Acres)	General Industrial (Acres)	Total Employees[1]
Existing Development	2,830	12,163	29,897	58	663	221	349	14,500
New Development								
City-wide infill	833.3	5,000	13,000	17	80	95	75	3,713
Foothills infill	38.4	370	960	7	9	85	0	1,509
North central	330.6	2,645	6,880	87	50	125	0	5,565
Northeast[2]	224.7	1,800	4,680	243.2	73.6	0	0	9,741
North industrial	0	0	0	0	7	1,189	385	17,145
Northwest	914.4	5,420	14,090	0	20	9	0	523
Southeast	229.6	2,530	6,580	68	13	0	0	2,586
Regional commercial	0	0	0	0	80	0	0	2,400
SUBTOTAL: New	2,571	17,765	46,190	422.2	332.6	1,503	460	43,182
TOTAL: Existing + New	5,401	29,928	76,087	480.2	995.6	1,724	809	57,682

Source: McDonald (May 1986) and Jones & Stokes Associates.

[1] Assumed employee density factors are 20 employees per gross acre for general commercial (highway commercial and community commercial), 30 employees per gross acre for regional commercial, 34 employees per gross acre for business park, professional office, and research and development, 4 employees per gross acre for general industrial, and 13 employees per gross acre for light industrial.

[2] Northeast growth forecasts reflect the Lower Intensity Alternative.

Table 17-2. Growth Forecasts for Roseville at Expected Buildout

	Residential (Acres)	Dwelling Units	Population	Business/ Prof./ R&D (Acres)	Commercial (Acres)	Light Industrial (Acres)	General Industrial Acres)	Total Employees[1]
Existing Development	2,830	12,163	29,897	58	663	221	349	14,500
New Development								
City-wide infill	833.3	5,000	13,000	17	105	117	97	4,590
Foothills infill	57.3	550	1,429	10	20	137	0	2,520
North central	551	4,408	11,472	151	127	223	0	10,570
Northeast[2]	224.7	1,800	4,680	367.8	131	0	0	15,125
North industrial	0	0	0	0	17	1,737	650	25,510
Northwest	1,371.5	8,129	21,141	0	49	15	0	1,170
Southeast	344.7	3,798	9,860	99	30	0	0	3,960
Regional commercial	0	0	0	0	80	0	0	2,400
SUBTOTAL: New	3,382.5	23,685	61,582	655	555	2,229	747	65,845
TOTAL: Existing + New	6,212.5	35,848	91,479	713	1,218	2,450	1,096	80,345

Source: McDonald (May 1986) and Jones & Stokes Associates.

[1] Assumed employee density factors are 20 employees per gross acre for general commercial (highway commercial and community commercial), 30 employees per gross acre for regional commercial, 34 employees per gross acre for business park, professional office, and research and development, 4 employees per gross acre for general industrial, and 13 employees per gross acre for light industrial.

[2] Northeast growth forecasts reflect the proposed project.

Table 17-3. Growth Forecasts for the South Placer Area

	Year 2005		Expected Buildout	
	Population	Employees	Population	Employees
Roseville	75,000	56,800	91,310	78,320
Loomis basin east	17,640	850	24,090	850
Rocklin	21,970	2,400	22,220	2,400
NW Rocklin plan area	41,420	9,790	59,830	15,050
Sunset west	3,990	800	4,030	800
Lincoln	7,170	11,500	8,470	11,500
Auburn	46,040	14,500	53,920	14,500
Placer County Totals	213,230	96,590	263,870	123,420
Sacramento[1]	31,500[2]	25,700[3]	34,320[2]	25,680[3]
TOTAL	244,730	122,290	298,190	149,100

Source: Fehr & Peers Associates.

[1] Sacramento refers to Sacramento residents working in South Placer, and Sacramento jobs filled by South Placer residents. This is necessary to demonstrate subregional jobs/housing balance (one job per two residents).

[2] Sacramento residents commuting to jobs in South Placer.

[3] South Placer residents commuting to jobs in Sacramento.

South Placer and 25,700 residents in South Placer would commute to jobs in Sacramento.

At expected buildout, the region's population would be approximately 263,870 and its employment level approximately 123,420. A small amount of commuting to and from Sacramento would still occur.

Land Use

Impacts

Year 2005 with Lower Intensity Alternative. Land uses in Roseville in the year 2005 are shown in Table 17-1. Approximately 5,401 acres of residential development, 480 acres of business/professional/R&D development, 995 acres of commercial development, 1,724 acres of light industrial development, and 809 acres of general industrial development is projected. The Lower Intensity Alternative proposes to develop approximately 669.2 acres or 13 percent of the development projected by the year 2005. This is considered a potentially-significant impact which could be reduced to a less-than-significant level by continuing to evaluate projects for compliance with the South Placer Policy Plan.

No estimates are available for the total amount of land that would be developed in the South Placer region by the year 2005.

Expected Build-Out with Proposed Project. Growth forecasts for Roseville at expected buildout are presented in Table 17-2. Approximately 6,212 acres of residential development, 713 acres of business/professional/R&D development, 1,218 acres of commercial development, 2,450 acres of light industrial development, and 1,096 acres of general industrial development are projected. The Specific Plan proposes to develop 851.2 acres, or approximately 11.4 percent of the development projected in the City by expected buildout. This is considered a potentially-significant impact which could be reduced to a less-than-significant level by continuing to evaluate projects for compliance with the South Placer Policy Plan.

No estimates are available for the amount of land that would be developed in the South Placer region by expected buildout.

Mitigation Measures

Year 2005 with Lower Intensity Alternative

Evaluate Developments for Compliance with the South Placer Policy Plan. To assure that growth occurs in compliance with the South Placer Policy Plan, the South Placer jurisdic-

tions should continue to evaluate projects in relation to the South Placer Policy Plan.

Expected Buildout with Proposed Project. The mitigation measure required for the year 2005 with Lower Intensity Alternative is also required for this alternative.

Population, Housing, and Employment

Impacts

Year 2005 with Lower Intensity Alternative. By the year 2005, the population in Roseville is projected to increase to approximately 76,087 (see Table 17-1). The number of dwelling units estimated is approximately 29,928, assuming an average of 2.6 persons per dwelling unit. This population represents an increase of approximately 46,000 over the current population of approximately 29,000. Approval of the Lower Intensity Alternative would result in the construction of 1,800 dwelling units and in approximately 4,680 residents. This represents approximately 6 percent of the total population in the City and 6 percent of the total estimated dwelling units. This impact is considered significant. See mitigation under Land Use.

Implementation of the Lower Intensity Alternative would result in approximately 9,741 employees, plus an additional 2,400 employees for the regional mall. These 12,141 employees represent approximately 21.4 percent of the total number of expected employees. This impact is considered significant. See mitigation under Land Use.

The population and the total number of employees expected in the South Placer region in the year 2005 is 213,230 and 96,590, respectively (see Table 17-3). The Lower Intensity Alternative represents less than 3 percent of the total population and approximately 12.5 percent of the total employment. This impact is considered significant. See mitigation under Land Use.

Expected Buildout with Proposed Project. At buildout, the population in Roseville is projected to reach 91,479 and the total number of dwelling units is projected at 35,848 (see Table 17-2). Approval of the proposed project represents approximately 5.2 percent of the total population and total dwelling units expected at buildout. This impact is considered significant. See mitigation under Land Use.

The South Placer region is projected to buildout to a population of 263,870 and employment level of 123,420 (see Table 17-3). Implementation of the proposed project would contribute approximately 17,525 of these employees. The

proposed project represents less than 2 percent of the population in the region at buildout and approximately 14.2 percent of the total number of employees. This impact is considered significant. See mitigation under Land Use.

Mitigation Measures

Year 2005 with Lower Intensity Alternative. See Land Use.

Expected Build-Out with Proposed Project. See Land Use.

Transportation

The setting discussion and the description of study assumptions is contained in Chapter 7, Transportation.

This section is based on a transportation report prepared by Fehr & Peers Associates, consultants to AKT Developments.

Impacts

Trip Generation Rates. Trip generation rates used for the analysis of the Northeast Area Plan are presented in Tables 17-4 and 17-5. They are based on research published by the ITE and Caltrans. This research indicates that, for residential developments, trip generation rates per dwelling unit decline as the dwelling unit density increases and that, for retail centers, trip rates per thousand square feet decrease as the overall size of the shopping center increases. The magnitudes of these variations are given in Table 17-5. The ITE research also indicates that a high proportion of the trips generated by retail businesses is secondary or diverted travel. This is travel that is already occurring on the local street system for other purposes, such as travel home from work, with stops at the commercial use along the way. As such drop-in visits do not represent a net increase in the number of vehicles on the surrounding street system, they are discounted from the traffic generation estimates. The ITE research suggests that only about 35 percent of the traffic generated by retail centers represents true primary travel that should be included in the evaluation of impacts. The survey data is representative of sites similar to the Plan area.

The retail trip rates given in Table 17-4 are based on the expected retail coverages projected for Roseville by Angus McDonald & Associates: 9,000-12,000 sf per gross acre. The trip rates in Table 17-5 for office, R&D, and industrial uses are based on the expected employee densities: 34 per gross acre for business professional and R&D, 4 per acre for general industrial, and 13 per acre for light industrial.

Table 17-4. Trip Generation Rates For Residential and Commercial Uses

Land Use Category	Description/Size	ADT	AM Peak In	AM Peak Out	PM Peak In	PM Peak Out
		Trips per du				
Residential	R-1 through R-5	10	0.21	0.55	0.63	0.37
	R-6 through R-10	8.5	0.14	0.50	0.55	0.30
	R-11 through R-15	7.0	0.12	0.40	0.47	0.23
	R-16 through R-20	6.0	0.10	0.35	0.40	0.20
		Trips per Acre				
Commercial	<10 acres/parcel	738	11.2	10.4	34.0	36.2
	10-20 acres/parcel	600	8.1	7.2	25.7	27.4
	20-30 acres/parcel	455	3.6	1.8	21.0	22.0
	30-40 acres/parcel	377	14.4	6.3	24.5	25.0
	40-50 acres/parcel	497	3.3	1.7	24.0	25.0
	50-100 acres/parcel	409	4.0	2.6	17.0	17.1
	100+ acres/parcel	409	4.3	1.7	15.0	15.0
		Trips per Room				
Hotel	(assumes 85 percent occupancy)	9.0	0.5	0.3	0.3	0.3

Source: ITE and Caltrans.

Table 17-5. Trip Generation Rates for Business Uses

Land Use	Employee/ Acre	Trips/Employee			Trips/Acre				
		ADT	AM	PM	ADT	AM		PM	
						In	Out	In	Out
Business park and professional office/research and development	34	3.8	0.54	0.54	129	16.4	2.0	2.8	15.6
General Industrial	4	3.0	0.49	0.57	12	1.8	0.2	0.3	2.0
Light Industrial	13	3.2	0.67	0.65	42	7.8	0.9	1.5	7.0

Source: ITE and Caltrans.

Year 2005 with Lower Intensity Alternative. By the year 2005, development in all of Roseville's major plan areas is projected to reach about two-thirds of its full buildout levels. Roseville's population would reach about 75,200 and its employment level about 56,800. Assuming a labor force participation rate of 0.5 employed residents per capita, Roseville would have about 37,600 employed residents. The result would be a jobs/labor force imbalance (with about 1.5 jobs for each employed resident) and a significant amount of in-commuting to Roseville from other areas.

Table 17-6 summarizes Roseville's City-wide trip generation forecast for the year 2005. With the Lower Intensity Alternative and with expected 2005 development levels in other plan areas, total daily trip generation in Roseville would reach about 474,000 primary vehicle trips daily. This represents a more than three-fold increase over the City's existing total traffic generation. The Lower Intensity Alternative would generate about 15 percent of the year 2005 City-wide total traffic. It would generate about half as much traffic as is currently generated in the City as a whole. Of all of the City's plan areas, the North Industrial would generate the most traffic in the year 2005, about 20 percent of the City's total. The remaining plan areas would each generate between 7 percent and 10 percent of the 2005 City-wide total.

The roadway system planned to support cumulative year 2005 development includes completion of the Route 65 Bypass as a four-lane expressway and completion of the facilities called for in the City of Roseville's current circulation plan, as well as roadways proposed as part of the specific plan area proposals in Northeast, Southeast, North Central, and Northwest Roseville and in Northwest Rocklin (as determined in the Stanford Ranch EIR). Within the Plan area, these include the roadway facilities illustrated in Figure 17-1. It includes the Route 65 Bypass, I-80 improvements, Roseville Parkway both east and west of the freeway, the Atlantic Street extension east of I-80 to connect with Eureka Road, the northerly extension of Rocky Ridge Drive, and the widening of Douglas Boulevard. The assumed baseline roadway widths are indicated in Figure 17-1.

Other heavily-loaded surface streets would include Roseville Parkway (particularly near I-80 and near Douglas Boulevard), the Eureka Road extension just east of I-80, and the Harding Boulevard extension between Atlantic and Roseville Parkway. All of these facilities would need to be widened to six lanes, with possible additional widenings in the immediate vicinity of the I-80 interchanges.

I-80 would carry about 15,500 vehicles just south of Douglas Boulevard in the peak hour. This represents more than double the 1985 volume at the same location. However, unlike today's conditions, year 2005 travel would be almost evenly balanced northbound and southbound. As a result, the freeway's

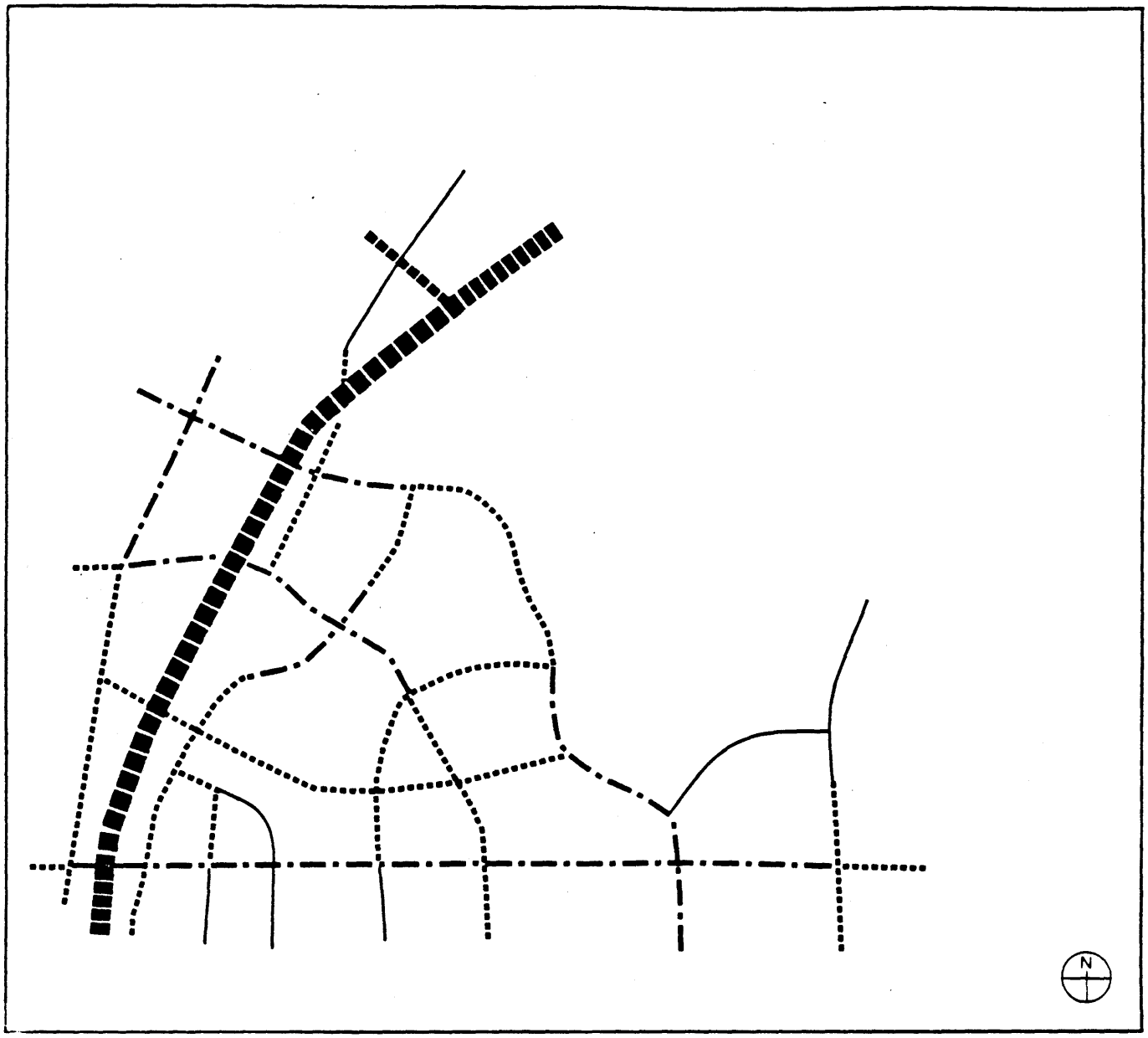


Figure 17-1.
Year 2005 Planned Roadway Widths

Table 17-6. Future City-Wide Trip Generation

	Year 2005 Lower Intensity		Expected Buildout	
	ADT (000)	% of Total	ADT (000)	% of Total
Existing development	145	31	145	23
City-wide infill	44	9	49	8
North central plan area	49	10	81	13
North industrial plan area	93	20	139	23
Northwest plan area	39	8	59	10
Southeast plan area	31	7	47	7
Northeast plan area	73	15	99	16
Total	474	100	619	100

Source: Fehr & Peers Associates.

capacity would be more effectively used and widening would not be as significant as if the present directional imbalance continued. To reduce this impact to a less-than-significant level and to maintain acceptable operating conditions on I-80, some widening would be necessary by the year 2005 unless a beltline facility is constructed to augment the current freeway capacity in the area.

Between Douglas Boulevard and the Route 65 Bypass, the year 2005 volumes on I-80 would be within the capacity of the planned eight-lane freeway section. North of the 65 Bypass, the volumes would reach the design capacity of the existing six-lane freeway. Therefore, impacts are less than significant and no mitigation is required.

Screenline Impacts. Table 17-7 summarizes the results of the screenline volume/capacity analysis. With the planned roadway widths and expected level of development, several screenlines would exceed their design capacities in the year 2005.

Screenlines A, I, J, and K, which measure north/south traffic flows in southern Roseville and across the Sacramento/Placer county line, would experience significant impacts. To reduce this impact to a less-than-significant level, I-80 south of the Douglas Boulevard interchange would need to be widened to 10 lanes, or the beltline freeway would need to be constructed.

Screenline D, which measures flow to and from Roseville at its northern boundary would experience significant impacts. To reduce this impact to a less-than-significant level, four more arterial lanes of capacity than currently planned would need to be provided.

Screenline G, which measures traffic accessing I-80 from the east would experience less-than-significant impacts. Constructing an urban interchange at Roseville Parkway/Harding Boulevard is recommended.

Screenline H, which measures east/west traffic flow along the west side of I-80, south of Atlantic Street, is likely to be one of the City's most congested corridors in the future, because opportunities to increase capacity are very limited. As the capacity of the primary facilities (Atlantic Street, Lead Hill Road, Douglas Boulevard, and Cirby Way) cannot easily be increased dramatically, this study suggests mitigating traffic impacts on this screenline by diverting travel between I-80 and the Northwest, North Industrial, and North Central plan areas to Roseville Parkway and the Route 65 Bypass (screenlines B and C) instead of routes leading through Central Roseville. To reduce significant impacts to a less-than-significant level, widen and upgrade the Route 65 Bypass and Roseville Parkway, and widen Atlantic Street west of I-80. Harding Boulevard would also need to be upgraded or its capacity expanded.

Table 17-7. Year 2005 Screenline Capacity Analysis with Planned Roadway Widths

Screenline	Daily Traffic Volume	Maximum Capacity	V/C Ratio
A	239,000	272,000	0.88[1]
B	176,000	288,000	0.61
C	123,000	164,000	0.75
D	83,000	80,000	1.04[2]
E	101,000	144,000	0.70
F	134,000	192,000	0.70
G	170,000	224,000	0.76[1]
H	132,000	144,000	0.91[1]
I,J,K	245,000	296,000	0.83[1]
M	82,000	124,000	0.66
N	82,000	112,000	0.73
O	77,000	160,000	0.68

Source: Fehr & Peers Associates.

[1] Volume exceeds design capacity but not maximum capacity.
[2] Volume exceeds maximum capacity.

Street and Intersection Impacts. Within Northeast Roseville, several individual streets and intersections would exceed their planned capacities. Figure 17-2 indicates the p.m. peak hour volumes in Northeast Roseville in the year 2005.

Volumes on Douglas Boulevard in 1985 were approximately 1,600 vehicles per hour in each direction east of Sunrise Avenue and approximately 2,300 vehicles per hour in the I-80 interchange area. By the year 2005, volumes would reach approximately 2,000 and 2,800, respectively. To reduce this significant impact to a less-than-significant level, Douglas Boulevard would need to be widened to six lanes.

Other heavily-loaded surface streets would include Roseville Parkway (particularly near I-80 and near Douglas Boulevard), the Eureka Road extension just east of I-80, and the Harding Boulevard extension between Atlantic Street and Roseville Parkway. To reduce these impacts to a less-than-significant level, all these facilities would need to be widened to six lanes, with possible additional widenings in the immediate vicinity of the I-80 interchanges.

The peak hour operating conditions at the area's key street intersections are presented in Figure 17-3. The worst LOS correspond to those locations at which highest-volume arterials intersect: Douglas Boulevard/Sunrise Avenue, Roseville Parkway/Douglas Boulevard, and Roseville Parkway/Harding Boulevard, as well as Roseville Parkway/Taylor Road and Eureka Road/Sunrise Avenue. The first three locations would operate at LOS E or F and would require mitigation to reduce these impacts to a less-than-significant level. Diverting traffic from Douglas Boulevard/Sunrise Avenue, widening Sunrise Avenue to six lanes, widening Eureka Road to six lanes, and widening Taylor Road to four lanes would improve the LOS at Douglas Boulevard/Sunrise Avenue. Widening Taylor Road to four lanes would improve Roseville Parkway/Taylor Road. Also, constructing urban interchanges at the Roseville Parkway/Douglas Boulevard and Roseville Parkway/Harding Boulevard intersections would be needed to improve these intersections. The last two locations would operate at service level D, at or below the design volume/capacity threshold of 0.85. These locations would not require additional mitigation before the year 2005, but would require mitigation to allow development beyond the year 2005.

Expected Buildout with Proposed Project. By the time all the Roseville major plan areas are built out and City-wide infill reaches its expected maximum, the City's population is projected to reach about 92,000 and its employment level about 78,000. The resulting jobs/labor force imbalance would be even more pronounced than in the year 2005, with about 1.7 jobs in the City for each employed resident. Roseville would continue to be a net importer of work commuters and shoppers, particularly from the north and south along the I-80 corridor.

