EXHIBIT C

APPENDICES

APPENDIX A

SPECIAL STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT VICINITY

Appendix A Special Status Plant Species with the Potential to Occur in the Project Vicinity

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Plants			
Alkali milk-vetch *(Astragalus tener var. tener)*	--/--/1B.2	Playas, valley and foothill grassland (adobe clay), vernal pools / alkaline, elevation 1 - 60m. Blooming Period: March - June	Low. Survey conducted during the blooming period. Suitable open grassland or vernal pool/alkaline habitats not present at project site.
Beach layia *(Layia carnosa)*	FE/CE/1B.1	Coastal dunes, hugely reduced in range along California's north coast dunes, on sparsely vegetated semi-stabilized dunes, usually behind foredunes, 0-75m elevation. Blooming Period: March - July	Low. Survey conducted during the blooming period. Suitable coastal dune habitat not present at project site.
Carmel Valley bush mallow *(Malacothamnus palmeri var. involucratus)*	--/--/1B.2	Chaparral, cismontane woodland, coastal scrub, elevation 30 - 1,100m. Blooming Period: May - October	Low. Survey conducted during the blooming period. Suitable chaparral, woodland, or coastal habitats not present at project site.
Carmel Valley malacothrix *(Malacothrix saxatilis var. arachnoidea)*	--/--/1B	Chaparral (rocky), elevation 25 - 335m. Blooming Period: March - December	Low. Survey conducted during the blooming period. Suitable chaparral habitat not present at project site.
Coastal dunes milkvetch *(Astragalus tener var. titi)*	FE/CE/1B.1	Coastal bluff scrub, coastal dunes. Known only from a few extant occurrences, mostly historical in Southern California. Moist sandy depressions of	Low. Survey conducted during the blooming period. Suitable coastal dune habitat not present at project site.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
		bluffs or dunes along and near the Pacific Ocean, one site on a clay terrace, 1-50m elevation. Blooming Period: March - May	
Congdon's tarplant *(Centromadia parryi spp. congdonii)*	FSC/--/1B.2	Valley and foothill grassland (alkaline), elevation 1 – 230m. Blooming Period: June - November	Possible. Species known to occur at a location approximately 800 feet from the project site within ruderal habitats similar to those found at the project site.
Contra Costa Goldfields *(Lasthenia conjugens)*	FE/--/1B.1	Cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools / mesic, 0-470m elevation. Blooming Period: March - June	Low. Survey conducted during the blooming period. Suitable woodland, playa, grassland or vernal pool habitats not present at project site.
Eastwood's goldenbush *(Ericameria fasciculata)*	FSC/--/1B.1	Closed cone coniferous forest, chaparral (maritime), coastal dunes, and coastal scrub/sand. Blooming Period: July - October	Low. Suitable forest, maritime chaparral or coastal habitats not present at project site.
Fragrant fritillary *(Fritillaria liliacea)*	--/--/1B.2	Coastal scrub, valley and foothill grassland, coastal prairie. Often on serpentine, various soils reported though usually clay in grassland, 3-410m elevation. Blooming Period: February - April	Low. Survey conducted during the blooming period. Suitable coastal scrub, open grassland or prairie habitats not present at project site.
Gowen cypress *(Cupressus goveniana ssp. goveniana)*	FT/--/1B.2	Closed cone coniferous forest. Narrowly endemic to Monterey County. Coastal terraces, usually in sandy soils, sometimes with Monterey pine, Bishop pine, 100-125m elevation. Evergreen	Not found. Species identifiable during reconnaissance-level survey and was not observed.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Hickman's cinquefoil *(Potentilla hickmanii)*	FE/CE/1B.1	Coastal bluff scrub, closed-cone coniferous forest, meadows and seeps, marshes and swamps, small streams in open or forested areas along the coast, 5-125m elevation. Blooming Period: April - August	Low. Survey conducted during the blooming period. Suitable coastal scrub, forest, or aquatic habitats not present at project site.
Hickman's onion *(Allium hickmanii)*	--/--/1B.2	Closed-cone coniferous forest, chaparral, coastal scrub, valley and foothill grassland, coastal prairie, sandy loam, damp ground and vernal swales, 20-200m elevation. Blooming Period: April - May	Low. Survey conducted during the blooming period. Suitable forest, chaparral, coastal scrub, open grassland or prairie habitats not present at project site.
Hooker's manzanita *(Arctostaphylos hookeri ssp. hookeri)*	--/--/1B.2	Sandy soils in coastal scrub, chaparral, and closed-cone forest habitats; evergreen, elevation 45 – 215m. Blooming Period: February - April	Not found. Species identifiable during reconnaissance-level survey and was not observed.
Hospital Canyon larkspur *(Delphinium californicum ssp. interius)*	--/--/1B.2	Cismontane woodland, chaparral, in wet, boggy meadows, openings in chaparral and in canyons, 225-1,060m elevation. . Blooming Period: April - June	Low. Project site is located at an elevation of 60 feet, below the typical elevations where this species is found.
Hutchinson's larkspur *(Delphinium hutchinsoniae)*	--/--/1B.2	Broadleaved upland forest, chaparral, coastal prairie, coastal scrub, elevation 0 – 400m. Blooming Period: March - June	Low. Survey conducted during the blooming period. Suitable forest, chaparral, coastal scrub, or prairie habitats not present at project site.
Jolon clarkia *(Clarkia jolonensis)*	--/--/1B.2	Cismontane woodland, chaparral, coastal scrub, 20-660m elevation. Blooming Period: April - June	Low. Survey conducted during the blooming period. Suitable woodland, chaparral, or coastal scrub habitats not present at project site.

Common and Scientific Name	**Status (Fed./State/ CNPS)**	**Habitat**	**Potential to Occur on Site**
Kellogg's horkelia *(Horkelia cuneata ssp. sericea)*	FSC/--/1B.1	Closed-cone coniferous forest, maritime chaparral, coastal scrub, sandy or gravelly openings, elevation 10 – 200m. Blooming Period: April - September	Low. Survey conducted during the blooming period. Suitable forest, chaparral, or coastal scrub habitats not present at project site.
Legenere *(Legenere limosa)*	--/--/1B.1	In beds of vernal pools, 1-880m elevation.. Blooming Period: April - June	Low. Survey conducted during the blooming period. Suitable aquatic habitat not present at project site.
Marsh microseris *(Microseris paludosa)*	FSC/--/1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland, 5-300m elevation. Blooming Period: April - June	Low. Survey conducted during the blooming period. Suitable forest, woodland, coastal scrub, or open grassland habitats not present at project site.
Marsh sandwort *(Arenaria paludicola)*	FE/CE/1B.1	Sandy openings, marshes and swamps (freshwater or brackish), 3-170m elevation. Blooming Period: May - August	Low. Suitable forest, chaparral, coastal scrub, open grassland or prairie habitats not present at project site.
Menzies's wallflower *(Erysimum menziesii ssp. menziesii)*	FE/CE/1B.1	Coastal dunes. Known only from Mendocino and Monterey Counties, localized on dunes and coastal strand, 0-35m elevation. Blooming Period: March - June	Low. Survey conducted during the blooming period. Suitable coastal scrub habitat not present at project site.
Monterey clover *(Trifolium trichocalyx)*	FE/CE/1B.1	Closed-cone coniferous forest, endemic to Monterey County. Poorly drained, low nutrient soil underlain with hardpan soils, also openings and burned areas, 120-205, elevation. Blooming Period: April - June	Low. Survey conducted during the blooming period. Project site is located at an elevation of 60 feet, below the typical elevations where this species is found.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Monterey pine *(Pinus radiata)*	--/--/1B.1	Closed-cone coniferous forest, cismontane woodland, elevation 25 - 185m. Evergreen	Not found. Species identifiable during reconnaissance-level survey and was not observed.
Monterey spineflower *(Chorizanthe pungens var. pungens)*	FT/--/1B.2	Chaparral (maritime) cismontane woodland, coastal dunes, coastal scrub, valley and foothill grassland/sandy. Blooming Period: April - June	Low. . Survey conducted during the blooming period. Suitable chaparral, coastal dune or scrub, or open grassland habitats not present at project site.
Pacific Grove clover *(Trifolium polyodon)*	--/CT/1B.2	Closed-cone coniferous forest, coastal prairie, meadows and seeps, valley and foothill grassland, mesic, elevation 5 – 120m. Blooming Period: April - June	Low. . Survey conducted during the blooming period. Suitable forest, meadow, open grassland or prairie habitats not present at project site.
Pajaro manzanita *(Arctostaphylos pajaroensis)*	FSC/--/1B.1	Sandy soils in chaparral habitat; evergreen, elevation 30 – 760m. Blooming Period: December - March	Not found. Species identifiable during reconnaissance-level survey and was not observed.
Pine rose *(Rosa pinetorum)*	--/--/1B.2	Closed-cone coniferous forest, 2-300m elevation. Blooming Period: May - July	Low. Suitable forest habitat not present at project site.
Pink Johnny-nip *(Castilleja ambigua var. insalutata)*	--/--/--1B.1	Coastal bluff scrub, coastal prairie, 0-100m elevation. Blooming Period: May - August	Low. Suitable bluff scrub or prairie habitats not present at project site.
Pinnacles buckwheat *(Eriogonum nortonii)*	--/--/1B.3	Chaparral, valley and foothill grassland / sandy, often on recent burns, elevation 300 - 975m. Blooming Period: May - June	Low. Project site is located at an elevation of 60 feet, below the typical elevations where this species is found.

Common and Scientific Name	**Status (Fed./State/ CNPS)**	**Habitat**	**Potential to Occur on Site**
Purple amole *(Chlorogalum purpureum var. purpureum)*	FT/--/1B.1	Cismontane woodland, valley and foothill grassland. Often in grassy areas with blue oaks in foothill woodland, 300-330m elevation. Blooming Period: May - June	Low. Project site is located at an elevation of 60 feet, below the typical elevations where this species is found.
Robust spineflower *(Chorizanthe robusta var. robusta)*	FE/--/1B.1	Cismontane woodland (openings) coastal dunes, coastal scrub/sandy or gravelly. Blooming Period: April - July	Low. Survey conducted during the blooming period. Suitable woodland, coastal dune or coastal scrub habitats not present at project site.
Round-leaved filaree *(California macrophylla)*	--/--/1B.2	Cismontane woodland, valley and foothill grassland / clay, elevation 15 - 1200m. Blooming Period: March - May	Low. Survey conducted during the blooming period. Suitable woodland, or grassland not present at project site.
Saline clover *(Trifolium depauperatum var. hydrophilum)*	--/--/1B.2	Marshes and swamps, valley and foothill grassland, vernal pools. Mesic, alkaline sites, 0-300m elevation. Blooming Period: April - June	Low. Survey conducted during the blooming period aquatic or grassland habitats not present at project site.
Sand gilia *(Gilia tenuiflora ssp. arenaria)*	FE/CT/1B.2	Maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, sandy openings, elevation 0 – 45m. Blooming Period: April - June	Low. Survey conducted during the blooming period. Suitable chaparral, woodland, coastal dune or coastal scrub habitats not present at project site.
Sand-loving wallflower *(Erysimum ammophilum)*	FSC/--/1B.2	Maritime chaparral, coastal dunes, coastal scrub, sandy openings, elevation 0 – 60m. Blooming Period: February - June	Low. Survey conducted during the blooming period. Suitable chaparral, coastal dune or coastal scrub habitats not present at project site.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Sandmat manzanita *(Arctostaphylos pumila)*	--/--/1B.2	Closed cone coniferous forest, maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, sandy openings, elevation 30 – 730m. Blooming Period: February - May	Not found. Species identifiable during reconnaissance-level survey and was not observed.
Santa Cruz clover *(Trifolium buckwestiorum)*	FSC/--/1B.1	Broadleaved upland forest, cismontane woodland, coastal prairie, elevation 105 – 610m. Blooming Period: April - October	Low. Project site is located at an elevation of 60 feet, below the typical elevations where this species is found.
Santa Cruz microseris *(Stebbinsoseris decipiens)*	FSC/--/1B	Broadleaved upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grassland, open areas, sometimes serpentine, elevation 10 – 500m. Blooming Period: April - May	Low. Survey conducted during the blooming period. Suitable forest, chaparral, coastal dune, coastal prairie or coastal scrub habitats not present at project site.
Santa Cruz tarplant *(Holocarpha macradenia)*	FT/CE/1B.1	Coastal prairie, coastal scrub, valley and foothill grassland, often on clay or sandy soils, 10-220m elevation.. Blooming Period: June - October	Low. Suitable grassland, coastal prairie, coastal dune or coastal scrub habitats not present at project site.
Santa Lucia bush mallow *(Malacothamnus palmeri var. palmeri)*	--/--/1B.2	Chaparral. Dry rocky slopes, mostly near summits, but occasionally extending down canyons to the sea. 60-365m elevation. Blooming Period: May - July	Low. Suitable chaparral habitat not present at project site.
Seaside bird's beak *(Cordylanthus rigidus ssp. littoralis)*	--/CE/1B.1	Closed-cone coniferous forest, maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, sandy often disturbed sites, elevation 0 – 215m. Blooming Period: May - October	Low. Suitable forest, chaparral, woodland, coastal dune or coastal scrub habitats not present at project site.

Common and Scientific Name	**Status (Fed./State/ CNPS)**	**Habitat**	**Potential to Occur on Site**
Tidestrom's lupine *(Lupinus tidestromii)*	FE/CE/1B.1	Coastal dunes, includes *Lupinus tidestromii* var. *tidestromii*. Partially stabilized dunes, immediately near the ocean, 0-3m elevation. Blooming Period: April - June	Low. Survey conducted during the blooming period. Suitable coastal habitat not present at project site.
Toro manzanita *(Arctostaphylos montereyensis)*	--/--/1B.2	Maritime chaparral, cismontane woodland, coastal scrub, sandy, elevation 30 – 730m. Blooming Period: February – March	Not found. Species identifiable during reconnaissance-level survey and was not observed.
Vernal pool bent grass *(Agrostis lacuna-vernalis)*	--/--/--1B.1	Vernal pools. In mima mound areas or on the margins of vernal pools, 115-145m elevation. Blooming Period: April - May	Low. Project site is located at an elevation of 60 feet, below the typical elevations where this species is found.
Yadon's rein orchid *(Piperia yadonii)*	FE/--/1B.1	Coastal bluff scrub, closed cone coniferous forest, chaparral (maritime)/sandy. Blooming Period: May - August	Low. Suitable forest, chaparral or coastal bluff scrub habitats not present at project site.
Communities			
Central Dune Scrub			Not found. Species typically composing this natural community not found at project site.
Central Maritime Chaparral			Not found. Species typically composing this natural community not found at project site.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Coastal and Valley Freshwater Marsh			Not found. Species typically composing this natural community not found at project site.
Coastal Brackish Marsh			Not found. Species typically composing this natural community not found at project site.
Monterey Pine Forest			Not found. Species typically composing this natural community not found at project site.
Northern Coastal Salt Marsh			Not found. Species typically composing this natural community not found at project site.
Valley Needlegrass Grassland			Not found. Species typically composing this natural community not found at project site.

Source: EMC Planning Group 2013, CNDDB 2013, USFWS 2013

Note:

FE: Listed as 'Endangered" by the Federal Endangered Species Act.

FT: Listed as "Threatened" by the Federal Endangered Species Act.

FC: A candidate for listing as threatened or endangered under the Federal Endangered Species Act.

FSC: United States Fish and Wildlife Service (USFWS) "Special Concern." Prior to February 1996, the USFWS identified these species as "Category 2" candidates for listing (taxa for which information in the possession of the USFWS indicated that proposing to list as endangered or threatened was possibly appropriate, but for which sufficient data on biological vulnerability and threat were not currently available to support proposed rules). The designation of Category 2 species as candidates resulted in confusion about the conservation status of these taxa. To reduce that confusion, and to clarify that the USFWS does not regard these species as candidates for listing, the USFWS has discontinued the designation of Category 2 species as candidates. The USFWS remains concerned about these species, but further biological research and field study are needed to resolve the conservation status of these taxa.

CE: Listed as "Endangered" by the California Endangered Species Act.

CT: Listed as "Threatened" by the California Endangered Species Act.

CSC: CDFG "Species of Special Concern." The CDFG "Species of Special Concern" designation does not afford these species any federal or state protection. These species should be taken into special consideration when decisions are made concerning the future of any land parcel. A species is included as a "Species of Special Concern" when their breeding populations in California are declining. Species are also included that are not declining worldwide, but in California the population is so low that it is potentially vulnerable to extirpation.

1B: Plants considered by California Native Plant Society (CNPS) to be rare, threatened, or endangered in California and elsewhere due to their limited or vulnerable habitat, their low numbers of individuals per population (even though they may be wide ranging), or their limited number of populations.

2: CNPS listing of plant species that are rare, threatened, or endangered in California, but more common elsewhere.

3: Plants about which more information is needed.

CNPS New Threat Code Extensions:

.1: Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2: Fairly endangered in California (20-80% occurrences threatened)

.3: Not very endangered in California (<20% of occurrences threatened or no current threats known)

Appendix A Special Status Animal Species with the Potential to Occur in the Project Vicinity

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
American badger *(Taxidea taxus)*	--/CSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Need sufficient food, friable soils, and open, uncultivated ground. Prey on burrowing rodents and dig burrows.	Low. Suitable open habitats with friable soils not found at project site.
Arroyo toad *(Bufo californicus)*	FE/CSC	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc. Rivers with sandy banks, willows, cottonwoods, and sycamores, loose, gravelly areas of streams in drier parts of range.	Low. Suitable vegetated aquatic habitats not found at project site.
Bank swallow *(Riparia riparia)*	--/CT	(Nesting) Colonial nester, nests primarily in riparian and other lowland habitats west of the desert, requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole	Low. Suitable bank or cliff habitats suitable for nesting not found at project site.
Bay checkerspot butterfly *(Euphydryas editha bayensis)*	FT/--	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay. *Plantago erecta* is the primary host plant, *Orthocarpus densiflorus* and *O. purpurscens* are secondary host plants.	Low. Suitable host plants not found at project site.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Black legless lizard *(Anniella pulchra nigra)*	--/CSC	Moist, warm habitats with loose soil for burrowing and prostrate plant cover in beaches, chaparral, pine-oak woodland, or riparian areas.	Low. Suitable beach, chaparral, woodland, or riparian habitats with loose soils not found at project site.
Blunt-nosed leopard lizard *(Gambelia sila)*	FE/CE	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures such as fence posts, they do not excavate their own burrows.	Low. Suitable alkali or desert scrub habitats not found at project site.
Burrowing owl *(Athene cunicularia)*	--/CSC	Open, dry, annual or perennial grasslands, desert or scrubland, available burrows.	Low. Suitable open habitats with available burrows not found at project site.
California brackishwater snail (mimic tryonia) *(Tryonia imitator)*	--/CSC	Aquatic, found on rocks and in gravel of riffles in cool, swift, clear streams.	Low. Suitable aquatic habitat not found at project site.
California clapper rail *(Rallus longirostris obsoletus)*	FE/CE	Found in saltwater and brackish marshes, traversed by tidal sloughs in the vicinity of San Francisco Bay. Associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.	Low. Suitable saltwater or brackish marsh habitats not found at project site.
California condor *(Gymnogyps californianus)*	FE/CE	Requires vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in the rocky walls provide nesting sites. Forages up to 100 miles from roost/nest.	Low. Project site surrounded by industrial development. Suitable open not found at project site.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
California horned lark *(Eremophila alpestris actia)*	--/CSC	Coastal regions, chiefly from Sonoma County to San Diego County, also within the main part of the San Joaquin Valley and east to the foothills. Prefers short-grass prairie, mountain meadows, open coastal plains, fallow grain fields, alkali flats.	Low. Suitable prairie, meadow, plains, fallow field, or alkali flat habitats not found at project site.
California least tern *(Sterna antillarum browni)*	FE/CE	Nests along the coast from San Francisco Bay south to northern Baja California. Colonial breeder on bare or sparsely vegetated, flat substrates. Sand beaches, alkali flats, land fills, or paved areas.	Low. Suitable beach, alkali flat or minimally disturbed areas not found at project site.
California linderiella *(Linderiella occidentalis)*	FSC/--	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools typically has very low alkalinity, conductivity, and total dissolved solids.	Low. Suitable aquatic habitat not found at project site.
California red-legged frog *(Rana draytonii)*	FT/CSC	Rivers, creeks and stock ponds with pools and overhanging vegetation.	Low. Species occurs within the Reclamation Ditch watershed and may wash through the project site during high flow events, however the lack of emergent vegetation needed for cover and the steep banks of the portion of the Reclamation Ditch within the project site make the occurrence of this species Low.

Common and Scientific Name	**Status (Fed./State/ CNPS)**	**Habitat**	**Potential to Occur on Site**
California tiger salamander *(Ambystoma californiense)*	FT/ CT	Grasslands, open oak woodlands, and seasonal pools or stock ponds in central California.	Low. Suitable aquatic habitat not found at project site.
Coast horned lizard *(Phrynosoma coronatum frontale)*	--/CSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Requires open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Low. Suitable lowland habitat with low bushes and sandy areas not found at project site.
Coast Range newt *(Taricha torosa torosa)*	--/CSC	Coastal drainages from Mendocino County to San Diego County. Lives in terrestrial habitats and will migrate over 1 km to breed in ponds, reservoirs and slow moving streams.	Low. Suitable aquatic habitat not found at project site.
Cooper's hawk *(Accipter cooperii)*	--/CSC	Oak or riparian woodlands.	Low. Oak or riparian woodland not found at project site.
Ferruginous hawk *(Buteo regalis)*	--/CSC	(Wintering) Open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon-juniper habitats. Mostly consumes flat lagomorphs, ground squirrels, and mice.	Low. Suitable wintering habitat not found at project site.
Giant kangaroo rat *(Dipodomys ingens)*	FE/CE	Annual grasslands on the western side of the San Joaquin Valley, marginal habitat in alkali scrub. Needs level terrain and sandy loam soils for burrowing.	Low. Project site outside of species' known range and suitable habitat not found.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Globose dune beetle *(Coelus globosus)*	--/--	Inhabitant of coastal sand dune habitat from Bodega Head in Sonoma County south to Ensenada, Mexico. Found in foredunes and sand hummocks, it burrows beneath the sand surface and is most common beneath dune vegetation.	Low. Suitable coastal sand dune habitat not found at project site.
Golden eagle *(Aquila chrysaetos)*	--/CSC	(Nesting and Wintering) Rolling foothills mountain areas, sage-juniper flats, desert. Cliff-walled canyons provide nesting habitat in most parts of range. Also uses large trees in open areas.	Low. Suitable nesting or wintering habitat not found at project site.
Green sea turtle *(Chelonia mydas)*	FE	Pacific Ocean.	Low. Project site not adjacent to the Pacific Ocean.
Hoary bat *(Lasiurus cinereus)*	--/CSC	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Low. Suitable combination of aquatic and open habitats not found at project site.
Least Bell's vireo *(Vireo bellii pusillus)*	FE/CE	(Nesting) Summer resident of Southern California in low riparian habitats in the vicinity of water or in dry river bottoms (below 2,000 feet). Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, *Baccharis*, mesquite.	Low. Suitable riparian habitat not found at project site.
Leatherback sea turtle *(Dermochelys coriacea)*	FE	Pacific Ocean.	Low. Project site not adjacent to the Pacific Ocean.

Common and Scientific Name	**Status (Fed./State/ CNPS)**	**Habitat**	**Potential to Occur on Site**
Marbled murrelet *(Brachyramphus marmoratus marmoratus)*	FT/FE	Feeds near-shore, nests inland along coast from Eureka to Oregon border and from Half Moon Bay to Santa Cruz. Nests in old-growth redwood-dominated forests, up to six miles inland, often in Douglas fir.	Low. Suitable redwood habitat not found at project site.
Monarch butterfly *(Danaus plexippus)*	--/--	Winter roost sites. Wind protected tree groves (Eucalyptus, Monterey pine, cypress) with nectar and water sources nearby	Low. Suitable protected tree groves not found at project site.
Olive ridley sea turtle *(Lepidochelys olivacea)*	FE	Pacific Ocean.	Low. Project site not adjacent to the Pacific Ocean.
Pallid bat *(Antrozous pallidus)*	--/CSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low. Suitable undisturbed open habitats not found at project site.
Pinnacles optioservus riffle beetle *(Optioservus canus)*	--/--	Aquatic, found on rocks and in gravel of riffles in cool, swift, clear streams.	Low. Suitable aquatic habitat not found at project site.
Prairie falcon *(Falco mexicanus)*	--/CSC	Nesting Habitats. Open terrain, either level or hilly breeding sites located on cliffs. Forages far distances, including to marshlands and ocean shores	Low. Suitable cliff habitat not found at project site.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Redwood shoulderband (snail) *(Helminthoglypta sequoicola consors)*	--/--	Known only from south slope of San Juan Grade, near foothills, 8 miles northwest of Salinas.	Low. Project site outside of species' known range and suitable habitat not found.
Salinas harvest mouse *(Reithrodontomys megalotis distichlis)*	--/--	Known only from the Monterey Bay region. Occurs in fresh and brackish water wetlands and probably in the adjacent uplands around the mouth of the Salinas River.	Low. Project site outside of species' known range and suitable habitat not found.
San Joaquin kit fox *(Vulpes macrotis mutica)*	FE/CT	Annual grasslands or grassy open stages with scattered shrubby vegetation. Needs loose-textured sandy soils for burrowing, and suitable prey base.	Low. Suitable grassland or open habitats not found at project site.
Santa Cruz long-toed salamander *(Ambystoma macrodactylum croceum)*	FE/CE	Wet meadows near sea level in a few restricted locales in Santa Cruz and Monterey Counties. Aquatic larvae prefer shallow (<12 inches) water, uses clumps of vegetation or debris for cover. Adults use mammal burrows.	Low. Suitable aquatic habitat not found at project site.
Short-eared owl *(Asio flammeus)*	--/CSC	(Nesting) Found in swamp lands, both fresh and salt; lowland meadows; irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.	Low. Suitable nesting habitat not found at project site.
Silvery legless lizard *(Anniella pulchra pulchra)*	--/CSC	Sandy or loose loamy soils under sparse vegetation, moist soils.	Low. Suitable sandy or loose soils near sparse vegetation not found at project site.

Common and Scientific Name	**Status (Fed./State/ CNPS)**	**Habitat**	**Potential to Occur on Site**
Smith's blue butterfly *(Euphilotes enoptes smithi)*	FE/--	Coastal dunes and coastal sage scrub plant communities. Host plants include *Eriogonum latifolium* and *Eriogonum parvifolium* for larval and adult stages	Low. Suitable host plants not found at project site.
Southern sea otter *(Enhydra lutris nereis)*	FT	Pacific Ocean. Hard- and soft-sediment marine habitats from the littoral zone to depths of less than 100 meters (330 feet), including protected bays and exposed outer coasts.	Low. Project site not adjacent to the Pacific Ocean.
Southwestern willow flycatcher *(Empidonax traillii extimus)*	FE/SE	Breeds within thickets of willows or other riparian understory usually along streams, ponds, lakes, or canyons. Migrants may be found among other shrubs in wetter areas.	Low. Suitable riparian habitat not found at project site.
Steelhead *(Oncorhynchus mykiss irideus)*	FT/--	Coastal stream with spawning gravel	Low. Suitable aquatic habitat not found at project site.
Tidewater goby *(Eucyclogobius newberryi)*	FE/FSC	Brackish water habitats, found in shallow lagoons and lower stream reaches, still but not stagnant water with high oxygen levels	Low. Suitable aquatic habitat not found at project site.
Tricolored blackbirds *(Agelaius tricolor)*	FSC/--	(Nesting) Areas adjacent to open water and access to protected nesting substrate	Low. Suitable vegetated habitats near open water not found at project site.
Two-striped garter snake *(Thamnophis hammondii)*	FSC/--	Coastal California from sea level to about 7,000 feet in elevation. Highly aquatic, found in or near permanent fresh water, often along streams with rocky beds and riparian growth.	Low. Suitable aquatic habitat not found at project site.

Common and Scientific Name	Status (Fed./State/ CNPS)	Habitat	Potential to Occur on Site
Vernal pool fairy shrimp *(Branchinecta lynchi)*	FT/--	Endemic to the grasslands of the Central Valley, Central Coast Mtns., and South Coast Mtns. in astatic rain-filled pools. Inhabit small, clear-water sandstone depression pools and grassed swale, earth slump, or basalt-flow depression pools.	Low. Suitable aquatic habitat not found at project site.
Western pond turtle *(Actinemys marmorata)*	--/CSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat for egg-laying.	Low. Species occurs within the Reclamation Ditch watershed and may wash through the project site during high flow events, however the lack of basking sites, haul-out areas and the steep banks of the portion of the Reclamation Ditch within the project site make the occurrence of this species Low.
Western snowy plover *(Charadrius alexandrinus nivosus)*	FT/CSC	(Nesting Sites) Sandy beaches, salt pond levees, shores of large alkali lakes, sandy, gravelly or friable soils for nesting	Low. Suitable nesting habitat not found at project site.

Source: EMC Planning Group 2013, CNDDB 2013, USFWS 2013

Note:

FE: Listed as 'Endangered" by the Federal Endangered Species Act.

FT: Listed as "Threatened" by the Federal Endangered Species Act.

FC: A candidate for listing as threatened or endangered under the Federal Endangered Species Act.

FSC: United States Fish and Wildlife Service (USFWS) "Special Concern." Prior to February 1996, the USFWS identified these species as "Category 2" candidates for listing (taxa for which information in the possession of the USFWS indicated that proposing to list as endangered or threatened was possibly appropriate, but for which sufficient data on biological vulnerability and threat were not currently available to support proposed rules). The designation of Category 2 species as candidates resulted in confusion about the conservation

status of these taxa. To reduce that confusion, and to clarify that the USFWS does not regard these species as candidates for listing, the USFWS has discontinued the designation of Category 2 species as candidates. The USFWS remains concerned about these species, but further biological research and field study are needed to resolve the conservation status of these taxa.

CE: Listed as "Endangered" by the California Endangered Species Act.

CT: Listed as "Threatened" by the California Endangered Species Act.

CSC: CDFG "Species of Special Concern." The CDFG "Species of Special Concern" designation does not afford these species any federal or state protection. These species should be taken into special consideration when decisions are made concerning the future of any land parcel. A species is included as a "Species of Special Concern" when their breeding populations in California are declining. Species are also included that are not declining worldwide, but in California the population is so low that it is potentially vulnerable to extirpation.

APPENDIX B

PRELIMINARY GEOTECHNICAL REPORT

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M E M O R A N D U M

To: **Wood Rodgers, Inc**
3301 C Street, Bldg 100-B,
Sacramento, CA 95816

August 16, 2013
Job No. 2011-104-ED1

Attn: Mr. Keith Hallsten

From: Gary Parikh, P.E., G.E., 666

Subject: Preliminary Geotechnical Findings
Elvee Road Extension Project, Salinas, California

This memorandum presents the geotechnical findings based on the available data and our experience around the project area

GEOLOGY AND SEISMIC HAZARDS

Site Geology

General geologic features pertaining to the site were evaluated by reference to "Geologic Map of the San Francisco Bay Region", U.S. Geological Survey Scientific Investigation Map, 2006, by R.W. Graymer, et al. Based on the geology map, the project site is situated in Alluvium (Holocene) (Qha) deposits. The portion of the published geologic map that includes the general project area is shown on Plate 1.

Seismic Sources

The project is located in a seismically active part of northern California. Many faults that exist in the San Francisco Bay Area are capable of producing earthquakes that may cause strong ground shaking at the site. Maximum magnitudes of some of the closest faults in the area based on Caltrans ARS Online (v2.2.06) are summarized in the following table. These maximum magnitudes represent the largest earthquake a fault is capable of generating and is related to the seismic moment.

EARTHQUAKE DATA

Fault (I.D.)	Fault Type	Approx. Distance from Site (miles)	Maximum Magnitude (Mmax)
Reliz Fault Zone (Blanco Section) (186)	Strike Slip	4.2	7
Zayante - Vergeles Lower 2011 CFM (163)	Strike Slip	7.7	7
Zayante - Vergeles Upper 2011 CFM (162)	Strike Slip	10.5	7
Monterey Bay (Monerey Bay Section) (174)	Strike Slip	12.4	7.2
San Andres (Creeping Section) 2011 CFM (182)	Strike Slip	12.8	7.9
Monterey Bay - Tularcitos (Seaside-Monterey Section) (191)	Strike Slip	13.6	7.2
Calaveras (So) - Paicines Extension 2011 CFM (180)	Strike Slip	17.5	6.5

The governing fault is the San Andreas Fault zone. Refer to Plate 2 for the fault map.

Seismic Hazards/Liquefaction Potential

Potential seismic hazards may arise from three sources: surface fault rupture, ground shaking and liquefaction. Since no active faults pass through the site, the potential for fault rupture is relatively low. Based on available geological and seismic data, the possibility of the site to experience strong ground shaking is considered moderately high.

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary but essentially total loss of shear strength under the reversing, cyclic shear stresses associated with earthquake shaking. Submerged, cohesionless sands and low plasticity silts of low relative density are the type of soils which usually are susceptible to liquefaction. Based on the liquefaction potential map (attached Plate 3), liquefaction potential is moderate at the site.

FINDINGS

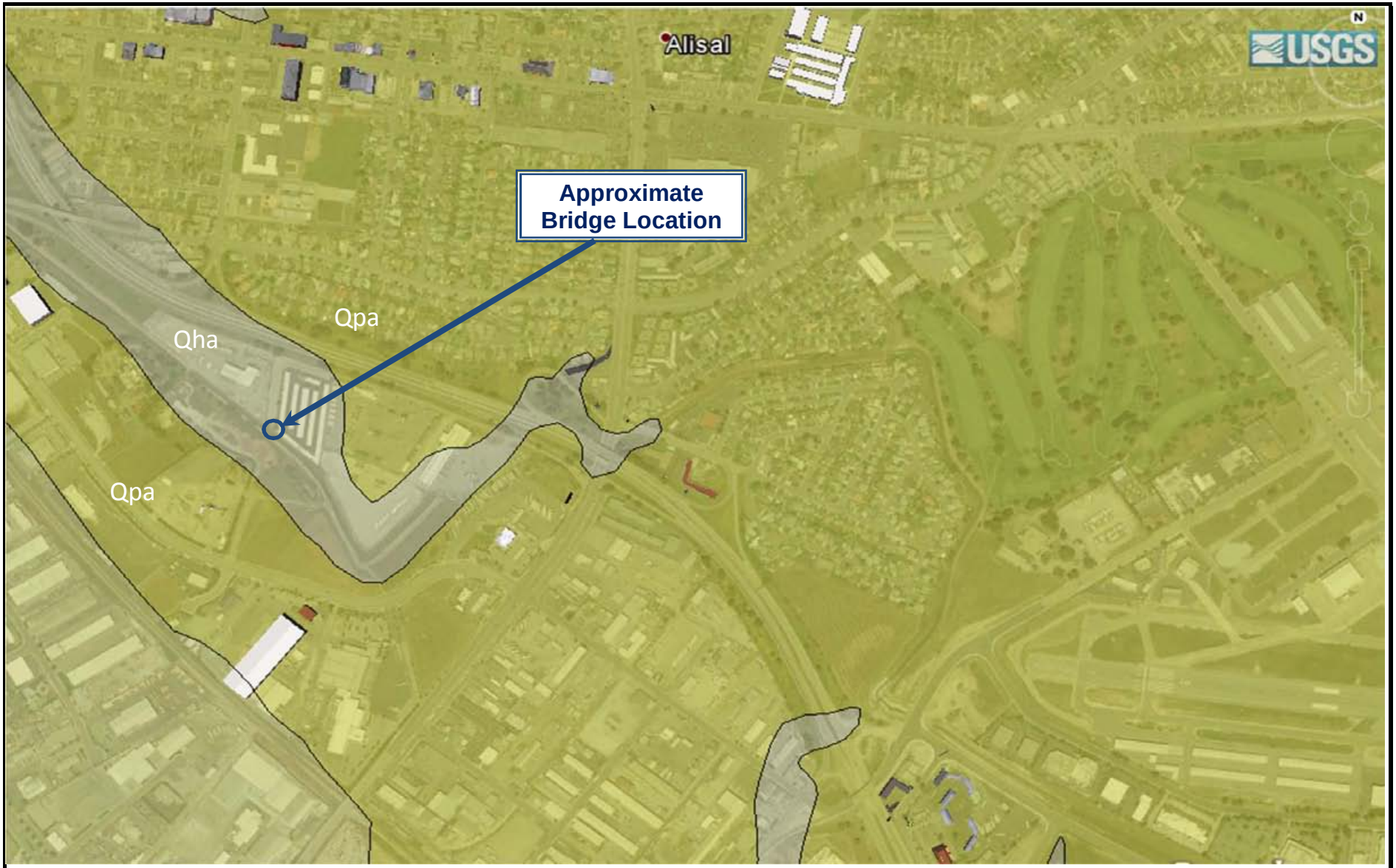
Pavement Section

Based on the available information and our experience around the project area, we anticipate the near surface expansive lean and fat clay at the project site. Chemical treatment such as lime treatment may be needed to improve the onsite soil. Otherwise, near surface soil should be excavated and backfilled with imported soil for the pavement section.

Foundation

As discussed above, the liquefaction potential is moderate based on the available maps. If the liquefiable soils are encountered during the field investigation, some mitigation measures should be considered during foundation design. Ground improvement can be considered to mitigate the potential hazard. Several ground improvement methods, such as dynamic compaction, stone columns, cement deep soil mixing (CDSM) and Controlled Low Strength Material (CLSM) columns are commonly used in California. If the design can accommodate, the frictional resistance and end bearing of the piles should be ignored from the soil layers above the potential liquefiable layers. This will require additional pile capacity by increasing the length or the size of the pile. Seismic design should be performed based on Caltrans Seismic Design Criteria.

Attachments: Plate 1: Geologic Map
Plate 2: Fault Map
Plate 3: Liquefaction Susceptibility Map



Qha- Alluvium (Holocene)
Qpa- Alluvium (Pleistocene)

Source: R.W. Graymer, et al.,"Geologic Map of the San Francisco Bay Region", U.S. Geological Survey Scientific Investigations Map 2918, 2006

GEOLOGIC MAP

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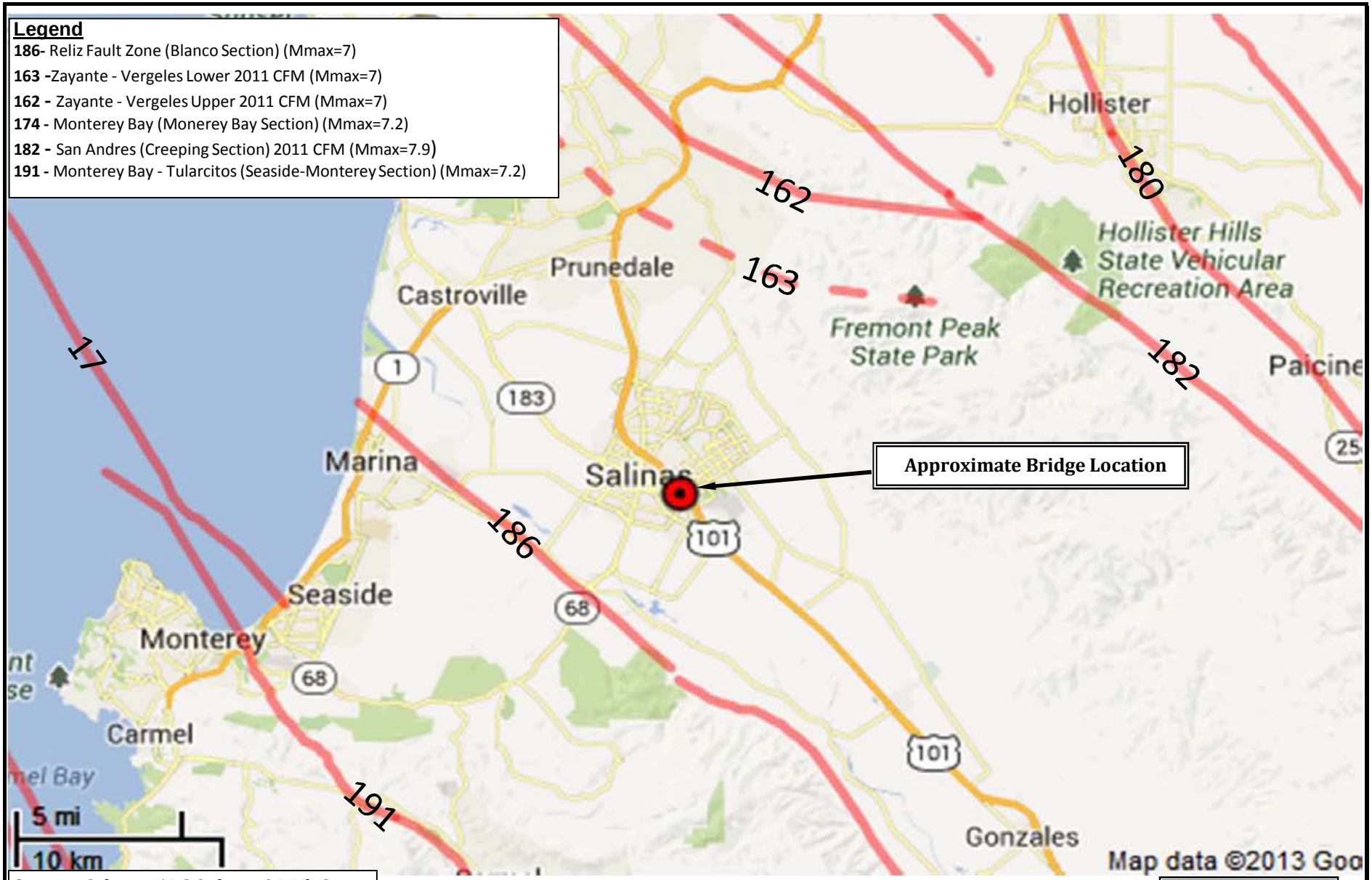
ELVEE DRIVE EXTENSION BRIDGE
SALINAS, CALIFORNIA

JOB NO.: 2011-104-EDE

PLATE NO.: 1



Source: Caltrans ARS Online v2 Web Site
http://dap3.dot.ca.gov/ARS_Online/

FAULT MAP

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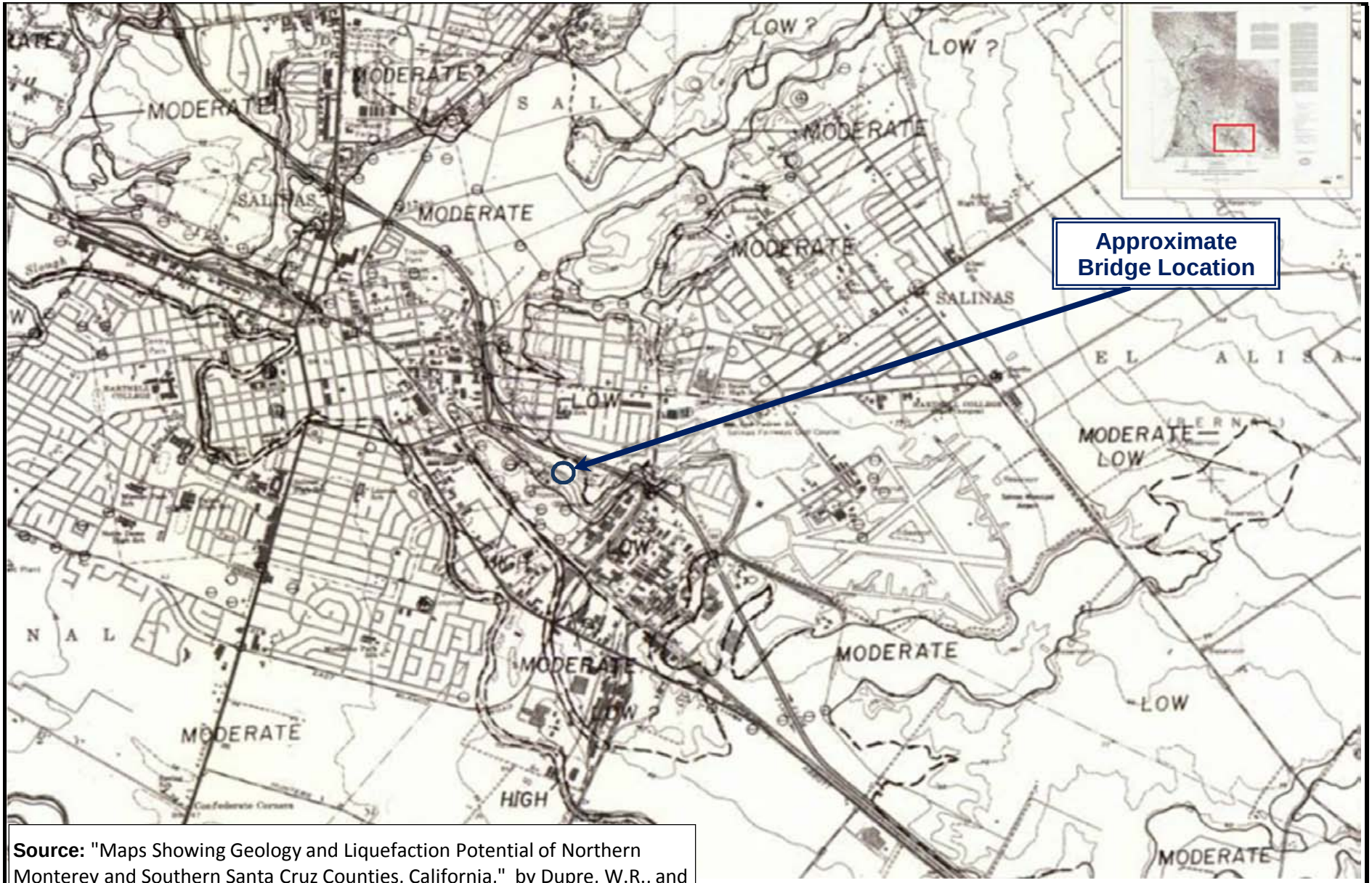
ELVEE DRIVE EXTENSION BRIDGE
SALINAS, CALIFORNIA

JOB NO.: 2011-104-EDE	PLATE NO.: 2



Source: "Maps Showing Geology and Liquefaction Potential of Northern Monterey and Southern Santa Cruz Counties, California," by Dupre, W.R., and Tinsley, J.C, 1980, Published by USGS.