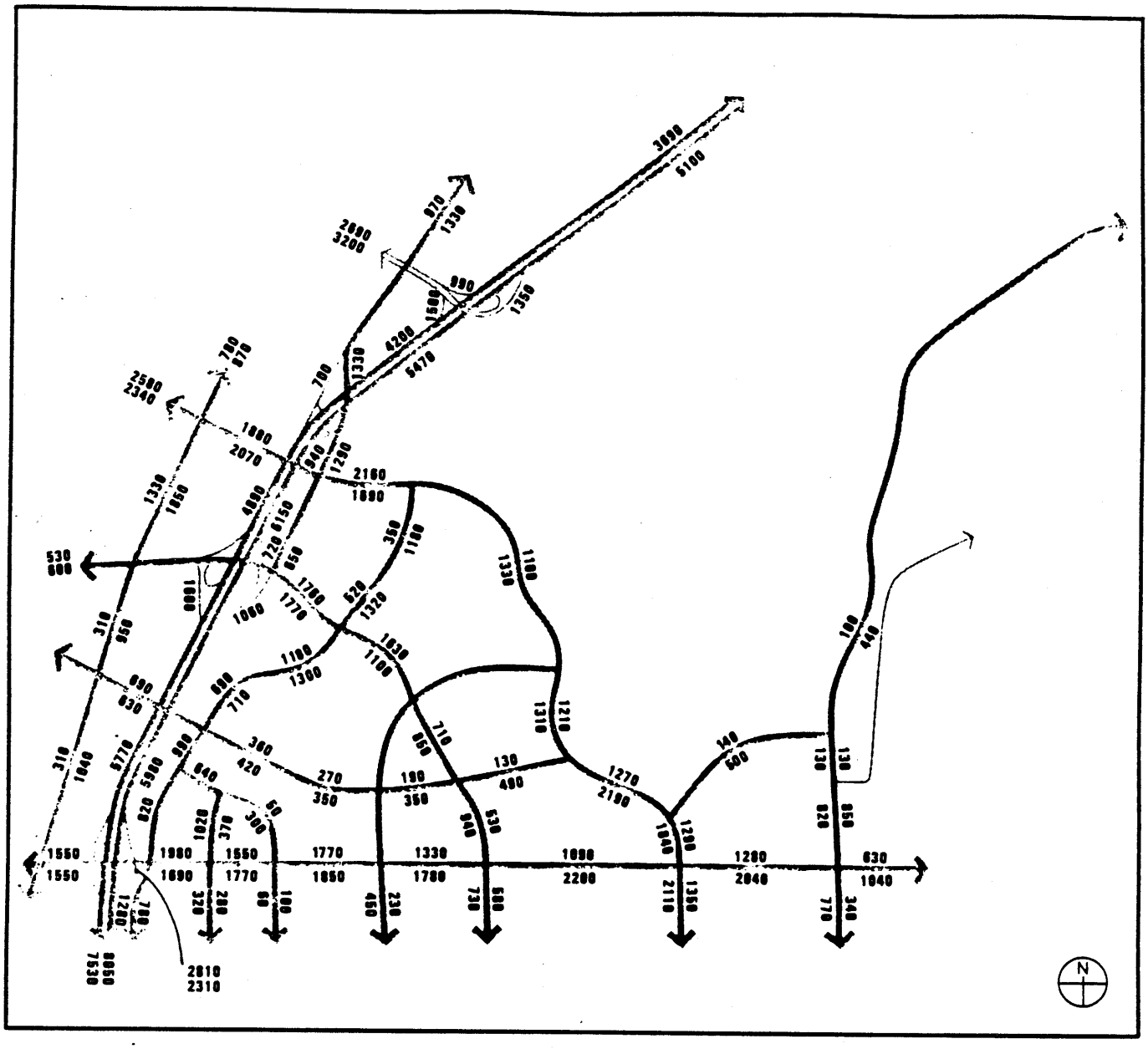


Figure 17-2.
Year 2005 PM Peak Hour Traffic Volumes

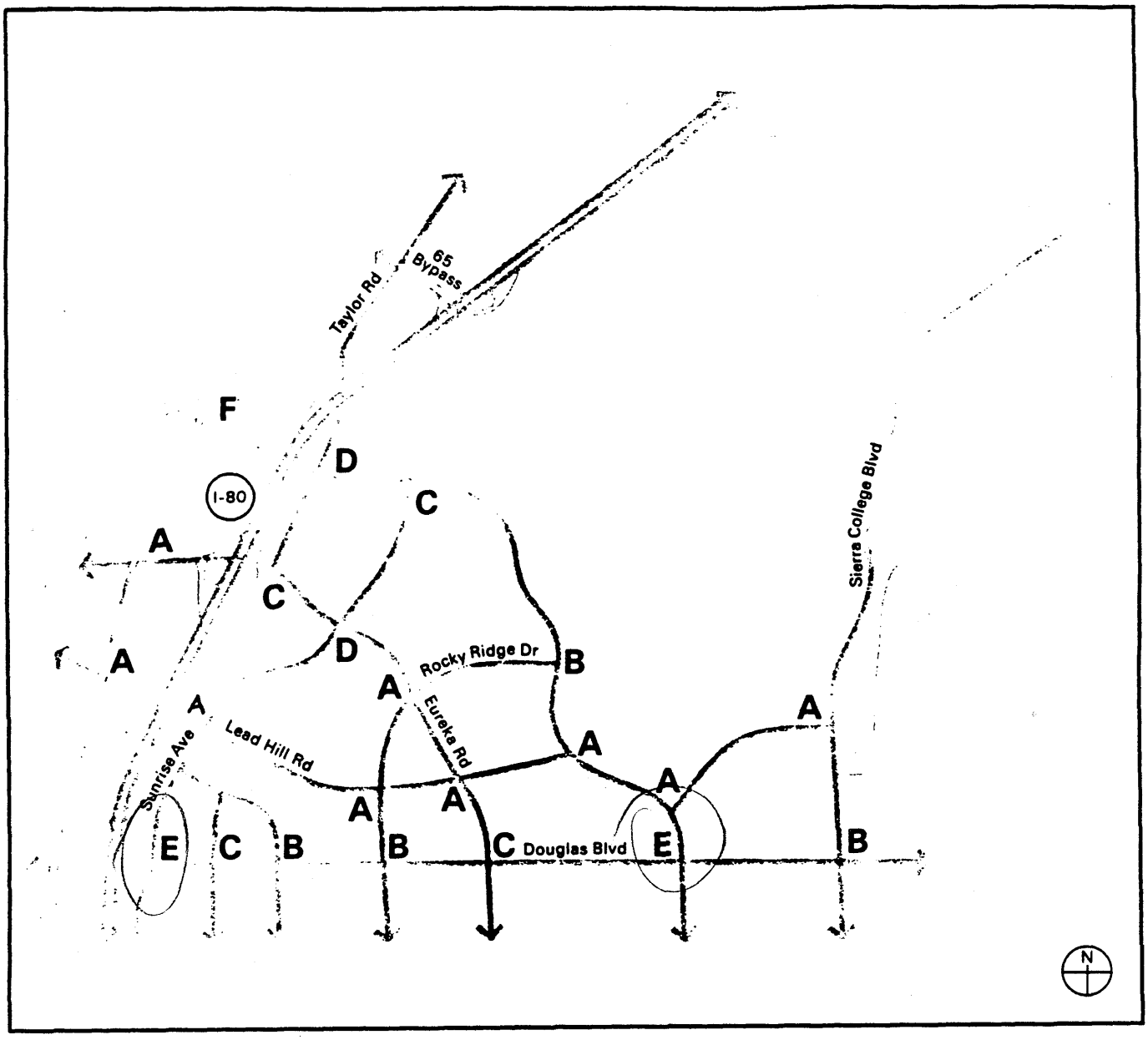


Figure **17-3.**
Year 2005 PM Peak Hour Levels of Service

As indicated in Table 17-6, City-wide trip generation is projected to reach about 619,000 vehicle trips per day at buildout. This represents a 30 percent increase over the 2005 level, and a four-fold increase in the 1985 level. The 99,000 trips generated by the Northeast Roseville Plan area would represent about 16 percent of the City-wide total. Other plan areas would generate between 47,000 and 139,000 trips each, with the North Industrial area generating the largest amount, about 23 percent of the City-wide total.

Table 17-8 indicates the effects that this growth would have on the City's principal travel corridors, comparing the buildout traffic volumes with existing conditions and with those projected for the year 2005. Because Roseville and the rest of south Placer would become relatively independent of Sacramento by about the year 2005, travel growth beyond 2005 would not lead to significant traffic increases in the I-80 corridor near the county line. Substantial traffic would continue to occur, however, throughout the Route 65 corridor (both existing and bypass) and the Douglas Boulevard corridor.

Table 17-9 summarizes the corridor-by-corridor growth. It indicates that, in the Route 65 and Douglas Boulevard corridors, travel growth between the present and the year 2005 would represent about three-fourths of the growth expected by buildout. In the I-80 corridor, however, 2005 traffic volumes would represent about 85 percent to 90 percent of the buildout levels.

Table 17-9 also demonstrates the relationship between project-only and cumulative impacts. Travel in the I-80 corridor would grow by about 30 percent if the full proposed plan were added to existing conditions. With cumulative development of the full project and buildout of all other major plan areas in south Placer, growth in the same corridor would average about 93 percent. In the Douglas Boulevard corridor, Northeast Plan area traffic alone would increase volumes by about 72 percent, while the cumulative impacts of City-wide and area-wide buildout would be a 226 percent increase over existing traffic. The Northeast Plan area would generate minimal impacts in the Route 65 corridor, but cumulative impacts of area-wide buildout would raise traffic volumes in that corridor by more than seven times their current levels.

Screenline Impacts. The capacity impacts of growth between year 2005 and buildout are summarized in Table 17-10. The analysis assumes that roadway widths are provided in accordance with the needs generated by year 2005 development levels and, therefore, indicates the extent to which roadway expansions are required between 2005 and buildout of the City. Most of the screenlines would require improvements. The exceptions would be those carrying traffic between Sacramento and Placer County, as relatively little growth is expected in the inter-county traffic movement between 2005 and buildout.

Table 17-8. Summary of Impacts by Travel Corridor

Travel Corridor	Measured at		Average Daily Traffic[1]			
	Screenline	Near	Existing (1985)	Existing +Project	Year 2005	Expected Buildout
I-80[2]	A	Sacramento County line	145	189	239	240
	I,J,K	Cirby Way	132	178	245	257
	B	Atlantic Street	87	104	176	205
Route 65[3]	M	Railroad	24	26	82	99
	N	Baseline	8	8	82	108
	O	Industrial	7	7	77	102
	D	Sunset	11	11	83	121
	C	Harding (65 Bypass)	22	24	123	152
Douglas[4]	E	Rocky Ridge	29	65	101	126
	F	Sierra Gardens	38	82	133	167
	G	Sunrise	67	121	170	203
	H	Harding	66	74	131	154

Source: Fehr & Peers Associates.

[1] Thousands of vehicles; 65 Bypass assumed to be completed.

[2] Includes I-80, Riverside, Sunrise, Sierra College.

[3] Includes Washington, Foothill, Industrial, and 65 Bypass.

[4] Includes Douglas, Cirby, Roseville Parkway, and Atlantic.

Table 17-9. Summary of Traffic Growth by Travel Corridor

Travel Corridor	Average Daily Traffic Volume				Growth Over Existing (percent)		
	Existing (1985)	Existing +Project	Year 2005	Expected Buildout	Existing +Project	Year 2005	Expected Buildout
I-80	121	157	220	234	30	82	93
Route 65	14	15	89	116	7	536	728
Douglas	50	86	134	163	72	168	226

Source: Fehr & Peers Associates.

Table 17-10. Screenline Capacity Analysis at Expected Buildout with Planned Year 2005 Roadway Widths

Screenline	Daily Traffic Volume	Maximum Capacity	V/C Ratio
A	240,000	328,000	0.73
B	205,000	320,000	0.64
C	152,000	190,000	0.80*
D	121,000	112,000	1.08**
E	126,000	144,000	0.88*
F	167,000	192,000	0.87*
G	203,000	232,000	0.87*
H	154,000	176,000	0.88*
I,J,K	257,000	336,000	0.76*
M	99,000	124,000	0.80*
N	108,000	112,000	0.96*
O	102,000	160,000	0.64

Source: Fehr & Peers Associates.

* Volume exceeds design capacity but not maximum capacity.

** Volume exceeds maximum capacity.

Significant impacts to screenlines E and F could be reduced to a less-than-significant level by upgrading Roseville Parkway to an expressway classification.

Significant impacts to screenlines C and H could be reduced to a less-than-significant level by the upgrading of Route 65 Bypass to freeway status and the upgrading of Roseville Parkway to expressway classification.

Cumulative development along the Route 65/Industrial Corridor would require several capacity upgrades for north/south travel in west Roseville. To reduce significant impacts to a less-than-significant level, provide capacity upgrades for screenlines D, M, and N.

Significant impacts to screenlines I, J, and K could be reduced to a less-than-significant level by providing up to two additional lanes of capacity for north/south travel between Douglas Boulevard and Cirby Way, either on I-80 or a parallel reliever.

Significant impacts to screenline B could be reduced to a less-than-significant level by upgrading Roseville Parkway to an expressway classification and widening Sierra College Boulevard to four lanes.

Significant impacts to screenline G could be reduced to a less-than-significant level by upgrading Roseville Parkway to an expressway classification and widening Eureka Road to eight lanes.

Mitigation Measures

Mitigating traffic impacts can include two types of measures: those which increase the capacity of the traffic circulation system and those which reduce traffic generation. This section discusses the capacity-increasing measures, including street and highway improvements that would be needed to carry traffic at acceptable LOS. TSM and transit measures that can be used to reduce traffic volumes are presented in Chapter 7, Transportation.

The analysis has not initially discounted traffic volumes for TSM. This conservative approach to specifying capacity mitigations, provides a safeguard if TSM programs are less effective than desired. If the TSM programs are successful, then the area's roadways would operate at better service levels than predicted.

Year 2005 with Lower Intensity Alternative. The required circulation system within and adjacent to the Plan area is illustrated in Figure 17-4. This plan includes several improvements to the planned system shown in Figure 17-1.

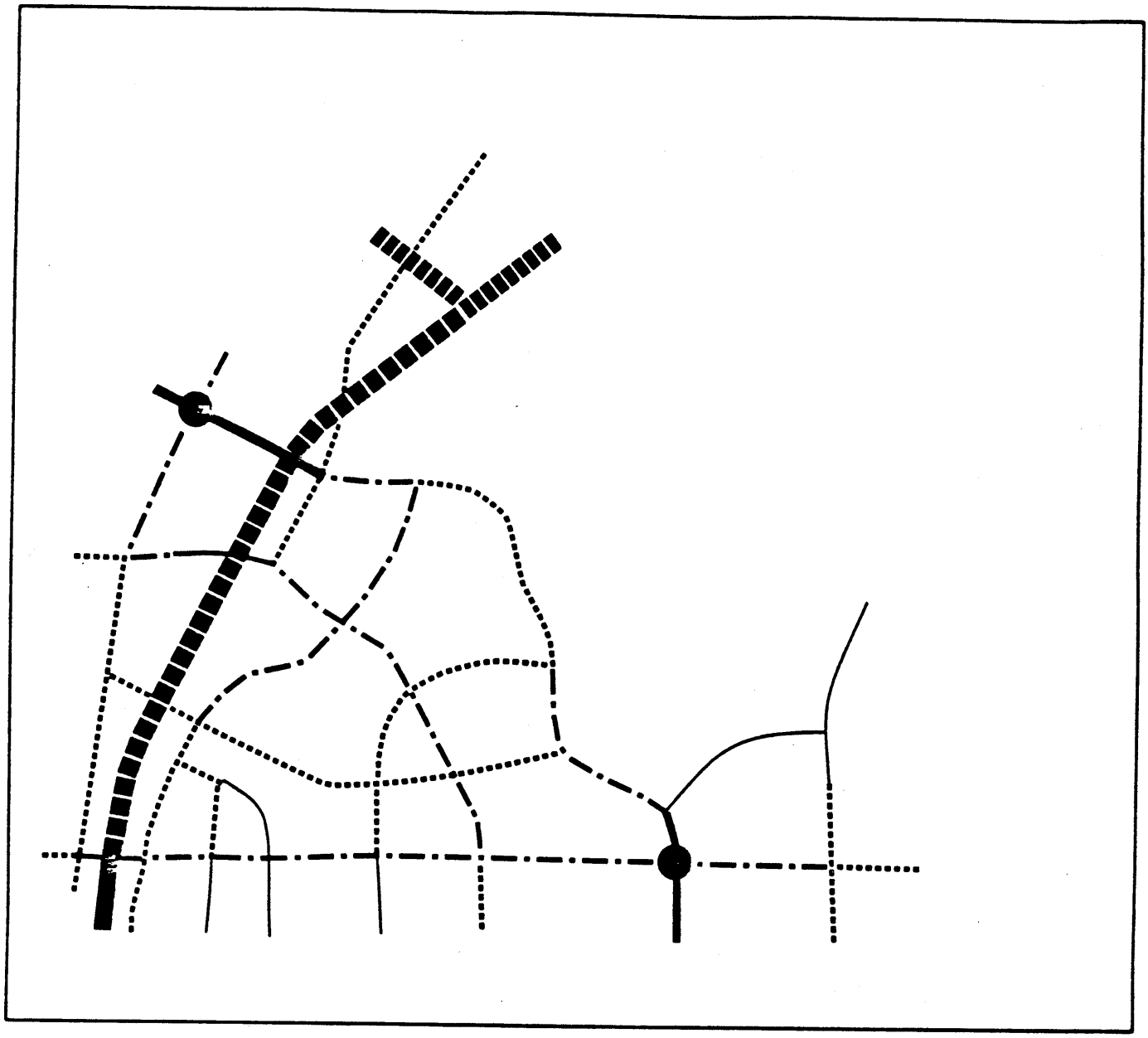


Figure **17-4.**
Year 2005 Mitigated Roadway Widths

Table 17-11 summarizes the corridor-level improvements needed to mitigate cumulative year 2005 impacts on screenlines in Northeast Roseville.

Table 17-12 indicates the effects of implementing corridor-level mitigation measures. All of the screenlines would operate at or below 75 percent of their maximum capacities, or at less-than-significant levels.

The capacity mitigations identified later do not take into consideration the prospective beltline freeway, which could be constructed through the project area. If such a facility were constructed by the year 2005, it would alleviate the need for several key mitigations. The first is the widening of I-80 south of Douglas Boulevard to 10 lanes, and the second is the need for urban interchanges along East Roseville Parkway, with its eventual upgrade to full expressway status. The beltline freeway would also reduce congestion levels in the vicinity of the I-80 interchanges at Douglas Boulevard and Atlantic Street.

In addition, the effect of TSM is not taken into account in identifying the mitigations. As discussed, an aggressive City-wide TSM program could improve peak-hour LOS by as much as one grade and make certain capacity improvements unnecessary.

Screenline Mitigations

Widen I-80 to 10 Lanes South of the Douglas Boulevard Interchange. In the I-80 corridor, south of the site, capacity shortfalls on screenlines A and I, J, and K could be mitigated by widening the freeway at least one lane in each direction. This would result in a 10-lane freeway at the Sacramento County line and as far north as Douglas Boulevard.

Provide Four More Arterial Lanes of Capacity on Screenline D than Currently Planned. Along the Route 65 corridor, at Roseville's northern City limits (screenline D), year 2005 traffic would warrant four more arterial lanes of capacity than currently planned. This capacity could be provided by widening or extending the existing or planned north/south facilities, such as Foothills Boulevard.

Widen and Upgrade the Route 65 Bypass to a Six-Lane Expressway or Freeway (depending on a Specific Analysis of Interchange Capacities), Roseville Parkway to a Six-Lane Expressway, and Widen Atlantic Street West of I-80. These mitigations are necessary to reduce traffic impacts on screenline H to a less-than-significant level.

Upgrade Harding Boulevard North of Atlantic Street from the Planned Four-Lane Width to Six Lanes or Expand its Capacity through Access Controls and the Use of Grade-Separated Interchanges at Major Cross Streets. A grade separation is already included in the planned design of Harding

Table 17-11. Year 2005 Screenline Mitigations in Project Area

Screenline	Facility	Existing Design	Planned Design	Required Design
B	Harding	--	4-lane	6-lane*
	I-80	6-lane	8-lane	8-lane
	Taylor	--	4-lane	4-lane
	Sunrise	--	4-lane	4-lane
	Roseville Parkway	--	4-lane	4-lane
	Sierra College	2-lane	2-lane	2-lane
C,H	Sunset Boulevard	2-lane	6-lane	6-lane
	Midas/Farron	4-lane	4-lane	4-lane
	65 Bypass	--	4-lane	6-lane*
	Roseville Parkway	--	4-lane	6-lane*
	Atlantic	2-lane	4-lane	6-lane*
	Lead Hill	4-lane	4-lane	4-lane
	Douglas	4-lane	4-lane	4-lane
	Cirby	4-lane	6-lane	6-lane
E	Roseville Parkway	--	6-lane	6-lane
	Atlantic/Eureka	--	4-lane	4-lane
	Douglas	2-lane	6-lane	6-lane
	Cirby	2-lane	4-lane	4-lane
F	Roseville Parkway	--	4-lane	4-lane
	Atlantic/Eureka	--	6-lane	6-lane
	Lead Hill	2-lane	4-lane	4-lane
	Douglas	2-lane	6-lane	6-lane
	Cirby	4-lane	4-lane	4-lane
G	Roseville Parkway	--	6-lane	6-lane
	Atlantic/Eureka	--	6-lane	6-lane
	Lead Hill	4-lane	4-lane	4-lane
	Douglas	4-lane	6-lane	6-lane
	Cirby	4-lane	4-lane	4-lane

Source: Fehr & Peers Associates.

* Indicates planned design inadequate.

Table 17-12. Year 2005 Screenline Capacity Analysis with Mitigations

Screenline	Daily Traffic Volume	Without Mitigations		With Mitigations	
		Maximum Capacity	V/C Ratio	Maximum Capacity	V/C Ratio
A	239,000	272,000	0.88*	328,000	0.73
B	176,000	288,000	0.61	272,000	0.65
C	123,000	164,000	0.75	206,000	0.60
D	83,000	80,000	1.04**	112,000	0.74
E	101,000	144,000	0.70	144,000	0.70
F	134,000	192,000	0.70	192,000	0.70
G	170,000	224,000	0.76*	254,000	0.67
H	132,000	144,000	0.91*	176,000	0.75
I,J,K	245,000	296,000	0.83*	336,000	0.73
M	82,000	124,000	0.66	124,000	0.66
N	82,000	112,000	0.73	112,000	0.73
O	77,000	160,000	0.68	160,000	0.48

Source: Fehr & Peers Associates.

* Volume exceeds design capacity but not maximum capacity.
** Volume exceeds maximum capacity.

Boulevard at Atlantic Street and an interchange is also recommended on the Harding Boulevard extension at Roseville Parkway. A six-lane width along the intervening section of Harding Boulevard would need to be considered in the year 2005 only if additional major access points are proposed between those two points. These mitigations are necessary to reduce traffic impacts on screenline B to a less-than-significant level.

Street and Intersection Mitigations. The effects of improvements on intersection operating conditions is shown in Figure 17-5. All locations would operate at Service Level mid-D or better, even in the p.m. peak hour. This provides a high level of assurance that none of the intersections would reach capacity and experience significant traffic impacts. Intersections that would be nearest this threshold, operating between Service Levels C and mid-D, would be: Sunrise Avenue/Douglas Boulevard, Sunrise Avenue/Atlantic Street (Eureka Road), Taylor Road/Atlantic Street, and Taylor Road/Roseville Parkway. Beyond the year 2005, additional improvements would be required in these areas, and/or along routes capable of diverting traffic around those locations.

Widen Douglas Boulevard to Six Lanes with Possible Additional Widening in the Immediate Vicinity of the I-80 Interchange.

Widen Roseville Parkway, the Eureka Road Extension just East of I-80, and the Harding Boulevard Extension Between Atlantic Street and Roseville Parkway to Six Lanes with Possible Additional Widenings in the Immediate Vicinity of the I-80 Interchanges.

Widen Sunrise Avenue to Six Lanes.

Widen Sections of Atlantic Street/Eureka Road to Six Lanes.

Widen Taylor Road to Four Lanes West of I-80.

Construct Urban Interchanges at the Roseville Parkway/Douglas Boulevard and Roseville Parkway/Harding Boulevard Intersections. Capacity shortfalls projected at two intersections along East Roseville Parkway, at Harding Boulevard and at Douglas Boulevard, would be mitigated by constructing urban interchanges, consistent with the planned expressway status of the Parkway.

Expected Build-Out with Proposed Project. The capacity requirements described in this section are very conservative in that they do not take into account two important mitigating factors. The first is the prospective beltline freeway, which could add significant capacity to key travel corridors east and parallel to I-80. If such a facility were constructed along any

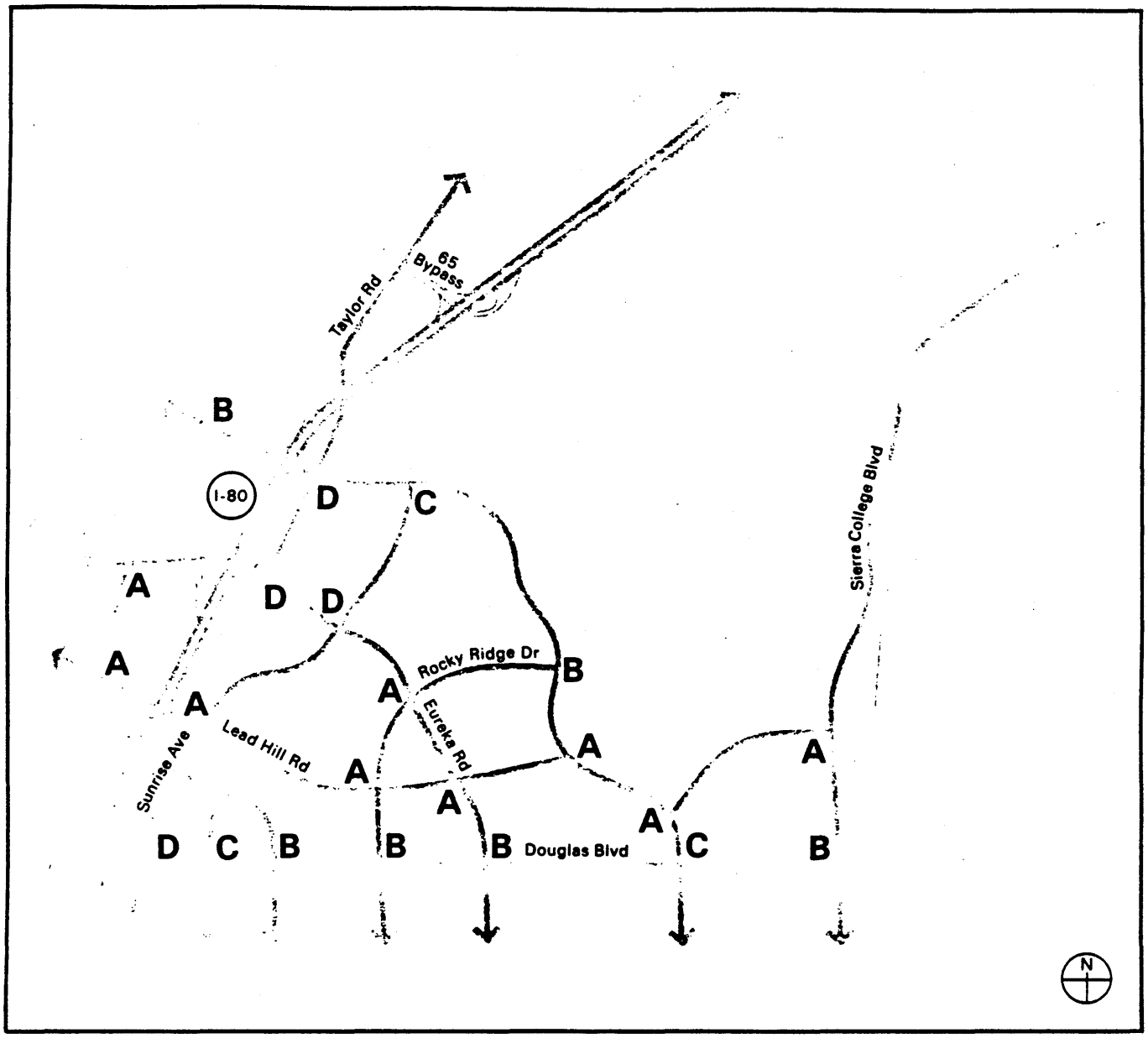


Figure **17–5.**
Year 2005 Mitigated Levels of Service

of the alignment options currently under consideration, it would eliminate the need to widen I-80 beyond its currently planned width. The beltline freeway would also significantly reduce demand on East Roseville Parkway, making it unnecessary to upgrade the facility to expressway status. If the beltline's western terminus were at the planned 65 Bypass/I-80 interchange, it would help relieve congestion through central Roseville by diverting more southeast-bound traffic along the 65 Bypass instead of through downtown.