LIQUEFACTION SUSCEPTIBILITY MAP

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ELVEE DRIVE EXTENSION BRIDGE
SALINAS, CALIFORNIA

JOB NO.: 2011-104-EDE	PLATE NO.: 3

APPENDIX C

PHASE I ENVIRONMENTAL SITE ASSESSMENT

PHASE I INITIAL SITE ASSESSMENT
SANBORN ROAD/U.S. HIGHWAY 101
AND ELVEE DRIVE IMPROVEMENTS
SALINAS, CALIFORNIA

(DRAFT)

For

WOOD RODGERS
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Sacramento, California CA 95816

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June 13, 2013 Job No. 2011-104-ISA

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PHASE I INITIAL SITE ASSESSMENT
SANBORN ROAD/U.S. HIGHWAY 101
AND ELVEE DRIVE IMPROVEMENTS
Salinas, California

SUMMARY OF CONCLUSIONS

This Phase I Initial Site Assessment (ISA) was performed by PARIKH Consultants, Inc. to evaluate whether potential sources or indications of hazardous substance contamination are present for the proposed improvements at Sanborn Road/Highway 101 interchange project and Elvee Drive extension in Salinas, Monterey County (Project Area). This study included a field inspection of the Project Area, and a review of listings of Federal and State regulatory agencies that are responsible for recording incidents of spills, and soil and ground water contamination and transfer, store, or disposal facilities that handle hazardous materials.

Previous land uses at the Project Area were primarily limited to commercial and light industrial uses.

A site reconnaissance of the Project Area was conducted to identify nearby sites or land uses that might adversely affect the corridor due to environmental hazards.

Review of previous land use and the site reconnaissance indicates that Project Area has supported vehicular activity since the 1950s. It is highly likely that the surface soils along Highway 101 are affected by deposition of aerial lead. Therefore it is recommended that surface samples of soil be collected and analyzed for total lead.

There are structures (including overcrossing and undercrossing) within the project limits. The project is not planned to modify those structures. Due to the age of these structures there is a potential for presence of asbestos containing materials (ACM) and lead based paint. In the event project work involves modification of these structures, an ACM investigation should be performed by an inspector certified by Asbestos Hazardous Emergency Response Act (AHERA) under Toxic Substance Control Act (TSCA) Title II and certified by Cal OSHA under State of California rules and regulations (California Code of Regulations, Section 1529). This work should be performed during the design phase.

Surveys for lead based paint should be conducted prior to demolition of any structures within the right-of-way. Lead based paint and ACM should be abated by using a contractor certified to perform such work.

Regulatory review of nearby sites identified 7-Eleven Store located at 335 Sanborn Road at Fairview Drive as an active fuel underground storage facility. Site visit showed presence of groundwater monitoring wells on Sanborn Road. Review of the latest quarterly groundwater monitoring report shows that the groundwater is impacted with benzene and MTBE. Further, the review shows that the groundwater gradient varies; therefore it appears that the contamination has not been fully characterized. Depth to groundwater is approximately 35 feet. In the event project work in this area includes installation of piles or excavation to groundwater, where groundwater will be extracted, it is recommended that both soil and groundwater be tested in the areas where the proposed ground disturbance is schedule to take place. The project proposes to construct a traffic signal at the Sanborn/ Fairview intersection; foundations for traffic signal poles would involve drilling up to 10 feet deep. Soil and groundwater samples should be tested for volatile organics and petroleum hydrocarbons and proper mitigation measures should be established for construction activities.

Site visit and review of regulatory data also identified the former Shell Station at 1060 Fairview Avenue. The site is located near the northbound on-ramp to Route 101 from Fairview Avenue. No acquisition of right-of-way from this site is planned. Even though the site is closed, because of its historical use as a service station, there may be residual fuels left in the surface soils. If the project will use a portion of the site, it is recommended that the surface soils in that portion of the site be tested for petroleum hydrocarbons.

Other than noted above during the Project Area site reconnaissance, environmental areas of concern were not readily identified or apparent based on the scope of work performed in this project.

This conclusion, and any and all conclusions, recommendations and information included in this report are based upon the information that was readily available to PARIKH Consultants, Inc. at the time of the site visit, and on PARIKH Consultants, Inc.'s professional judgment and reviews using accepted initial site assessment practices pursuant to the scope of work.

1.0 INTRODUCTION

This Phase I Initial Site Assessment (ISA) was performed to identify potential environmental impacts to proposed improvements at Sanborn Road/Highway 101 interchange and Elvee Drive Extension in Salinas, Monterey County (Project Area). The detail project description is provided in the following sections. The project location and proposed project improvements maps are presented in Figure 1 and Figure 2. The Project Area consists of the segment of:

- Sanborn Road between Fairview Avenue and Work Street,
- Fairview Avenue from Sanborn Road to the northbound U.S. Highway 101 on-ramp,
- Northbound on-ramp to northbound US Highway 101 from Fairview Avenue,
- Southbound U.S. Highway 101 off-ramp to Sanborn Road
- Elvee Drive from Sanborn Road through to Work Street (both existing segment and proposed extension, including bridge or culvert at Reclamation Ditch).

The purpose of this investigation was to identify and evaluate potential hazardous waste sites and update the evaluation of environmental factors that may have affected the soil and groundwater quality in the project area vicinity due to past and present environmental and commercial activities. This report was prepared by PARIKH Consultants, Inc.

The ISA studies were performed between April 15 and June 5, 2013 and included the following scope of work:

- Site visit and visual inspection of exterior of the project vicinity
- Review of Previous Environmental Reports in the project vicinity
- Review of computer database government record search of hazardous waste sites within 1.6-kilometer of the project
- Review of area hydrogeology
- Review of available agency records for the project vicinity
- Preparation of a written report summarizing the results

The following sections present the details and findings of the Phase I Initial Site Assessment:

- Section 2.0 - Project Description and Historic Information
- Section 3.0 - Physical Site Inspection
- Section 4.0 - Regulatory Review
- Section 5.0 - Conclusions and Recommendations
- Section 6.0 – Limitations

2.0 PROJECT DESCRIPTION AND HISTORIC INFORMATION

2.1 PROJECT DESCRIPTION

Following Project Description and discussion is obtained from Wood Rodgers. The proposed project is designed to improve operational traffic and circulation conditions at the Sanborn Road/U.S. Highway 101 interchange. As part of the traffic impact analysis conducted for the Salinas-Ag Industrial Center Program Environmental Impact Report (EMC Planning Group 2009), a range of existing circulation network operational deficiencies were identified that would worsen with implementation of that project. In 2010, the City adopted changes to the City of Salinas Traffic Impact Fee Ordinance to incorporate additional traffic network improvements needed to ensure that the operational deficiencies are rectified so that the network operates at acceptable performance levels under current conditions plus build out of the Salinas-Ag Industrial Center project. Several of the proposed project improvements are among those added to the Traffic Impact Fee Ordinance in response to the prior traffic impact analysis.

The close spacing between the existing Elvee Drive/Sanborn Road intersection and the adjacent Sanborn Road southbound off-ramp from U.S. Highway 101 causes operational deficiencies and contributes to traffic accidents. Caltrans requires a minimum spacing between a ramp intersection and the nearest public street intersection of 400 feet as a mandatory design standard or 500 feet as an advisory design standard, The proposed project is intended to correct this situation by removing the connection of Elvee Drive to Sanborn Road and providing access via an extension of Elvee Drive to Work Street instead. Eliminating the portion of Elvee Drive near Sanborn Road would also provide space for widening the southbound off-ramp to Sanborn Road.

The existing southbound off-ramp from U.S. Highway 101 to Sanborn Road terminates with a left-turn lane and a right-turn lane at the signalized intersection with Sanborn Road. Traffic analysis has shown that by the time that this project can be completed and opened for public use, the operation of that ramp intersection will be at a deficient level of service (LOS) D in the PM peak hour and LOS C in the AM peak hour. The proposed improvements (adding additional turn

lanes at the ramp terminal) will improve operations to acceptable LOS C in the PM peak hour and LOS B in the AM peak hour.

The proposed project consists of the following components, each of which is shown on Figure 2:

1. Widening the southbound U.S. Highway 101 off-ramp to Sanborn Road to add two lanes to accommodate a left-turn lane, a shared left-turn/through lane, and dual right-turn lanes. The existing traffic signal at the ramp terminal at Sanborn Road will be modified to accommodate the ramp widening. The ramp will be widened from its existing 28-foot width to 57 feet for a length of approximately 485 feet along the ramp;

2. Signalization of the Sanborn Road/Fairview Avenue/northbound U.S. Highway 101 off-ramp intersection, with associated striping modifications to Fairview Avenue. No widening of the northbound off-ramp is anticipated. Construction of the traffic signal pole foundations would involve drilled holes up to 10 feet deep.

3. Construction of a ramp meter on the northbound U.S. Highway 101 on-ramp from Fairview Avenue. Construction of the ramp meter would involve shallow (less than 5 feet) excavation in existing State right-of-way. No widening or realignment of the northbound on-ramp is planned.

4. Extension of the dedicated right-turn lane to Work Street on westbound Sanborn Road by removing the existing raised traffic island at the entrance to Pilot Travel Center and reconstructing that driveway entrance from Sanborn Road. The right–turn lane would be extended by approximately 400 feet from its existing length of 160 feet to a proposed length of 560 feet to reduce driver confusion about right turns into the Pilot Travel Center versus right turns onto Work Street;

5. Construction of an extension of Elvee Drive from the existing northwest end of Elvee Drive (north of the Reclamation Ditch) to Work Street. Curb, gutter, and sidewalk will be constructed on both sides of Elvee Drive between the existing north end of Elvee Drive to approximately 70 feet south of the Reclamation Ditch. Curb, gutter, sidewalk, and landscaping will be constructed along the east side of the Elvee Drive Extension from approximately 70 feet south of the Reclamation Ditch to Work Street.

Approximately 890 linear feet of new roadway would be constructed. The cross section of the new segment located south of the Reclamation Ditch is 51 feet wide and includes two travel lanes with curb, gutter and sidewalk on one side and AC dike on the other side. The cross section for the segment located north of the Reclamation Ditch is 56 feet wide and includes two travel lanes with curb, gutter and sidewalk on both sides;

6. Access roads from both sides of Elvee Drive to the Reclamation Ditch to ensure access remain consistent with existing conditions;

7. On the west side of Elvee Drive, the existing driveway access to the City-owned parcel currently being used by Granite Construction will be reconstructed. A new driveway access to the parcel immediately north will be provided;

8. The new Elvee Drive/Work Street intersection will be evaluated for signalization. The signalization evaluation and design will be determined upon an update to the traffic analysis and during the final design phase of the project. Construction of traffic signal pole foundations would involve drilled holes up to 10 feet deep. If a signal at this location is not currently warranted, then Elvee Drive will be stop-controlled, with provision for a future signal when warranted. The curb returns at the intersection of Elvee Drive with Work Street will be reconstructed to accommodate long tractor trucks;

9. Construction of a single-span bridge or box culvert to carry Elvee Drive over the existing Reclamation Ditch. If a significant increase in the 100-year water surface elevation upstream of Elvee Drive would result, mitigation would be required. Such mitigation may consist of adding additional flow capacity where the Reclamation Ditch passes under John Street. Such additional flow capacity may consist of either modifying the existing box culvert under John Street to increase its capacity or adding an additional culvert parallel to the existing box culvert.

10. Approximately 400 feet of the existing Elvee Drive (from the intersection of Elvee Drive and Sanborn Road to a point 400 feet west) will be closed to accommodate the U.S. Highway 101 southbound ramp widening. This segment of the road will be demolished and removed. Elvee Drive will then terminate at a cul-de-sac at the entrance to the Coast Counties Peterbilt property. Figure 2, Proposed Project Improvements, shows two possible cul-de-sac configurations. The preferred size of the cul-de-sac has not yet been determined, so the smallest and largest diameters

under consideration are shown. The larger radius cul-de-sac would require additional right-of-way to be acquired from the adjacent businesses, but would provide enough space for long-tractor trucks to turn around, which would be beneficial to the adjacent businesses that provide services to such trucks. The cul-de-sac alternatives are shown at a location that allows access to the Coast Counties Peterbilt facility, but have the required separation from the widened off- ramp;

11. Approximately 1,400 feet of Elvee Drive in front of Leonard's Lockers Self Storage, Caltrans Maintenance Station, and Coast Counties Peterbilt will be reconstructed to provide two, 20-foot travel lanes and to add curb, gutter, sidewalk, and street lighting. Landscape planting along this section of Elvee Drive within the public right-of-way will be provided if sufficient space and funding is available;

12. If the project is constructed in phases such that the Elvee Drive Extension is completed and opened to public traffic but the section of Elvee Drive that intersects with Sanborn Road is temporarily left open, then the first phase of improvements may include necessary improvements to restrict left-turn ingress to or egress from Elvee Drive at Sanborn Road and rehabilitation of the existing Elvee Drive pavement; and

13. Construction of enhanced capacity for conveyance of Reclamation Ditch flows under John Street, downstream of the primary project area. The type of capacity enhancement has not yet been defined, but would likely be an enlarged box culvert, an additional culvert, or a parallel pipe. The need for this improvement to be constructed as part of the proposed project has not yet been confirmed, but the improvement is assumed at this time for purposes of environmental review.

2.2 U.S.G.S. MAP REVIEW

USGS maps from 1910, 1912, 1940, 1947, 1948, 1968, 1975 and 1984 (Salinas) obtained through Environmental Data Resources, Inc., were reviewed. These USGS maps are included in Appendix A. Elevation of the Project Area is approximately 60 feet above mean sea level. The maps show presence of the Alisal to the northwest of Salinas, northwest of the current Route 101. Later maps show growth and Salinas toward Alisal and merger of Alisal into Salinas. The maps also show that the topographic gradient at the Project Area is generally towards the south.

2.3 HISTORICAL AERIAL PHOTOGRAPH REVIEW

To examine the historical use of the area, a review of aerial photographs, obtained through Environmental Data Resources, Inc., from 1956, 1968, 1971, 1981, 1987, 1998 , 2005, 2009 and 2010 was performed. Aerial photographs are enclosed as Appendix B. A summary description of the photographs reviewed is presented below.

The 1956 aerial photo shows presence of Highway 101 and Sanborn Road and the interchange with Route 101 in generally the same shape as today. John Street overcrossing at Route 101 appears to be under construction. West of the overcrossing, John Street is not clearly visible. Properties to the north and south of Route 101 are not developed. There are some residential properties ½ mile or more to the north of Route 101.

The 1968 aerial photo shows development of residential properties to the north side of Route 101. John Street and its overcrossing at Route 101 appear to be complete. Current outline of the Caltrans Maintenance yard is somewhat visible. Surface staining, possibly related to storm water collection basin, and is visible in the northwest portion of the Caltrans maintenance yard. A wastewater treatment facility is visible to the southwest of the Caltrans Maintenance yard.

The 1971 aerial photo shows the presence of the same stained area in the Caltrans Maintenance Yard. Areas currently covered by Pilot Travel Centers are showing signs of development. The 1981 aerial photo shows development of buildings in the current location of Coast Counties Truck & Equipment to the east and Leonard's Lockers Self Storage Facility to the west. It is not clear whether the Caltrans property is paved, however the stain readily observed in the northwest portion of the yard is no longer readily visible in the 1981 or later aerial photographs. The 2005 aerial photo clearly shows that the maintenance yard is paved.

2.4 HISTORICAL SANBORN MAP REVIEW

Historical Sanborn maps were not available for the Project Area. Result of the EDR inquiry is included in Appendix C.

3.0 PHYSICAL SITE INSPECTION

Observations made during the site inspection of the project vicinity are described in the following paragraphs. The site inspection was performed on May 25th, 2013.

3.1 SITE VISIT

The site visit consisted of drive-by and walk-through of the area of study and observation of problem sites or visual contamination.

The Project Area inspected consisted of the John Street interchange, the Sanborn Road undercrossing, a couple of the side streets connecting to Sanborn Road including Fairview Avenue and Mayfair Drive, and areas on and between Elvee Drive and Route 101.
In general as outlined in the above sections, areas to the north of Route 101 were primarily single family residential properties. Only one area to the north east of John Street overcrossing from Route 101 was identified as commercial property. That property is a large yard occupied by commercial and agricultural equipment for rental. It is located between John Street and Route 101.

On the south side of Route 101, Elvee Drive traverses parallel to the freeway. Businesses such as Coast Counties Truck and Equipment Company, Peterbilt, Caltrans Salinas Maintenance Station, Leonard's Lockers Self Storage are present. Past the self-storage facility, Elvee Drive turns towards the south. After Elvee Drive turns to south, to the west is a Salinas Valley Ford Trucks Facility. Sanborn Road traverses under Route 101. Immediately to the northeast, Fairview Avenue ties into Sanborn Road. Between Fairview Avenue and Route 101 are a couple of motels. To the north of Fairview Avenue east of Sanborn Road is a 7-Eleven retail service station. Across from 7-Eleven, west of Sanborn Road is a Valero Service Station. During the site visit, several monitoring wells were observed on the 7-Eleven facility and on Sanborn Road and Mayfair Drive.

North of Route 101, Fairview Avenue intersects Sanborn Road and moves towards the east towards an on-ramp to Route 101. Two motels are located on the south side of Fairview Avenue between the street and Route 101. Further east is a vacant lot. The lot was formerly occupied by a service station. There was evidence of abandoned groundwater monitoring wells on the property. Portion of the lot was unpaved while portions were paved with asphalt and concrete.

Review of regulatory reports for this site indicates that the site is currently undergoing groundwater monitoring. The most recent groundwater monitoring report is for first quarterly 2013 and it indicates that depth to groundwater is approximately 35 feet and gradient is towards

the north. The monitoring well to the west site MW-8 which is located on Sanborn Road shows impacts of MTBE and benzene above the drinking water standards.

3.2 AERIAL LEAD DEPOSITION

The Highway 101 Corridor is a traffic-bearing road in Monterey County. Historical aerial photographs show that Route 101 has supported vehicular traffic from the late 1950s. Due to this vehicular activity the soils along Route 101, Sanborn Road and John Street are likely contaminated with lead from exhaust of cars burning leaded gasoline. The lead levels in surface soils along highways can reach concentrations in excess of the hazardous waste threshold, requiring disposal at either a Class I landfill or on-site stabilization. Special health and safety procedures should be in effect for the workers working near lead contaminated areas. A work plan for investigation of the ADL should be submitted and work should be performed according to an approved work plan. This work should be performed during the design phase.

3.3 ASBESTOS CONTAINING MATERIALS AND LEAD BASED PAINT

There are freeway overcrossing and undercrossing structures within the Project Area. Due to the age of these structures there is a potential for presence of asbestos containing materials (ACM) and lead based paint. In the event that these structures are to be modified or removed, an ACM investigation should be performed by an inspector certified by Asbestos Hazardous Emergency Response Act (AHERA) under Toxic Substance Control Act (TSCA) Title II and certified by Cal OSHA under State of California rules and regulations (California Code of Regulations, Section 1529). This work should be performed during the design phase.

4.0 REGULATORY REVIEW

4.1 DATABASE AND REGULATORY REVIEWS

A search of environmental regulatory databases was conducted for the Project Area. The database search was conducted by Environmental Data Resources, Inc. (EDR) to determine whether documentation exists related to environmental incidents at the site or surrounding properties. The databases searched and respective search distances from the site location (Project Limits) as specified by ASTM guidelines are as follows:

- Federal Databases

  - National Priority List (NPL) – 1 mile
  - Proposed National Priority List (Proposed NPL) – 1 mile
  - Comprehensive Environmental Response Compensation, and Liability Information System (CERCLIS) – ½ mile
  - CERCLIS No Further Remedial Action Planned (CERCLIS – NFRAP) – ¼ mile
  - Corrective Action Report (CORRACTS) – 1 mile
  - Resource Conservation and Recovery Information System treatment, storage disposal facility (RCRIS-TSD) – ½ mile
  - RCRIS Large quantity generator – ¼ mile
  - RCRIS small quantity generator – ¼ mile
  - Emergency Response Notification System (ERNS) – Project limits
  - Superfund (CERCLA) Consent Decrees (CONSENT) – 1 mile
  - Records of Decision (ROD) – 1 mile
  - Delisted NPL – 1 mile
  - Facility Index System/Facility Identification Initiative Program Summary Report (FINDS) – Project limits
  - Hazardous Material Reporting System (HMIRS) – Project limits
  - Material Licensing Tracking System (MLTS) – Project limits
  - Mines master index file (MINES) – ¼ mile
  - Federal Superfund liens (NPL liens) – Project limits
  - PCB Activity Database System (PADS) – Project limits
  - RCRA Administration Action Tracking System
  - Toxic Chemical Release Inventory System (TRIS) – Project limits
  - Toxic Substance Control Act (TSCA) – Project limits
  - Section 7 Tracking System (SSTS) – Project limits
  - FIFRA/TSCA Tracking System (FTTS) – Project limits

- State of California, Regional and County Databases

  - Annual Workplan Sites (AWP) – 1 mile
  - Cal sites Databases (CAL-SITES) – 1 mile
  - California Hazardous Material Incident Report System (CHMIRS) – 1 mile
  - "Cortese" Hazardous Waste and Substance Sites List (CORTESE) – 1 mile
  - Proposition 65 Records (NOTIFY 65) – 1 mile
  - Toxic Pits Cleanup Act Sites (TOXIC PITS) – 1 mile
  - State Landfill – ½ mile
  - Waste Management Unit Database (WMUDS/SWAT) – ½ mile
  - Leaking Underground Storage Tank Information System (LUST) – ½ mile
  - Bond expenditure Plan (CA BOND EXP. PLAN) – 1mile
  - Active UST Facilities (UST) – ¼ mile
  - Facility Inventory Database (CA FID UST) – ¼ mile
  - Hazardous Substance Storage Container Database (HIST UST) – ¼ mile

- Aboveground Petroleum Storage Tank Facilities (AST) – Project limits
- Cleaner Facilities (CLEANERS) – ¼ mile
- Waste Discharge System (CA WDS) – Project limits
- List of Deed Restrictions (DEED) – Project limits
- Spills, Leaks, Investigation and Cleanup Cost Recovery Listing (CAL SLIC) – ½ mile
- Hazardous Waste Information System (HAZNET) – ¼ mile

The results of the EDR database search and descriptions of the environmental databases are provided in Appendix D.

The EDR report identified several sites adjacent to the Project Area with potential impacts. The sites identified on the south side of Elvee Drive including Caltrans Maintenance Yard at 850 Elvee Drive; and Coast Counties Truck and Equipment at 920 Elvee Drive are listed on the LUST Database among others. However these sites were closed in the mid 1990s or early 2000's. There appears to be no potential for adverse impacts to the Project Area from these facilities.

A dry cleaner facility was identified as 676 Meadow Drive, site ID A-1. However during drive by this site was identified as a residential property and no adverse impacts from dry cleaning operations were noted.

The property at 335 Sanborn Road was identified as site ID-AD242 as the Southland Corporation Store (7-Eleven). The site was identified on the Historical Cortese and LUST list. EDR indicates that the site remediation is currently ongoing. This site was also identified during review of the Envirostor and Geotracker files at the RWQCB. Review of the latest groundwater monitoring report for the 7-Eleven Store indicates presence of MTBE and benzene in the groundwater well (MW-8) which is located on Sanborn Road. The contaminants are present at concentrations exceeding the respective MCLs. The groundwater gradient at the site varies to the north or north east, and as this well is located to the west of the station, it appears the source of the contamination has not been adequately characterized. The report is included in Appendix E.

Former Shell Service Station with Site ID DB488 is located at 1060 Fairview Avenue. The site is listed as closed by EDR, and Geotracker. Review of the Geotracker data indicate that the site was closed in 2003 and the monitoring wells were abandoned. The project will not acquire any right-of-way from this site.

Other sites identified in the EDR report were either down/cross gradient or too far up gradient to pose an adverse environmental concern.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Review of previous land use and the site reconnaissance indicates that the Highway 101 Project Area has supported vehicular activity since the 1950s. It is highly likely that the surface soils along Highway 101 are affected by deposition of aerial lead. Therefore it is recommended that surface samples of soil be collected and analyzed for total lead.

There are structures (including overcrossing and undercrossing) within the Project Area. Due to the age of these structures there is a potential for presence of asbestos containing materials (ACM) and lead based paint. The project is not planned to modify those structures. In the event project work involves modification of any structures, an ACM investigation should be performed by an inspector certified by Asbestos Hazardous Emergency Response Act (AHERA) under Toxic Substance Control Act (TSCA) Title II and certified by Cal OSHA under State of California rules and regulations (California Code of Regulations, Section 1529). This work should be performed during the design phase.

Surveys for lead based paint should be conducted prior to demolition of any structures within the right-of-way. Lead based paint and ACM should be abated by using a contractor certified to perform such work.

Regulatory review of nearby sites identified 7-Eleven Store located at 335 Sanborn Road as an active fuel underground storage facility. Site visit showed presence of groundwater monitoring wells on Sanborn Road. Review of the latest quarterly groundwater monitoring report shows that the groundwater is impacted with benzene and MTBE. Further, the review shows that the groundwater gradient varies; therefore it appears that the contamination has not been fully characterized. Depth to groundwater is approximately 35 feet. In the event project work in this area includes installation of piles or excavation to groundwater, where groundwater will be extracted, it is recommended that both soil and groundwater be tested in the areas where the proposed ground disturbance is schedule to take place. Soil and groundwater samples should be tested for volatile organics and petroleum hydrocarbons and proper mitigation measures should be established for construction activities.

Site visit and review of regulatory data also identified the former Shell Station at 1060 Fairview Avenue. The site is located near the northbound on-ramp to Route 101 from Fairview Avenue. No acquisition of right-of-way from this site is planned. Even though the site is closed, because of its historical use as a service station, there may be residual fuels left in the surface soils. If any portion of the site will be used for the project, it is recommended that the surface soils in that portion of the site be tested for petroleum hydrocarbons.

Other than noted above during the site reconnaissance of the Project Area, environmental areas of concern were not readily identified or apparent based on the scope of work performed in this project. Based on PARIKH Consultants, Inc.'s Phase I Initial Site Assessment findings, environmental conditions or issues of concerns, other than noted above, were not identified or indicated.

6.0 LIMITATIONS

The operations, facility conditions and information obtained and utilized in the preparation of this report have been obtained in part from the client, and their employees or agents, and various government officials and are assumed by PARIKH Consultants, Inc. to be complete and correct. It should be noted that this information is subject to professional interpretation, which leads to conclusions, which may differ, based upon opinions specific to individuals.

This report has been presented in accordance with generally accepted environmental assessment practices, based upon the information set forth within the report narrative, for specific application to the proposed improvement project. No warranty, expressed or implied, is made.

The conclusions in this report are qualitative opinions based on limited quantitative information. Soil and groundwater sampling and analysis were not a part of this scope of work. The scope of work was limited to observation of the surface at a specific time, a limited aerial survey review, and environmental database research. This assessment is not designed to predict future site or off-site conditions. Also, site conditions can differ at locations other than those observed along the project corridor. Subsurface conditions can differ from those observed on the surface.

This study is not a risk assessment and is not intended to provide information needed for public health risk assessment purposes. The consultant has endeavored to determine as much as practical

about the site conditions given what we consider to be a reasonable amount of analysis and research time. Additional investigation or sampling and analysis could result in information that would lead to revised conclusions. Additional search can usually turn up more information but frequently with a diminishing rate of information return for the effort spent. The degree of certainty of an environmental assessment is proportional to the time and effort spent. However, the degree of certainty cannot be 100% even with highly detailed exploratory drilling and testing work well beyond the scope of this study.

Respectfully submitted,

PARIKH CONSULTANTS, INC.

Gary PARIKH, P.E., G.E. #666

Project Manager

APPENDIX D

TECHNICAL MEMORANDUM
PROPOSED ALTERNATIVES – HYDRAULIC ANALYSIS

TECHNICAL MEMORANDUM

TO: City of Salinas, Caltrans District 5, and
Monterey County Water Resources Agency

FROM: Chris A. Ferrari, P.E.

DATE: July 1, 2013

SUBJECT: **Proposed Alternatives for Elvee Drive Improvement Project**

PURPOSE

This Technical Memorandum (TM) is an extension of the previous Elvee Drive evaluation entitled, "Hydraulic Evaluation of Reclamation District Channel – State Route 101 Southbound Off-Ramp to Sanborn Road & Elvee Drive Improvement Project" by Wood Rodgers, Inc. (Wood Rodgers) that was submitted to the City of Salinas (City) in May of 2012. The May 2012 TM discussed several alternatives to mitigate a 0.22-foot increase in water surface elevation during the design flood that would result if a 14-foot by 10-foot box culvert is constructed within the Reclamation Ditch for the Elvee Drive extension. Based on the initial model results of a study done by Wood Rodgers using the Federal Emergency Management Agency (FEMA) HEC-RAS model, an additional culvert at John Street appeared to mitigate the 0.22-foot increase in water surface elevation; however, this is not consistent with results provided by Monterey County Water Resources Agency (MCWRA). The MCWRA's model that included multiple downstream reaches showed that an additional 60-inch culvert at John Street would not fully reduce the increase in water surface elevation upstream of Elvee Drive (an increase of 0.12-foot would remain), and further would increase the water surface elevation in reaches downstream of John Street. The MCWRA also evaluated additional conveyance options at John Street, but none of them could fully reduce the impact of a culvert at Elvee Drive both upstream of Elvee Drive and downstream of John Street.

The purpose of this TM is to provide the City with additional options to construct the Elvee Drive road extension in the Reclamation Ditch without impacting flood elevations either upstream or downstream.

EVALUATION

Table 1 (below) lists seven concepts to extend Elvee Drive across the Reclamation Ditch. Concepts 1 through 6 include the 14-foot by 10-foot box culvert in the Reclamation Ditch and mitigation to address the 0.2-foot increase in water surface elevation. Concept 7 has been added to show that a proposed bridge would not increase water surface elevations; therefore, no additional mitigation is required.

Concept 1 would place the Elvee Drive 14-foot by 10-foot box culvert, but no additional improvement would be made to mitigate the 0.22-foot increase in water surface elevation. The City would be required to notify the adjacent property owners of the resulting increase in water surface elevation. **Figure 1** shows the location of the 0.22-foot increase in water surface elevation.

Concept 2 would place an additional 60-inch culvert under John Street in addition to the 14-foot by 10-foot box culvert at the Elvee Drive extension. However, this alternative will not fully reduce the increase in water surface elevation upstream of Elvee Drive, based on the MCWRA's modeling results. **Figure 2** shows the location of the proposed 60-inch culvert at John Street.

Concept 3 would place a 60-inch culvert under John Street and include off-stream detention basin storage to offset the 0.12-foot increase in water surface elevation upstream of Elvee Drive resulting from a 14-foot by 10-foot box culvert. Concept 3 would result in no increase in water surface elevation in the Reclamation Ditch. **Figure 3** shows the location of the proposed off-stream detention basin.

Concept 4 will place a large off-stream basin to divert the 0.22-foot increase in water surface elevation resulting from the Elvee Drive 14-foot by 10-foot box culvert. No improvements will be constructed at John Street. **Figure 4** shows the location of the proposed larger off-stream detention basin.

Concept 5 proposes the use of floodwalls along the top bank of the channel between Elvee Drive and the culvert outlet on the west side of Highway 101. The estimated length of the floodwalls is approximately 3,240 feet, but additional off-stream basin storage would be necessary to mitigate the removal of the overbank floodplain. The proposed floodwall heights would be designed to be in compliance with FEMA Title 44 CFR, Section 65.10 freeboard requirements, and the volume of the basin is sized to capture the volume in the overbanks. **Figure 5** shows the location of the proposed floodwalls along the Reclamation Ditch.

Concept 6 would increase the channel capacity on the west bank within the Reclamation Ditch between Elvee Drive and Highway 101. Normal flow conditions within the Reclamation Ditch would not result in any overflow in the overbank channel. The additional channel capacity would mitigate the 0.22-foot increase in water surface elevation that would otherwise result from the 14-foot by 10-foot box culvert. **Figure 6** shows the location of the increase in channel capacity in the Reclamation Ditch.

Concept 7 proposes a clear-span bridge over the Reclamation Ditch at Elvee Drive to avoid any significant water surface elevation impacts. Since the MCWRA would not release their hydraulic model to Wood Rodgers, Wood Rodgers requested the MCWRA to evaluate a 35-foot clear-span bridge and a 40-foot clear-span bridge. The vertical clearance under a bridge would be in excess of 12 feet. Either bridge span would produce a negligible increase in the water surface elevation (0.02 foot), so would require no additional mitigation. Wood Rodgers will refine the bridge abutment locations to determine the appropriate span length in the span range identified. **Figure 7** shows the location of the proposed bridge for Elvee Drive over the Reclamation Ditch. **Figures 8-11** provide the results from the MCWRA's hydraulic model for either a 35-foot clear-span or 40-foot clear-span bridge.

Table 1
Proposed Elvee Drive Project Concepts

Concept	Project	Proposed Mitigation	Model Results
1	Elvee Drive (14' x 10' culvert)	No Additional Culvert at John Street	0.22' increase in WSEL.
2	Elvee Drive (14' x 10' culvert)	Place 60" Culvert at John Street	0.12' increase in WSEL.
3	Elvee Drive (14' x 10' culvert)	Place 60" Culvert at John Street Including Off-Stream Storage	Mitigation will result in no increase in WSEL.
4	Elvee Drive (14' x 10' culvert)	No additional culvert at John Street. Place Off-Stream 6.0 ac-ft Storage near Elvee Drive	Mitigation will result in no increase in WSEL.
5	Elvee Drive (14' x 10' culvert)	Place 3,200 LF of Floodwalls and Off-Stream Storage	Mitigation will result in no increase in WSEL
6	Elvee Drive (14' x 10' culvert)	Additional Reclamation Ditch Channel Capacity	Mitigation will result in no increase in WSEL
7	Elvee Drive Bridge (35' to 40' span)	None Required	Negligible increase (0.02') in WSEL

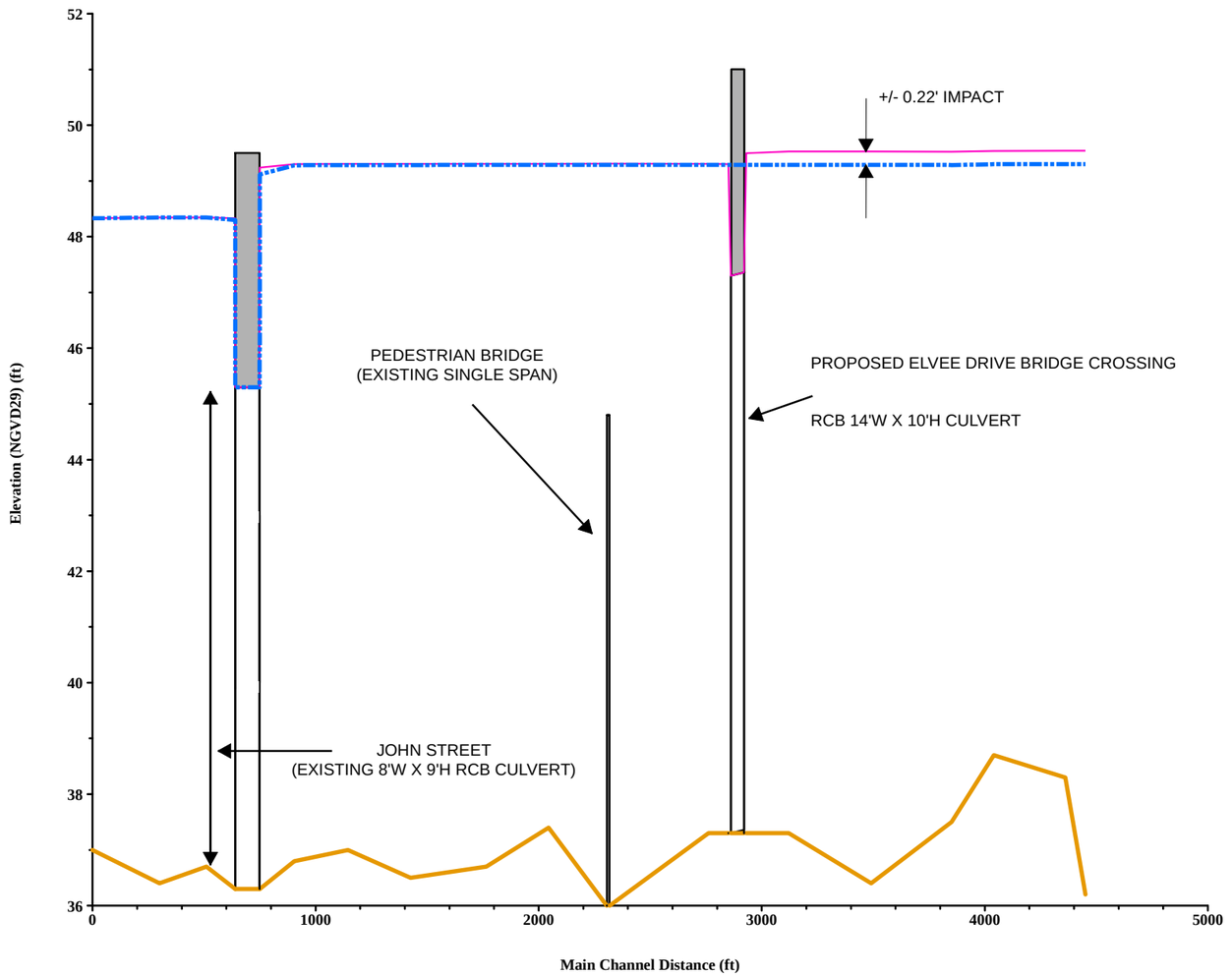
CONCLUSION

Wood Rodgers initially proposed a 14-foot by 10-foot box culvert for the Elvee Drive extension, but the proposed crossing resulted in a 0.22-foot increase in water surface elevation in the Reclamation Ditch during design flood conditions. Several concepts were proposed to mitigate the minor increase in water surface elevation, but none of those concepts have been found to fully mitigate the impact of the box culvert in a cost-effective way. Therefore, Wood Rodgers has investigated, and recommends constructing, a 35-foot to 40-foot clear-span bridge over the Reclamation Ditch to carry the Elvee Drive Extension, which provide sufficient waterway opening such that no additional flood mitigation is required. The results from the MCWRA's model indicate that the 100-year storm hydraulic grade line will encroach onto the proposed bridge soffit, but such encroachment is less than that at all existing culverts in the Reclamation Ditch and is not expected to cause any difficulty because floating debris is negligible and flow velocities are low (in the range of 1.0 foot per second). The proposed bridge deck will be designed to provide a minimum of one foot of freeboard to prevent overtopping. Final design of the proposed bridge will determine the exact bridge span in the 35-foot to 40-foot range investigated.

Enclosures:

Figure 1 – Concept 1 – 14' x 10' Box Culvert at Elvee Drive
Figure 2 – Concept 2 – Box Culvert at Elvee Dr. plus 60" Culvert at John Street
Figure 3 – Concept 3 – Box Culvert at Elvee Dr. plus 60" Culvert at John St & Off-Stream Detention
Figure 4 – Concept 4 – Box Culvert at Elvee Dr. plus Off-Stream Detention Storage
Figure 5 – Concept 5 – Box Culvert at Elvee Dr. plus Floodwalls and Off-Stream Storage
Figure 6 – Concept 6 – Box Culvert at Elvee Dr. plus Increase Channel Capacity
Figure 7 – Concept 7 – Bridge at Elvee Drive
Figure 8A – 35' Bridge, HEC-RAS Section 16.377 & 16.368
Figure 8B – 35' Bridge, HEC-RAS Section 16.360
Figure 8C – 35' Bridge, HEC-RAS Section 16.357 & 16.348
Figure 8D – 35' Bridge, HEC-RAS Section 16.344
Figure 9 – 35' Bridge, Reclamation Ditch Profile
Figure 10A – 40' Bridge, HEC-RAS Section 16.377 & 16.368
Figure 10B – 40' Bridge, HEC-RAS Section 16.360
Figure 10C – 40' Bridge, HEC-RAS Section 16.357 & 16.348
Figure 10D – 40' Bridge, HEC-RAS Section 16.344
Figure 11 – 40' Bridge, Reclamation Ditch Profile

LOCATION MAP



SANBORN ROAD / US 101 INTERCHANGE

CONCEPT 1

PROPOSED ELVEE DRIVE CONDITION

SALINAS, CA

JULY 2013

NORTH

100-YEAR WATER SURFACE ELEVATION

- Existing
- Construction of Elvee Drive

NOTES:
1. PROPOSED 14' X 10' BOX CULVERT AT ELVEE DRIVE.

2. THIS ALTERNATIVE DOES NOT MITIGATE FOR THE INCREASE IN WATER SURFACE ELEVATION UPSTREAM OF ELVEE DRIVE.

FIGURE 1

PRELIMINARY

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
3301 C Street, Bldg. 100-B Tel: 916.341.7760
Sacramento, CA 95816 Fax: 916.341.7767

SANBORN ROAD / US 101 INTERCHANGE

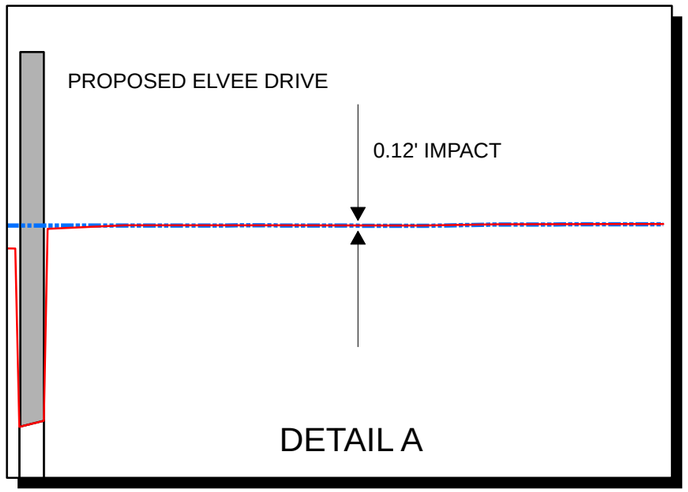
CONCEPT 2

PROPOSED 48" CULVERT AT JOHN STREET

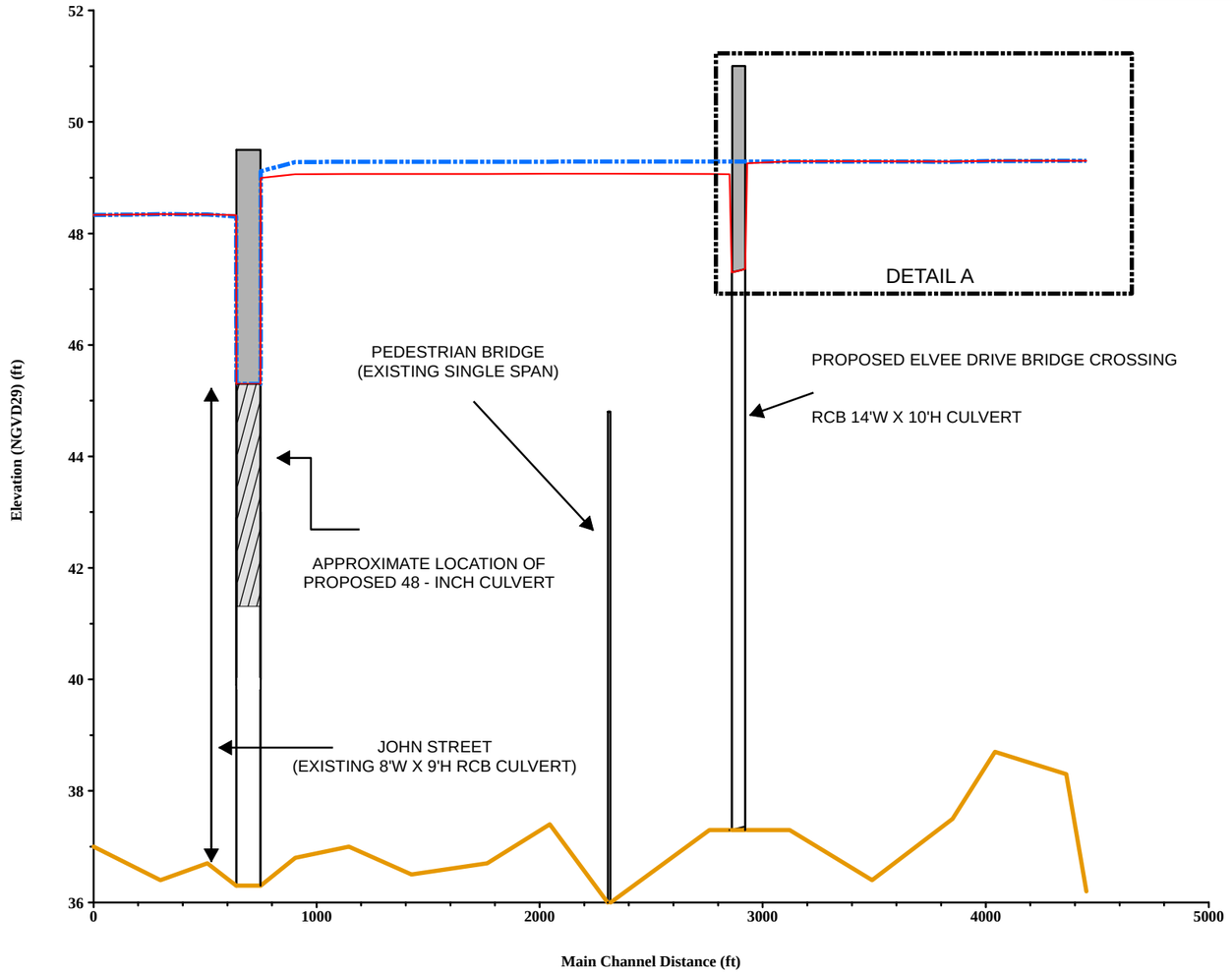
SALINAS, CA

JULY 2013

LOCATION MAP



DETAIL A



APPROXIMATE LOCATION OF PROPOSED 60-INCH CULVERT AT JOHN STREET

NOTE: PLACEMENT OF 48-INCH CULVERT ON LEFT OR RIGHT SIDE OF EXSITING BOX CULVERT WILL BE DETERMINED DURING DESIGN

100-YEAR WATER SURFACE ELEVATION

- Existing
- Construction of 60" Culvert

NOTES:

1. PROPOSED 14' X 10' BOX CULVERT AT ELVEE DRIVE.
2. PROPOSED 48" CULVERT AT JOHN STREET.

FIGURE 2

PRELIMINARY

WOOD RODGERS

DEVELOPING INNOVATIVE DESIGN SOLUTIONS

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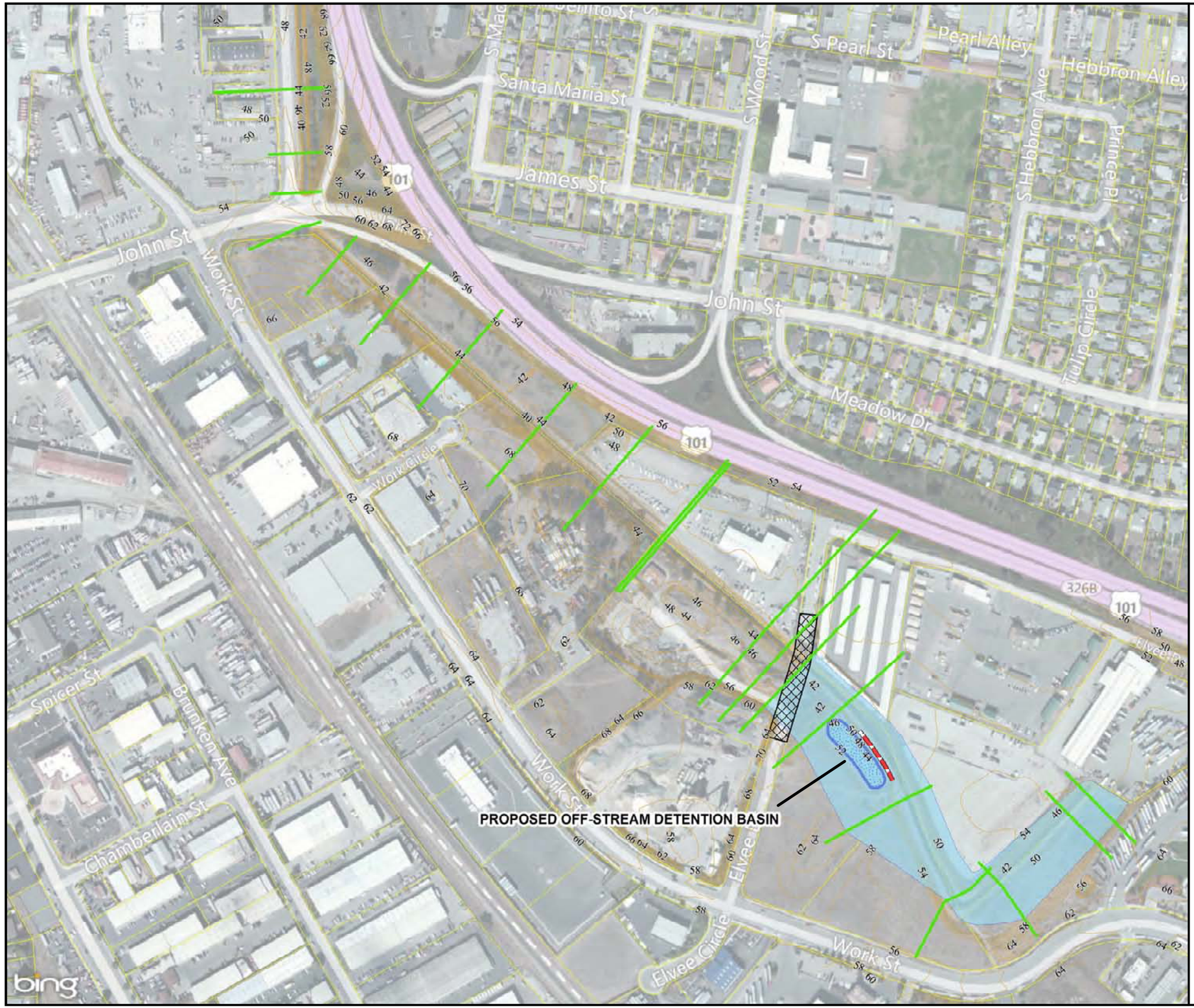
Sacramento, CA 95816 Fax: 916.341.7767

SANBORN ROAD / US 101 INTERCHANGE

CONCEPT 3
60" CULVERT AT JOHN STREET
AND OFF-STREAM DETENTION STORAGE
SALINAS, CA
JULY 2013



NORTH

0 150 300

FEET

- Concrete Spillway
- HEC-RAS Cross-Sections
- Contours
- Proposed Elvee Drive Extension
- 100-Year Water Surface Extents
- Parcel Information
- Proposed Detention Basin

NOTES:

1. PROPOSED 14' X 10' BOX CULVERT AT ELVEE DRIVE.

2. PROPOSED 60" CULVERT AT JOHN STREET.

3. PROPOSED DETENTION BASIN FOR OFF-STREAM STORAGE. APPROXIMATELY 1.83 AC-FT VOLUME.

4. THE PROPOSED DETENTION BASIN IS SIZED TO MITIGATE FOR THE 0.12-FT INCREASE IN WATER SURFACE ELEVATION UPSTREAM OF ELVEE DRIVE OF CONCEPT 2.

5. CONCRETE SPILLWAY WILL ALLOW CHANNEL TO OVERFLOW INTO THE DETENTION BASIN.

FIGURE 3

PRELIMINARY

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
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Sacramento, CA 95816 Fax: 916.341.7767

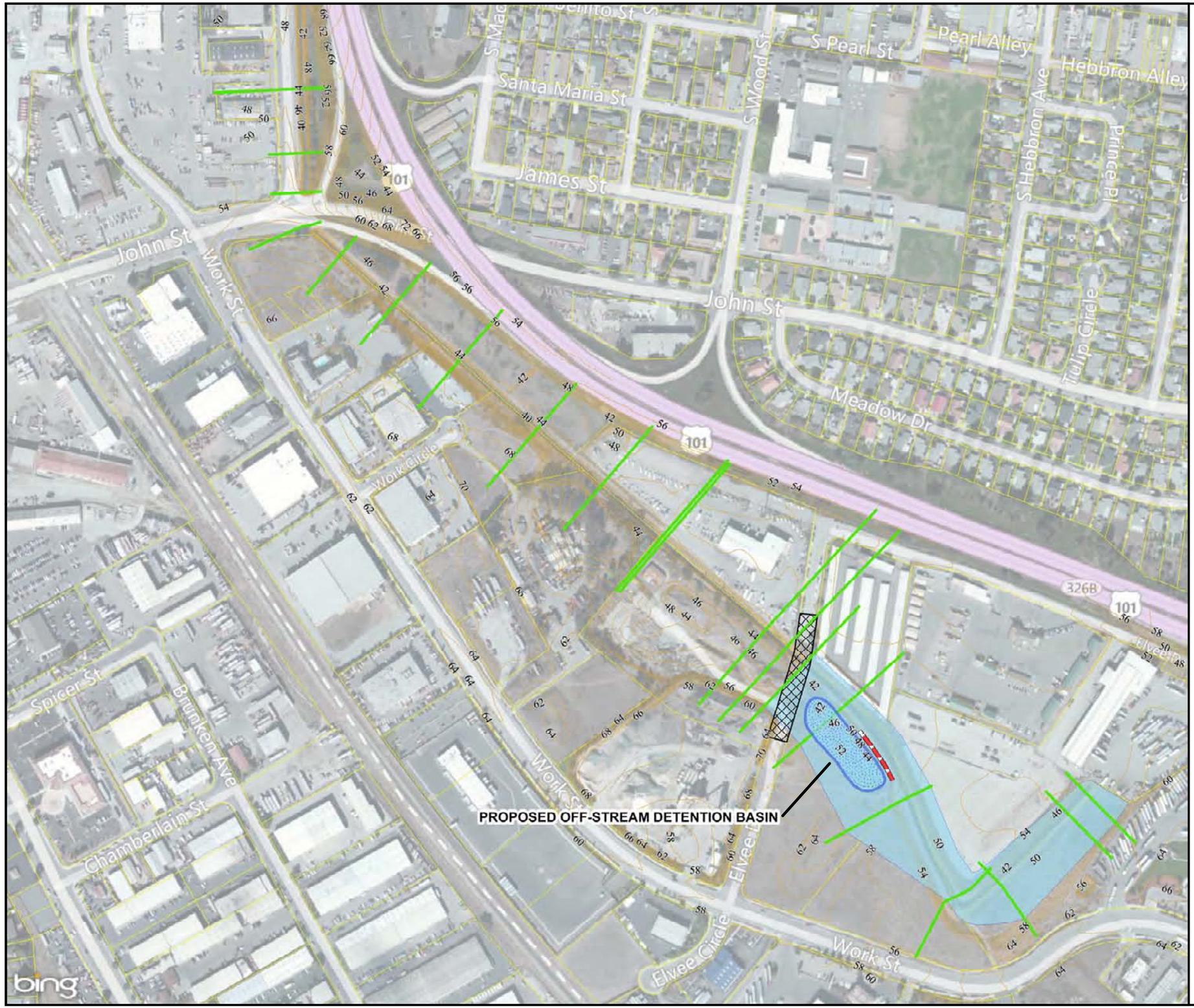
SANBORN ROAD / US 101 INTERCHANGE

CONCEPT 4

OFF-STREAM DETENTION STORAGE

SALINAS, CA

JULY 2013



NORTH

0 150 300

FEET

- Concrete Spillway
- HEC-RAS Cross-Sections
- Contours
- Proposed Elvee Drive Extension
- 100-Year Water Surface Extents
- Parcel Information
- Proposed Detention Basin

NOTES:

1. PROPOSED 14' X 10' BOX CULVERT AT ELVEE DRIVE

2. PROPOSED DETENTION BASIN FOR OFF-STREAM STORAGE. APPROXIMATELY 6.00 AC-FT IN VOLUME.

3. THE PROPOSED DETENTION BASIN IS SIZED TO MITIGATE FOR THE 0.22-FT INCREASE IN WATER SURFACE ELEVATION UPSTREAM OF ELVEE DRIVE OF CONCEPT 1.

FIGURE 4

PRELIMINARY

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
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Sacramento, CA 95816 Fax: 916.341.7767

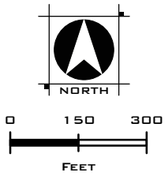
SANBORN ROAD / US 101 INTERCHANGE

CONCEPT 5

FLOODWALLS AND OFF-STREAM STORAGE

SALINAS, CA

JULY 2013



- Proposed Flood Walls
- HEC-RAS Cross-Sections
- Contours
- Proposed Elvee Drive Extension
- 100-Year Floodplain to be Removed
- Parcel Information
- Proposed Detention Basin

NOTES:

1. PROPOSED 14' X 10' BOX CULVERT AT ELVEE DRIVE.

2. PROPOSED FLOODWALLS UPSTREAM OF ELVEE DRIVE TO REMOVE FLOWS FROM THE OVERBANK FLOODPLAIN.

3. PROPOSED DETENTION BASIN FOR OFF-STREAM STORAGE. APPROXIMATELY 29.05 AC-FT.

4. THE PROPOSED FLOODWALLS WILL CONFINE ALL CONVEYANCE TO THE CHANNEL. THE INCREASE IN HGL WILL BE MITIGATED BY THE ADDITION OF A DETENTION BASIN.

FIGURE 5

PRELIMINARY

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DEVELOPING INNOVATIVE DESIGN SOLUTIONS
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Sacramento, CA 95816 Fax: 916.341.7767

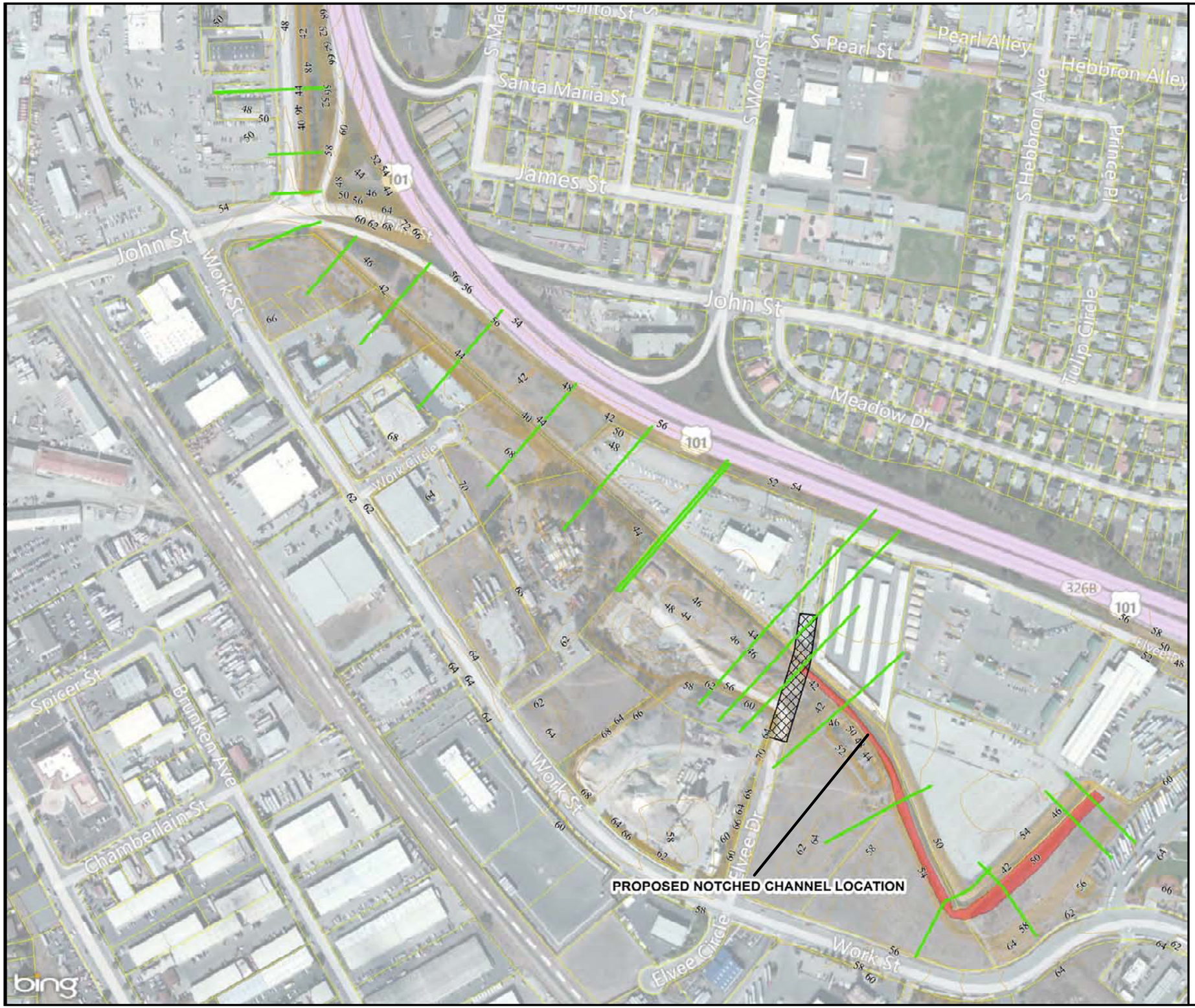
SANBORN ROAD / US 101 INTERCHANGE

CONCEPT 6

INCREASE CHANNEL CAPACITY

SALINAS, CA

JULY 2013



NORTH

0 150 300

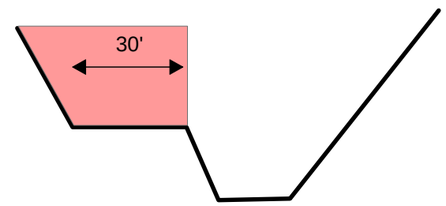
FEET

- HEC-RAS Cross-Sections
- Contours
- Proposed Elvee Drive Extension
- Proposed Notched Channel Location
- Parcel Information

NOTES:

1. PROPOSED 14' X 10' BOX CULVERT AT ELVEE DRIVE.

2. PROPOSED NOTCH IN CHANNEL THAT WILL INCREASE CAPACITY.



TYPICAL SECTION

FIGURE 6

PRELIMINARY

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
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Sacramento, CA 95816 Fax: 916.341.7767

SANBORN ROAD / US 101 INTERCHANGE

CONCEPT 7

BRIDGE AT ELVEE DRIVE

SALINAS, CA

JULY 2013

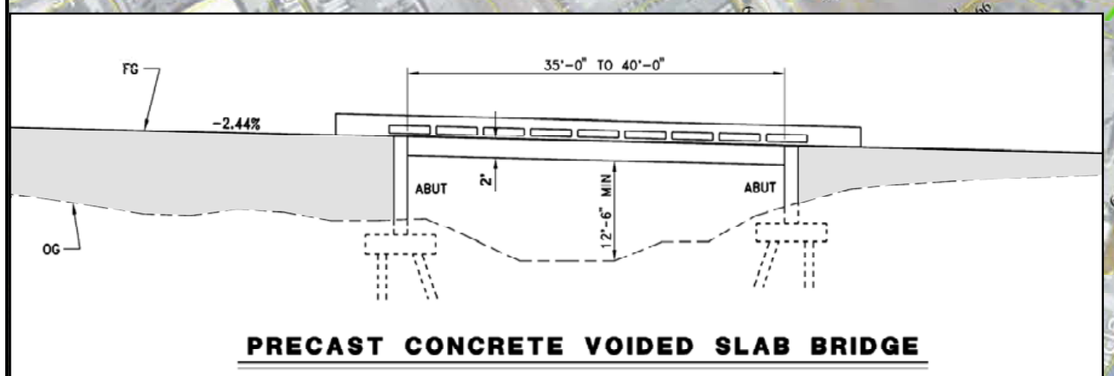
NORTH

0 150 300

FEET

- HEC-RAS Cross-Sections
- Contours
- Proposed Elvee Drive 35-ft to 40-ft Span Bridge
- Parcel Information

NOTE:
PROPOSED 35-FT TO 40-FT BRIDGE SPAN AT ELVEE DRIVE.



PRECAST CONCRETE VOIDED SLAB BRIDGE

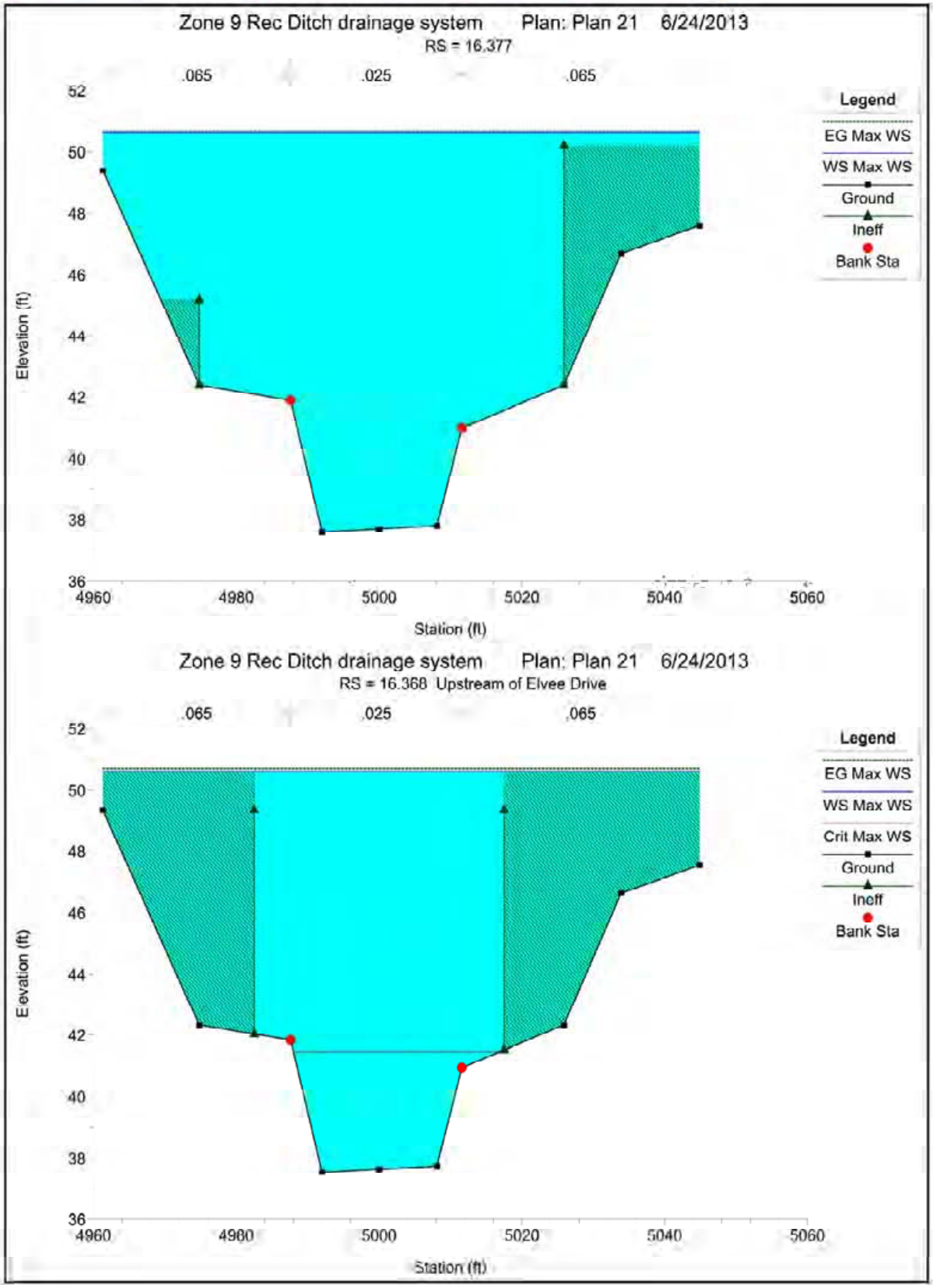
BRIDGE ELEVATION
LOOKING DOWNSTREAM

FIGURE 7

PRELIMINARY

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
3301 C Street, Bldg. 100-B Tel: 916.341.7760
Sacramento, CA 95816 Fax: 916.341.7767