Unless roadway system expansion keeps pace with continued development beyond the year 2005, capacity problems will arise at many locations before City-wide buildout is reached. Within northeast Roseville, facility enlargements required beyond 2005 are identified in Table 17-13.

Upgrade Roseville Parkway Both East and West of I-80 to an Expressway Classification. This would require installing interchanges at major intersections such at Lead Hill Road, Rocky Ridge Drive, and Taylor Road and limiting access at points in between. The facility would need to be six lanes wide throughout.

Upgrade the Route 65 Bypass to Freeway Status. Sufficient right-of-way would need to be retained along the planned alignment to upgrade interchanges as needed and provide full shoulder, median, and travelled way width for a six-lane freeway.

Provide Capacity Upgrades for Screenlines D, M, and N. The equivalent of eight additional arterial lanes of capacity would be needed at the northern City limits (screenline D). This could be provided by extending the planned expressway/freeway class section of Route 65 (the Bypass) north to the northern part of the Northwest Rocklin Plan area or by widening existing 65 and parallel routes such as Carlsberg Boulevard, Stanford Ranch Road, and Foothills Boulevard. Further south in the same corridor (screenlines M and N), capacity upgrades of between two and four lanes would become necessary by cumulative buildout.

Provide Additional Capacity for North/South Travel Between Douglas Boulevard and Cirby Way. In the I-80 corridor, additional capacity would be required for north/south travel between Douglas Boulevard and Cirby Way (screenlines I, J, and K). Providing this capacity might involve widening some established existing four-lane streets, such as Riverside Avenue or Sunrise Avenue, to six lanes.

Widen Sierra College Boulevard to Four Lanes.

Widen Eureka Road to Eight Lanes.

Demand Reduction through TSM. TSM measures are discussed in Chapter 7, Transportation. Implementing TSM measures under

Table 17-13. Buildout Screenline Mitigations in Project Area

Screenline	Facility	Required Year 2005	Required at Buildout
B	Harding	6-lane	6-lane
	I-80	8-lane	8-lane
	Taylor	4-lane	4-lane
	Sunrise	4-lane	4-lane
	Roseville Parkway	4-lane	6-lane
	Sierra College	2-lane	4-lane
C,H	Sunset Boulevard	6-lane	6-lane
	Midas/Farron	4-lane	4-lane
	65 Bypass	6-lane	6-lane*
	Roseville Parkway	6-lane	6-lane**
	Atlantic	6-lane	6-lane
	Lead Hill	4-lane	4-lane
	Douglas	4-lane	4-lane
	Cirby	6-lane	6-lane
E	Roseville Parkway	6-lane	6-lane**
	Atlantic/Eureka	4-lane	4-lane
	Douglas	6-lane	6-lane
	Cirby	4-lane	4-lane
F	Roseville Parkway	4-lane	6-lane**
	Atlantic/Eureka	6-lane	6-lane
	Lead Hill	4-lane	4-lane
	Douglas	6-lane	6-lane
	Cirby	4-lane	4-lane
G	Roseville Parkway	6-lane	6-lane**
	Atlantic/Eureka	6-lane	8-lane
	Lead Hill	4-lane	4-lane
	Douglas	6-lane	6-lane
	Cirby	4-lane	4-lane

Source: Fehr & Peers Associates.

* Upgrade to freeway classification required.
** Upgrade to expressway classification required.

the buildout alternative would improve the levels of service given in Figure 17-5 by one grade each. This would mean that any one of the following to take place:

- Roseville's streets and intersections would operate at Service Level C or better, even in peak hours through the year 2005.

- Some of the prescribed capacity improvements would not be necessary. (Those which are used to mitigate volume/capacity ratios otherwise predicted to be better than 0.85 in Table 17-12 and Table 17-14 would not be necessary.)

Air Quality

Impacts

The setting discussion is contained in Chapter 8, Air Quality, and the description of study assumptions for the alternatives is contained in Chapter 7, Transportation.

Year 2005 with Lower Intensity Alternative

Construction-Related Impacts. Construction in the Plan area would cause an indeterminable quantity of dust particles to be emitted into the atmosphere. A major fraction of these dust particles would settle out on and immediately adjacent to the Plan area, while a minor fraction would contribute to the area's ambient particulate level. In general, particles larger than 30 microns (effective aerodynamic diameter) would settle out within a short distance of the project site. This impact is considered to be less than significant; however, implementing standard dust-reducing construction practices is recommended.

Construction equipment having internal combustion engines would emit an indeterminable quantity of nitrogen oxides, hydrocarbons, particulates, sulfur dioxides, and carbon monoxides. This impact is considered to be less than significant.

Contribution to Regional Air Quality Problems. As described in Chapter 8, Air Quality, ozone is the principal problem pollutant on a regional scale. The proposed project would increase traffic-related and other air pollutant emissions that are ozone precursors. This would contribute to regional ozone problems, incrementally adding to the difficulty in attaining the ozone standard.

Estimates of reactive organic compound and nitrogen oxide emissions from vehicle traffic have been prepared for the Lower Intensity Alternative. These are presented in Table 17-15. The

Table 17-14. Screenline Capacity Analysis at Expected Buildout with Mitigations

Screenline	Without Mitigations			With Mitigations	
	Daily Traffic Volume	Maximum Capacity	V/C Ratio	Maximum Capacity	V/C Ratio
A	240,000	328,000	0.73	328,000	0.73
B	205,000	320,000	0.64	320,000	0.64
C	152,000	190,000	0.80[1]	236,000	0.65
D	121,000	112,000	1.08[2]	176,000	0.68
E	126,000	144,000	0.88[1]	190,000	0.67
F	167,000	192,000	0.87[1]	238,000	0.70
G	203,000	232,000	0.87[1]	286,000	0.71
H	154,000	176,000	0.88[1]	192,000	0.80[1]
I,J,K	257,000	336,000	0.76[1]	352,000	0.73
M	99,000	124,000	0.80[1]	140,000	0.71
N	108,000	112,000	0.96[1]	144,000	0.75
O	102,000	160,000	0.64	160,000	0.64

[1] Volume exceeds design capacity but not maximum capacity.
[2] Volume exceeds maximum capacity.

Table 17-15

REGIONAL POLLUTANT EMISSIONS LOWER INTENSITY ALTERNATIVE

LAND USE	TRIP TYPES	TRIPS BY TRIP TYPE	AVERAGE TRIP LENGTH	VMT BY CATEGORY	ROG RATE (G/MI)	NOx RATE (G/MI)	ROG EMISSIONS (LB/DAY)	NOx EMISSIONS (LB/DAY)
R-5.5	H-W	719.2	8.49	6,105.8	1.44	0.97	19.4	13.1
	OTHER	2,625.7	6.45	16,929.7	1.26	1.07	47.0	39.9
R-9	H-W	545.8	8.49	4,633.9	1.44	0.97	14.7	9.9
	OTHER	3,565.9	6.45	22,992.0	1.26	1.07	63.9	54.2
R-10	H-W	497.6	8.49	4,225.0	1.44	0.97	13.4	9.0
	OTHER	3,251.3	6.45	20,963.3	1.26	1.07	58.2	49.5
R-12	H-W	412.5	8.49	3,501.9	1.44	0.97	11.1	7.5
	OTHER	2,612.3	6.45	16,843.4	1.26	1.07	46.8	39.7
SUBTOTAL		14,230.3	6.76	96,194.9			274.5	222.8
HC	H-W;O-W	482.7	7.76	3,744.4	1.24	1.05	10.2	8.7
	OTHER	27,826.8	6.01	167,299.1	0.95	1.15	350.4	424.2
CC	H-W;O-W	135.5	7.76	1,051.0	1.24	1.05	2.9	2.4
	OTHER	8,763.8	6.01	52,689.5	0.95	1.15	110.4	133.6
RC	H-W;O-W	525.6	7.76	4,077.3	1.24	1.05	11.1	9.4
	OTHER	33,997.3	6.01	204,397.0	0.95	1.15	428.1	518.2
BP	H-W;O-W	9,707.2	7.76	75,298.3	1.24	1.05	205.8	174.3
	OTHER	1,268.9	6.01	7,628.9	0.95	1.15	16.0	19.3
R&D	H-W;O-W	13,213.0	7.76	102,493.5	1.24	1.05	280.2	237.3
	OTHER	1,727.2	6.01	10,384.1	0.95	1.15	21.7	26.3
SUBTOTAL		97,648.1	6.44	629,063.1			1,436.8	1,553.7
TOTALS		111,878.4	6.48	725,258.0			1,711.4	1,776.6

Notes: Average trip lengths based on data from 1979 Sacramento Area Transportation Study (SATS) model run.
Vehicle emission rates based on EMFAC6D model run for year 2000, 0-1.5% heavy trucks, 43.6-59.8% cold starts, 20-30 mph average speeds, and 80 degrees F.
Trip rates reflect year 2005 conditions for the Lower Intensity Alternative.

increase in incremental emissions from the Lower Intensity Alternative will be 0.9 ton per day for reactive organic compounds and 0.9 ton per day for nitrogen oxides. Appendix 17-1 documents the trip generation data used in preparing the regional pollutant emission estimates.

As a point of comparison, the regional air quality plan is based on growth projections that imply about 57 tons per day of reactive organic compound emissions from region-wide vehicle traffic in 1995 (Sacramento Area Council of Governments 1985). The California Air Resources Board estimates year 2000 vehicle emissions in Placer County (outside the Tahoe Basin) as 5.7 tons per day of reactive organic compounds and 14.3 tons per day of nitrogen oxides (see Table 8-2).

Because the Air Quality Plan does not project attainment of the ozone air quality standard, and because the regional air quality impact of the proposed project would be focused in an area downwind of the Plan area, the levels of increased emissions described above for the future year development conditions are considered to be a potentially significant adverse impact. A substantially less-intensive level of development would need to be implemented to mitigate this impact to a less-than-significant level. Implementation of the transportation system management measures described in Chapter 7, Transportation, would, however, help slightly to reduce this impact (see the Mitigation Measures section below).

Consistency with the Regional Air Quality Plan. Determinations of consistency with the Sacramento Air Quality Plan are made by comparing proposed projects with land use conditions assumed in the analysis conducted for the plan. These assumptions describe conditions in the year 1987, since that is the deadline for attaining the federal air quality standards. Because buildout under any of the plan alternatives would occur after 1987, it is not possible to make a technical determination of consistency with the Air Quality Plan.

Regional growth projections have been used in extrapolating beyond 1987 in the reasonable further progress report for the Air Quality Plan (Sacramento Area Council of Governments 1985). These growth projections, however, are simple population totals. They do not include any assumptions regarding the geographic distribution of future growth or its relationship to local land use plans.

A principal objective of the Air Quality Plan is to attain the air quality standards; the proposed project would tend to make it more difficult for the plan to succeed.

Potential for Localized Carbon Monoxide Problems. The air quality analyses prepared for this EIR have focused on the potential for localized carbon monoxide problems at sensitive receptors near heavily congested intersections, as identified in

Chapter 7, Transportation, of this EIR. Based on level-of-service analyses for the Lower Intensity Alternative, the following intersections were selected for analysis.

- o Taylor Road and Route 65 Bypass
- o Taylor Road and Eureka Road
- o Douglas Boulevard and Sunrise Avenue
- o Sunrise Avenue and Eureka Road
- o Harding Boulevard and East Roseville Parkway
- o Douglas Boulevard and East Roseville Parkway
- o Sunrise Avenue and East Roseville Parkway

Analyses were performed using the CALINE3 dispersion model, EMFAC6D vehicle emission rates, and afternoon peak hour traffic volume projections for the Lower Intensity Alternative. The data and assumptions used for this analysis are described in Appendix 17-2.

Potential peak-hour carbon monoxide levels near the selected intersections are presented in Table 17-16. None of the intersections shows a potential for carbon monoxide levels above the state or federal 1-hour standards. A potential violation of the state and federal 8-hour carbon monoxide standards is indicated for the intersection of Douglas Boulevard and East Roseville Parkway. Two other intersections (Harding Boulevard at East Roseville Parkway and Douglas Boulevard at Sunrise Avenue) have predicted 8-hour carbon monoxide levels very close to the federal and state standards. This is considered to be a potentially significant impact which could be mitigated to a less-than-significant level by implementing planned and recommended transportation improvements.

Expected Build-Out with Proposed Project

Construction-Related Impacts. Impacts would be similar to the Lower Intensity Alternative.

Contribution to Regional Air Quality Problems. Development of buildout conditions would result in more emissions than the year 2005 with Lower Intensity Alternative conditions. Since the amount of emissions expected to result from the Lower Intensity Alternative is considered to be a potentially significant adverse impact, emissions expected to result from development of buildout conditions would also be considered to be a potentially significant adverse impact. As with the Lower Intensity Alternative, a substantially less intensive level of development would need to be implemented to mitigate this impact to a less-than-significant level. Implementation of the transportation system management measures is recommended.

Consistency with the Regional Air Quality Plan. As with other development conditions, a determination of consistency of buildout conditions with the Regional Air Quality Plan is not possible; buildout would occur after 1987. However,

Table 17-16. Summary of CALINE3 Results,
Lower Intensity Alternative, Year 2005

Receptor	Incremental 1-hr CO	Wind Angle	Background CO	Total 1-hr CO	Total 8-hr CO
NE HARDING & PRKWY	10.1	270	3.0	13.1	7.9
SE HARDING & PRKWY	11.8	320	2.0	13.8	8.3
SW HARDING & PRKWY	10.5	90	2.0	12.5	7.5
NW HARDING & PRKWY	12.7	170	2.0	14.7	8.8
NE TAYLOR & HWY 65	6.5	290	2.0	8.5	5.1
SE TAYLOR & HWY 65	7.4	40	2.0	9.4	5.6
SW TAYLOR & HWY 65	7.2	30	2.0	9.2	5.5
NW TAYLOR & HWY 65	7.6	210	2.0	9.6	5.8
NE DOUGLAS & SUNRS	12.0	250	2.0	14.0	8.4
SE DOUGLAS & SUNRS	12.2	290	2.0	14.2	8.5
SW DOUGLAS & SUNRS	9.8	20	2.0	11.8	7.1
NW DOUGLAS & SUNRS	10.8	230	2.0	12.8	7.7
NE TAYLOR & EUREKA	4.9	240	2.0	6.9	4.1
SW TAYLOR & EUREKA	4.3	340	2.0	6.3	3.8
NW TAYLOR & EUREKA	5.3	220	1.5	6.8	4.1
NE SUNRISE & EUREK	7.2	230	3.0	10.2	6.1
SE SUNRISE & EUPEK	4.7	40	1.0	5.7	3.4
SW SUNRISE & EUREK	6.2	230	3.0	9.2	5.5
NW SUNRISE & EUREK	5.2	200	3.0	8.2	4.9
NE DOUGLAS & PRKWY	11.7	190	2.0	13.7	8.2
SE DOUGLAS & PRKWY	13.4	340	2.0	15.4	9.2
SW DOUGLAS & PRKWY	9.9	10	2.0	11.9	7.1
NW DOUGLAS & PRKWY	10.1	170	2.0	12.1	7.3
NE SUNRISE & PRKWY	4.4	220	1.0	5.4	3.2
SE SUNRISE & PRKWY	4.8	280	1.5	6.3	3.8
SW SUNRISE & PRKWY	4.9	280	1.5	6.4	3.8
NW SUNRISE & PRKWY	4.3	220	1.0	5.3	3.2

Notes: Wind angle is in degrees, representing the direction from which the wind blows.
Receptor locations are 100' from roadway centerlines.
8-hour average CO value assumed to be 60% of total peak hour value.

development of buildout conditions would result in more ozone precursor emissions than the proposed project or the Lower Intensity Alternative. It would, therefore, cause greater difficulty in attaining the ozone air quality standard in comparison to the other development conditions.

Potential for Localized Carbon Monoxide Problems. Analysis of the year 2005 with Lower Intensity Alternative results in projected carbon monoxide concentrations just above the state and federal 8-hour standards at one intersection and just below the standards at two others.

To estimate expected carbon monoxide concentrations under buildout conditions, the EIR preparers compared projected traffic volumes and volume/capacity ratios for buildout conditions (Table 17-14) and Year 2005 with the Lower Intensity Alternative (Table 17-12). Projected traffic volumes for buildout conditions are higher than the Year 2005 with Lower Intensity Alternative. Projected volume/capacity ratios are higher along a majority of the screenlines. Therefore, violations of the carbon monoxide standards are expected under buildout conditions.

Planned and recommended roadway improvements described in the Transportation section of this chapter would lower volume/capacity ratios, reduce traffic congestion, and result in lower carbon monoxide concentrations. However, the mitigation measures are not considered to be sufficient to reduce projected carbon monoxide concentrations to a level below the state and federal standards. Therefore, development of buildout conditions is considered to have significant adverse unavoidable localized air quality impacts.

Mitigation Measures

Year 2005 with Lower Intensity Alternative

Implement Dust-Reducing Construction Practices. This measure is described in detail in Chapter 8, Air Quality.

Implement TSM Measures. The magnitude of the projected emission increases could be reduced slightly by implementation of carefully designed TSM plans under the existing Roseville TSM Ordinance. See also Chapter 7, Transportation, and Appendix 7-1.

Implement Planned and Recommended Transportation Improvements. The Transportation section of this chapter describes a variety of roadway improvements assumed as a basis for preparing the traffic analyses. These planned improvements are inherently assumed in the air quality analyses presented above. Trip generation rates used in this EIR have also assumed a small

amount of transit and nonvehicular travel mode usage (about 2 percent overall).

The Transportation section of this chapter also outlines several highway improvements needed to accommodate development in the Plan area. These improvements include:

- Widen I-80 to 10 lanes south of the Douglas Boulevard interchange
- Widen Taylor Road to four lanes west of I-80
- Upgrade Harding Boulevard north of Atlantic Street
- Widen and upgrade Route 65 Bypass to a six-lane expressway or freeway
- Widen Roseville Parkway east of I-80 to six lanes

In addition, the traffic analysis recommends intersection improvements for East Roseville Parkway/Harding Boulevard and for East Roseville Parkway/Douglas Boulevard.

Based on resulting changes in intersection congestion, these highway improvements appear adequate to mitigate potential carbon monoxide impacts from the Lower Intensity Alternative to a less-than-significant level.

Air quality impacts involving regional pollution problems, however, would not be mitigated by the planned and recommended highway improvements and would be significant.

Expected Build-Out with Proposed Project

Implement Dust-Reducing Construction Practices. These measures are described in Chapter 8, Air Quality.

Implement TSM Measures. As stated earlier, TSM can reduce the magnitude of emission increases. However, these measures are not expected to reduce emission increases to a less-than-significant level. See also Chapter 7, Transportation.

Implement Planned Recommended Transportation Improvements. Roadway improvement mitigation measures are described in the Transportation portion of this chapter. Although they would result in a reduction in projected carbon monoxide concentrations, these mitigation measures would not be able to reduce the concentrations to a level below federal and state standards. They are, therefore, unable to mitigate buildout condition localized air quality impacts to a less-than-significant level.

Air quality impacts involving regional pollution problems also would not be mitigated by these improvements.

Impacts

Year 2005 with Lower Intensity Alternative. Construction of this alternative would contribute several sources of noise to the project area. Construction activities would be a temporary noise source. The major long term noise source would be vehicle traffic.

Construction Noise. Construction equipment and activities typically generate noise levels of 85-90 dBA at 50 feet from the equipment. Off-site noise levels during project construction would vary considerably depending on the location of construction activities and the types of equipment in use. Construction noise levels near the project boundaries could be expected to vary from 55-80 dBA.

In addition to typical construction equipment and activities, development would involve explosive blasting to penetrate the lava cap surface. The frequency of blasting and the amount of explosive is unknown. Therefore, average noise levels over a 24-hour period (CNEL, Ldn, or Leq) cannot be estimated. Impulse SEL values of up to 120 dBC can be expected (U. S. Army Corps of Engineers 1979). Values in the 90-110 dBC range are expected to be more common.

At certain times during the construction phase, these noise levels could result in annoyance to nearby residents. However, due to the temporary nature of construction noise and the limited amount of existing development on surrounding properties, construction noise impacts are not considered to be significant. In addition, development would need to comply with the regulations in the Roseville Municipal Code, Chapter 9.24.

Traffic Noise. Buildout of this alternative would result in significant increases in traffic volumes. As a result, overall noise levels in the planning area would increase. Table 17-17 and Figure 17-6 show noise levels projected to result from development of the this alternative. Table 17-17 shows projected noise levels at various distances from representative roadways. The noise contours shown in Figure 17-6 have been prepared to graphically display noise levels in the area that is expected to be exposed to the highest noise levels.

With development of this alternative, noise levels would increase from existing conditions. In general, however, projected noise levels are compatible with proposed land uses.

Residential uses are generally expected to be exposed to noise levels shown as normally acceptable on Figure 9-3. Some residential uses directly facing major roadways (e.g., East

Table 17-17. Comparison of Noise Levels Along Selected Roadways Under Year 2005 with Lower Intensity Alternative Conditions

Roadway Segment	Distance Between Receptor and Roadway Centerline in Feet	Expected CNEL dB
Interstate 80 between Atlantic Street and Taylor Road	100	80.06
	200	75.54
	300	72.90
	400	71.02
	500	69.57
	1,000	65.06
	2,000	60.54
Taylor Road north of East Roseville Parkway	100	59.50
	200	54.98
	300	52.34
	400	50.47
	500	49.02
East Roseville Parkway between Sunrise Avenue and Rocky Ridge Drive	100	65.30
	200	60.78
	300	58.14
	400	56.27
	500	54.82
Sunrise Avenue south of East Roseville Parkway	100	63.60
	200	59.08
	300	56.44
	400	54.57
	500	53.12
Sunrise Avenue between Lead Hill Road and Douglas Boulevard	100	65.06
	200	60.54
	300	57.90
	400	56.03
	500	54.58
Eureka Road between Sunrise Avenue and Rocky Ridge Drive	100	67.50
	200	62.98
	300	60.34
	400	58.47
	500	57.02

Table 17-17. Continued

Roadway Segment	Distance Between Receptor and Roadway Centerline in Feet	Expected CNEL dB
Rocky Ridge Drive between Eureka Road and Lead Hill Road	100	60.29
	200	55.77
	300	53.13
	400	51.26
	500	49.81
Lead Hill Road between Eureka Road and East Roseville Parkway	100	59.48
	200	54.96
	300	52.32
	400	50.45
	500	49.00
Douglas Boulevard between Sierra Gardens Drive and Rocky Ridge Drive	100	68.59
	200	64.07
	300	61.43
	400	59.56
	500	58.11
Douglas Boulevard between Eureka Road and East Roseville Parkway	100	67.43
	200	62.91
	300	60.27
	400	58.40
	500	56.95

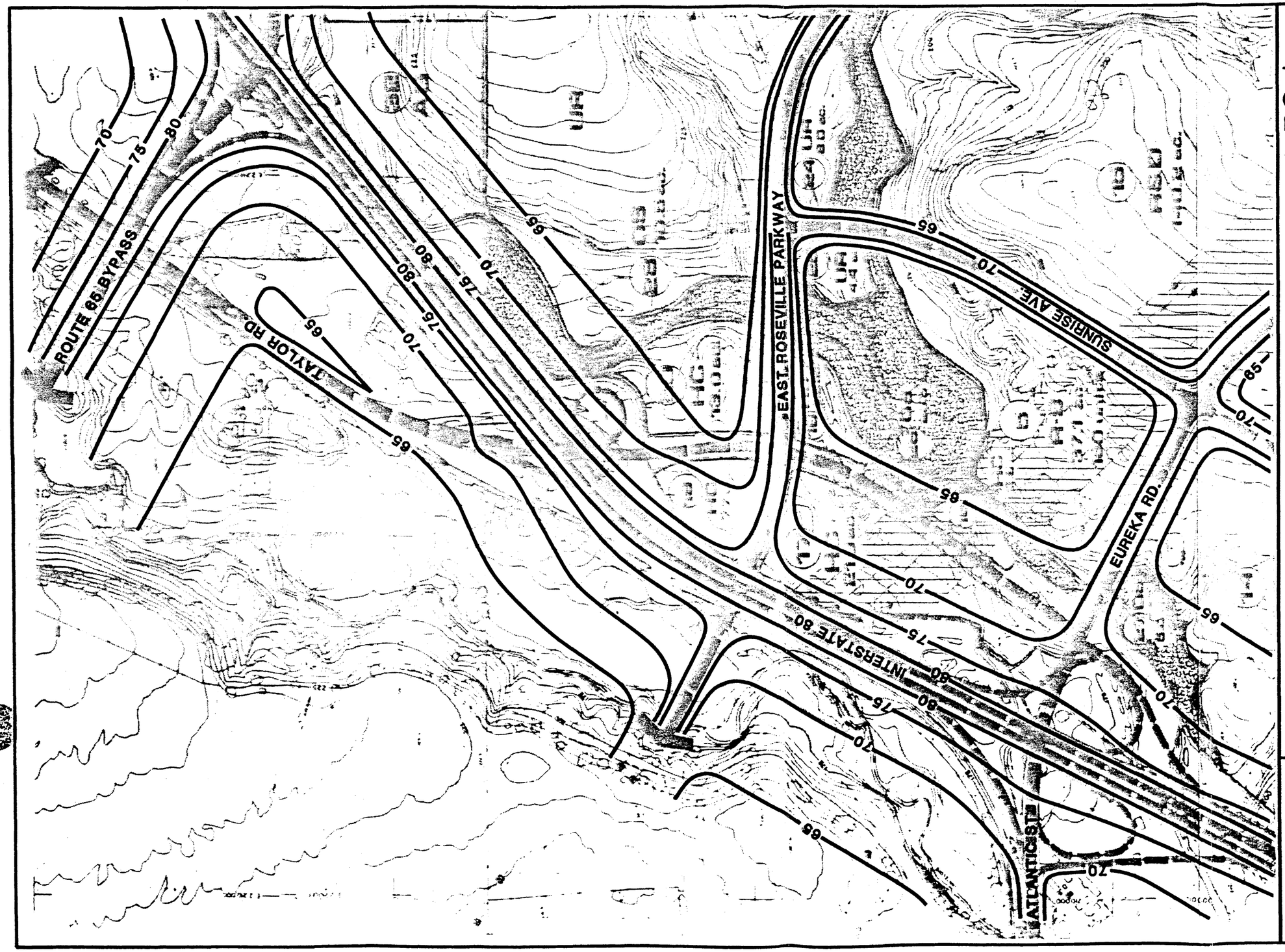


FIGURE 17-6.

TRAFFIC NOISE CONTOURS (CNEL) YEAR 2005 WITH LOWER INTENSITY ALTERNATIVE

Roseville Parkway [parcels 3 and 4], Eureka Road [parcel 5], and Sunrise Avenue [parcel 5]) are in the range described as conditionally acceptable in Figure 9-3, and therefore potentially significant impacts could occur. To reduce these potentially significant impacts to a less-than-significant level, multifamily residences constructed on parcels 3, 4, and 5 should be designed to meet the state noise insulation standards as specified in Title 24 of the California Administrative Code. Residential building design considerations are also recommended to reduce noise levels.

Nonresidential uses are also generally expected to be exposed to noise levels shown as normally acceptable on Figure 9-3. However, the noise level contours shown in Figure 17-6 indicate a potential for noise problems along I-80. The potential CNEL levels in this area are 60-75 dB. These CNEL values are considered to be conditionally acceptable for office and commercial uses. To reduce potentially significant impacts to a less-than-significant level, prepare site-specific noise analyses for commercial or office uses exposed to CNEL levels of 70-80 dB or more.

Transient lodging (hotels and motels) in the highway commercial areas within 500 feet of I-80 would be exposed to noise levels considered normally unacceptable (CNEL level of 70 dB or higher). To reduce this potentially significant impact to a less-than-significant level, hotels and/or motels located along I-80 should be further than 500 feet from I-80. Transient lodging within 500-2,000 feet of I-80 would be exposed to noise levels considered conditionally acceptable (CNEL level 60-70 dB). To reduce this potentially significant impact to a less-than-significant level, project-specific noise analyses for hotels and/or motels within 500-2,000 feet of I-80 should be prepared.

Expected Build-Out with Proposed Project. Similar to the Year 2005 with Lower Intensity Alternative, development of buildout conditions would result in short-term construction-related noise and long-term traffic-related noise.

Construction Noise. Noise resulting from construction activities associated with buildout conditions would not be significantly different than noise levels associated with the Year 2005 with Lower Intensity Alternative. Both conditions would involve use of construction equipment and explosives blasting, and potentially result in annoyance to nearby residents.

Traffic Noise. Although development of buildout conditions would result in substantially more traffic than the Year 2005 with Lower Intensity Alternative, a commensurate increase in noise levels is not expected. This relationship is a result of noise measurement using a logarithmic scale, rather than a linear scale. For example, a 50 percent increase in

traffic would result in an increase in noise levels substantially less than 50 percent (the numerical percent change in noise levels would depend on value of the initial noise level). Noise levels resulting from buildout conditions are expected to be higher than Year 2005 with Lower Intensity Alternative. A limited number of areas expected to be in the conditionally acceptable range under the Year 2005 with Lower Intensity Alternative conditions may be in the normally unacceptable range under buildout conditions. However, the noise levels under buildout conditions are not expected to be different enough to result in different general conclusions. The noise levels that would result from buildout conditions are considered to be a potentially significant impact that could be mitigated to a less-than-significant level.

Mitigation Measures

Year 2005 with Lower Intensity Alternative

Construction-related noise impacts would be temporary in nature and, therefore, are considered less than significant. Noise resulting from operation of equipment could be reduced by proper maintenance. Annoyance resulting from overall noise impacts, including noise resulting from blasting, could be reduced by complying with the City Code which establishes guidelines for construction noise. Generally, construction would occur between the hours of 7 a.m.-7 p.m. on Mondays-Fridays, and between the hours of 8 a.m.-8 p.m. on Saturdays and Sundays.

Meet the State Noise Insulation Standards for Multi-Family Residences. The state noise insulation standards apply to all multi-family residential development proposed for areas exposed to predicted CNEL levels of 60 dB or more. These standards require floor/ceiling assemblies to have a "sound transmission class" rating of at least 50, while entrance doors must have a sound transmission class rating of at least 30.

Implement Residential Building Design Considerations. Residential areas adjacent to major roadways should be planned and designed to minimize interior noise levels. Building design and orientation should minimize exposure of windows and sliding doors to roadway traffic noises. Bedrooms and other noise-sensitive areas of dwellings should be shielded from exterior noise sources by other portions of the dwelling or the use of buffer areas.

Nonresidential buildings should be designed to provide shielding of adjacent residential areas from traffic noise sources. Site planning for the nonresidential area of the project should also give consideration to the design and placement, away from residential uses, of potential noise sources such as storage areas, loading docks, and parking lots.

Prepare Project-Specific Noise Analyses for Commercial and Office Uses Near I-80 that are Exposed to CNEL Levels of 70 dB or More. Construction of commercial and office facilities within the CNEL level of 70 dB or more (portions of parcels 14, 17, and 19) should only be undertaken after a detailed analysis of the noise reduction requirements of each structure is made and the needed noise insulation features have been incorporated into the design.

Locate Hotels and/or Motels Further than 500 Feet from I-80 and Prepare Project-Specific Noise Analyses for Hotels and/or Motels within 500-2,000 Feet of I-80. Construction of transient lodging within 500-2,000 feet of I-80 (CNEL level 60-70 dB) should only be undertaken after a detailed analysis of the noise reduction requirements of each structure is made and the needed noise insulation features have been incorporated into the design.

Expected Buildout with Proposed Project. The mitigation measures required for the Year 2005 with Lower Intensity Alternative are also required for this alternative.

Chapter 18

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Chapter 19

REPORT PREPARATION

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LIST OF APPENDICES

Appendix 1-1

Initial Study: Environmental Checklist

I. Background

1. Name of Proponent AKT Developments
2. Address and Phone Number of Proponent 7700 College Town Drive Suite 101, Sacramento, CA 95826-2397 (916) 383-2500
3. Date of Checklist Submitted _____
4. Agency Requiring Checklist City of Roseville
5. Name of Proposal, if applicable See Project Description

II. Environmental Impacts

(Explanations of all "yes" and "maybe" answers are required on attached sheets.)

	Yes	Maybe	No
1. Earth. Will the proposal result in:			
a. Unstable earth conditions or in changes in geologic substructures?	____	X	____
b. Disruptions, displacements, compaction or overcovering of the soil?	X	____	____
c. Change in topography or ground surface relief features?	X	____	____
d. The destruction, covering or modification of any unique geologic or physical features?	____	X	____
e. Any increase in wind or water erosion of soils, either on or off the site?	____	X	____
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?	____	X	____

	Yes	Maybe	No
g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?		X	
2. Air. Will the proposal result in:			
a. Substantial air emissions or deterioration of ambient air quality?		X	
b. The creation of objectionable odors?		X	
c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?			X
3. Water. Will the proposal result in:			
a. Changes in currents, or the course of direction of water movements, in either marine or fresh waters?			X
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	X		
c. Alterations to the course or flow of flood waters?		X	
d. Change in the amount of surface water in any water body?		X	
e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?	X		
f. Alteration of the direction or rate of flow of ground waters?		X	
g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?		X	
h. Substantial reduction in the amount of water otherwise available for public water supplies?		X	
i. Exposure of people or property to water related hazards such as flooding or tidal waves?		X	

		Yes	Maybe	No
4.	**Plant Life.** Will the proposal result in:			
	a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, and aquatic plants)?	____	X	____
	b. Reduction of the numbers of any unique, rare or endangered species of plants?	____	X	____
	c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?	____	X	____
	d. Reduction in acreage of any agricultural crop?	____	X	____
5.	**Animal Life.** Will the proposal result in:			
	a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms or insects)?	____	X	____
	b. Reduction of the numbers of any unique, rare or endangered species of animals?	____	X	____
	c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?	____	X	____
	d. Deterioration to existing fish or wildlife habitat?	____	X	____
6.	**Noise.** Will the proposal result in:			
	a. Increases in existing noise levels?	X	____	____
	b. Exposure of people to severe noise levels?	____	____	X
7.	**Light and Glare.** Will the proposal produce new light or glare?	X	____	____
8.	**Land Use.** Will the proposal result in a substantial alteration of the present or planned land use of an area?	X	____	____
9.	**Natural Resources.** Will the proposal result in:			
	a. Increase in the rate of use of any natural resources?	____	____	X

	Yes	Maybe	No
b. Substantial depletion of any nonrenewable natural resource?	____	____	X
10. **Risk of Upset. Will the proposal involve:**			
a. **A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?**	____	X	____
b. **Possible interference with an emergency response plan or an emergency evacuation plan?**	____	X	____
11. Population. Will the proposal alter the location, distribution, density, or growth rate of the human population of an area?	X	____	____
12. Housing. Will the proposal affect existing housing, or create a demand for additional housing?	X	____	____
13. Transportation/Circulation. Will the proposal result in:			
a. Generation of substantial additional vehicular movement?	____	X	____
b. Effects on existing parking facilities, or demand for new parking?	____	X	____
c. Substantial impact upon existing transportation systems?	____	X	____
d. Alterations to present patterns of circulation or movement of people and/or goods?	____	X	____
e. Alterations to waterborne, rail or air traffic?	____	____	X
f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?	____	X	____
14. Public Services. Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:			
a. Fire protection?	____	X	____
b. Police protection?	____	X	____
c. Schools?	____	X	____

		Yes	Maybe	No
d.	Parks or other recreational facilities?	____	X	____
e.	Maintenance of public facilities, including roads?	____	X	____
f.	Other governmental services?	____	X	____
15.	**Energy.** Will the proposal result in:			
a.	Use of substantial amounts of fuel or energy?	____	X	____
b.	Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?	____	X	____
16.	**Utilities.** Will the proposal result in a need for new systems, or substantial alterations to the following utilities:			
a.	Power or natural gas?	____	X	____
b.	Communications systems?	____	X	____
c.	Water?	____	X	____
d.	Sewer or septic tanks?	____	X	____
e.	Storm water drainage?	____	X	____
f.	Solid waste and disposal?	____	X	____
17.	**Human Health.** Will the proposal result in:			
a.	Creation of any health hazard or potential health hazard (excluding mental health)?	____	X	____
b.	Exposure of people to potential health hazards?	____	X	____
18.	**Aesthetics.** Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view?	____	X	____
19.	**Recreation.** Will the proposal result in an impact upon the quality or quantity of existing recreational opportunities?	X	____	____
20.	**Cultural Resources.**			
a.	Will the proposal result in the alteration of or the destruction of a prehistoric or historic archaeological site?	____	X	____

	Yes	Maybe	No
b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	____	X	____
c. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?	____	X	____
d. Will the proposal restrict existing religious or sacred uses within the potential impact area?	____	X	____
21. Mandatory Findings of Significance.			
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	____	X	____
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)	____	X	____
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	____	X	____
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	____	X	____

III. Discussion of Environmental Evaluation

IV. Determination
(To be completed by the Lead Agency)

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. [ ]

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION WILL BE PREPARED. [ ]

I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. [XX]

April 23, 1986
Date

Daniel E. Dameron
Signature Daniel E. Dameron

For City of Roseville

APPENDIX 7-1

NORTHEAST ROSEVILLE SPECIFIC PLAN
TRANSIT AND TSM CONSIDERATIONS

NORTHEAST ROSEVILLE SPECIFIC PLAN
TRANSIT AND TSM CONSIDERATIONS

The traffic impacts of the Northeast Roseville Plan and cumulative development can be reduced through measures that divert residents and employees to non-automobile modes of travel and which encourage them to travel at times outside of the normal daily peaks. These measures include the provision and promotion of transit services, and the implementation of other Transportation Systems Management (TSM) programs such as ridesharing and variable work hour programs.

Transit

A variety of transit services are currently available in Roseville, but there is presently only limited regular service east of I-80 in the immediate vicinity of the project site.

Regional Transit (RT) operates two lines on Douglas Boulevard, but only as far east as Sunrise Avenue. RT lines 100 and 103 both provide commute-hour service to downtown Sacramento via I-80, with a total of four runs southbound each morning and four northbound each afternoon.

Placer County Transit provides service between Roseville and Auburn with stops at Sierra College, Rocklin and other intermediate points. There are nine northbound and nine southbound runs daily, including several commuter express runs. Most of the non-commute runs are of the "fixed route deviation" type, which allow the bus to deviate up to one mile from its normal route to pick up passengers. Placer County Transit also operates two bus trips daily each way between Roseville and the Granite Bay area.

Roseville Area Dial-a-Ride (RADAR) provides demand-responsive bus service within the City. The service operates from 6 a.m. and 6 p.m. on weekdays and from 9 a.m. to 3 p.m. on Saturdays. In addition to on-call dial-a-ride service, subscription service is available for regularly scheduled pick-ups.

Roseville Urban Shuttle (RUSH) operates two fixed-route shuttles through the City. Route A travels along Douglas Boulevard as far east as Sunrise, and provides service to downtown and the majority of the western part of the City. Route B travels along Douglas to Sierra Gardens, and through most of southeast and southwest Roseville and downtown. Buses run one hour apart on each route.

All of the above transit systems operate under funding constraints. For most, providing service to the Northeast Plan site, even if it were done simply by extending existing routes, would increase operating expenses and equipment needs for the transit operators.

For systems such as RT, whose funding is determined under the State and federal formulae for operating subsidies, the cost of serving a new area is related to the ability to generate fare-box revenues in that area. The development density and trip generation potential in the Northeast Plan area are as high as in many areas currently served by RT, and the area could probably be served without significantly affecting the system-wide fare-box recovery ratio. However, to the extent that new capital expenditures are required and operating performance reduced, serving the area could represent a net deficit to the transit operating agencies. RT has generally maintained the position that it cannot provide service in new areas without jeopardizing its ability to fund service in existing areas. As a result, RT has been considering various new revenue generating mechanisms, including assessment districts and transit impact fees. Depending on the strategy RT ultimately selects, one such mechanism might be applied in the project area as development takes place. While it would raise development costs, it would also insure that a reasonable amount of transit service would be provided through the site and would help reduce traffic impacts.

For the RUSH and RADAR systems, additional tax revenues that the proposed project would generate for the City of Roseville would probably make it possible to expand service to cover the site. If not, other means of funding additional service would have to be identified.

Assuring that at least basic transit service is provided through the Northeast Plan site would be an important part of a TSM-based traffic mitigation program. With basic transit service alone (quarter-hour frequencies in peak hours, half-hour off-peak), and no special TSM promotions, about two percent of the trips generated on the site would be made via transit. This reduction in automobile trip generation is already reflected in the trip rates used in the body of this report. Under this scenario, about 1700 transit trips would be generated daily in year 2005, about 200 of them in the peak hour.

Providing higher levels of transit service along with effective TSM measures could increase transit use considerably, to up to 10 percent in peak hours. There would be about 8500 transit riders daily, including about 1000 in peak hours. This would reduce traffic generation levels by about five to ten percent, improving intersection service levels by between one-half and one full service level with respect to those cited in the body of this report.

TSM

To help make the transit service effective and to promote other forms of non-auto travel, a TSM plan will be required under an existing City ridesharing ordinance. Such a program, along with good transit service, could reduce traffic impacts considerably, as described in the preceding paragraph.

Roseville's TSM ordinance is attached. It calls for a variety of measures, including posting transit information, carpool matching, and preferential parking, and requires annual performance reports. It is designed to reduce traffic generation by 20% to 30% below the amount that would occur if everyone drove alone. This would represent a traffic decrease of up to ten percent relative to expected no-TSM conditions.

Additional measures that go beyond Roseville's TSM ordinance might be considered by the project developers. The attached checklist of measures has been suggested by the local Caltrans rideshare branch as means to potentially achieve 40% reductions in drive-alone travel, or a 20% to 25% reduction in traffic relative to typical no-TSM situations. If all such measures were applied and were as successful as suggested, traffic service levels on the Northeast Plan site could be improved by up to two grades relative to those given in the body of this report.

ROSEVILLE TSM ORDINANCE

ORDINANCE NO. 1695

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE ADDING ARTICLE 37 TO ORDINANCE 802, THE ZONING ORDINANCE, RELATING TO RIDESHARING.

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. Article 37 is hereby added to Ordinance 802, the Zoning Ordinance of the City of Roseville, to read as follows:

ARTICLE 37 RIDESHARING

37.01 Findings

The City Council of the City of Roseville hereby finds and determines that:

A. A significant level of increase in new employment opportunities is anticipated in the South Placer region, including the City of Roseville, over the coming two decades.

B. Ridesharing among employees for home to work trips is a simple, inexpensive and effective means of reducing peak hour, single occupant motor vehicle trips. A reduction in such trips can be expected to result in a reduction in the potential air quality, traffic circulation, and energy consumption impacts relating to the anticipated growth in new jobs.

C. The anticipated level of employment growth in the South Placer region, including the City of Roseville, relative to the existing employment base provides an unusual opportunity to establish ridesharing as a common commuting practice.

D. Ridesharing is one of a number of measures and programs to be implemented under the South Placer Transportation Systems Management (TSM) Program in which the City of Roseville is a participant.

E. Implementation of a ridesharing program is required by the public health, safety and welfare.

37.02 Establishment of Ridesharing Program and Purpose

The City of Roseville Ridesharing Program is hereby established. The purpose and intent of the Ridesharing Program is to:

A. Reduce total vehicle emissions in the South Placer region and in the City of Roseville by reducing the number of vehicular trips that might otherwise be generated by home-to-work commuting.

B. Reduce peak hour traffic circulation in the South Placer region and in the City of Roseville by reducing both the number of vehicular trips and the vehicular miles of travel that might otherwise be generated by home-to-work commuting.

37.03 Ridesharing Program Objectives

The fundamental objective of the ridesharing program as established by this Article is to reduce the average number of vehicular trips for home-to-work commuting to 25% fewer trips than would occur if all such trips were made in single occupant motor vehicles. Large employment facilities will be expected to accomplish a higher percentage of this reduction than small employment centers in recognition of the greater opportunity for rideshare matches at large employment and educational facilities.

37.04 Ridesharing Program Requirement Nonexclusive

The requirements of this Article are nonexclusive. No section or provision of this article shall preclude application of any other development standards, requirements, or conditions of approval that may be imposed in the project review and approval procedures of the City.

37.05 Definitions

As used in this Article, the following terms shall be given the meaning ascribed to them in this section.

A. Applicant. An applicant for a conditional use permit, zoning change, or tentative subdivision map for a use or uses which, individually or collectively, may generate employment for fifty (50) or more employees at a common work location.

B. Carpool. A motor vehicle occupied by two or more persons regularly or habitually traveling together.

C. Common Work Location or Employment Facility. Either a single building or a group of buildings or work locations at a common site.

D. Commuter. An employee who travels regularly or habitually to and from an employment facility three or more days a week.

E. Commuter Matching Service. Any system for mapping and matching home and work locations of interested commuters to identify prospects for ridesharing.

F. Major Project Controller. The Lessor or manager of a common work location whose tenants, individually or collectively, employ fifty (50) or more employees, or an employer who employs fifty (50) or more persons.

G. Peak Hour Commuter. A commuter who regularly or habitually arrives at or departs from an employment facility during the morning hours of 7:30 a.m. to 8:30 a.m. or the evening hours of 4:30 p.m. to 5:30 p.m.

H. Project Controller. The Lessor or manager of a common work location whose tenants, individually or collectively, employs ten (10) or more but less than fifty (50) employees, or an employer who employs ten (10) or more but less than fifty (50) employees.

I. Ridesharer. Any employee who commutes by any mode other than single occupancy light or medium duty vehicle, motorcycle or moped.

J. Sacramento Rideshare Program. The commuter matching service and commuter information service operated by the CALTRANS-Sacramento Ridesharing Project.

K. Shift of Employment. Any group of employees who work at a common work location and who arrive and depart from work in a common time interval not greater than one hour.

L. South Placer Transporation Coordinator or Transportation.

Coordinator. The coordinator of transportation information and transportation plans, as established by the Coordination Agreement for the South Placer Task Force Relating to Highway 65, a joint powers agreement entered into by the County of Placer and the Cities of Roseville, Rocklin, and Lincoln, as it now exists and as it may hereafter be amended.

M. Transporation Plan. The plan submitted by an applicant and approved by the City pursuant to this Article.

37.06 Project Requirements

Every project controller and major project controller shall encourage ridesharing for tenants and employees by providing the following incentives to ridesharing:

A. Posting: Posting in a conspicuous place or places informational materials provided by the Transportation Coordinator to encourage ridesharing. Such informational materials may include but are not limited to:

1. Current schedules, rates (including procedures for obtaining transit passes), and routes of mass transit service to the common work location or employment facility.

2. The location of all bicycle routes within at least a five-mile radius of the common work location or employment facility.

3. Posters or flyers encouraging the use of ridesharing and referrals to sources of information concerning ridesharing.

B. Commuter Matching Service. Disseminating annually to all tenants and employees, to new tenants and to new employees when hired, written information provided by the Transportation Coordinator regarding an areawide commuter ridesharing matching service.

37.07 Facilitation

Every new major project controller and any existing major project controller that expands by 20% or more at any one time or cumulatively overtime, from the effective date of this Article, shall facilitate the tenants' or employees' use of an areawide ridesharing program by:

A. Ridesharing Coordinator. Designating an employee or other appropriate person to serve as a ridesharing coordinator. The ridesharing coordinator's responsibilities shall include:

1. Publicizing the availability of public transporation.

2. Communicating employee or tenant transportation needs to the Transportation Coordinator.

3. Assisting employees or tenants in forming carpools or vanpools.

4. Performing, semi-annually, an employee or tenant transportation profile showing the distribution of employees and tenants by transportation mode.

B. Sacramento Rideshare Program. Using the Sacramento Rideshare Program, or an equivalent independent matching service.

C. Parking Facilities. Establishing preferential parking facilities for carpools and vanpools, and provide parking for bicycles as follows:

1. Preferential Parking. If a major project controller provides or subsidizes off-street parking facilities or spaces to any employee or tenant, for the parking of motor vehicles used primarily for commuting between place of residence and the common work location, or employment facility, such major project controller shall provide guaranteed parking spaces for each carpool and vanpool in which its tenants or employees participate, under more favorable terms and conditions than are afforded to parking of single occupant motor vehicles. Parking spaces assigned to exclusive carpool or vanpool use shall be so designated with appropriate signing or pavement markings. Such parking shall be made available on request of any carpool or vanpool to the major project controller's ridesharing coordinator.

2. Bicycle Parking Facilities. Bicycle parking facilities which will accommodate the parking and securing of bicycles shall be made available at the request of any tenant or employee whose primary mode of commuting is by bicycle, made to the major project controller's ridesharing coordinator.

37.08 Transporation Plan Required

With every application for a conditional use permit, zoning change, tentative subdivision map, or building permit by a new major project controller, or existing major project controller having over 200 employees at one common work location, the applicant shall submit, along with any other required information, a Transportation Plan for the project. The Transportation Plan shall include the following:

A. Description. A description of the activity and operating characteristics of the proposed project (e.g., business hours and peak hours of traffic generation).

B. Estimate. An estimate of the commuting characteristics of the tenants and/or employees anticipated at the project site (e.g., travel distance and mode).

C. Mitigation Measures. Mitigation measures designed to achieve a reduction in the number of vehicle trips that would occur if all home-to-work trips by the anticipated tenants or employees were made in single occupant vehicles. Where the project may generate 50 to 200 tenants and/or employees, the applicant shall design a program to achieve a 20% reduction in vehicle trips. Where the project may generate 201 or more tenants and/or employees, the applicant shall design a program to achieve a 30% reduction in vehicle trips. Reduction in vehicle trips are due twelve (12) months from the time employee thresholds are reached. Such mitigation measures shall be selected by the applicant and may include, but are not limited to, the following:

1. Payment of subsidies or provision of other incentives to carpoolers or vanpoolers.

2. Payment of parking charges or absorption of vanpool operation expense for ridesharers.

3. Payment of subsidies or provision of incentives for the use of transit or transportation by other than single occupancy motor vehicles.

4. Provision of amenities, such as bicycle lockers, transit shelters, shuttle buses, etc., designed to enhance the use of other than single occupancy motor vehicles.

5. An adequate number of shower and personal locker facilities for regular bicycle commuters.

6. A vanpool program consisting of a continuously outstanding offer to acquire a van or vans (by purchase, lease, or otherwise), to obtain insurance and to make available to any group of at least eight (8) employees a van for their use in a vanpool.

7. Provisions for shifting of vehicle trips from the peak hour to the nonpeak hours. A reduction in vehicle trips per day required by this section shall be permitted and calculated in the following manner: the number of trips taken out of the peak hour, divided by the estimated total trips times 2% would equal the percent reduction of vehicle trips per day allowed.

8. Any other program the applicant may devise.

37.09 Review of Transportation Plan

A. The Transportation Plan shall be referred to the Transportation Coordinator for review and evaluation of the proposed mitigation measures and for recommendation to the Planning Commission or the City Council.