Elvee Drive Preliminary Analysis - 35' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
35' BRIDGE, HEC-RAS SECTION 16.377 & 16.368
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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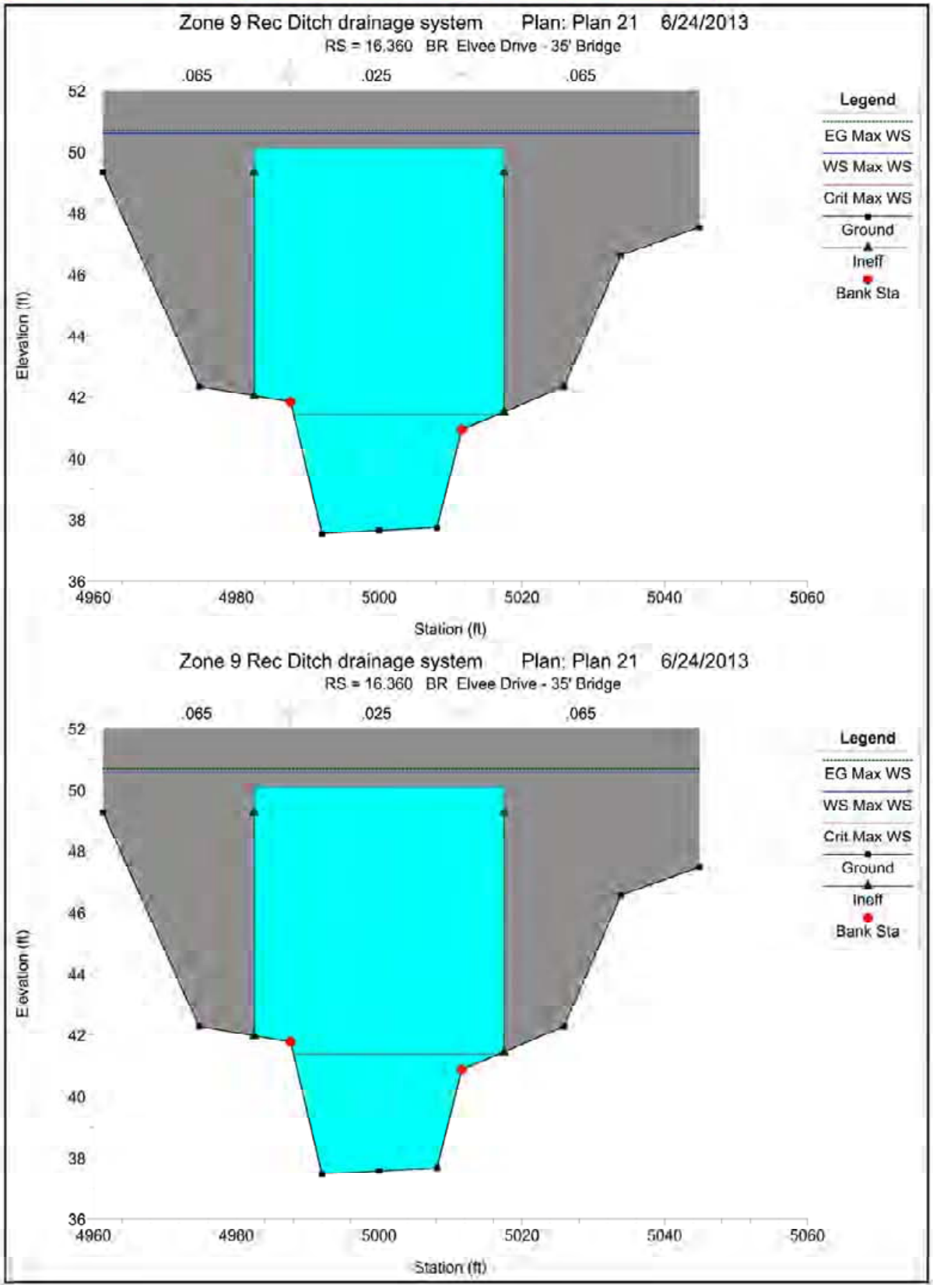
FIGURE 8A

Elvee Drive Preliminary Analysis - 35' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
35' BRIDGE, HEC-RAS SECTION 16.360
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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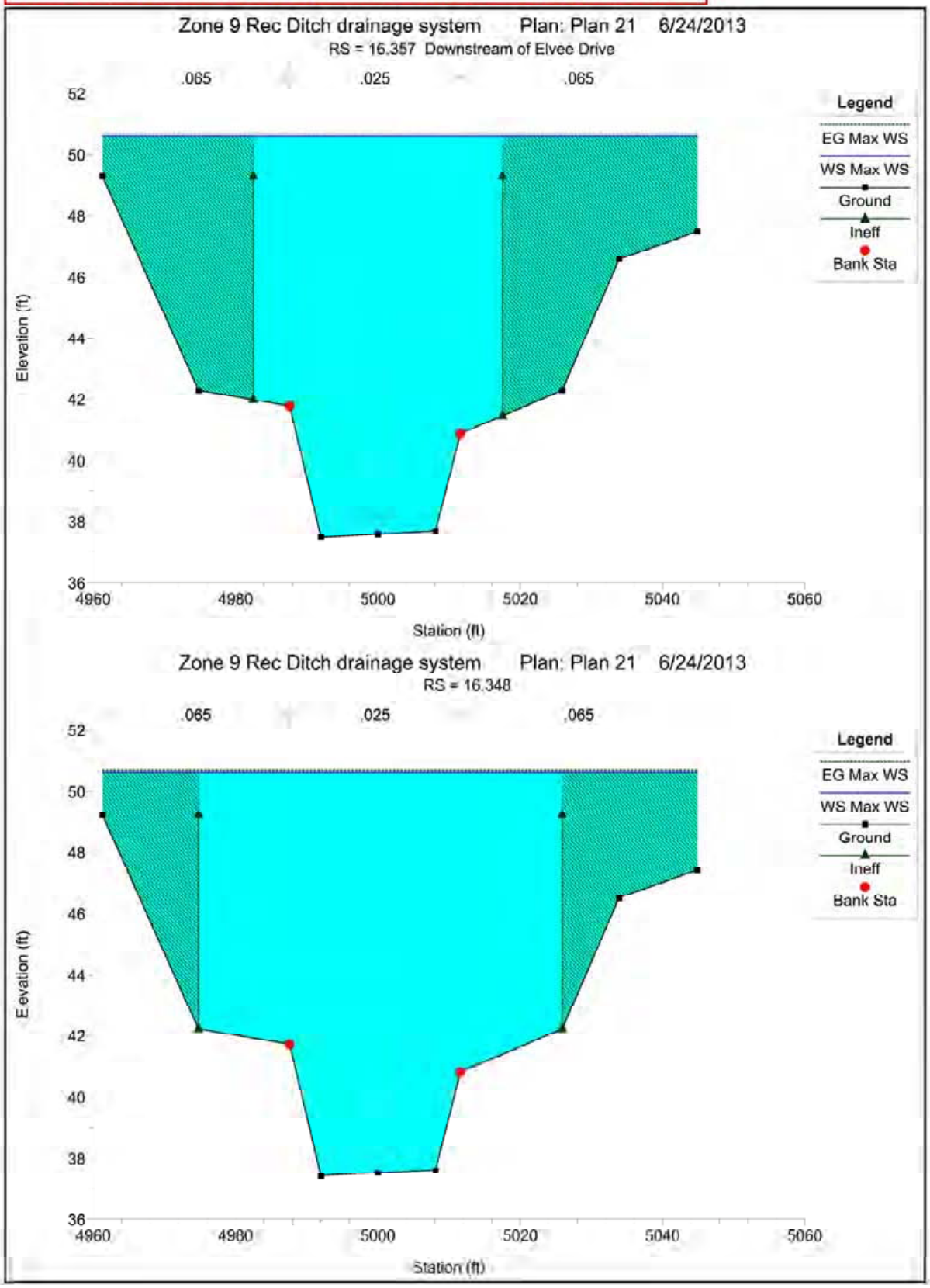
FIGURE 8B

Elvee Drive Preliminary Analysis - 35' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
35' BRIDGE, HEC-RAS SECTION 16.357 & 16.348
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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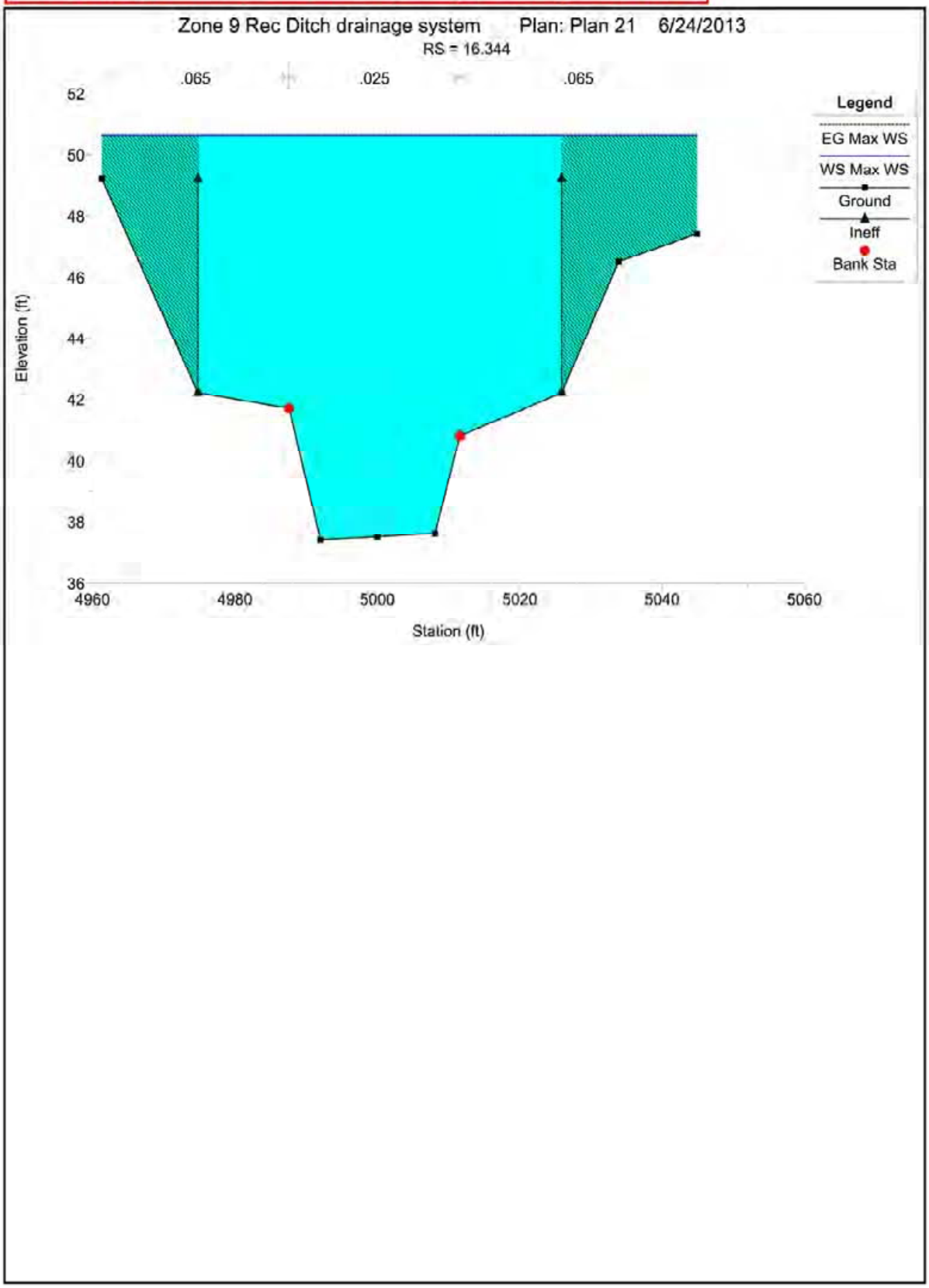
FIGURE 8C

Elvee Drive Preliminary Analysis - 35' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
35' BRIDGE, HEC-RAS SECTION 16.344
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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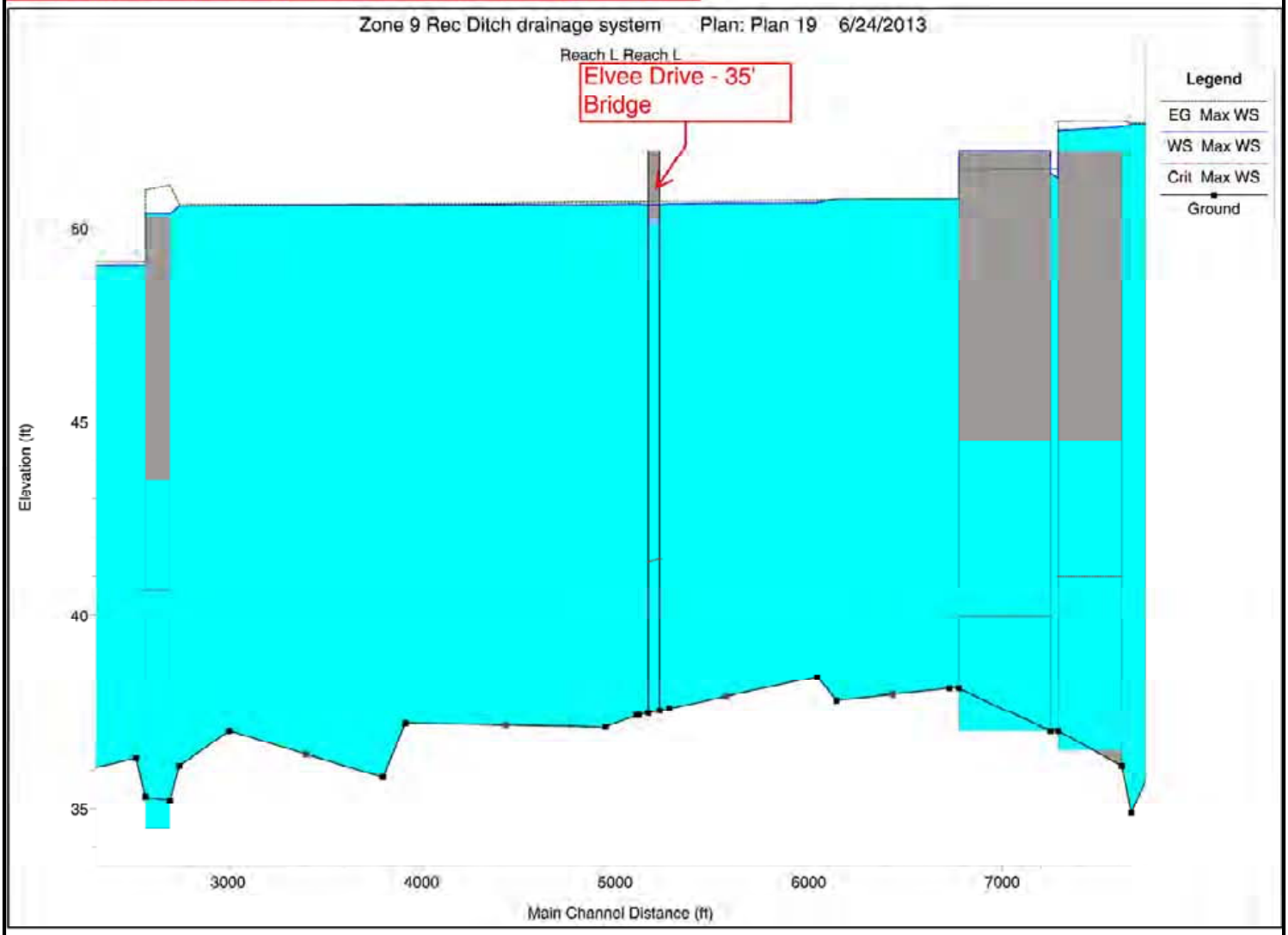
FIGURE 8D

Elvee Drive Preliminary Analysis - 35' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
35' BRIDGE, RECLAMATION DITCH PROFILE
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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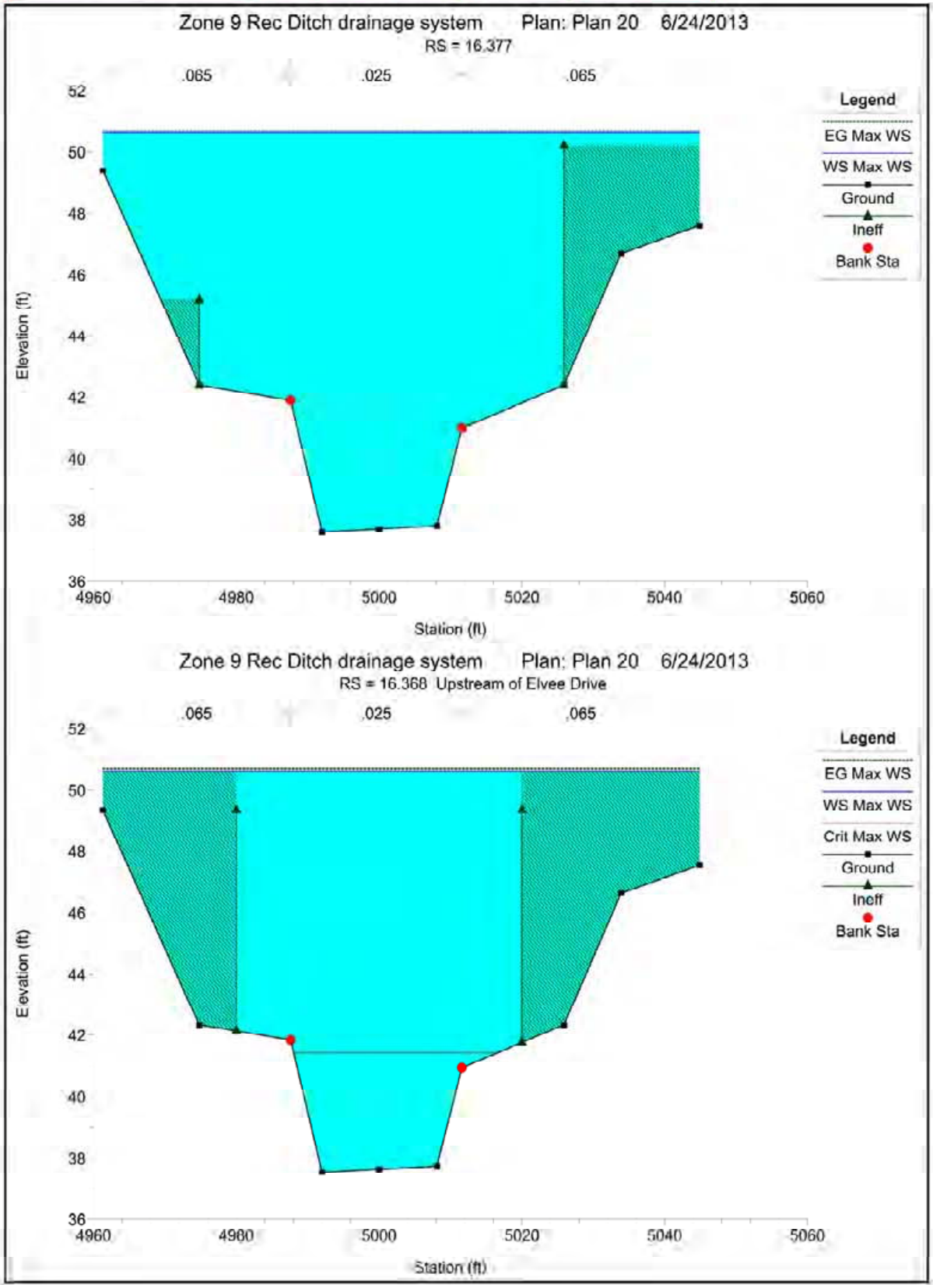
FIGURE 9

Elvee Drive Preliminary Analysis - 40' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
40' BRIDGE, HEC-RAS SECTION 16.377 & 16.368
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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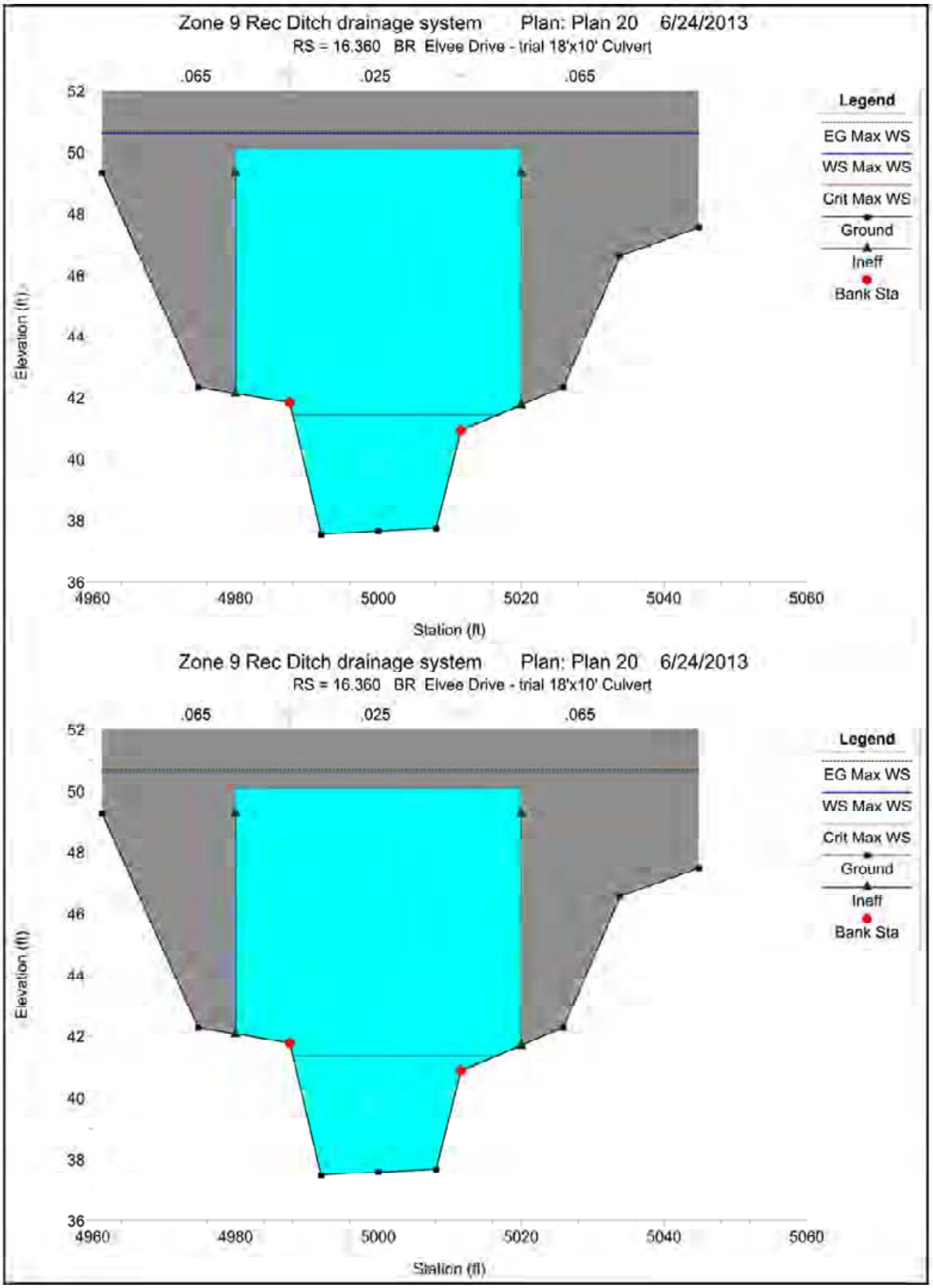
FIGURE 10A