B. The Planning Commission or City Council, as the case may be, shall review and evaluate the Transportation Plan and shall approve, or disapprove the Transportation Plan as part of the review and approval process for the application under submission. No project application subject to the provisions of this Article shall be approved without approval of the Transportation Plan. A Transportation Plan shall not be approved unless it is found to meet the trip reduction objectives established in this Article.

37.10 Compliance with Transportation Plan a Condition of Approval

Compliance with the approved Transportation Plan shall be included as a condition of approval for conditional use permits and tentative subdivision maps, and may be included as a term of any development agreement between the City and the project applicant.

37.11 Transportation Plan Agreement

As a condition of approval of the project, the City may require the applicant to enter into a written agreement with the City obligating the applicant to comply with the Transportation Plan. Such agreement shall be made to run with the land and bind all successors in interest of the applicant and shall constitute an equitable servitude on the property. Where appropriate, the City may require the agreement to include a provision for a penalty, in the event of breach by the applicant or a successor in interest, and, where the applicant is required to construct physical improvements on the project site, to include a provision for improvement security for said construction in a form approved by the City Attorney.

37.12 Credit for Project Requirements

Actions required by Section 37.06, Project Requirements, may be referred to in the Transportation Plan and credited for their potential contribution to trip reduction objectives required by this Article.

37.13 Parking Space Credit

Parking space requirements for tenant or employee parking may be reduced below the prevailing parking standard for projects that submit a Transportation Plan. The total number of spaces required may be reduced by the equivalent of the percentage of trip reduction that is to be achieved by the programs specified in the Transportation Plan. In no case shall parking spaces allowed exceed the prevailing parking standards.

A. Legal Assurance Against Failure

A performance bond or a covenant to run with the land may be made a part of the site development requirement to guarantee that enough land to accomodate the reduction in parking spaces be set aside and held in reserve for a period of four years. After four years, if the Transportation Plans have achieved the anticipated reduction in vehicle trips, the land may be released from the set aside.

B. Monitoring System

The Transportation Coordinator will compute actual achievement in reduction of vehicle trips annually. In the case of failure to meet the required reduction in vehicle trips, the use of the reserved land under this section may be invoked or other actions as are necessary to offset the degree of failure.

C. On-Street Parking Restrictions

On-street parking adjacent to the project may be restricted to facilitate the parking space reduction measure if it is deemed necessary or if adverse impacts on adjacent land uses are taking place.

37.14 Annual Report Required

Each major project controller subject to the requirements of Section 37.08 of this Article, and all successors in interest of said applicant obligated to carry out the Transportation Plan or any part thereof, shall submit to the Transportation Coordinator a report by March 1 every year describing the transportation program. The report shall contain at a minimum the following information:

A. Description. A description of the measures taken to comply with this Article, including an accounting of the resources expended on rideshare promotion activities.

B. Use. The average number of tenants and/or employees regularly arriving at and leaving the employment facility for the reporting period by each of the following methods of transportation:

1. Single passenger motor vehicles (including mopeds).

2. Carpools. (Survey to include number of vehicles and number of occupants per vehicle.)

3. Van-type vehicles with eight or more commuters.

4. Mass transit.

5. Bicycles.

6. All others.

C. Numbers. The total number of tenants and/or employees by work shifts, at the employment facility, shall be included in the report.

37.15 Compliance with Requirements

The Transportation Coordinator shall periodically review compliance with the requirements under this Article by on-site checks at the common work location or employment facility. In the event of noncompliance, the Transportation Coordinator shall report to the City Planning Director who shall enforce the requirements of this Article.

37.16 Penalty

In the event of failure to comply with the requirements of this Article or with the terms of a Transportation Plan required pursuant to this Chapter, the City may impose the following penalties in addition to any other remedy provided by law:

A. Any penalty which may be imposed under the Zoning Code.

B. Any penalty as set forth in the Transportation Plan Agreement, if any.

The penalties set forth in this section are nonexclusive.

37.17 Effect on Existing Facilities

All existing project controllers and major project controllers within the City of Roseville shall comply with the provisions of this Article immediately upon the effective date of this Ordinance.

SECTION 2. This Ordinance shall be effective at the expiration of thirty (30) days from the date of its adoption.

SECTION 3. The City Clerk is hereby directed to cause this Ordinance to be published once after its final passage in a newspaper of general circulation of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this 16th day of February, 1983, at the following vote on roll call:

AYES COUNCILMEMBERS: Harry Crabb, Jr., June Manish, George A. Buljan Martha Riley, Richard Roccucci

NOES COUNCILMEMBERS: None

ABSENT COUNCILMEMBERS: None

ATTEST:

Richard Roccucci
Mayor

City Clerk

CHECKLIST OF TSM MEASURES*

1. City Responsibilities

   a. Adopt appropriate policies that involve developers property managers, employers, workers, and residents in traffic mitigation.

   b. Adopt city performance standards of expected peak hour trip reduction (e.g., 40% commute trip reduction and level of service C).

   c. Develop and implement effective city procedures for monitoring and adjusting Trip Reduction strategies to gain maximum results in traffic mitigation.

   d. Fund and establish a City Transportation Coordinator who:

      (1) Coordinates TSM activities among city businesses, employers and property managers

      (2) Advocates and implements city Trip Reduction programs and actions

      (3) Trains, assists and coordinates activities of community and Employer Transportation Coordinators

*Source: Caltrans District 3 - Rideshare Branch.

(4) Assists in the design of on-site Trip Reduction programs at developments, companies, businesses and residential locations.

(5) Represents and coordinates the city TSM efforts or needs with transportation providers or agencies (local transit, Regional Transit, Sacramento Rideshare)

(6) Conducts, evaluates, and monitors results of annual Trip Reduction surveys; prepares issues and recommendations for the community or city

(7) The city will provide necessary office space and support for the city Transportation Coordinator.

e. Require the creation and maintenance in perpetuity of a "Business and Community Association". The Association should act as a forum for transportation issues and as catalyst for action.

2. Recommended actions which will provide a physical transportation facility and environment that will be supportive and conducive to multiple occupant vehicles, bicycle, and pedestrian circulation:

a. Neighborhood and business streets and sidewalks designed to accomodate bus, carpool, vanpool, bicycle and walking commuters.

b. Provide commuter parking spaces (Park and Ride) at major arterial intersections with state highways and each other, and at shopping centers. The Park and Ride lots should be designed, constructed, landscaped and deeded to the City, County, or State along with necessary streets, sidewalks, etc. The City will maintain the Park and Ride lots deeded to it.

c. Provide bus turnouts (and shelters at shopping centers and Park and Ride lots) for passenger waiting and loading onto transit, carpools, vanpools and shuttles.

d. Provide bicycle paths and lanes for intra- and inter-community circulation, connecting residential to jobs and services. Provide secure bicycle parking (lockers or stanchions) at Park and Ride lots, major transit stops, employment and shopping centers.

e. Integrate as many traffic operational improvements as feasible to expedite traffic flow and increase capacity. Examples are:

(1) Synchronized traffic signals

(2) Turn lane installations

(3) Bicycle paths, lanes

(4) Expressway design on major arterials

(5) Off-street loading zones

(6) Frontage roads along expressways in lieu of direct access of adjacent properties

(7) Shuttle service for intra-development circulation and connection with transit service modes.

f. Community design should provide childcare, shopping, banking and food services near work to minimize mid-day auto trips.

g. Design and construct employment and shopping centers to minimize vehicular trips within the developments. Building clustering, multi-story construction, attractive all-weather pedestrian malls, bicycle paths/lanes, and pedestrian connectors between adjacent high density land uses.

h. Reduce the number of employee parking spaces provided at employment centers to 75% of planned employment.

i. Physically separate employee parking where feasible from visitor and service delivery parking to discourage parking misuse.

j. Provide bicycle parking stanchions or lockers for 8% of employees and personal lockers/showers for 4% of employees (2% male + 2% female) at major employment buildings.

k. At employment and shopping centers prohibit on-street parking at peak commute hours on arterials.

l. Utilize arterial curb (parking) lanes for buses, carpools and vanpools during peak commute hours.

m. Place at strategic locations, "Rideshare Information, Call 445-POOL" signs.

n. Establish and fund a Community Transportation Coordinator:

(1) Coordinates TSM activities among local businesses, employers, property managers and residents

(2) Advocates and assists in implementing and monitoring Community, City, County and Regional Trip Reduction programs and actions

(3) Trains, assists and coordinates activities of Employer Transportation Coordinators

(4) Assists in the design of on-site Trip Reduction programs at developments, companies, businesses and residential locations

(5) Represents and coordinates the community and employer TSM efforts or needs with transportation providers or agencies (local transit, Regional Transit, Sacramento Rideshare)

(6) Conducts and monitors results of annual Trip Reduction surveys, prepare issues and recommendations by the community or city

(7) The city or community shall provide necessary office space and support for the Community Transportation Coordinator

3. Recommended actions at each employment center which adopt, implement and maintain comprehensive, equitable traffic mitigation programs:

a. Seek comparable city, county and regional trip reduction programs to avoid market disadvantage to City, developers, employers and property managers.

b. Establish, adopt and maintain equitable incremental trip reduction standards and goals for community employers:

(1) Employers of 49 or fewer workers participate in annual transportation surveys, post alternative transportation information and distribute promotional material to employees

(2) Employers of 50 through 99 workers perform the above plus provide reserved carpool parking as demand

warrants, bicycle lockers or stanchions for eight percent of the employees, provide all new employees with alternative transportation information, and participate in annual efforts to encourage all employees to carpool, vanpool, bus or bicycle commute.

(3) Employers of 100 or more workers perform both of the above plus assign a staff person, entitled "Employer Transportation Coordinator" (ETC) to represent the company in community trip reduction efforts, liaison with neighboring employers, community, city and county Transportation Coordinators, liaison with transportation service or information providers, and oversee the company employee parking program. The ETC shall present the employee needs to management, and convey employer transportation policy to employees. ETC will encourage alternative work hours, on-site bus pass sales, vanpool formation and telecommuting within the needs of the employer.

(4) Qualifying employers, to the extent possible, advocate and accomodate adjustable work hours (flextime, staggered work shifts), provide preferential placement and assignment of parking spaces to carpools and vanpools, support employer or community based shuttles, provide on-site sales of bus passes, offer or arrange for assistance in forming car or vanpools, manage employee parking to encourage multi-occupant commuter vehicles.

(5) Qualifying employers develop and update biannually a Transportation Management Plan which reports performance against previous goals and state goals and strategies for the next plan cycle. Annual evaluations will be conducted congruent with the community evaluation.

(6) Landlords or property managers assume the responsibilities for equivalent employer actions based on worker population. Responsibility would become effective when 25% or more of the work force in the building is comprised of employers with less than 50 employees.

(7) Trip Reduction goals to be incremental:

(a) Employers of 49 or fewer employees have an ultimate goal of 30% trip reductions. First

year goal under the Trip Reduction program will be 15% and increasing 5% per year thereafter until the 30% is reached.

(b) Employers with 50 or more employees have an ultimate goal of 40% trip reductions. First year goal under the Trip Reduction program shall be 15% and increasing by 5% per year thereafter until the 40% goal is reached.

(c) Annual reports shall monitor achievement and sustenance of goals..

c. Through cooperative efforts, the City, Community and Employer Transportation Coordinators monitor progress towards trip reduction and level of service goals and prepare strategies for full compliance or reasonable further progress. Employers and qualifying property managers commit to aggressive pursuit of such goals so as to ensure high levels of quality of life factors such as ease of circulation, attractive business, residential, and employment environments, and competitiveness in the marketplace due a quality community.

4. Recommended actions to provide funds necessary for successful implementation, monitoring, and maintaining of the TSM/Trip Reduction program:

a. The City Transportation Coordinator to be funded by the City as a commitment to continuity and independence in authority of the program.

b. The Community Transportation Coordinator should be funded by a permanent local source (e.g., Business Association or Fee or Assesment Districts) to ensure continuity and pursuit of community interests.

c. Employer Transportation Coordinators will be funded by the respective qualifying employers and property managers to ensure focus on company or landlord interests and continuity of services and responsibility.

d. Monitoring efforts will include: survey design, conduct, analysis and evaluation to be joint efforts with specific responsibilities to the employer, community and city coordinators.

e. The capital costs of transportation infrastructure will probably be primarily borne by the developers, with city, state and federal funds as available.

f. Costs incurred by transportation-providers and information agencies demand may be funded equitably by users, fees, or assesments.

5. We suggest placing conditions on development and construction programs to specific phased approvals based on performance standards. This will allow partial development and financial return to investors to fund necessary improvements and programs.

6. As a control mechanism and to inform all future interests, we suggest covenants, conditions and restrictions placed on land titles to ensure continuity of programs by future land or lease holders.

Appendix 13-1. Common and Scientific Names of Plant Species Referred to in Text

Alopecurus	*Alopecurus saccatus*
Arroyo willow	*Salix lasiolepis*
Black willow	*Salix goodingii*
Blue oak	*Quercus douglasii*
Brodiaea	*Brodiaea* species (*B. pulcellum*, *B. lacuna-vernalis*, *B. laxa*, *B. elegans*, *B. minor*)
Brome grass	*Bromus* species (*B. mollis*, *B. diandrus*, *B. rubens*, *B. madritensis*)
Buckbrush	*Ceanothus cuneatus*
Buckeye	*Aesculus californicus*
Button bush	*Cephalanthus occidentalis*
Clover	*Trifolium* species (*T. depauperatum*, *T. tridentatum*, *T. olivaceum*, etc.)
Coyote-thistle	*Eryngium vaseyi*
Downingia	*Downingia ornatissima*, *D. bella*
Fescue	*Vulpia* species (e.g., *V. microstachys*, *V. bromoides*, *V. myuros*)
Foxtail grass	*Hordeum* species (e.g., *H. leporinum*, *H. geniculatum*)
Fremont cottonwood	*Populus fremontii*
Goldfields	*Lasthenia* species (e.g., *L. californica*, *L. platycarpha*, *L. fremontii*)
Hair grass	*Deschampsia danthonioides*
Himalaya berry	*Rubus procerus*
Honeysuckle	*Lonicera* species
Interior live oak	*Quercus wislizenii*
Larkspur	*Delphinium variegatum*
Lupine	*Lupinus* species (e.g., *L. bicolor*, *L. vallicola*)
Navarretia	*Navrretia* species (e.g., *N. pubescens*, *N. tagetina*, *N. intertexta*, *N. leucocephala*)
Oatgrass	*Avena barbata*
Oregon ash	*Fraxinus latifolia*
Owl's clover	*Orthocarpus* species (e.g., *O. erianthus*, *O. attenuatus*)
Pogogyne	*Pogogyne zizyphoriodes*
Poison oak	*Toxicodendron diversilobum*
Popcorn flower	*Plagiobothrys* species (e.g., *P. fulvus*, *P. nothofulvus*, *P. greenei*, *P. canescens*)
Toyon	*Heteromeles arbutifolia*
Valley oak	*Quercus lobata*
Water starwort	*Callitriche heterophylla*
Wooly marbles	*Psilocarphus brevissimus*

Appendix 13-2

Wildlife Species List

The following list identifies wildlife species that are likely to occur within the Plan area at some time during the year. Those species observed during the field surveys are noted with an asterisk.

AMPHIBIANS:

Tiger salamander	Ambystoma tigrinum
California slender salamander	Batrachoseps attenuatus
Pacific treefrog	Hyla regilla*
Bullfrog	Rana catesbeiana*
Western toad	Bufo boreas

REPTILES:

Western pond turtle	Clemmys marmorata*
Western fence lizard	Sceloporus occidentalis*
Southern alligator lizard	Gerrhonous multicarinatus
Gilbert's skink	Eumeces gilberti
Racer	Coluber constrictor
Gopher snake	Pituophis melanoleucus
Ringneck snake	Diadophis punctatus
Sharp-tailed snake	Contia tenuis
Common garter snake	Thamnophis sirtalis
Western terrestrial garter snake	T. elegans
Western aquatic garter snake	T. couchi
Common kingsnake	Lampropeltis getulus
Western rattlesnake	Crotalus viridis

BIRDS:

Great blue heron	Ardea herodias*
Green-backed heron	Butorides striatus
Great egret	Casmerodius albus
Snowy egret	Egretta thula
Wood duck	Aix sponsa*
Mallard	Anas platyrhynchos*
Cinnamon teal	A. cyanoptera
Turkey vulture	Cathartes aura*
Black-shouldered kite	Elanus leucurus
Cooper's hawk	Accipiter cooperii*
Sharp-shinned hawk	Accipiter striatus
Red-shouldered hawk	Buteo lineatus
Red-tailed hawk	B. jamaicensis*
Swainson's hawk	Buteo swainsoni
Goldern eagle	Aquila chrysaetos

BIRDS: (continued)

Prairie falcon	Falco mexicanus
Peregrine falcon	Falco peregrinus
American kestrel	Falco sparverius*
California quail	Lophortyx californicus*
Killdeer	Charadrius vociferus*
Long-billed curlew	Numenius americanus
Ring-billed gull	Larus delawarensis
California gull	L. californicus
Mourning Dove	Zenaida macroura*
Band-tailed pigeon	Columba fasciata
Common barn owl	Tyto alba*
Screech owl	Otus asio
Great horned owl	Bubo virginianus*
White-throated swift	Aeronautes saxatalis)
Anna's hummingbird	Calypte anna*
Rufous hummingbird	Selasphorus rufus
Allen's hummingbird	S. sasin
Belted kingfisher	Megaceryle alcyon*
Northern flicker	Colaptes auratus
Acorn woodpecker	Melanerpes formicivorous*
Downy woodpecker	Picoides pubescens
Nuttall's woodpecker	Picoides nuttallii*
Western kingbird	Tyrannus verticalis*
Ash-throated flycatcher	Myiarchus cinerascens*
Black phoebe	Sayornis nigricans*
Say's phoebe	S. saya
Western flycatcher	Empidonax difficilis
Western wood pewee	Contopus sordidulus
Horned lark	Eremophila alpestris*
Violet-green swallow	Tachycineta thalassina
Tree swallow	Iridoprocne bicolor*
Northern rough-winged swallow	Stelgidopteryx serripennis
Barn swallow	Hirundo rustica
Cliff swallow	Petrochelidon pyrrhonota*
Scrub jay	Aphelocoma coerulescens*
Yellow-billed magpie	Pica nuttalli*
Common crow	Corvus brachyrhynchos
Plain titmouse	Parus inornatus*
Bushtit	Psaltriparus minimus*
White-breasted nuthatch	Sitta carolinensis*
Red-breasted nuthatch	S. canadensis
Brown creeper	Certhia familiaris
Wrentit	Chamaea fasciata
House wren	Troglodytes aedon*
Bewick's wren	Thyromanes bewickii*
Northern mockingbird	Mimus polyglottos*
American robin	Turdus migratorius*
Varied thrush	Ixoreus naevius
Western bluebird	Sialia mexicana*
Blue-gray gnatcatcher	Polioptila caerulea
Golden-crowned kinglet	Regulus satrapa
Ruby-crowned kinglet	R. calendula

BIRDS: (continued)

Water pipit	Anthus spinoletta
Cedar waxwing	Bombycilla cedrorum*
Phainopepla	Phainopepla nitens
Loggerhead shrike	Lanius ludovicianus
European starling	Sturnus vulgaris*
Hutton's vireo	Vireo huttoni*
Warbling vireo	V. gilvus
Orange-crowned warbler	Vermivora celata*
Yellow-rumped warbler	Dendroica coronata
Black-throated gray warbler	Dendroica nigrescens
House sparrow	Passer domesticus
Western meadowlark	Sturnella neglecta*
Red-winged blackbird	Agelaius phoeniceus*
Northern oriole	Icterus galbula*
Brewer's blackbird	Euphagus cyanocephalus*
Brown-headed cowbird	Molothrus ater
Western tanager	Piranga ludoviciana
Black-headed grosbeak	Pheucticus melanocephalus*
Purple finch	Carpodacus purpureus
House finch	C. mexicanus*
American goldfinch	Carduelis tristis*
Lesser goldfinch	C. psaltria*
Pine siskin	C. pinus
Rufous-sided towhee	Pipilo erythrophthalmus*
Brown towhee	P. fuscus
Savannah sparrow	Passerculus sandwichensis*
Lark sparrow	Chondestes grammacus*
Dark-eyed junco	Junco hyemalis
White-crowned sparrow	Zonotrichia leucophrys*
Golden-crowned sparrow	Z. atricapilla*
Song sparrow	Melospiza melodia*

MAMMALS:

Opossum	Didelphis virginiana
Ornate shrew	Sorex ornatus
Broad-footed mole	Scapanus latimanus
Yuma myotis	Myotis yumanensis
Small-footed myotis	M. leibii
California myotis	M. californicus
hoary bat	Lasiurus cinereus
Red bat	L. borealis
Western pipistrelle	Pipistrellus hesperus
Big brown bat	Eptesicus fuscus
Townsend's big-eared bat	Plecotus townsendii
Pallid bat	Antrozous pallidus
Brazilian free-tailed bat	Tadarida brasiliensis
Black-tailed jackrabbit	Lepus californicus
Brush rabbit	Sylvilagus bachmani
Desert cottontail	S. auduboni*
California ground squirrel	Spermophilus beecheyi
Western gray squirrel	Sciurus griseus*

MAMMALS: (continued)

Botta's pocket gopher	Thomomys bottae*
California pocket mouse	Perognathus californicus
Western harvest mouse	Reithrodontomys megalotis
Deer mouse	Peromyscus maniculatus
Dusky-footed woodrat	Neotoma fuscipes
California vole	Microtus californicus
Coyote	Canis latrans
Gray fox	Urocyon cinereoargenteus
Raccoon	Procyon lotor*
Long-tailed weasel	Mustela frenata
Western spotted skunk	Spilogale gracilis
Striped skunk	Mephitis mephitis*
Mountain lion	Felis concolor
Bobcat	Felis rufus
Mule deer	Odocoileus hemionus

Appendix 16-1.

ARCHAEOLOGICAL SURVEYS IN PLACER COUNTY, CALIFORNIA: NORTHEAST ROSEVILLE SPECIFIC PLAN

D. L. True

Contract to: D. L. True and Far Western Anthropological Research Group, Inc., P.O. Box 413, Davis, CA 95617

Report prepared for: Jones and Stokes Associates, Inc.
2321 P St., Sacramento, CA 95816

April 1986

INTRODUCTION

The Northeast Roseville Specific Plan is described as a long range planning document for a 1632.8 acre parcel located in Placer County in the City of Roseville. Figure 1 shows the location of the project area, and figure 2 provides additional locational information relative to principal highways and local features.

A request for an archaeological survey of selected portions of the larger project area was solicited by Jones and Stokes Associates in late March, 1986 and an agreement was finalized on March 31, 1986 which provided for:

1. a record search for previously recorded archaeological sites on and adjacent to the project area including the National Register of Historic Places;

2. a review of the relevant archaeological and historical literature for the project area including the regional ethnography;

3. a field survey of the designated portions of the plan area to determine whether or not significant cultural resources were present. This field survey was to concentrate on the potentially sensitive areas adjacent to the principal drainages with less intensive examination of the remainder of the designated survey area;

4. preparation of a suitable report providing necessary descriptive background, results of the surveys and recommendations for mitigation or other suitable measures designed to address the potential impact the development of the plan area might have on extant cultural resources.

A record search was initiated on receipt of the approved proposal and field surveys were started a few days later. The field investigations were carried out by qualified professional archaeologists working for Far Western Anthropological Research Group under the supervision of D.L. True. Field survey personnel are listed as part of Appendix 1.

The survey area is shown on figure 2. The space here was examined by professionally trained archaeologists looking for artifacts, features, soil alteration, and/or faunal remains. The entire area was examined using standard archaeological survey techniques. No sampling procedures were used.

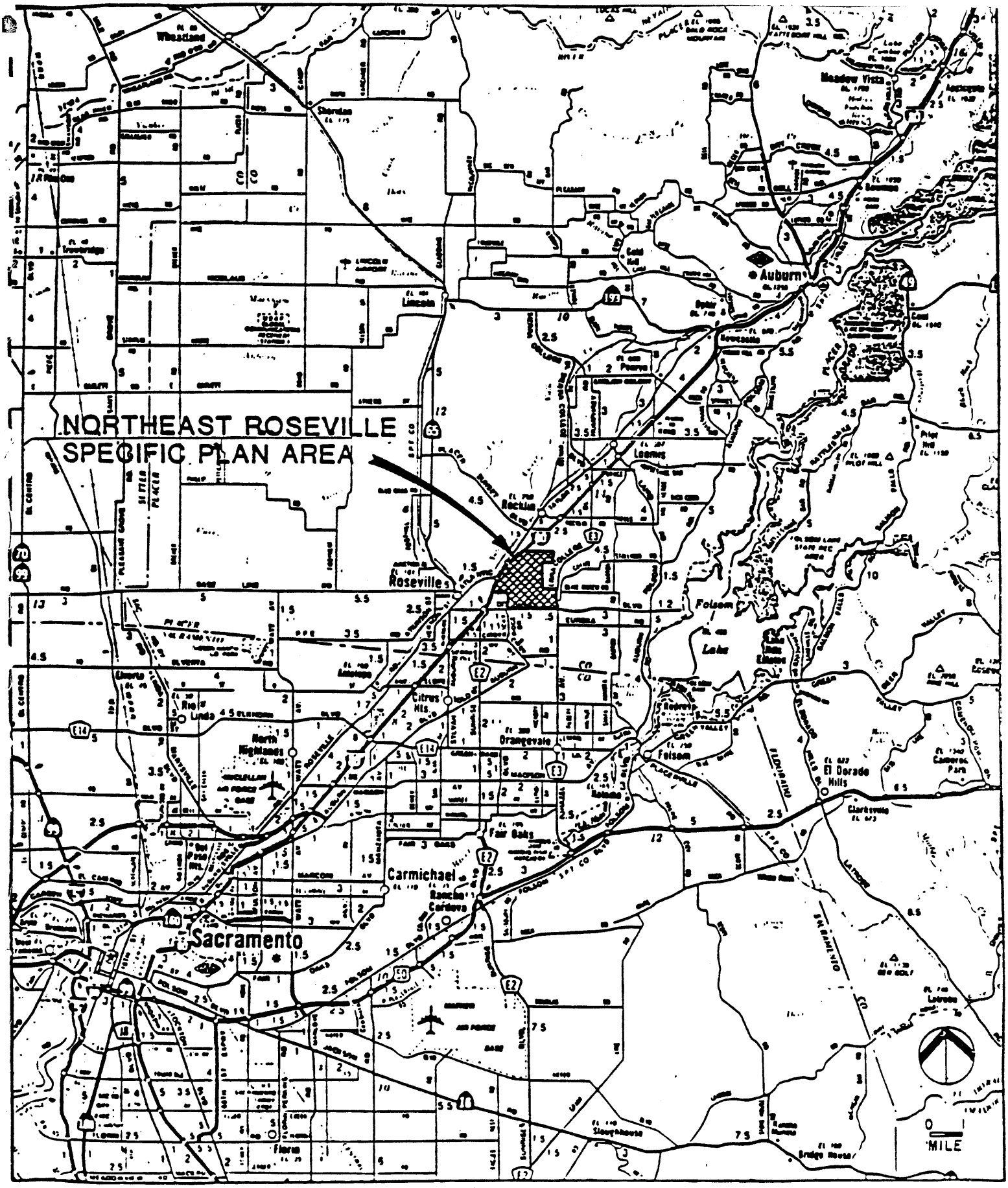
NORTHEAST ROSEVILLE
SPECIFIC PLAN AREA
Wheatland
Meadow Vista
Auburn
Lincoln
Loomis
Rocklin
Roseville
Folsom
Lake
Citrus Hts.
Orangevale
Folsom
El Dorado Hills
North Highlands
Fair Oaks
Carmichael
Rancho Cordova
Sacramento
Florin
MILE

FIGURE 1

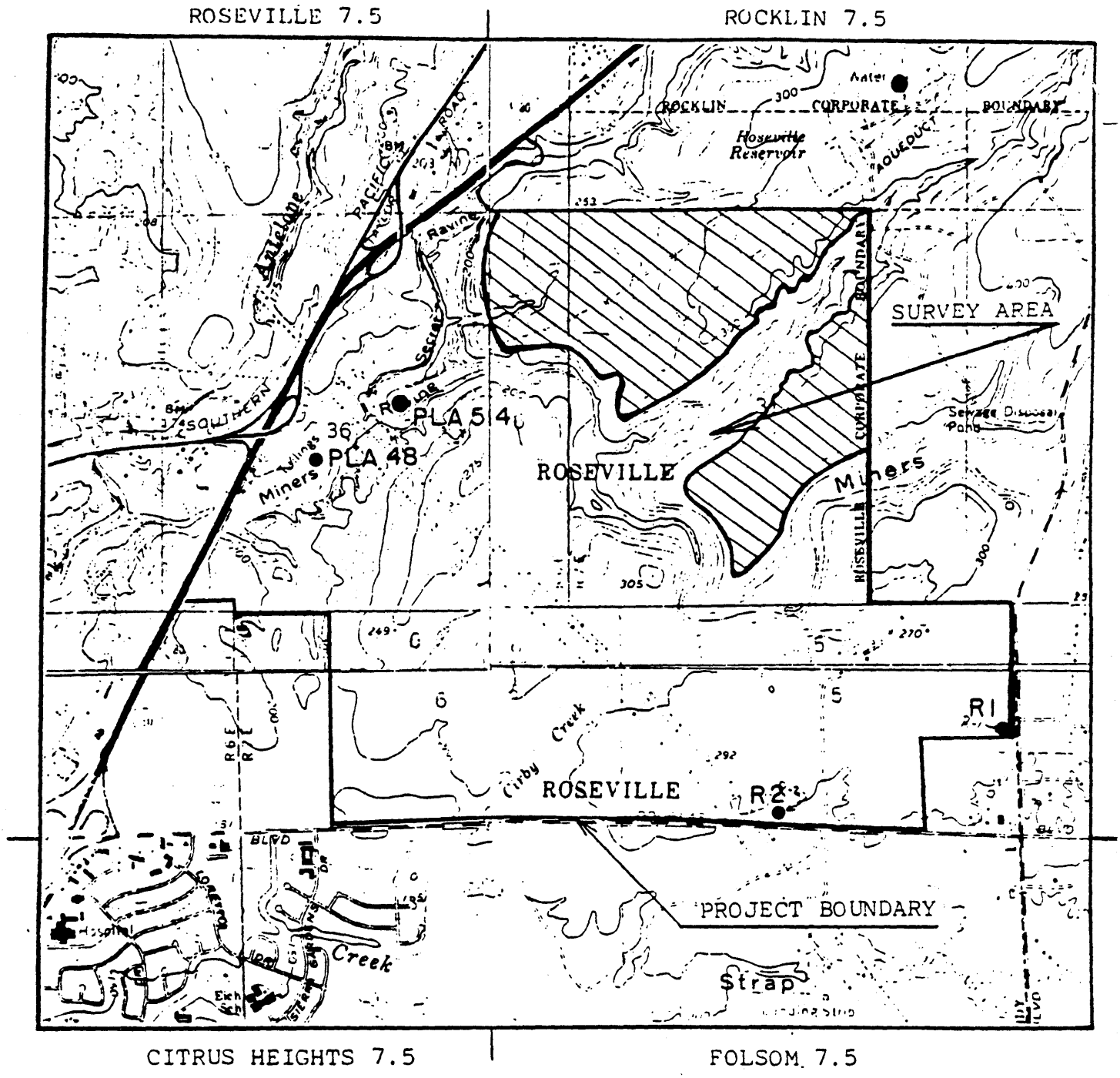
ROSEVILLE 7.5
ROCKLIN 7.5
ROCKLIN CORPORATE BOUNDARY
Water
Hoseville Reservoir
AQUEDUCT
PACIFIC RAILROAD
Dry Creek
Ravine
Secret
SURVEY AREA
SOUTHERN
PLA 54
PLA 48
Miners
ROSEVILLE
Sewage Disposal Pond
CORPORATE BOUNDARY
ROSEVILLE
Miners
R1
Dry Creek
ROSEVILLE
R2
PROJECT BOUNDARY
Strap
CITRUS HEIGHTS 7.5
FOLSOM 7.5
UNSURVEYED AREA

FIGURE 2

THE SETTING

Geographic-Environmental Background

That part of the Sacramento Valley that is presently of interest is generally described as a floodplain situation marked by gentle increases in elevation from the Sacramento River to the margins of the adjacent foothill province. In general this is an undulating surface with minimal relief and it is dissected by the several principal tributaries of the Sacramento River (Consumnes, American and Feather). Topographically the surface varies locally but in addition to the general increase in elevation from west to east, there is evidence for subtle but recognizable terracing in relation to the major streams. In part the recognizable topographic expression can be attributed to the nature of the underlying alluvium and geological formations. For a detailed discussion of the topographic and pedologic circumstances prevailing for the eastern margins of the study area see Shlemon (1967) "Quaternary Geology of Northern Sacramento County, California." A generalized diagram shows relationships of the more obvious surfaces and geologic units (Figure 13, page 59). Field trip "C" (ibid., pp. 51-59) locates and discusses some of the local geology and land forms. The bibliography (ibid., pp. 15) lists the standard available resources relating to local and regional geology and soils. Hauge (1973) edits a similar volume which includes a summary of the local environment (p. 7) and a section entitled "Geologic Notes on the Folsom-Roseville Area." Both represent useful background information (Aune 1973:59-63).

In general the larger area has been categorized as a grassland community characterized by stands of oaks which made up substantial areas of Oak Parkland, and riparian communities along the several major and minor drainages. Descriptions of grassland communities are relatively common in the literature, but see Klyver (1931:9), Heady (1977:492-510), and the bibliography of the Heady paper for general and specific discussions of grassland related resources. One of the better known discussions of California Grasslands in general including several specific references to the Sacramento Valley Region is Burcham (1957) recently reprinted (1982). This treatise presents an excellent summary of the local environment including discussions of the riparian and adjacent foothill woodland communities.

Oak woodland is described in some detail by Griffin (1977:384-415) with specific comments relating to the Sacramento Valley on pages 387-388. Some comments on riparian communities are also included in the Griffin paper (pp. 405-407) and the bibliography provides several additional data sources. Holstein (1984:2-19) presents a description of Riparian Habitats in California. Katibah (1984:23) provides a historic resume of the riparian forests of central California, and Scott and Marquiss (1984:51-57) present a historical overview of the Sacramento River which provides useful information on the local environment conditions and circumstances. The bibliographies of these three papers include many other references dealing with the resources of the general area. Historical references which describe these environmental contexts in earlier times are relatively common (see for example Burcham, pp. 77-78), and there is little doubt as to the availability of natural resources as a basis for a substantial aboriginal population.

Ethnographic Background

The geographic space in which the Northeast Roseville Specific Plan is located was occupied in historic and late prehistoric times by the ethnographically described Nisenan who represented a regional subdivision of the larger Maidu cultural and linguistic group. The southern Maidu (Nisenan) territory extended from the crest of the Sierra on the east to the Sacramento River on the west. The northerly boundary was located somewhere between the Yuba and Feather River, and the southerly line was somewhere between the American and Consumnes rivers. Although the entire stretch of land from the Sacramento River to the high Sierra is included within the Nisenan territory regional subdivisions are known, and the most important of these, in terms of the present project, was the separation of the valley and Foothill Nisenan.

Important cultural differences have been documented for the two groups with respect to settlement and subsistence patterns. The general ethnographic reports propose for the valley proper, that most occupancy was concentrated in several population centers or villages located along the Sacramento, American, Bear and Feather Rivers (Wilson and Towne 1978:388). In the valley, resources were generally plentiful and relatively large settlements developed in favorable locales (high ground). The subsistence included fish, migratory birds, deer, elk, and a variety of vegetal products including acorns and tules. These settlements are pictured as sedentary, but seasonal collecting of some resources over portions of the adjacent grassland/oak parkland is likely and the development of temporary campsites and collecting/processing stations can be proposed.

Because of this ethnographic identification and the obvious concentration of cultural debris in the noted village settlements, most research to date has been concentrated on the riverine communities. Ethnographic descriptions relating to the Nisenan can be found in Wilson and Towne 1978:387-397; Kroeber 1925:391-441; Kroeber 1932: several locations; and Beals 1933:335-414. Specific references to the Valley Nisenan can be found in Kroeber 1929:253-290; and Faye 1923.

The adjacent Hill Nisenan apparently occupied smaller villages or camps in more scattered contests with an emphasis on the collection of subsistence resources over much larger territorial units. In many instances the resources utilized were similar to those collected by the Valley Nisenan, but it has been suggested that they were less concentrated and at times may have been less reliable. In any case, for reasons that relate to topographic circumstances, subsistence resources and undefined socio-cultural factors, the settlement system for the hill people is characterized as more diffuse with smaller villages spread over larger territories. The pattern as proposed would include larger numbers of seasonally utilized camps and temporary processing stations.

References to the settlement and subsistence practices of the Hill Nisenan can be found in the general Nisenan references cited above, and in Wilson (1972:32-38); Matson (1972:39-44) and Erskian and Ritter (1972:28-31).

The open grassland and oak parkland areas which characterize the larger valley region between the major rivers and the margins of the foothill province were used mostly on a seasonal and temporary basis and few ethnographically described settlements have been identified for that region. This space, which served in part as a buffer zone between the Valley and Hill Nisenan has been referred to as a kind of no-mans land used by both groups as convenient, but not claimed specifically by either.

For the general area in and around the present city of Roseville at least some of the geographic space would be considered part of this buffer zone. One major village is noted for the Roseville vicinity and it appears that it was part of the Valley Nisenan settlement pattern, but this is far from conclusive. (Pichiku as described in Wilson and Town 1978:Figure 1;p. 388). There is reason to believe that other camps of some importance existed along the major tributaries of the American and perhaps the Bear River.

In general it must be assumed that the Roseville area was very close to the easterly boundary of the general valley Nisenan area of influence and as such, may have been used by both hill and valley groups. The general consensus is that the hill people focused on resources around and above the 1000 foot elevation, and concern with the lower elevations may have been minimal. Based on extrapolations from the literature it can be proposed that the project area and its general vicinity was used seasonally for deer, rabbit, grasshoppers, acorns, and a variety of herbaceous annuals and grass seeds. Greens were probably collected in the spring, and tules may have been available in small scale wetland contexts. Waterfowl were certainly present at times, as were fish in the more important drainages. At the present time oak resources tend to be concentrated along the streams, and while they may have been more widespread in pre-contact times, it seems reasonable to propose a generally similar distribution of resources for at least the last several hundred years. Based on such projections it is likely that major camps would have been located along or adjacent to the riparian zones associated with the drainages, or in relation to Oak parkland resources in reasonable proximity to reliable water resources. Seasonal camps and processing stations would most likely be located along the lessor tributaries or in oak parkland contexts apart from the riparian associations. The open grassland regions, while important as elements in the general subsistence pattern, were certainly used on a more casual basis and under circumstances not often identifiable in the archaeology.

Although the ethnographically derived model for site and resource distributions can be reasonably projected into prehistoric times, the nature of the utilizations and thus the settlement pattern for pre-Nisenan occupancies must be considered tentative. A pattern of small camps situated in generally similar geographic contexts seems reasonable and differences, if any, would probably relate to more diffuse distributions of sites, and somewhat, but not entirely different artifact inventories. Published archaeological data for the project area are scarce, and much of the information available for the larger area is limited to short reports generated as part of Environmental Impact Assessments. To a substantial degree these data have not yet been subjected to a systematic synthetic treatment of analysis.

Previous Archaeological Investigation

In general the northern periphery of Sacramento County and adjacent areas in Placer County have had minimal attention from professional archaeologists. During the 1930's, 1940's and 1950's attention was focused on sites and resources in the adjacent delta region and along the major rivers. With few exceptions work in the area between the Sacramento River and the foothills was limited to casual examinations mostly by local nonprofessionals. Several important sites were investigated in the Consumnes-Deer Creek region (Lillard and Purves 1936; Lillard, Heizer, and Fenenga 1939), and work in that area was renewed in the late 1960's (Johnson 1976). These important investigations were not exactly remote from the Roseville area, and occupy somewhat similar elevational and geographic contexts. They appear to have been within the Miwok rather than Nisenan territory, however, and as such were more closely related to the delta archaeology which pre-occupied central California archaeologists for the best part of three decades. For a summary description of the history of archaeological investigation in the general Consumnes-Deer Creek area, the reader is referred to Johnson 1976:3-14.

Based on a cursory but reasonable assessment of the published or generally available literature, it is possible to identify two regions within the Nisenan territory in the general vicinity of Roseville for which some archaeological data are available. The first includes the Dry Creek drainage from an area upstream from the present city of Roseville to a point near its present terminous within the floodplain of Sacramento County. The second local region is that along Linda Creek in Sacramento County.

Palumbo (1966) reported some 31 archaeological sites for the Dry Creek drainage, of which 23 are in Placer County. The Palumbo thesis describes the general characteristics of the sites (midden versus no midden) and lists the artifacts recovered from each. In many instances the sites in question were previously recorded by Mott, then re-located and described by Palumbo and Mott. Typically only surface collections were made and it seems that in many instances the artifacts were collected from the surface leaving little evidence of previous occupancy or utilization. Overall, it seems reasonably clear that most sites represent evidence of temporary camps and special activity stations. A range of ages is represented, however, and both Middle and Late Horizon sites appear to be represented. The Evelyn Site (site 31-86 in the Palumbo series) seems to have been the only major village in the Roseville area (at least on the Dry Creek drainage). Because no historic remains were noted during the 1962 looting of the midden, there is some question as to whether or not this site corresponds to the ethnographic village reported for the Roseville area in several earlier papers.

For the Linda Creek area, Johnson (1976a) notes the presence of one large camp or village location (site 30) and a smaller campsite (site 32) along with scattered artifacts and/or isolates in several nearby contexts. Based on his evaluation of the sites and artifacts Johnson

proposes a span of occupation ranging from AD 300 to AD 1200. Although described as part of the Linda Creek investigation, Johnson notes the relative proximity of the Indian Rock Corral site (1 1/2 miles east) which seems to have been another important camp or village (SAC-246).

A cursory examination of the Dry Creek assemblage in conjunction with the evidence from Johnson's site 32 and similar artifacts recovered from Cripple Creek not too far away (True 1986) suggests that at least some of the small camps and artifact scatters can be attributed to earlier occupancies with some similarities with the Martis material in the adjacent Sierra. (see also Curtice, 1961 in this regard).

Other archaeological work in the general area has been limited, but includes surveys by Payen (1959, 1966), investigation of two sites in the Roseville area by American River College in the 1960's (unidentified) and two additional sites examined on Strap Ravine (Palumbo 1966). According to Johnson (1976) Martin reported on a badly disturbed site near Roseville in 1970. The site is described as being adjacent to Douglas Blvd. and Interstate 80 which makes it likely to have been the Evelyn site reported by Palumbo. Roper (1973) provides additional information on the Strap Ravine sites originally reported by Peck in 1966. These data have been gleaned from Johnson (1976) which lacks a bibliography and they cannot be identified further at the present time. Unfortunately, these reports are not published and are often filed in obscure locations where they cannot be retrieved in any reasonable length of time. A geological field log (Aune 1973:61) describes a geological outcropping that straddles Strap Ravine on the south side of Douglas and a bit less than a mile east of the Douglas Blvd.-Sunrise intersection, which included "dozens of mortar cups." The site not further identified is certainly part of previously recorded resources along Strap Ravine.

Although descriptions of additional cultural resources for the area are scattered and scarce, a few references were uncovered as part of the record search conducted for this investigation. These are considered below under the heading Record Search-Archaeological-Historic.

RECORD SEARCH-ARCHAEOLOGICAL/HISTORIC-SPECIFIC

Consistent with the specifications included in the scope of work, a record search for previously recorded prehistoric and historic archeological sites within or adjacent to the Northeast Roseville Specific Plan area was conducted at the North Central Information Center, Department of Anthropology, California State University, Sacramento. The search was conducted by Daryl Noble under the supervision of Marianne Russo, Assistant Coordinator for the center. This examination is recorded as search number 86-10. Several documents relating to this search are included as part of Appendix 2.

Supplemental to the record search for previously recorded sites, a number of other sources were consulted. These sources included the National Register of Historic Places (1985), The California Inventory of

Historic Places (1976), California Historical Landmarks (1979), California Place Names (1969), California Gold Camps (1975), Gold Districts of California (1979), and Historic Spots in California (1966). Based on these data sources, and the site records on file at the center, the following can be proposed for the project area, and its immediate environs.

1. A transmission line transect which crosses the subject property diagonally from Douglas Blvd. to Interstate 80 Freeway. This transact was surveyed as part of a previous project (Record Center report number 301, Peak and Associates 1979.) No Cultural resources reported.

2. The geographic area marginal to Interstate 80, related to the Atlantic Blvd off-ramp and adjacent areas. This part of the project area was surveyed by Billy Peck (1980) for Fuller Associates. One prehistoric site was recorded (CA-PLa-48). Additional surveys in the same general area resulted in the recording of the remnants of an old wooden pipeline.

3. The parcel adjacent to the above was surveyed and a report prepared for the Regional Office, California Archaeological Site Survey (Record Center Report number 467). No resources reported.

4. The parcel of land that joins the subject property on the southwest corner was surveyed in 1979 by Ann Peak and Associates. Record Center Report number 399. No prehistoric resources noted. One historic well and evidence of ranch structures reported.

5. All the land within and along the Interstate route including off ramp areas were surveyed by Caltrans. No significant resources reported.

6. A parcel of land within the larger Plan area, but not part of the present survey agreement (Urban reserve areas) was surveyed as part of a previous investigation. No details but assume no resources as none were noted.

7. Rocky Ridge Road Survey. Ann Peak and Associates, 1981. No cultural remains were recorded for the right of way, but scattered surface artifacts were reported for an area near Dry Creek (not located on map).

8. Apparently a highway bypass route was surveyed in January and February of 1982 by Caltrans personnel W. Wiant and W. Waldron. This work resulted in recordation of CA-PLa-514, a prehistoric site and CA-PLa-510H, an historic pipeline (Appendix 2 site records). Although a report on this survey was not found during the record search, the bypass route appears to run roughly parallel to the present Highway 80, crossing Secret Ravine near its confluence with Miners Ravine.

For areas in the general vicinity, but not directly contiguous with

the Plan area, the following reports were noted as a result of the records search.

1. Foster and Foster (1982). Survey of Diamond Oaks North for R.C. Fuller Associates. This report has not yet been integrated into the file system since it has no formal site numbers (trinomials). Five prehistoric, 7 historic fence line features, and 16 isolates were reported. None of these resources have any relationship to the present investigation.

2. Foster and Foster (1981). An Archaeological Reconnaissance of the Roseville - Placer County - Rocklin West Sewer Assessment District. This project was an extensive surface examination of a series of pipeline routes north and west of Roseville. The project was done for R.C. Fuller and Associates. The report has not yet been plotted on the record center master maps and no official number has been assigned. Six prehistoric, two historic sites, 8 historical features and 6 isolated artifacts were recorded as part of this investigation. None of these resources have any bearing on the present investigation.

3. Hildebrandt, Basgall and Bouey (1978). An extensive areal survey in the region north of Sunset Oaks and Rocklin. The work was done for Kendall Engineering (Auburn, California). Several prehistoric and historic sites were recorded, but they have no direct bearing on the proposed Northeast Roseville Specific Plan.

4. Basgall and Jobson (1978). A survey of a small area along Pleasants Grove Creek for Kendall Engineering. No cultural resources were recorded.

RECORD SEARCH-HISTORICAL-GENERAL

1. No National Register Sites will be Impacted by the proposed developments within the Northeast Roseville Specific Plan Area.

2. Examination of the Volume "istoric Spots In California" (1966) by Hoover, Rensch and Rensch (Stanford University Press) lists and describes Secret Ravine as the scene of extensive placer mining during the 1850's and 1860's, that it was the location for granite quarrying operations during the 1870's and that during the 1880's apple orchards were planted on the adjacent ridges. The settlements and other activities associated here appear to have been upstream from the present project location, and except for some of the mining, had little or no impact locally.

3. California Historic Landmarks Not dated. This is a Document distributed by the State of California Resources Agency. The first transcontinental railroad is listed as item 788-1. This is of general interest, but has no no direct relationship with the project area.

4. California Gold Camps Gudde and Gudde (1975). Published by University of California Press. Lists Miners Ravine, but is clearly considering an area upstream near the town of Auburn. Also lists Secret Ravine with the principal concern being placer mining. None of the remains of these activities are significant.

5. California Place Names Gudde (1969) University of California Press. Lists south branch of Pleasants Grove Greek, with no specific information. Lists town of Elverta, Kaseberg Creek, Roseville Station and Secret Ravine. No useful information is presented other than locations. None of the places listed will be significantly impacted by the proposed development.

These references were included as part of the record search and copies are included as part of Appendix 2.

THE SURVEYS

Approximately 1000 acres of the subject property was examined by professional archaeologists looking for artifacts, features, soil alteration, and/or faunal remains. The entire parcel (see Figure 1) was examined and no sampling techniques were used. The indicated space was examined on foot with survey transects ranging from 10 to 30 meters depending on location and circumstances. All outcrops were examined and special attention was given to the sensitive areas along the drainages, as well as other places deemed likely spots for habitations or other activities.

Survey conditions were generally poor because of the heavy grass cover. This means that it can be stated with some certainty that no major villages or bedrock mortar stations were overlooked, but that it is likely that isolated artifacts or small flake scatters would have been missed. Short of complete removal of the vegetation, or a re-survey late in the summer there is little more than can be done. In general it was agreed by the survey crews, that the coverage was satisfactory, albeit less than ideal.

THE RESULTS

Prehistoric

The surveys described above resulted in the discovery of two previously unreported prehistoric sites. These are described briefly below.

Site R-1

This is a small processing station consisting of four bedrock

mortars on two adjacent outcrops. No associated artifacts were noted and there was no obvious midden visible.

Site R-2

This also is a small processing station. It includes two bedrock mortars on one small outcrop. No artifacts were noted and no obvious midden was visible.

These two site locations are shown on figure 2 and additional details are presented in the site sheets attached as Appendix 3. Copies of these site sheets have been submitted to the Regional Rrecord Center with a request for permanent trinomial numbers.

In addition to the new sites noted above, attempts were made to locate and verify the previously recorded sites in the subject property (Placer 48, and Placer 514). Placer 48 was relocated, but several attempts to find 514 were unsuccessful.

An examination of the site record for Placer 48 indicates that it consisted of bedrock mortars and a few artifacts. Its location is described as the north side of Secret Ravine, and southwest of the dredge tailings near the Atlantic street overcrossing. The original report (1960) described a "group" of bedrock mortars and some broken cobbles and pestle fragments. The site was examined again in 1979 and again in 1980. The 1980 survey describes 21 bedrock mortars (with measurements, situated on four outcroppings). Artifacts as of that date included broken groundstone and a flake. No midden was noted and the possibility of mining related disturbance is mentioned.

Site Placer 514 is described as an open site (no bedrock mortars) characterized by a flake scatter. The artifacts noted include 2 possible manos, 6 basalt flakes, 1 basalt flake tool, 1 obsidian flake, and one schist point. The inability to re-locate the site is attributed to heavy grass cover and the possibility that the identifying artifacts were collected in 1980.

Historic

Historic resources noted were limited to dredge tailings, fences reported as part of previous surveys, and part of an old wooden stave pipeline. The latter recorded as Placer 510H. Location and details are included in Appendix 3.