Elvee Drive Preliminary Analysis - 40' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
40' BRIDGE, HEC-RAS SECTION 16.360
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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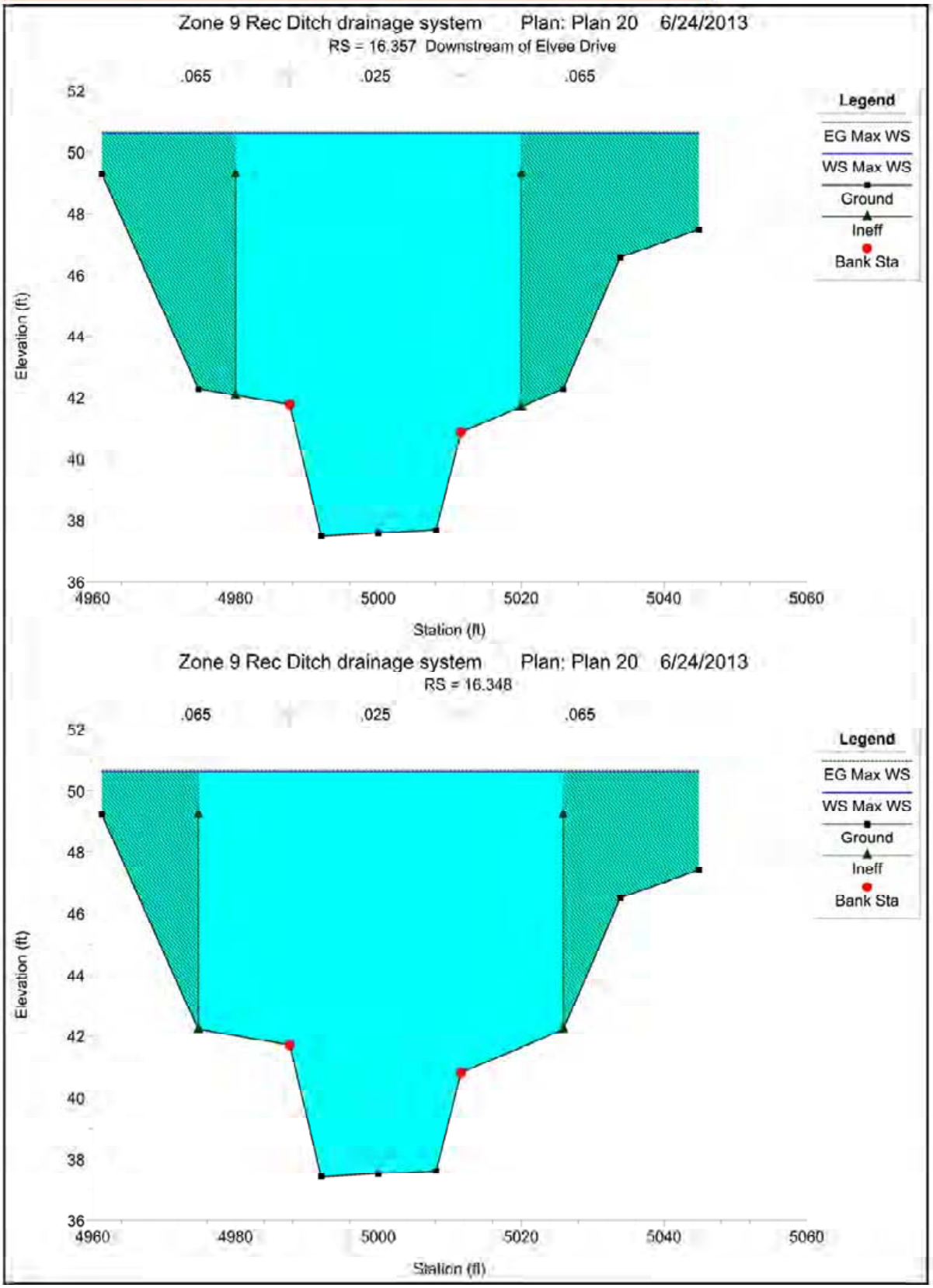
FIGURE 10B

Elvee Drive Preliminary Analysis - 40' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
40' BRIDGE, HEC-RAS SECTION 16.357 & 16.348
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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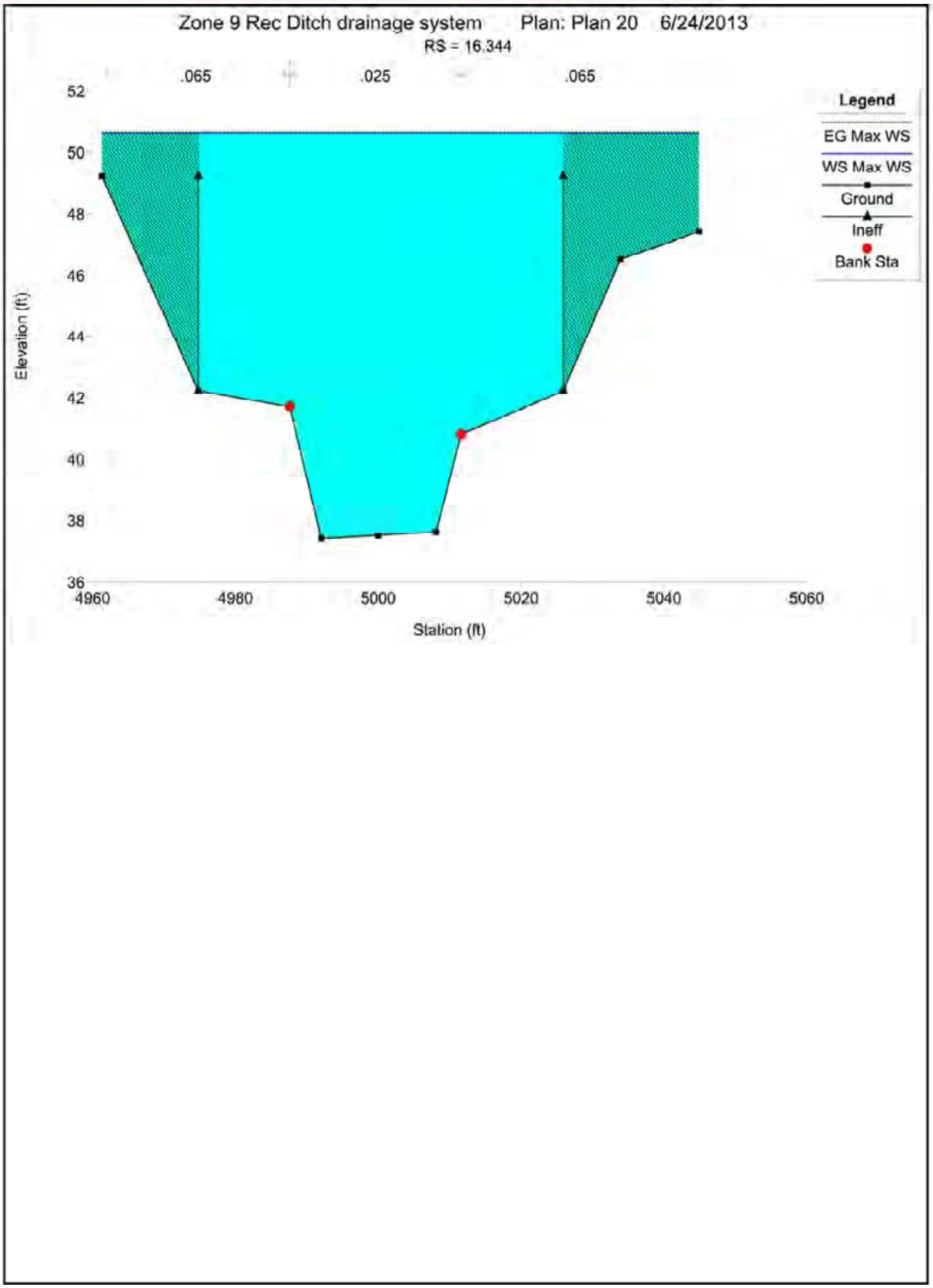
FIGURE 10C

Elvee Drive Preliminary Analysis - 40' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
40' BRIDGE, HEC-RAS SECTION 16.344
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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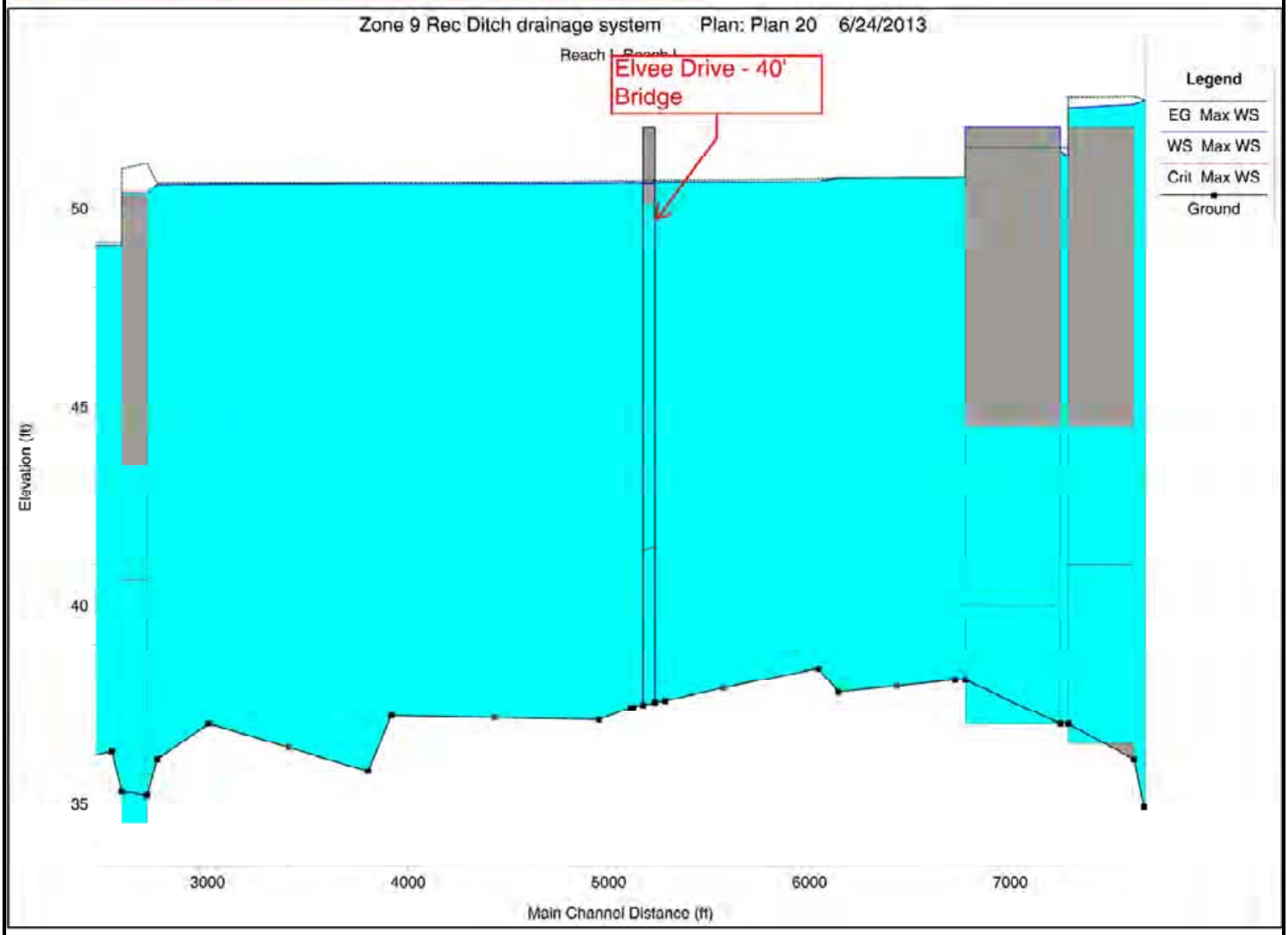
FIGURE 10D

Elvee Drive Preliminary Analysis - 40' Bridge, Existing Flow Rates



SANBORN ROAD / US 101 INTERCHANGE
ELVEE DRIVE PRELIMINARY ANALYSIS
40' BRIDGE, RECLAMATION DITCH PROFILE
SALINAS, CA
JUNE 2013

PRELIMINARY

WOOD RODGERS

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FIGURE 11

APPENDIX E

TECHNICAL MEMORANDUM
WATER QUALITY ASSESSMENT

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

TECHNICAL MEMORANDUM

To: Eda Herrera, PE

From: Jennifer Hanson, CPESC
Wood Rodgers, Inc.

Date: Revised March 17, 2014

Subject: Sanborn Road/U.S. Highway 101 Interchange Improvements Water Quality Assessment

Introduction

The purpose of this Water Quality Assessment Memorandum (WQAM) is to fulfill the requirements of the California Environmental Quality Act (CEQA), and to provide information, to the extent possible, for National Pollution Discharge Elimination System (NPDES) permitting. This document includes a discussion of the proposed project, the physical setting of the project area, and the regulatory framework with respect to water quality; it also provides data on surface water and groundwater resources within the project area and the water quality of these waters, describes water quality impairments and beneficial uses, and identifies potential water quality impacts/benefits associated with the proposed project, and recommends avoidance and/or minimization measures.

Project Overview

The City of Salinas is proposing this project to improve traffic and circulation conditions at the Sanborn Road/U.S. Highway 101 interchange. As part of the traffic impact analysis conducted for the Salinas-Ag Industrial Center Program Environmental Impact Report (EMC Planning Group 2009), a range of circulation network deficiencies that would occur with implementation of that project and under cumulative development conditions in the City as described in the 2002 City of Salinas General Plan ("general plan") were identified. In 2010, the City adopted changes to the City of Salinas Traffic Impact Fee Ordinance to incorporate additional traffic network improvements needed to ensure that the network operates at acceptable performance levels with build-out of the Salinas-Ag Industrial Center project and cumulative development in the City.

The improvements included in the proposed project are among those added to the Traffic Impact Fee Ordinance in response to the prior traffic impact analysis.

The close spacing between the existing Elvee Drive/Sanborn Road intersection and the adjacent Sanborn Road southbound off-ramp from U.S. Highway 101 causes operational deficiencies and contributes to traffic accidents. Caltrans requires a minimum spacing between a ramp intersection and the nearest public street intersection of 400 feet as a mandatory design standard or 500 feet as an advisory design standard. The proposed project is intended to correct this situation by removing the connection of Elvee Drive to Sanborn Road and providing access via an extension of Elvee Drive to Work Street instead. Eliminating the portion of Elvee Drive near Sanborn Road would also provide space for widening the southbound off-ramp to Sanborn Road.

Project Description

There is one build alternative for the proposed project and the no build alternative.

No Build Alternative: The No Build Alternative would not construct any improvements to the roadway network within the project area. Elvee drive would not be extended and the proposed improvements to the Sanborn Road/US 101 interchange would not be made.

Build Alternative: The proposed project consists of the following components, each of which is shown on Figure 2:

1. Signalize the Sanborn Road/Fairview Avenue/northbound U.S. Highway 101 off-ramp intersection, with associated striping modifications to Fairview Avenue. No widening of the northbound off-ramp is anticipated;

2. Construct a ramp meter on the northbound U.S. Highway 101 on-ramp from Fairview Avenue;

3. Extend the dedicated right-turn lane to Work Street on westbound Sanborn Road by removing the existing raised traffic island at the entrance to Pilot Travel Center and reconstructing that driveway entrance from Sanborn Road. The right–turn lane would be extended by approximately 400 feet from its existing length of 160 feet to a proposed length of 560 feet to reduce driver confusion about right turns into the Pilot Travel Center versus right turns onto Work Street;

4. Construct an extension of Elvee Drive from the existing north end of Elvee Drive (approximately 225 feet north of the Reclamation Ditch) to Work Street. Curb, gutter, and sidewalk will be constructed on both sides of Elvee Drive between the existing north end of and Work Street. Landscaping will also be constructed on both sides of Elvee Drive Extension from approximately 70 feet south of the Reclamation Ditch to Work Street;

Approximately 890 linear feet of new roadway would be constructed. The cross section of the new segment located south of the Reclamation Ditch will be similar to the segment north of the Reclamation Ditch which is 56 feet wide and includes two travel lanes with curb, gutter and sidewalk on both sides;

5. Provide an access road from west side of Elvee Drive to the Reclamation Ditch to retain existing access opportunities;

6. Reconstruct the existing driveway access located on the west side of Elvee Drive to the City-owned parcel currently being used by Granite Construction. A new driveway access to the parcel immediately north which is also owned by the city will be provided as well;

7. Evaluate the new Elvee Drive/Work Street intersection for signalization. The signalization evaluation and design will be determined upon an update to the traffic analysis and during the final design phase of the project. If a signal at this location is not currently warranted, then Elvee Drive will be stop-controlled, with provision for a future signal when warranted. The curb returns at the intersection of Elvee Drive with Work Street will be reconstructed to accommodate long tractor trucks;

8. Construct a 49-feet clear-span bridge to allow the extension of Elvee Drive to cross over the existing Reclamation Ditch. The superstructure of the bridge would be constructed of pre-cast, pre-stressed concrete slabs. No falsework construction (temporary supports to hold the bridge in place until the bridge is completed) within the Reclamation Ditch would be required, nor would any modification of the bed or bank of the Reclamation Ditch.

9. Reconstruct approximately 1,400 feet of Elvee Drive in front of Leonard's Lockers Self Storage, Caltrans Maintenance Station, and Coast Counties Peterbilt to provide two, 20-foot travel lanes and to add curb, gutter, sidewalk, and street lighting; and. 10. Reconstruct approximately 450 feet of Elvee Drive from Sanborn Road to the Coast Counties Peterbilt driveway to improve the condition of the deteriorated roadway and install asphalt dikes within the public right of way.

Watershed & Receiving Water Body Description

The project is located within the Alisal Creek Watershed and discharges directly to the Salinas Reclamation Ditch. The Reclamation Ditch crosses multiple watersheds and is located in the Central Coast Region of California, in northern Monterey County, and drains approximately 157 square miles. The "Reclamation Ditch Watershed" includes several smaller watersheds including: Tembladero Slough, Merritt Lake, Santa Rita Creek, Espinosa Lake, Gabilan Creek, Natividad Creek, Alisal Slough and Alisal Creek. The Reclamation Ditch is a series of manmade earthen channels that drain into Tembladero Slough, then the Old Salinas River Channel, and ultimately into the Pacific Ocean at Moss Landing Harbor.

The Reclamation Ditch crosses through the project area in the area of the Elvee Drive extension. To accommodate the extension, a simple-span precast slab structure will be constructed. The structure's abutments will be set back from the top of the ditch banks so that excavation of the inner, water-contacting slopes will not be necessary.

The existing project area is fairly flat and has little topographic relief, except on the new Elvee Drive extension where the roadway will be sloped towards the canal on the west side of the canal. Storm water runoff generated from the impervious surface areas within the project area discharges through drainage system which outfalls into the Reclamation Ditch. The project will create approximately1.5 acres of new impervious surface area.

The total disturbed soil area associated with the project is approximately 2.5 acres. A Risk Level Assessment, per the Construction General Permit (2009-0009-DWQ, as amended by 2010-0014-DWG) (hereafter CGP), has been completed. It was determined that this project is a Risk Level 2 project.

Regulatory Setting

The primary federal law regulating water quality is the Clean Water Act (CWA). The United States Environmental Protection Agency (EPA) has delegated to the State Water Resources Control Board (State Board) the enforcement of the CWA in California. The State Board's policies are implemented through regionally tailored Basin Plans which are issued by the local Regional Water Quality Control Boards (Regional Boards). The project is located within the Central Coast Regional Board's (Region 3) jurisdiction.

Surface water and groundwater resources, and their associated water quality, are regulated in California through many different applicable laws, regulations, and ordinances administered by local, state, and federal agencies. These regulations ensure that the hydrologic and qualitative characteristics of surface water and groundwater resources are considered, so that existing and potential beneficial uses they provide are not threatened.

All project activities need to be in compliance with, at a minimum, the following: the Federal Clean Water Act, the Porter Cologne Water Quality Control Act (California Water Code), and the Water Quality Control Plan (Basin Plan) for the Central Coast Regional Board.

Federal Laws and Requirements

Clean Water Act

In 1972 Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States (U.S.) from any point source unlawful unless the discharge is in compliance with a NPDES permit. Known today as the Clean Water Act (CWA), Congress has amended it several times. In the 1987 amendments, Congress directed dischargers

of storm water from municipal and industrial/construction point sources to comply with the NPDES permit scheme. Important CWA sections are:

Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines. Section 303 requires that the state adopt water quality objectives for surface waters. The Basin Plan contains water quality objectives that are considered necessary to protect the specific beneficial uses it identifies. Section 303(d) specifically requires the state to develop a list of impaired water bodies and subsequent numeric Total Maximum Daily Loads (TMDLs) for constituents that impair a particular water body. The Salinas Reclamation Ditch (Upper Reclamation Ditch, Alisal Creek) is identified on 303 (d) List to be impaired by fecal coliform and nitrates.

- Section 401 requires an applicant for a federal license or permit to conduct any activity, which may result in a discharge to waters of the U.S., to obtain certification from the State that the discharge will comply with other provisions of the act. (Most frequently required in tandem with a Section 404 permit request. See below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Board's administer this permitting program in California. Section 402(p) requires permits for discharges of storm water from industrial/construction and Municipal Separate Storm Sewer Systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE). It is not anticipated that any dredge or fill will placed within the Reclamation Ditch, therefore it is not anticipated that a 404 permit will be required.

State, Regional and Local Requirements

Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the State. It predates the CWA and regulates discharges to waters of the State. Waters of the State include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined and this definition is broader than the CWA definition of "pollutant". Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB adjudicates water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the

state by approving Basin Plans, TMDLs, and NPDES permits. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

National Pollution Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of storm water dischargers, including MS4s. The U.S. EPA defines an MS4 as "any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over storm water, that are designed or used for collecting or conveying storm water." The Regional Board has identified the City of Salinas (City) as an owner/operator of an MS4 pursuant to federal regulations. The Regional Board issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

The City's NPDES Permit, Order No. R3-2012-0005, NPDES Permit No. CA 0049981, Waste Discharge Requirements for City of Salinas, Municipal Storm Water Discharges (the Permit) was adopted on May 3, 2012 and became effective on June 17, 2012. The Permit covers the incorporated parts of the City and requires the following:

Compliance with receiving water limitation which adherence to water quality standards, which for storm water discharges is to be achieved through an iterative approach requiring the implementation of improved and better tailored Best Management Practices over time. Implement BMPs to reduce storm water pollutant discharges to the Maximum Extent Practicable (MEP) and protect water quality and beneficial uses.

The permit requires the City to implement BMPs to reduce pollutants in stormwater discharges to the MEP. These BMPs include erosion control, sediment control, and construction site waste management practices; the implementation of good housekeeping practices designed to control pollutants at the source, promote the use of proper waste management practices, and implement control practices to keep pollutants away from any entrance to the storm drainage system; requirements for new development and redevelopment designed to preserve pre-developed hydrologic and pollutant conditions; requirements for development planning, and watershed characterization.

This Permit required the City to develop and implement an effective Storm Water Management Plan (SWMP) that demonstrates how the City will comply with the Permit. The SWMP describes the minimum procedures and practices the City uses to reduce pollutants in storm water and non-storm water discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed project will be

designed and constructed in accordance with the guidelines and procedures outlined in the latest SWMP to address storm water runoff.

The Permit also required the City to develop design standards for new development and significance redevelopment projects. This project is considered new development and therefore will be required to adhere to the appropriate new development standards. The City's most recent design standards are contained in the City of Salinas Stormwater Development Standards, December 2013.