RECOMMENDATIONS

With appropriate design and engineering constraints in mind, it is recommended that the two newly recorded prehistoric sites be avoided and protected via some kind of open space easement. If this option is deemed impractical the resources could be mitigated via detailed photo-documentation and measure of the bedrock features, supplemented by no less than 2 one meter by one meter test excavations in the vicinity of each outcropping (six units total).

For site Placer 48 protection and avoidance is recommended as the preferred treatment with a second option consisting of detailed measurements and photo-documentation of the bedrock features. As was the case for the new sites this documentation would be supplemented by test excavations in the vicinity of the features. No less than 4 one by one test units are recommended for this locale. If no midden or subsurface artifacts are encountered the test units would be considered an appropriate mitigation. If sub-surface remains are encountered, recommendations for additional testing or excavation would have to be based on the nature and potential significance of those results.

For site Placer 514 it would be required (1) to relocate the site at some time when the vegetation is sufficiently reduced or removed (2) make a complete and detailed collection of all surface artifacts and (3) excavate no less than 3 one by one test units to determine whether or not a subsurface deposit exists. If there is no evidence for significant subsurface remains the test excavations can serve as an adequate mitigation with no further work required.

With respect to the historic remains no additional work is recommended except to propose that the old rock fences be avoided whenever feasible. They are not unique resources and cannot be related to any specific significant historical activity, but they are of interest and might in some way enhance the project development. There is no basis for attempting to preserve the dredge tailings and whatever evidence of placer mining remains in the drainages themselves will be protected by planned open space easements. The wooden stave pipeline is of interest, but there is not much point in further field work nor would it be practical to try to preserve or protect it. Additional archival studies can always be made by any interested historian without restrictions on the present property.

Appendix 17-1

Regional Emissions of Smog Precursors

The dominant precursors of ozone and other photochemical smog components are usually categorized as reactive organic gases and nitrogen oxides. Reactive organic gases include most volatile organic compounds other than methane and a few complex chlorinated organic chemicals. While there are seven different oxides of nitrogen, nitric oxide and nitrogen dioxide are generally the only ones considered as ozone precursors.

The contribution of development projects to regional smog problems is usually estimated from the amount of vehicle travel associated with the project and estimates of average vehicle emission rates. Estimates of cumulative vehicle travel associated with a project can be derived from computerized traffic modeling studies or by combining separate estimates of project-related vehicle trips and average trip lengths.

The traffic modeling studies conducted for this project were not designed to produce direct estimates of cumulative vehicle travel. Consequently, the trip generation rates presented in the Transportation chapter of this EIR were combined with data from the Land Use chapter to estimate a base trip volume. This base trip volume was then adjusted to remove double-counting of trips between different parcels within the plan area. Table 17-1a illustrates the procedure used.

Each vehicle trip (one-way travel event) has both an origin (production end) and a destination (attraction end). Use of standard trip generation rates will double-count any trips which have both origin and destination ends within the study area. The traffic study prepared for this project did not specifically identify the volume of "internal" trips.

A reasonable estimate of the volume of internal trips can be made by establishing a balance between separate estimates of internal trip productions and internal trip attractions. The total trip generation rate for each land use category was first split between trip productions (origins) and trip attractions (destinations). Then separate estimates were made for internal vs external destinations for produced trips, and for internal vs external origins of attracted trips.

For the aggregate total of all "internal" trips, the sum of trip productions must equal the sum of trip attractions. The initial estimates of internal destinations of produced trips and the internal origins of attracted trips were modified until this balance was achieved without using unreasonable internal vs

TABLE 17-1a. TRIP RATE ADJUSTMENT TO REMOVE DOUBLE-COUNTING OF INTRA-PROJECT TRIPS

LAND USE	TRIP ESTIMATE	BASIS	BASE TRIP RATES	P/A TRIP RATE SPLIT PRODUCTIONS	P/A TRIP RATE SPLIT ATTRACTIONS	BASE TRIP VOLUME	% PRODUCTIONS W INTERNAL DESTINATION	# INTERNAL TRIP PRODUCTIONS	% ATTRACTIONS W INTERNAL ORIGIN	# INTERNAL TRIP ATTRACTIONS	NET TRIPS GENERATED	ADJUSTED TRIP RATE
R-5.5	357	UNITS	10.0	95%	5%	3,570.0	45%	1,526.2	25%	44.6	3,525.4	9.9
R-9	510	UNITS	8.5	95%	5%	4,335.0	45%	1,853.2	25%	54.2	4,280.8	8.4
R-10	465	UNITS	8.5	95%	5%	3,952.5	50%	1,877.4	25%	49.4	3,903.1	8.4
R-12	468	UNITS	7.0	95%	5%	3,276.0	50%	1,556.1	25%	41.0	3,235.1	6.9
SUBTOTAL	1,800	UNITS				15,133.5		6,812.9		189.2	14,944.3	
HC	50.1	ACRES	578.2	1%	99%	28,968.3	15%	43.5	2%	573.6	28,394.7	566.8
CC	23.5	ACRES	455.0	3%	97%	10,692.5	49%	157.2	16%	1,659.5	9,033.0	384.4
RC	96.7	ACRES	409.0	5%	95%	39,550.3	40%	791.0	12%	4,508.7	35,041.6	362.4
BP	103.0	ACRES	129.0	10%	90%	13,287.0	20%	265.7	5%	597.9	12,689.1	123.2
R&D	140.2	ACRES	129.0	10%	90%	18,085.8	15%	271.3	5%	813.9	17,271.9	123.2
SUBTOTAL	413.5	ACRES				110,583.9		1,528.7		8,153.6	102,430.3	
TOTALS						125,717.4		8,341.6		8,342.7	117,374.7	

Notes: Intra-project trip rate corrections based on Jones & Stokes Associates estimates.
Net trips generated = base trip volume - internal trip attractions; net trips generated = 93.4% of base trip volume.
Trip rates reflect year 2005 conditions for the Low Intensity Alternative.

external patterns. For the Lower Intensity Alternative, the resulting estimate of internal trips was 6.6 percent of the unadjusted trip volume.

This estimate of internal trips seems, at first glance, to be rather low for a large mixed use area. It results, however, from the extensive amount of commercial and office land use proposed. Residential land uses account for only 12 percent of the cumulative vehicle trips generated by development of the plan area.

One further adjustment was made to the net trip generation presented in Table 17-1a. All significant employers in the City of Roseville are required to develop and implement "transportation system management" (TSM) plans. These plans are designed to reduce peak hour employee commute trips. These plans will also result in a small reduction in cumulative vehicle travel. An estimate of the overall effect of such TSM plans is presented in Table 17-1b. Tables 17-1c through 17-1h summarize the reactive organic gas (ROG) and the nitrogen oxide (NOx) emission rates used in this analysis.

TABLE 17-1b. TSM PROGRAM ADJUSTMENT TO TRIP GENERATION ESTIMATES

LAND USE	TRIP ESTIMATE	BASIS	TRIP TYPES	NET TRIP RATES	TSM PROGRAM EFFECT	ADJUSTED NET TRIP RATE	ADJUSTED NET TRIPS	OVERALL TSM EFFECTIVENESS
R-5.5	357	UNITS	H-W	2.4	15%	2.0	719.2	
			OTHER	7.5	2%	7.4	2,625.7	
R-9	510	UNITS	H-W	1.3	15%	1.1	545.8	
			OTHER	7.1	2%	7.0	3,565.9	
R-10	465	UNITS	H-W	1.3	15%	1.1	497.6	
			OTHER	7.1	2%	7.0	3,251.3	
R-12	468	UNITS	H-W	1.0	15%	0.9	412.5	
			OTHER	5.9	5%	5.6	2,612.3	
SUBTOTAL	1,800	UNITS					14,230.3	4.8%
HC	50.1	ACRES	H-W;O-W	11.3	15%	9.6	482.7	
			OTHER	555.4	0%	555.4	27,826.8	
CC	23.5	ACRES	H-W;O-W	7.7	25%	5.8	135.5	
			OTHER	376.7	1%	372.9	8,763.8	
RC	96.7	ACRES	H-W;O-W	7.2	25%	5.4	525.6	
			OTHER	355.1	1%	351.6	33,997.3	
BP	103.0	ACRES	H-W;O-W	110.9	15%	94.2	9,707.2	
			OTHER	12.3	0%	12.3	1,268.9	
R&D	140.2	ACRES	H-W;O-W	110.9	15%	94.2	13,213.0	
			OTHER	12.3	0%	12.3	1,727.2	
SUBTOTAL	413.5	ACRES					97,648.1	4.7%
TOTALS							111,878.4	4.7%

Notes: Work trips separated from total trips based on data in California Air Resources Board 1982.
Trip rates reflect year 2005 conditions for the Low Intensity Alternative.

TABLE 17-1c.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 80 DEG
F I & M ADJUSTMENT = 25.0% (LDA,LDT,MDT)

FLEET MIX					
% LDA	% LDT	% MDT	% HDG	% HDD	% MC
73.3%	23.3%	2.4%	0.0%	0.0%	1.0%

2000 ROG RATES FOR WORK TRIPS

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
59.77%	5.93%	34.30%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	0.1258	12	2.11	20	1.44
5	4.54	13	1.97	25	1.24
6	3.90	14	1.86	30	1.09
7	3.40	15	1.77	35	0.97
8	3.01	16	1.68	40	0.89
9	2.71	17	1.61	45	0.84
10	2.46	18	1.55	50	0.82
11	2.27	19	1.49	55	0.79

COLD IDLE (5 MPH 100% COLD START) = 6.29 g/mile

OPERATING MODE MIX CALCULATIONS: WORK TRIPS (PM PEAK HOUR)

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	2.98%	62.97%	5.69%	31.34%	54.95%	13.71%	31.34%
H-S	0.00%	39.48%	35.17%	25.35%	25.09%	49.56%	25.35%
H-O	0.00%	48.30%	22.36%	29.34%	30.65%	40.01%	29.34%
O-W	0.99%	43.01%	25.65%	31.34%	29.00%	39.66%	31.34%
O-O	0.00%	22.19%	54.60%	23.21%	6.34%	70.45%	23.21%
IN-EX	91.71%	62.66%	6.00%	31.34%	54.32%	14.34%	31.34%
EX-IN	4.31%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
THROUGH	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		59.78%	5.92%	34.30%	51.75%	13.95%	34.30%

Table 17-1d.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 80 DEG F
I & M ADJUSTMENT = 25.0% (LDA,LDT,MDT)

FLEET MIX					
% LDA	% LDT	% MDT	% HDG	% HDD	% MC
72.9%	23.2%	2.4%	0.5%	0.0%	1.0%

2000 ROG RATES FOR NON-WORK TRIPS, RESI-DENTIAL LAND USES

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
53.44%	17.64%	28.93%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	0.1274	12	2.16	20	1.48
5	4.63	13	2.03	25	1.26
6	3.98	14	1.91	30	1.10
7	3.47	15	1.81	35	0.98
8	3.08	16	1.73	40	0.89
9	2.77	17	1.65	45	0.84
10	2.52	18	1.59	50	0.82
11	2.33	19	1.53	55	0.79

COLD IDLE (5 MPH 100% COLD START) = 6.34 g/mile

OPERATING MODE MIX CALCULATIONS: NON-WORK TRIPS, RESIDENTIAL USES

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	0.00%	51.87%	4.69%	43.44%	45.27%	11.29%	43.44%
H-S	28.04%	39.48%	35.17%	25.35%	25.09%	49.56%	25.35%
H-O	20.96%	48.30%	22.36%	29.34%	30.65%	40.01%	29.34%
O-W	0.00%	43.01%	25.65%	31.34%	29.00%	39.66%	31.34%
O-O	0.00%	22.19%	54.60%	23.21%	6.34%	70.45%	23.21%
IN-EX	50.00%	64.49%	6.17%	29.34%	55.91%	14.75%	29.34%
EX-IN	1.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
THROUGH	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		53.44%	17.63%	28.93%	41.41%	29.66%	28.93%

Table 17-1e.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 80 DEG F
I & M ADJUSTMENT = 25.0% (LDA,LDT,MDT)

FLEET MIX					
% LDA	% LDT	% MDT	% HDG	% HDD	% MC
72.2%	23.0%	2.4%	1.0%	0.5%	1.0%

2000 ROG RATES FOR NON-WORK TRIPS, OFFICE & COMMER-CIAL LAND USES

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
43.56%	7.35%	49.09%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	0.1298	12	1.87	20	1.28
5	3.95	13	1.75	25	1.09
6	3.40	14	1.66	30	0.95
7	2.98	15	1.57	35	0.85
8	2.65	16	1.50	40	0.77
9	2.39	17	1.43	45	0.73
10	2.18	18	1.38	50	0.71
11	2.01	19	1.33	55	0.68

COLD IDLE (5 MPH 100% COLD START) = 6.40 g/mile

OPERATING MODE MIX CALCULATIONS: NON-WORK TRIPS, NON-RESIDENTIAL USES

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	0.00%	51.87%	4.69%	43.44%	45.27%	11.29%	43.44%
H-S	5.00%	39.48%	35.17%	25.35%	25.09%	49.56%	25.35%
H-O	3.00%	48.30%	22.36%	29.34%	30.65%	40.01%	29.34%
O-W	0.00%	43.01%	25.65%	31.34%	29.00%	39.66%	31.34%
O-O	2.00%	22.19%	54.60%	23.21%	6.34%	70.45%	23.21%
IN-EX	30.00%	64.49%	6.17%	29.34%	55.91%	14.75%	29.34%
EX-IN	60.00%	33.92%	3.29%	62.79%	29.36%	7.85%	62.79%
THROUGH	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		43.56%	7.35%	49.09%	36.69%	14.23%	49.09%

Table 17-1f.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 80 DEG F
I & M ADJUSTMENT = 0.0% (LDA,LDT,MDT)

FLEET MIX

% LDA	% LDT	% MDT	% HDG	% HDD	% MC
73.3%	23.3%	2.4%	0.0%	0.0%	1.0%

2000 NOx RATES FOR WORK TRIPS

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
59.77%	5.93%	34.30%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	0.0351	12	0.92	20	0.97
5	1.08	13	0.91	25	1.05
6	1.03	14	0.92	30	1.13
7	1.00	15	0.92	35	1.19
8	0.97	16	0.93	40	1.23
9	0.95	17	0.93	45	1.26
10	0.94	18	0.95	50	1.30
11	0.92	19	0.96	55	1.40

COLD IDLE (5 MPH 100% COLD START) = 1.38 g/mile

OPERATING MODE MIX CALCULATIONS: WORK TRIPS (PM PEAK HOUR)

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	2.98%	62.97%	5.69%	31.34%	54.95%	13.71%	31.34%
H-S	0.00%	39.48%	35.17%	25.35%	25.09%	49.56%	25.35%
H-O	0.00%	48.30%	22.36%	29.34%	30.65%	40.01%	29.34%
O-W	0.99%	43.01%	25.65%	31.34%	29.00%	39.66%	31.34%
O-O	0.00%	22.19%	54.60%	23.21%	6.34%	70.45%	23.21%
IN-EX	91.71%	62.66%	6.00%	31.34%	54.32%	14.34%	31.34%
EX-IN	4.31%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
THROUGH	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		59.78%	5.92%	34.30%	51.75%	13.95%	34.30%

Table 17-1g.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 80 DEG F
I & M ADJUSTMENT = 0.0% (LDA,LDT,MDT)

FLEET MIX					
% LDA	% LDT	% MDT	% HDG	% HDD	% MC
72.9%	23.2%	2.4%	0.5%	0.0%	1.0%

2000 NOx RATES FOR NON-WORK TRIPS, RESI-DENTIAL LAND USES

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
53.44%	17.64%	28.93%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	0.0351	12	0.92	20	0.99
5	1.06	13	0.92	25	1.07
6	1.01	14	0.92	30	1.15
7	0.98	15	0.93	35	1.21
8	0.96	16	0.94	40	1.25
9	0.94	17	0.94	45	1.28
10	0.93	18	0.96	50	1.32
11	0.92	19	0.97	55	1.42

COLD IDLE (5 MPH 100% COLD START) = 1.40 g/mile

OPERATING MODE MIX CALCULATIONS: NON-WORK TRIPS, RESIDENTIAL USES

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	0.00%	51.87%	4.69%	43.44%	45.27%	11.29%	43.44%
H-S	28.04%	39.48%	35.17%	25.35%	25.09%	49.56%	25.35%
H-O	20.96%	48.30%	22.36%	29.34%	30.65%	40.01%	29.34%
O-W	0.00%	43.01%	25.65%	31.34%	29.00%	39.66%	31.34%
O-O	0.00%	22.19%	54.60%	23.21%	6.34%	70.45%	23.21%
IN-EX	50.00%	64.49%	6.17%	29.34%	55.91%	14.75%	29.34%
EX-IN	1.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
THROUGH	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		53.44%	17.63%	28.93%	41.41%	29.66%	28.93%

Table 17-1h.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 80 DEG F
I & M ADJUSTMENT = 0.0% (LDA,LDT,MDT)

	FLEET MIX					
	% LDA	% LDT	% MDT	% HDG	% HDD	% MC
	72.2%	23.0%	2.4%	1.0%	0.5%	1.0%

2000 NOx RATES FOR NON-WORK TRIPS, OFFICE & COMMERCIAL LAND USES

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
43.56%	7.35%	49.09%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	0.0371	12	0.93	20	0.99
5	1.05	13	0.93	25	1.07
6	1.01	14	0.93	30	1.15
7	0.99	15	0.94	35	1.21
8	0.96	16	0.95	40	1.25
9	0.95	17	0.95	45	1.29
10	0.94	18	0.97	50	1.34
11	0.93	19	0.98	55	1.45

COLD IDLE (5 MPH 100% COLD START) = 1.42 g/mile

OPERATING MODE MIX CALCULATIONS: NON-WORK TRIPS, NON-RESIDENTIAL USES

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	0.00%	51.87%	4.69%	43.44%	45.27%	11.29%	43.44%
H-S	5.00%	39.48%	35.17%	25.35%	25.09%	49.56%	25.35%
H-O	3.00%	48.30%	22.36%	29.34%	30.65%	40.01%	29.34%
O-W	0.00%	43.01%	25.65%	31.34%	29.00%	39.66%	31.34%
O-O	2.00%	22.19%	54.60%	23.21%	6.34%	70.45%	23.21%
IN-EX	30.00%	64.49%	6.17%	29.34%	55.91%	14.75%	29.34%
EX-IN	60.00%	33.92%	3.29%	62.79%	29.36%	7.85%	62.79%
THROUGH	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		43.56%	7.35%	49.09%	36.69%	14.23%	49.09%

Appendix 17-2

Dispersion Modeling Considerations

General Concepts

Predicting the ambient air quality impacts of pollutant emissions requires and assessment of the transport, dispersion, chemical transformation, and removal processes which affect pollutant emissions after their release from a source. Gaussian dispersion models are frequently used for such analyses. The term "gaussian dispersion" refers to a general type of mathematical equation used to describe the horizontal and vertical distribution of pollutants downwind from an emission source.

Gaussian dispersion models treat pollutant emissions as being carried downwind in a defined plume, subject to horizontal and vertical mixing with the surrounding atmosphere. The plume spreads horizontally and vertically with a reduction in pollutant concentrations as it travels downwind. Mixing with the surrounding atmosphere is greatest at the edge of the plume, resulting in lower pollutant concentrations outward (horizontally and vertically) from the center of the plume. This decrease in concentration outward from the center of the plume is treated as following a gaussian ("normal") statistical distribution. Horizontal and vertical mixing generally occur at different rates. Because turbulent motions in the atmosphere occur on a variety of spatial and time scales, vertical and horizontal mixing also vary with distance downwind from the emission source.

The CALINE3 Model

Dispersion modeling analyses for this EIS have used the CALINE3 model (Benson, 1979). CALINE3 is a dispersion model specifically designed to evaluate air quality impacts of highway projects. Each highway link analyzed in the model is treated as a sequence of short segments. Each segment of a highway link is treated as a separate emission source producing a plume of pollutants which disperses downwind. Pollutant concentrations at any specific location are calculated as the total contribution from overlapping pollution plumes originating from the sequence of roadway segments.

The discussion of "pollution plumes" above may suggest to some that pollution concentrations at a given location would be the average, not the sum, of the incremental concentrations from each overlapping plume. The pollution plume terminology

suggests the analogy of physically mixing fluids with different pollutant concentrations. Such an analogy is inappropriate in the case of atmospheric dispersion models. The flaw in the fluid mixing analogy involves the total volume of fluid present as additional source contributions are added. The volume of "carrier fluid" (air) at a receptor point remains constant regardless of the number of overlapping pollution plumes affecting the site.

The faulty fluid mixing analogy can be visualized as pouring buckets of water with different salt concentrations into an empty swimming pool. The resulting pollutant (salt) concentration is the average of the concentrations in the incremental additions of salty water. The actual situation with atmospheric dispersion modeling is more like pouring different sized jars of salt into a swimming pool already filled with water. The resulting pollutant (salt) concentration is the sum of the effects of the incremental additions of salt.

When winds are essentially parallel to a highway link, pollution plumes from all roadway segments overlap. This produces high concentrations near the roadway (near the center of the overlapping pollution plumes), and low concentrations well away from the highway (at the edges of the overlapping pollution plumes). When winds are at an angle to the highway link, pollution plumes from distant roadway segments make essentially no contribution to the pollution concentration observed at a receptor location. Under such cross-wind situations, pollutant concentrations near the highway are lower than under parallel wind conditions (fewer overlapping plume contributions), while pollutant concentrations away from the highway may be greater than would occur with parallel winds (near the center of at least some pollution plumes).

The CALINE3 model employs a "mixing cell" approach to estimating pollutant concentrations over the roadway itself. The size of the mixing cell over each roadway segment is based on the width of the "traffic lanes" of the highway plus an additional turbulence zone on either side (normally 10 feet). Parking lanes and roadway shoulders are not counted as traffic lanes. The height of the mixing cell is dependent on pollutant residence time within the mixing cell, but is generally about 10 feet.

Pollutants emitted along a highway link are treated as being well mixed within the mixing cell volume due to mechanical turbulence from moving vehicles and convective mixing due to the temperature of vehicle exhaust gases. Pollutant concentrations downwind from the mixing cell are calculated using horizontal and vertical dispersion rates which are a function of various meteorological and ground surface conditions.

Modeling Procedures

The complete CALINE3 input file is presented as Appendix C. The following paragraphs discuss major considerations used in the model set-up.

Highway Network. CALINE3 modeling was performed to evaluate the carbon monoxide increments produced by traffic on major roadways in and adjacent to the plan area. Roadways evaluated included I-80, Highway 65 Bypass, Harding Boulevard, Taylor Road, Douglas Boulevard, Sunrise Avenue, East Roseville Parkway, Atlantic Street, Eureka Road, and Lead Hill Road. The freeway interchanges at Douglas Boulevard, Atlantic Street, and Taylor Road were also included in the modeled network.

Each roadway was modeled as a series of segments to account for changes in roadway geometrics and/or traffic conditions. Roadway segments subject to traffic backups at intersections were modeled as separate links. A total of 100 roadway links were included in the analysis. This extensive roadway network was incorporated into the analysis to minimize the use of "background" carbon monoxide increments to account for unmodeled emission sources.

Modeling was done with most roadway links treated as being at-grade. Overpass links were treated as bridge sections. A few interchange ramp segments were treated as fill sections. Mixing zone widths were based on the number of lanes, assuming a standard 12 foot lane width. Where predicted traffic congestion indicated speeds below 25 mph, no additional turbulence zone width was used.

Receptor Locations. The modeling analysis focused on locations 100 feet from roadway centerlines around intersections showing significant traffic congestion. Seven intersections were analyzed:

- Taylor Road and Highway 65 Bypass
- Taylor Road and Eureka Road
- Harding Boulevard and Roseville Parkway
- Sunrise Avenue and East Roseville Parkway
- Sunrise Avenue and Eureka Road
- Douglas Boulevard and Sunrise Avenue
- Douglas Boulevard and East Roseville Parkway

Twenty-seven receptor locations were modeled (the potential location southwest of Taylor Road and Eureka Road was inside a freeway interchange). Receptor heights were set at 5 feet.

Traffic Conditions. CALINE3 modeling was performed for future peak hour traffic under the Lower Intensity Alternative. Traffic volumes were based on results of the traffic analysis presented in the Transportation chapter of the EIR.

Vehicle Emission Rates. Vehicle emission rates used for the CALINE3 modeling were developed from the EMFAC6D computer program. Emission rates reflected year 2000 conditions, a 40 degree F temperature, and vehicle mixes appropriate for three types of roadways (freeways, major arterials, and local streets). Tables 17-2a through 17-2c present the EMFAC6D emission rates for these three roadway categories. Emission rates for individual highway links reflected expected vehicle speeds, based on level-of-service conditions identified in the traffic analysis (see Transportation chapter of the EIR).

In the vicinity of major intersections, the basic EMFAC6D emission rates were increased to incorporate estimates of vehicle delays due to signal cycles and traffic congestion. Tables 17-2d through 17-2f illustrate the idle adjustments made to the EMFAC6D emission rates.

CALINE3 Parameters. The CALINE3 model was run using an averaging time of 60 minutes; a surface roughness factor of 150 cm; settling and deposition velocities of 0 cm/second; and a scale factor of 0.3048 (to convert from feet to meters).

The CALINE3 run assumed a wind speed of 1.0 meters/second (2.2 mph), a moderate ground-level temperature inversion (stability class F), and a mixing height limit of 100 meters (323 feet). Thirty six wind directions were modeled, using 10 degree directional increments.

Model Results. Table 17-2g summarizes the incremental peak hour carbon monoxide values estimated by CALINE3 at each receptor location under the Lower Intensity Alternative.

Background Carbon Monoxide Levels. No "background" carbon monoxide value was included in the CALINE3 model run, since CALINE3 assigns a uniform value to all receptors. Background carbon monoxide levels (from sources not specifically modeled) were estimated separately for each receptor location. The values used (1-3 ppm) are presented in Table 17-16 of the Cumulative Impacts chapter. The specific value used at each receptor location depended on the wind direction producing the maximum 1-hour carbon monoxide concentration and the land uses upwind of the receptor location.

Table 17-2a.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 40 DEG F
I & M ADJUSTMENT = 25.0% (LDA,LDT,MDT)

FLEET MIX					
% LDA	% LDT	% MDT	% HDG	% HDD	% MC
65.8%	20.9%	2.2%	4.8%	5.4%	0.9%

2000 CO RATES FOR FREEWAY TRAFFIC

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
19.54%	11.71%	68.75%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	1.6767	12	20.71	20	13.98
5	42.20	13	19.44	25	11.65
6	36.58	14	18.35	30	9.86
7	32.27	15	17.40	35	8.55
8	28.90	16	16.57	40	7.71
9	26.20	17	15.83	45	7.31
10	24.01	18	15.15	50	7.18
11	22.22	19	14.54	55	6.91

COLD IDLE (5 MPH 100% COLD START) = 113.16 g/mile

OPERATING MODE MIX CALCULATIONS: FREEWAY TRAFFIC

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	10.81%	22.93%	2.07%	75.00%	20.01%	4.99%	75.00%
H-S	5.58%	39.48%	35.17%	25.35%	25.09%	49.56%	25.35%
H-O	17.04%	48.30%	22.36%	29.34%	30.65%	40.01%	29.34%
O-W	3.22%	43.01%	25.65%	31.34%	29.00%	39.66%	31.34%
O-O	8.35%	22.19%	54.60%	23.21%	6.34%	70.45%	23.21%
IN-EX	10.00%	33.96%	3.25%	62.79%	29.44%	7.77%	62.79%
EX-IN	15.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
THROUGH	30.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		19.55%	11.71%	68.75%	13.19%	18.06%	68.75%

Table 17-2b.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 40 DEG F
I & M ADJUSTMENT = 25.0% (LDA,LDT,MDT)

FLEET MIX					
% LDA	% LDT	% MDT	% HDG	% HDD	% MC
70.4%	22.4%	2.3%	3.0%	1.0%	1.0%

2000 CO RATES FOR ARTERIAL TRAFFIC

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
35.53%	19.77%	44.71%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	1.7011	12	26.16	20	17.64
5	56.13	13	24.49	25	14.88
6	48.14	14	23.08	30	12.75
7	42.05	15	21.87	35	11.14
8	37.32	16	20.82	40	10.08
9	33.59	17	19.89	45	9.54
10	30.60	18	19.07	50	9.32
11	28.17	19	18.33	55	8.92

COLD IDLE (5 MPH 100% COLD START) = 116.22 g/mile

OPERATING MODE MIX CALCULATIONS: ARTERIAL TRAFFIC

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	18.02%	51.87%	4.69%	43.44%	45.27%	11.29%	43.44%
H-S	9.30%	39.48%	35.17%	25.35%	25.09%	49.56%	25.35%
H-O	28.41%	48.30%	22.36%	29.34%	30.65%	40.01%	29.34%
O-W	5.37%	43.01%	25.65%	31.34%	29.00%	39.66%	31.34%
O-O	13.91%	22.19%	54.60%	23.21%	6.34%	70.45%	23.21%
IN-EX	10.00%	33.96%	3.25%	62.79%	29.44%	7.77%	62.79%
EX-IN	10.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
THROUGH	5.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		35.53%	19.77%	44.71%	24.58%	30.72%	44.71%

Table 17-2c.

WEIGHTED COMPOSITE RATES FOR YEAR = 2000 TEMP = 40 DEG F
I & M ADJUSTMENT = 25.0% (LDA,LDT,MDT)

FLEET MIX					
% LDA	% LDT	% MDT	% HDG	% HDD	% MC
72.2%	23.0%	2.4%	1.0%	0.5%	1.0%

2000 CO RATES FOR LOCAL TRAFFIC

OPERATING MODE MIX			CATALYST
% COLD	% HOT	% STABIL	VEHICLES
44.93%	25.04%	30.02%	99.98%

SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE	SPEED (MPH)	COMPOSITE RATE
IDLE	1.6839	12	28.87	20	19.45
5	63.67	13	26.99	25	16.49
6	54.29	14	25.41	30	14.20
7	47.18	15	24.06	35	12.45
8	41.68	16	22.90	40	11.27
9	37.36	17	21.89	45	10.64
10	33.92	18	20.99	50	10.37
11	31.15	19	20.19	55	9.89

COLD IDLE (5 MPH 100% COLD START) = 115.69 g/mile

OPERATING MODE MIX CALCULATIONS: LOCAL TRAFFIC

TRIP TYPE	% VMT	CATALYST VEHICLE MODES % COLD	% HOT	% STABIL	NONCATALYST VEHICLE MODES % COLD	% HOT	% STABIL
H-W	21.62%	59.61%	5.39%	35.00%	52.03%	12.97%	35.00%
H-S	11.15%	42.31%	37.69%	20.00%	26.89%	53.11%	20.00%
H-O	34.09%	51.27%	23.73%	25.00%	32.53%	42.47%	25.00%
O-W	6.44%	46.98%	28.02%	25.00%	31.68%	43.32%	25.00%
O-O	16.69%	23.12%	56.88%	20.00%	6.61%	73.39%	20.00%
IN-EX	5.00%	59.32%	5.68%	35.00%	51.43%	13.57%	35.00%
EX-IN	5.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
THROUGH	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
WTD AVG		44.93%	25.04%	30.02%	31.05%	38.92%	30.02%

TABLE 17-2d. IDLE ADJUSTMENT TO VEHICLE EMISSION RATES, LEVEL OF SERVICE C

INPUT VARIABLES	10.2%TR	10.2%TR	10.2%TR	10.2%TR	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	1.5%TR	1.5%TR	1.5%TR
SPEED (MPH) FOR BASE EMISSION RATE	15	20	25	30	5	10	15	20	25	30	5	10	15
BASE EMISSION RATE, GM/MI	17.40	13.98	11.65	9.86	56.13	30.60	21.87	17.64	14.88	12.75	63.67	33.92	24.06
HOT STABILIZED IDLE RATE, GM/MIN	1.6767	1.6767	1.6767	1.6767	1.7011	1.7011	1.7011	1.7011	1.7011	1.7011	1.6839	1.6839	1.6839
100% COLD START 5 MPH RATE, GM/MI	113.16	113.16	113.16	113.16	116.23	116.23	116.23	116.23	116.23	116.23	115.68	115.68	115.68
LINK LENGTH, FT	800	800	800	800	250	250	250	250	250	250	250	250	250
DELAY PER VEHICLE, SECONDS OF IDLE	20	20	20	20	20	20	20	20	20	20	20	20	20
% CATALYST VEHICLES	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98
% NON-CATALYST COLD STARTS	13.19	13.19	13.19	13.19	24.58	24.58	24.58	24.58	24.58	24.58	31.05	31.05	31.05
% CATALYST COLD STARTS	19.55	19.55	19.55	19.55	35.53	35.53	35.53	35.53	35.53	35.53	44.93	44.93	44.93
OUTPUT													
COLD START IDLE RATE, GM/MIN	9.43	9.43	9.43	9.43	9.69	9.69	9.69	9.69	9.69	9.69	9.64	9.64	9.64
% IDLE TIME IN EMFAC/MOBILE RATES	25.38	18.05	13.66	10.37	45.78	32.99	25.38	18.05	13.66	10.37	45.78	32.99	25.38
IDLE SECONDS IN EMFAC/MOBILE RATES	9.23	4.92	2.98	1.89	15.61	5.62	2.88	1.54	0.93	0.59	15.61	5.62	2.88
REQUIRED EXTRA IDLE SECONDS	10.77	15.08	17.02	18.11	4.39	14.38	17.12	18.46	19.07	19.41	4.39	14.38	17.12
WEIGHTED % COLD STARTS	19.55	19.55	19.55	19.55	35.53	35.53	35.53	35.53	35.53	35.53	44.93	44.93	44.93
WEIGHTED COLD/HOT IDLE RATE, GM/MIN	3.19	3.19	3.19	3.19	4.54	4.54	4.54	4.54	4.54	4.54	5.26	5.26	5.26
ADDED IDLE ADJUSTMENT, GM/MI	3.78	5.29	5.98	6.36	7.02	22.96	27.34	29.49	30.46	31.01	8.13	26.61	31.68
BASE EMISSION RATE, GM/MI	17.40	13.98	11.65	9.86	56.13	30.60	21.87	17.64	14.88	12.75	63.67	33.92	24.06
ADJUSTED EMISSION RATE, GM/MI	21.18	19.27	17.63	16.22	63.15	53.56	49.21	47.13	45.34	43.76	71.80	60.53	55.74
ADJUSTMENT FACTOR, % INCREASE	21.74	37.87	51.30	64.51	12.50	75.05	125.01	167.17	204.70	243.18	12.77	78.45	131.67

TABLE 17-2e. IDLE ADJUSTMENT TO VEHICLE EMISSION RATES, LEVEL OF SERVICE D

INPUT VARIABLES	10.2%TR	10.2%TR	10.2%TR	10.2%TR	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	1.5%TR	1.5%TR	1.5%TR
SPEED (MPH) FOR BASE EMISSION RATE	15	20	25	30	5	10	15	20	25	30	5	10	15
BASE EMISSION RATE, GM/MI	17.40	13.98	11.65	9.86	56.13	30.60	21.87	17.64	14.88	12.75	63.67	33.92	24.06
HOT STABILIZED IDLE RATE, GM/MIN	1.6767	1.6767	1.6767	1.6767	1.7011	1.7011	1.7011	1.7011	1.7011	1.7011	1.6839	1.6839	1.6839
100% COLD START 5 MPH RATE, GM/MI	113.16	113.16	113.16	113.16	116.23	116.23	116.23	116.23	116.23	116.23	115.68	115.68	115.68
LINK LENGTH, FT	800	800	800	800	250	250	250	250	250	250	250	250	250
DELAY PER VEHICLE, SECONDS OF IDLE	30	30	30	30	30	30	30	30	30	30	30	30	30
% CATALYST VEHICLES	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98
% NON-CATALYST COLD STARTS	13.19	13.19	13.19	13.19	24.58	24.58	24.58	24.58	24.58	24.58	31.05	31.05	31.05
% CATALYST COLD STARTS	19.55	19.55	19.55	19.55	35.53	35.53	35.53	35.53	35.53	35.53	44.93	44.93	44.93
OUTPUT													
COLD START IDLE RATE, GM/MIN	9.43	9.43	9.43	9.43	9.69	9.69	9.69	9.69	9.69	9.69	9.64	9.64	9.64
% IDLE TIME IN EMFAC/MOBILE RATES	25.38	18.05	13.66	10.37	45.78	32.99	25.38	18.05	13.66	10.37	45.78	32.99	25.38
IDLE SECONDS IN EMFAC/MOBILE RATES	9.23	4.92	2.98	1.89	15.61	5.62	2.88	1.54	0.93	0.59	15.61	5.62	2.88
REQUIRED EXTRA IDLE SECONDS	20.77	25.08	27.02	28.11	14.39	24.38	27.12	28.46	29.07	29.41	14.39	24.38	27.12
WEIGHTED % COLD STARTS	19.55	19.55	19.55	19.55	35.53	35.53	35.53	35.53	35.53	35.53	44.93	44.93	44.93
WEIGHTED COLD/HOT IDLE RATE, GM/MIN	3.19	3.19	3.19	3.19	4.54	4.54	4.54	4.54	4.54	4.54	5.26	5.26	5.26
ADDED IDLE ADJUSTMENT, GM/MI	7.29	8.81	9.49	9.87	22.99	38.94	43.31	45.46	46.43	46.98	26.64	45.12	50.19
BASE EMISSION RATE, GM/MI	17.40	13.98	11.65	9.86	56.13	30.60	21.87	17.64	14.88	12.75	63.67	33.92	24.06
ADJUSTED EMISSION RATE, GM/MI	24.69	22.79	21.14	19.73	79.12	69.54	65.18	63.10	61.31	59.73	90.31	79.04	74.25
ADJUSTMENT FACTOR, % INCREASE	41.92	62.99	81.44	100.13	40.96	127.25	198.05	257.73	312.05	368.46	41.84	133.02	208.60

TABLE 17-2f. IDLE ADJUSTMENT TO VEHICLE EMISSION RATES, LEVEL OF SERVICE E

INPUT VARIABLES	10.2%TR	10.2%TR	10.2%TR	10.2%TR	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	4%TRUCKS	1.5%TR	1.5%TR	1.5%TR
SPEED (MPH) FOR BASE EMISSION RATE	15	20	25	30	5	10	15	20	25	30	5	10	15
BASE EMISSION RATE, GM/MI	17.40	13.98	11.65	9.86	56.13	30.60	21.87	17.64	14.88	12.75	63.67	33.92	24.06
HOT STABILIZED IDLE RATE, GM/MIN	1.6767	1.6767	1.6767	1.6767	1.7011	1.7011	1.7011	1.7011	1.7011	1.7011	1.6839	1.6839	1.6839
100% COLD START 5 MPH RATE, GM/MI	113.16	113.16	113.16	113.16	116.23	116.23	116.23	116.23	116.23	116.23	115.68	115.68	115.68
LINK LENGTH, FT	800	800	800	800	250	250	250	250	250	250	250	250	250
DELAY PER VEHICLE, SECONDS OF IDLE	50	50	50	50	50	50	50	50	50	50	50	50	50
% CATALYST VEHICLES	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98	99.98
% NON-CATALYST COLD STARTS	13.19	13.19	13.19	13.19	24.58	24.58	24.58	24.58	24.58	24.58	31.05	31.05	31.05
% CATALYST COLD STARTS	19.55	19.55	19.55	19.55	35.53	35.53	35.53	35.53	35.53	35.53	44.93	44.93	44.93
OUTPUT													
COLD START IDLE RATE, GM/MIN	9.43	9.43	9.43	9.43	9.69	9.69	9.69	9.69	9.69	9.69	9.64	9.64	9.64
% IDLE TIME IN EMFAC/MOBILE RATES	25.38	18.05	13.66	10.37	45.78	32.99	25.38	18.05	13.66	10.37	45.78	32.99	25.38
IDLE SECONDS IN EMFAC/MOBILE RATES	9.23	4.92	2.98	1.89	15.61	5.62	2.88	1.54	0.93	0.59	15.61	5.62	2.88
REQUIRED EXTRA IDLE SECONDS	40.77	45.08	47.02	48.11	34.39	44.38	47.12	48.46	49.07	49.41	34.39	44.38	47.12
WEIGHTED % COLD STARTS	19.55	19.55	19.55	19.55	35.53	35.53	35.53	35.53	35.53	35.53	44.93	44.93	44.93
WEIGHTED COLD/HOT IDLE RATE, GM/MIN	3.19	3.19	3.19	3.19	4.54	4.54	4.54	4.54	4.54	4.54	5.26	5.26	5.26
ADDED IDLE ADJUSTMENT, GM/MI	14.32	15.83	16.51	16.90	54.94	70.88	75.26	77.41	78.38	78.93	63.66	82.14	87.21
BASE EMISSION RATE, GM/MI	17.40	13.98	11.65	9.86	56.13	30.60	21.87	17.64	14.88	12.75	63.67	33.92	24.06
ADJUSTED EMISSION RATE, GM/MI	31.72	29.81	28.16	26.76	111.07	101.48	97.13	95.05	93.26	91.68	127.33	116.06	111.27
ADJUSTMENT FACTOR, % INCREASE	82.28	113.23	141.73	171.36	97.88	231.65	344.13	438.83	526.74	619.03	99.98	242.15	362.46

TABLE 17-2g. SUMMARY OF CALINE3 RESULTS, LOWER INTENSITY ALTERNATIVE, YEAR 2005

RECEPTOR	PEAK HOUR CARBON MONOXIDE CONCENTRATION (PPM) BY WIND ANGLE																																		MAX CO	ANGLE
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
NE HARDING & PKWY	0.9	0.9	0.3	0.3	0.6	1.4	1.3	1.1	0.9	0.7	0.8	1.6	3.3	4.3	4.9	6.4	7.2	6.9	6.8	8.0	9.4	8.8	8.6	8.6	8.7	8.8	9.4	10.1	8.2	3.2	1.4	1.5	1.6	1.6	1.5	1.1	10.1	270
SE HARDING & PKWY	7.1	6.0	5.3	5.4	5.8	6.7	7.1	6.1	4.4	3.3	3.7	4.6	1.6	1.3	1.0	1.6	1.3	1.2	1.3	3.1	4.3	2.0	1.4	2.1	2.9	3.0	2.8	2.7	2.7	2.7	3.7	8.9	11.8	10.7	9.1	7.8	11.8	320
SW HARDING & PKWY	7.0	6.5	7.3	8.4	8.8	10.2	10.1	10.2	10.3	10.5	9.8	8.1	4.5	4.3	4.6	4.5	3.9	3.0	3.4	2.9	1.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	3.9	6.5	7.2	7.0	10.5	90
NW HARDING & PKWY	0.0	0.1	0.9	1.2	1.3	2.3	2.8	2.6	2.4	2.1	2.1	2.9	5.2	8.3	10.5	11.1	11.9	12.7	11.9	9.7	7.9	6.6	6.2	6.8	7.1	6.8	5.2	2.9	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	12.7	170
NE TAYLOR & HWY 65	3.2	3.8	5.1	5.8	6.7	8.0	8.2	8.7	8.6	8.5	8.5	8.5	8.5	2.9	4.5	3.0	3.3	2.3	2.4	3.0	2.6	6.2	4.1	4.4	3.3	3.2	3.7	4.7	5.4	6.5	4.3	2.4	2.4	2.6	2.6	2.9	6.5	290
SE TAYLOR & HWY 65	1.3	1.3	1.2	2.5	7.4	6.1	5.0	4.8	4.0	4.0	4.4	4.1	3.7	1.9	1.6	1.9	2.7	2.0	2.7	3.0	4.3	6.4	8.7	8.9	8.1	8.1	8.0	8.0	8.0	8.1	2.4	4.0	2.8	2.1	1.8	1.5	7.4	40
SW TAYLOR & HWY 65	4.2	5.2	6.3	7.2	2.1	1.3	1.6	2.3	2.4	2.5	2.4	2.7	2.9	1.0	0.6	0.8	1.5	0.8	1.1	1.6	1.6	5.0	2.7	3.0	2.0	1.6	1.4	1.2	1.2	1.2	3.6	5.1	3.9	3.3	3.1	3.3	7.2	30
NW TAYLOR & HWY 65	0.0	0.0	0.0	1.3	6.1	4.8	3.8	3.8	3.5	3.2	3.0	2.8	3.2	6.7	6.2	5.1	5.1	3.6	3.9	4.5	5.3	7.6	2.1	2.1	1.4	1.7	1.8	2.2	2.9	4.1	1.8	0.0	0.0	0.0	0.0	0.0	7.6	210
NE DOUGLAS & SUNRS	2.4	2.5	1.9	1.1	0.7	0.1	0.1	0.1	0.2	2.9	3.7	5.0	4.7	4.2	3.7	3.8	3.6	3.3	3.4	3.3	4.3	8.0	9.5	11.7	11.1	12.0	10.4	6.1	3.7	3.5	3.4	3.1	2.9	3.1	3.6	3.8	12.0	250
SE DOUGLAS & SUNRS	7.0	6.0	5.4	4.9	4.3	4.3	4.8	5.4	4.4	2.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.8	6.4	6.2	5.2	4.8	6.3	10.0	12.2	10.4	9.6	8.4	7.7	7.6	8.1	12.2	290
SW DOUGLAS & SUNRS	6.2	8.7	9.8	8.3	8.6	8.0	8.6	8.7	8.2	5.2	2.6	2.3	2.3	2.4	2.3	2.5	2.7	1.9	0.7	0.4	0.4	0.4	0.9	4.4	3.5	2.9	2.7	3.6	5.9	8.7	8.9	7.9	7.4	6.4	5.9	5.8	9.8	20
NW DOUGLAS & SUNRS	1.5	4.5	5.5	3.5	3.1	2.1	1.7	1.8	1.9	4.8	6.9	7.4	7.1	7.1	7.2	7.6	7.3	7.5	7.1	5.3	5.2	5.7	6.7	10.8	9.9	9.6	6.4	3.9	2.5	1.9	1.8	1.8	1.2	0.9	1.0	1.1	10.8	230
NE TAYLOR & EUREKA	1.9	1.7	2.4	1.1	0.9	0.3	0.2	0.4	0.6	0.6	0.5	0.6	2.5	4.2	3.1	2.3	1.9	1.5	1.7	1.6	1.9	3.2	4.4	4.1	4.9	4.2	3.8	4.1	3.4	1.4	1.3	1.4	1.3	2.3	2.4	1.8	4.9	240
SW TAYLOR & EUREKA	3.4	3.1	3.7	3.1	2.1	1.6	1.6	1.9	2.2	2.3	2.8	2.9	1.9	1.5	1.0	0.5	0.3	0.3	0.4	0.3	0.8	2.2	3.4	2.2	2.5	2.8	2.6	2.4	2.8	3.7	3.7	3.3	3.2	3.6	4.3	3.5	4.3	340
NW TAYLOR & EUREKA	2.1	2.2	2.2	2.3	1.6	0.7	0.5	0.5	0.7	0.6	0.5	0.8	3.4	4.7	3.3	2.3	2.1	2.1	2.1	2.2	3.1	4.9	5.3	3.7	3.0	3.1	3.2	3.6	2.5	1.5	1.5	1.5	1.6	1.9	2.7	2.1	5.3	220
NE SUNRISE & EUREK	3.5	4.2	4.4	2.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.5	0.9	0.7	2.0	1.8	1.4	1.2	1.1	1.1	1.4	5.8	7.2	5.6	4.5	4.1	4.5	5.2	6.8	4.1	2.3	3.0	2.9	2.6	3.1	7.2	230
SE SUNRISE & EUREK	2.7	2.9	2.3	3.1	4.7	4.1	3.6	3.6	3.6	3.4	3.2	3.1	3.7	4.1	3.9	2.7	2.4	2.6	2.9	3.4	4.0	2.6	2.8	2.2	1.3	0.7	0.6	0.8	1.0	1.3	2.6	3.1	3.0	3.3	2.5	2.2	4.7	40
SW SUNRISE & EUREK	4.9	5.4	5.7	3.6	1.0	0.9	0.9	0.9	1.0	1.0	1.1	1.2	1.9	2.4	2.4	0.5	0.1	0.1	0.1	0.1	0.1	0.4	4.2	6.2	4.8	3.8	3.1	3.1	3.1	3.2	4.1	4.7	4.8	5.0	4.7	4.6	6.2	230
NW SUNRISE & EUREK	1.2	1.6	1.2	1.9	3.6	3.0	2.4	2.1	1.9	2.0	1.8	1.7	2.1	2.5	3.2	5.1	4.2	4.1	4.2	4.4	5.2	4.8	4.1	3.6	2.6	2.1	2.2	2.6	3.3	3.8	1.2	0.7	1.3	1.2	0.9	0.9	5.2	200
NE DOUGLAS & PKWY	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.3	2.5	3.6	4.4	4.4	4.4	4.1	4.1	8.8	11.7	9.7	9.1	8.5	9.0	9.2	9.3	7.8	6.7	4.3	4.6	4.9	5.5	6.5	7.8	7.2	2.0	11.7	190
SE DOUGLAS & PKWY	4.0	3.8	4.0	4.3	4.2	3.8	2.5	1.6	1.7	1.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	3.7	7.0	5.2	4.3	3.8	3.5	3.4	3.5	3.7	5.5	6.2	8.2	9.4	9.6	10.7	12.5	13.4	7.7	13.4	340
SW DOUGLAS & PKWY	9.6	9.9	8.9	8.7	8.6	8.6	8.6	8.2	6.0	4.7	3.0	3.1	3.4	3.5	3.8	4.3	5.2	7.0	3.7	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.8	2.6	2.3	2.1	3.2	4.6	5.3	5.5	5.1	5.4	9.9	10
NW DOUGLAS & PKWY	5.7	6.5	5.4	4.7	4.4	4.2	3.8	3.6	3.8	4.6	7.4	9.4	9.6	9.1	8.6	8.4	8.9	10.1	7.0	3.9	4.0	4.3	4.3	3.6	2.2	2.0	2.5	2.9	0.5	0.4	0.5	0.7	1.1	1.4	1.1	1.7	10.1	170
NE SUNRISE & PKWY	1.4	1.5	0.7	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.2	1.3	1.4	1.2	1.2	1.7	0.8	0.9	0.9	1.5	3.2	2.6	4.4	2.8	3.0	3.5	4.1	3.0	2.0	1.1	0.6	0.7	0.5	0.6	1.1	1.2	4.4	220
SE SUNRISE & PKWY	2.0	2.1	1.3	1.1	0.9	0.6	0.7	0.8	1.0	1.2	0.8	0.2	0.3	0.2	0.4	0.9	0.1	0.2	0.3	0.7	2.8	2.4	3.4	1.7	1.6	1.4	1.1	1.9	4.8	4.1	2.8	2.4	1.9	1.6	1.7	1.8	4.8	280
SW SUNRISE & PKWY	2.6	2.9	2.4	2.1	1.9	1.5	1.3	1.1	1.3	1.1	1.0	0.6	0.7	0.6	1.0	1.2	0.6	1.0	1.3	1.6	1.8	1.1	3.1	1.3	1.2	1.1	0.7	1.8	4.9	4.3	2.7	2.4	1.9	2.1	2.4	2.5	4.9	280
NW SUNRISE & PKWY	1.4	1.8	0.9	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.4	1.7	1.5	1.7	2.1	2.8	2.0	2.1	2.4	2.8	3.0	2.4	4.3	3.2	3.2	3.4	3.6	2.5	2.2	1.2	0.8	0.7	0.6	0.6	1.0	1.2	4.3	220

Note: Wind angle is in degrees, representing the direction from which the wind blows.