Water Quality Objectives

The State Board and Regional Boards are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA, and regulating discharges to ensure compliance with the water quality standards. As mentioned above, these water quality objectives are listed in Basin Plans designated for respective regions. In California, Regional Boards designate beneficial uses for all surface and groundwater in their region and then set criteria necessary to protect these uses. Water quality objectives consist of both narrative and numerical goals and are established to preserve existing and potential future beneficial uses of regional water bodies. The water quality objectives must comply with the State Anti- Degradation Policy (State Board Resolution No. 68-16).

The following beneficial uses have been assigned to the project's receiving water body: Reclamation Ditch: Contact Water Recreation (REC1), Non-contact Water Recreation (REC2), Wildlife Habitat (WILD), Warm Freshwater Habitat (WARM), and Commercial and Sport Fishing (COMM).

303 (d) List and Total Maximum Daily Loads (TMDL)

Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, the State Board identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-source point controls (NPDES permits or Waste Discharge Requirements), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

The project discharges to the Salinas Reclamation Ditch which is identified on the 303 (d) List for being impaired by Ammonia, unionized; Fecal coliform (from natural, agricultural grazing, and urban runoff/sewer sources); Low dissolved oxygen (source unknown); Pesticides (from agricultural, industrial, and nonpoint sources; Priority organics (from agricultural, industrial, non-point, urban runoff/sewer, and unknown sources); Chlorpyrifos; Copper; Diazinon; E. Coli; Nitrate; Sediment toxicity; Turbidity; Unknown toxicity; and pH.

Construction General Permit

Construction General Permit (GCP) (Order No. 2009-009-DWQ, as amended by 2010-0014-DWG), adopted on November 16, 2010, became effective on February 14, 2011. The permit regulates storm water discharges from construction sites which result in a Disturbed Soil Area (DSA) of one acre or greater, and/or are smaller sites that are part of a larger common plan of development. For all projects subject to the CGP, applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan (SWPPP).

By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least one acre must comply with the provisions of the CGP. Construction activity that results in soil disturbances of less than one acre is subject to this CGP if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop storm water pollution prevention plans; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the CGP.

The CGP separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring, and pre- and post-construction aquatic biological assessments during specified seasonal windows.

City of Salinas Stormwater Design Standards

The City of Salinas Stormwater Design Standards (SWDS), December 2013 includes a process for assessing requirement for storm water quality measurements on a project specific basis. The Design Standards require an evaluation of the impervious area that would be created and/or replaced by the project, and other aspects of the project. The SWDS include a Threshold Determination Process Spreadsheet to aid in making this determination.

Affected Environment

The quality of water in an area depends upon several factors, including land use, topography, geology, soils, surface and groundwater hydrology, and climate. Following is a brief description of these general characteristics in the project area and surroundings.

General Setting

The proposed project area (which refers to the area within which the full range of project improvements is located) is entirely within the City of Salinas (City). Regional access to the project area is provided from US 101, Fairview Avenue, Sanborn Road, Work Street, and Elvee Drive. The project area is located in a developed urban setting largely on roadways and vacant

land that primarily border industrial uses located south of US 101 and limited commercial and residential uses north of US 101 (See Figure 1 Project Vicinity Map).

Figure 2 illustrates the proposed project improvements shows the locations and types of planned improvements. A bridge will be required to allow the Reclamation Ditch to cross under the Elvee Drive extension. This new bridge will completely span the ditch and will not have any columns within the channel.

The Reclamation Ditch traverses through the project area as shown in Figure 2. The Monterey County Water Resources Agency oversees the development and implementation of water quality, water supply, and flood control projects in Monterey County, including operation and maintenance of the Reclamation Ditch. The Reclamation Ditch is part of a drainage system within the lower Salinas Valley. It is a man-made drainage channel system that was constructed in the early 1900s to drain lands for agricultural purposes, and is now also used as a flood control facility and to covey storm water runoff.

Land Use

All improvements are located within existing City and California Department of Transportation (Caltrans) rights-of-way, except a small area at the intersection of Work Street with the Elvee Drive extension, where the radius of the curb return must be increased to accommodate turning movements of large trucks, and one parcel where the new cul-de-sac on Elvee Drive will be constructed and sidewalk added. Project improvements are proposed on existing roadways that primarily border commercial and general industrial land uses, with minor commercial and residential uses at the Sanborn Road/US 101 northbound on-ramp. The proposed new extension of Elvee Drive is on vacant land designated Industrial.

Climate

The climate for the project area is characterized as having a semi-arid Mediterranean climate with year round moderate temperatures and seasonal rainfall. The City of Salinas has an average annual temperature of 57.3° Fahrenheit. During the summer, coastal fog is common in the morning; however this typically recedes over the Pacific Ocean by mid-afternoon. Average annual precipitation for the City of Salinas is 14.1 inches, with most precipitation occurring between October and April. Heavy rains can occur which can make exposed soils experience significant erosion and can cause hydromodification of unlined earthen channels. Wind is also a common feature to the local climate; and as such, exposed soil or construction material scan be susceptible to wind erosion. As temperatures rise inland, cool marine air is spread into the Salinas Valley resulting in strong winds across and down the valley.

Topography and Soils

The City of Salinas lies in the northern portion of the Salinas Valley, on a flat alluvial plain between the Gabilan and Santa Lucia Mountain Ranges. The elevation within the city varies from 40 feet to 120 feet. The project area is approximately 52 feet above mean sea level. The

existing project area is fairly flat and has little topographic relief, except in locations of minor cuts or minor fills to accommodate the roadway network.

The dominant soil type within the project area is Cropley silty clay. According to the United States Department of Agriculture, Corpley silty clay is: moderately well and well drained; has medium to very high runoff; and slow permeability. The k factor for the dominant soil type within the project area is 0.24. This indicates that the soil is moderately susceptible to particle detachment and erosion.

Receiving Water

The project's receiving water body is the Reclamation Ditch traverses through the project area as shown in Figure 2. The Monterey County Water Resources Agency oversees the development and implementation of water quality, water supply, and flood control projects in Monterey County, including operation and maintenance of the Reclamation Ditch. The Reclamation Ditch is part of a drainage system within the lower Salinas Valley. It is a man-made drainage channel system that was constructed in the early 1900s to drain lands for agricultural purposes, and is now also used as a flood control facility and to covey storm water runoff.

The Reclamation Ditch Watershed includes entire watershed above the Potrero Road tide gates (near Moss Landing) on the Old Salinas River Channel, excluding the influence from the Salinas River itself via the Old Salinas River Channel. The Reclamation Ditch Watershed thus includes the watersheds of: Tembladero Slough, Merritt Lake, Santa Rita Creek, Espinosa Lake, Gabilan Creek, Natividad Creek, Alisal Slough and Alisal Creek.

The following beneficial uses have been assigned to the project's receiving water body: Reclamation Ditch: Contact Water Recreation (REC1), Non-contact Water Recreation (REC2), Wildlife Habitat (WILD), Warm Freshwater Habitat (WARM), and Commercial and Sport Fishing (COMM).

Groundwater

According to the Monterey County Groundwater Management Plan (May 2006), the project area is located within the Salinas River Basin which encompasses approximately 561 square miles and generally has been separated into five hydrologically-linked subareas: the Pressure Area, East Side Area, Forebay Area, Arroyo Seco Area, and the Upper Valley Area. The project lies within the Pressure Area, which extends from offshore beneath Monterey Bay to Gonzales. In this area, clay divides the groundwater basin into an upper aquifer, a lower aquifer, and a deep aquifer. Groundwater in the Salinas River Basin has historically been over drafted to meet agricultural demand; which has resulted in seawater intrusion. Along with water quality issues associated with seawater intrusion, long-term agricultural production in the Salinas Valley has contributed to an extensive non-point-source nitrate problem.

Environmental Consequences

Potential impacts to water quality can be attributed to soil erosion and suspended solids being introduced into surface waters. The construction activities necessary to complete the proposed project may have an impact on the water quality of waterways without adequate mitigation measures. Commonly used construction activity BMPs will be required to minimize any potential impacts and will be outlined in the Stormwater Pollution Prevention Plan (SWPPP).

Potential Impacts to Water Quality

Potential impacts on receiving waters associated with storm water discharges are typically related to one of the following:

- Short-term changes in water quality during and after storm events including temporary increases in the concentration of one or more pollutants, toxics or bacteria levels.

- Long-term water quality impacts caused by the cumulative effects associated with repeated storm water discharges from a number of sources.

- Physical impacts due to erosion, scour, and deposition associated with increased frequency and volume of runoff that alters aquatic habitat.

Short Term Impacts:

During construction, the proposed project has the potential to cause temporary short term water quality impacts due to grading activities, traffic detours, and removal of existing vegetation, which can cause increased erosion. Storm water runoff from the proposed project may transport pollutants into the current stormwater drainage system and/or the Reclamation District if best management practices (BMPs) are not properly implemented and maintained. The project will create approximately 2.5 acres of disturbed soil area during construction and therefore will be required to comply with the Construction General Permit and develop and implement a SWPPP.

The primary pollutants of concern associated with require construction activities are described below:

- Sediment: There is a high potential for sediment discharges to occur during grading and landscaping activities. During grading slope surface protection systems (such as existing vegetation or hard surfaces) are removed, exposing erodible sediment beneath. During landscaping activities it is common that large areas of exposed sediment occur while irrigation is being installed or planting is occurring.

- Oil, grease and petroleum products: The use of heavy equipment during construction increases the likelihood that oil, grease, or other types of petroleum products come into

contact with storm water runoff. Fueling or maintenance of construction vehicles will also occur within the proposed project site during construction resulting in a risk of accidental spills or releases of fuels, oils, or other potentially toxic materials.

- Trash: Trash is a common pollutant found on construction projects. It can be related to illegal dumping or as a direct result of construction activities.
- Chemicals and other Types of Waste: Many different chemicals will be utilized for construction including but not limited to: paints, solvents, curing compounds, fertilizers, pesticides, etc.

Long Term Impacts:

Permanent impacts to water quality could occur over months or years following construction of the project. The primary causes of these impacts would be from increased storm water runoff rates and volumes, increased storm water pollutant loads, changes in riparian and wetland areas, and spreading of invasive plant species that could adversely affect riparian areas. To the maximum extent practical, the proposed highway realignment will be constructed to be as hydraulically disconnected from the watersheds it crosses as possible. However, there are several potential ways a highway can permanently impact water quality if not designed to minimize and mitigate for these potential impacts. Potential permanent impacts include:

- **Roadway Pollutants**: Increased pollutant discharges from the road surface during storm events including oil, trash, dust, brake linings, and hazardous materials spills during traffic accidents. The installation of permanent storm water treatment BMPs such as vegetated swales/strips and or other treatment mechanisms will minimize the discharge of highway pollutants to waterways. These features will be incorporated into the project's design.

- **Erosion/Sediment**: Wherever concentrated flow from the roadway surface cannot be adequately controlled, erosion may occur. Erosion from concentrated flow can cause gullies, alter channel geomorphology, change the hydrology of receiving water body, and discharge sediment above background levels to waterways. The project area, when disturbed, is expected to have a moderate erosion potential.

- **Impervious Surface:** Proposed alternatives will add approximately 1.5 acres of impervious surface to the project area. The proposed project will be designed to minimize increases in storm water discharge rates by installing appropriate permanent storm water treatment BMPs and other measures to encourage the storage and infiltration of storm water within the right-of-way.

- **Bridge Replacement**: To accommodate the new portion of Elvee Road a bridge will be constructed over the Reclamation Ditch. Bridge construction could result in significant changes to a particular creek's geomorphology. However, the bridge proposed for this project will not result in any modifications to the existing channel and will free-span the channel. The bridge will be designed to pass flood waters and allow unimpeded flow of the ditch, as verified by the Monterey County Water Agency.

The City currently has a SWMP that when implemented addresses runoff impacts on water quality standards, development of TMDLs, and watershed planning.
The proposed project design will incorporate permanent erosion control and source control elements to ensure that storm water runoff does not cause soil erosion. Implementation of the project-specific long-term mitigation measures, design BMP, and if necessary, treatment BMP, would also reduce or avoid impacts on water quality.

Avoidance and Minimization Measures

To address the potential temporary and permanent impacts related to the construction of the proposed project the following avoidance and minimization measures are recommended:

Avoidance Measures for Short Term Impacts:

The project will create greater than one acre of disturbed soil area and as such, the project will be required to obtain coverage under the Construction General Permit and development and implement a SWPPP. The SWPPP will identify the temporary construction site BMPs that will be implemented to reduce or eliminate the potential for polluted storm water discharges to occur or non-authorized nonstorm water discharges. The contractor will be required to ensure the SWPPP is effectively controlling storm water pollution at all times.

Erosion Control BMPs: Erosion Control BMPs will be especially important to ensure sediment laden water is not discharged into the canal. Preservation of existing vegetation will be implemented, where appropriate, to minimize the amount of exposed erodible soil and to reduce the need for soil stabilization practices. Areas that will be disturbed as a result of construction activities will be stabilized with Soil Stabilization BMPs, also referred to as erosion control. Soil stabilization is a source control measure that is designed to keep soil particles from detaching and becoming transported in storm water runoff.

Stabilization practices may include both soft surface protection systems and hard surface protection systems. Soil Stabilization BMPs implemented on this site may consist of hydro-seeding, vegetation planting, mulch, geotextiles, plastic covers, erosion control blankets, and soil binders. These practices are implemented to reduce the amount of soil (sediment) that is removed from the site due to precipitation. Effective soil cover shall be provided for inactive areas and all finished slopes, open space, utility backfill and completed lots. Inactive areas of construction are

areas of construction activity that have been disturbed and are not scheduled to be re-disturbed for at least 14 days.

Sediment Control BMPs: Sediment controls are structural measures that are intended to complement and enhance Soil Stabilization BMPs and reduce sediment discharges from this construction site. The sediment controls that will be considered for this project were designed to intercept and filter out soil particles that may be detached and transported in storm water runoff as a result of construction activities. Sediment Control BMPs such as drain inlet filters, silt fences, fiber rolls, temporary flow conveyance systems, sediment basins and traps, check dams, and street sweeping should be used during construction.

Wind Erosion Control BMPs: Wind has the potential to transport erodible soil particles that are not stabilized or controlled with sediment control or soil stabilization practices. The potential for wind erosion to occur on this construction project will be eliminated or reduced through the implementation of the following practices: dust control, soil stabilization, and materials management.

Tracking Control BMPs: Tracking controls should be considered throughout the duration of construction to eliminate the potential for sediment to be transported from the site as a result of vehicles and construction equipment entering and exiting the site. Tracking controls may consist of the following practices: street sweeping and vacuuming, stabilized construction entrances and exits, and stabilized construction roadways. Sweeping should occur as necessary, depending on storm and traffic frequency and as required by the City.

Vehicle and Equipment Best Management Practices: Vehicles and construction equipment will be used to complete construction activities on this site. Below are descriptions of pollution prevention practices that shall be utilized to address pollutants commonly associated with construction vehicles and equipment:

- **Construction Vehicles and Equipment Storage:** Construction equipment stored on-site shall be kept within designated staging areas. Construction vehicles and equipment will be kept free of leaks and will be stored away from drainages and water bodies. Leaks must be cleaned up immediately and leaked material shall be disposed of properly.

- **Construction Vehicles and Equipment Maintenance:** To reduce the potential for pollutants to come in contact with storm water, equipment maintenance and cleaning shall be done off site when possible. In a reasonable manner, vehicles and equipment shall be maintained in good working condition to prevent leakage.

- **Construction Vehicles and Equipment Fueling:** If possible, fueling may be conducted off site due to size of construction site and staging requirements. If fueling activities must be conducted on site, a fueling area with a protective perimeter barrier must be established in accordance with all applicable rules and regulations.

- **Construction Vehicles and Equipment Washing:** If washing must occur on site, designated bermed wash areas should be used to prevent pollutant storm water discharges from the site. Water use will be minimized to eliminate potential non-storm water discharges and to minimize potential for erosion to occur from non-storm water runoff.

Nonstorm Water Management: Non-storm water is water that is generated from sources other than precipitation. Non-authorized non-storm water discharges are prohibited by the Construction General Permit. Authorized non-storm water discharges (identified in the Construction General Permit) are allowed if the non-storm water to be discharged is free of pollutants, with the exception of sediment, and the amount of water to be discharged is less than 0.25 million gallons per day. Measures shall be implemented to control all non-storm water discharges during construction.

Dewatering: Minor dewatering may be required during the construction of the footings for the Elvee Drive structure over the Reclamation Ditch. Dewatering and ponded water management applies to areas where storm water has collected in low spots, trenches or other depressions and needs to be removed to proceed with construction activities or for vector control. During construction the contractor should develop a site specific dewatering plan to address: sediment removal, pumping requirements, and discharge requirements. Below are the sediment removal options that should be considered during dewatering activities.

Avoidance Measures for Long Term Impacts:

The City of Salinas SWDS requires the evaluation of post construction storm water requirements that are based upon the increase in impervious surface over the existing condition. The project will create approximately 1.5 acres of new impervious surface area and is therefore subject to the following requirements:

- **Requirement 1:** Minimize impervious areas; limit disturbance of creeks and natural drainages features, minimize compaction of highly permeable soils; limit clearing and grading of native vegetation to the minimum needed to build the project; and incorporation of source control BMPs.

- **Requirement 4 (15,000 square foot threshold):** Requirement 4 is applied whenever Requirement 5 is applied. Requirement 4 will require the project to complete the following:
    - For redevelopment projects outside of approved Urban Sustainability Areas, runoff retention requirements apply to all created impervious area and half of all replaced impervious area. For redevelopment projects within an approved Urban Sustainability Area, runoff retention requirements apply to all created impervious area and retention volume associated with replaced impervious area shall be maintained or replaced in kind.
    - Where the design infiltration rate is greater than 0.3 inches per hour, projects shall prevent offsite discharge from all rainfall events with up to 0.98 inches of rainfall in 24 hours using infiltration. (0.98 inches is the 95th percentile rainfall event.
    - Where the design infiltration rate is less than or equal to 0.3 inches per hour, a low flow control system with the capacity of no more than 0.01 cfs per tributary acre is permitted. The procedures described in Section 4.5 may be used to size the flow control facilities.
    - A locally or regionally calibrated continuous simulation model7 that results in equivalent effective on-site runoff volume reduction and peak flow mitigation (no increase in 5-, 10-, 25- or 100-year rainfall events) as would be achieved by either option above may be used to support an alternative design configuration.
    - Provide Stormwater Control Plan
    - Provide Operations and Maintenance Plan

- **Requirement 5:** For all projects creating or replacing ≥ 22,500 square feet of impervious area the following requirements, in addition to those in Requirements 1 and 4, apply:
    - Post Development Peak Flows shall not to exceed pre-project peak flows for 2- through 100-year rainfall events.

- **Road Projects:** For project that add traffic lanes resulting in 50 percent or more alteration of impervious surface to an existing street or road, runoff from the entire project, including existing, new and/or replaced impervious surface, must be included in the treatment system design.

  For projects that add traffic lanes resulting in less than 50 percent alteration of impervious surface to an existing street or road, runoff from the new and/or replaced impervious surface area must be included in the treatment system design. If the runoff from the existing lanes cannot be separated from the runoff generated by the additional lanes, any onsite treatment shall be designed and sized to treat the runoff from the entire road.

The existing project area is 6.7 acres and the proposed increase in impervious surface is 1.5 acres. Therefore, treatment of the entire project area is not required unless runoff from the existing portion of the road cannot be separated from the new impervious surface area.

- Storm water treatment measures, such as biofiltration planters, stormwater storage facilities, and infiltration basins will be incorporated into project to address Requirements 4 and 5. BMPs shall be designed accordance to the SWDS. A Preliminary Water Control Plan will be prepared and a preliminary water control meeting will be held when the design plans are 50% completed.

APPENDIX F

SANBORN ROAD/US 101 RAMPS INTERSECTIONS AND ELVEE DRIVE IMPROVEMENTS, SALINAS TRANSPORTATION IMPACT ANALYSIS MEMORANDUM

Technical Memorandum

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

To:	*City of Salinas* – Rob Russell, Eda Herrara
Cc:	*Wood Rodgers, Inc.* – Ali Hemmati
From:	*Wood Rodgers, Inc.* – Ravi Narayanan, PE, TE, Mario Tambellini
Date:	March 7, 2014 (Updated March 20, 2014)
File:	J:\Jobs\8081_020_Sanborn101Ramp\Traffic\Memo\8081_US101Sanborn_TOA_20140320.docx
Job No.:	8081.020
RE:	**Sanborn Road / US 101 Ramps Intersections and Elvee Drive Improvements, Salinas Transportation Impact Analysis Memorandum**

INTRODUCTION

The City of Salinas has currently initiated an improvement project that, among other proposed features, will construct operational improvements at the ramp terminal intersections at Sanborn Road interchange with U.S. Route 101 (US 101), and Elvee Drive local roadway circulation improvements. To that end, the City has initiated an environmental disclosure and documentation process. This technical memorandum has been prepared by Wood Rodgers in order to summarize the traffic impacts of the proposed traffic-related features of the project.

PROJECT DESCRIPTION

The following represents a summary of traffic operations related project features:

A. Signalize the Sanborn Road/Fairview Avenue/northbound U.S. Highway 101 off-ramp intersection, with associated striping modifications to Fairview Avenue.

B. Restrict Elvee Drive access for the current US 101 SB Ramps / Sanborn Road /Elvee Dr intersection to right-in/right-out only.

C. Construct a ramp meter on the northbound U.S. Highway 101 on-ramp from Fairview Avenue;

D. Extend the dedicated right-turn lane to Work Street on westbound Sanborn Road by approximately 400 feet, from its existing length of 160 feet to a proposed length of 560 feet.

E. Construct an extension of Elvee Drive from the existing north end of Elvee Drive (approximately 225 feet north of the Reclamation Ditch) to Work Street. Approximately 890 linear feet of new roadway would be constructed.

F. Provide an access road from west side of Elvee Drive to the Reclamation Ditch to retain existing access opportunities;

G. Reconstruct the existing driveway access located on the west side of Elvee Drive to the City-owned parcel currently being used by Granite Construction. A new driveway access to the parcel immediately north which is also owned by the city will be provided as well.

PROJECT SCENARIOS

This study examines the following two scenarios:

"No-Build" Condition – This scenario assumes existing facilities are retained without any capacity, control, or timing improvements. The observed deficiencies associated with this scenario are part of the "Need and Purpose" for the proposed operational improvement project.

"With-Project" Condition – This scenario includes construction of project improvements as listed in the previous section.

PROJECT OPENING DAY (YEAR 2015) OPERATIONS

This study evaluates the proposed operational improvements for acceptable operations under "project opening day" conditions (i.e. the time the improvements are anticipated to be operational). Per the current project schedule and discussions with City staff, it is anticipated that the proposed ramp terminal improvements will likely complete construction and be operational no sooner than Year 2015. Therefore, "project opening day" is regarded as Year 2015 in this analysis. The *Salinas Ag-Industrial Center Traffic Impact Analysis* developed Year 2030 traffic volume forecasts for the study intersections based on the AMBAG travel demand forecasting model. A linear interpolation between the study's Year 2009 traffic counts and the Year 2030 traffic volume forecasts was performed to yield Opening Day (Year 2015) traffic volume forecasts at the study intersections.

A discussion of existing conditions, including accident data, is included in the *US 101/Sanborn Road Interchange Ramps Operational Improvements Traffic Operations Technical Memorandum* (Wood Rodgers, dated August 23, 2011) included in **Appendix Exhibit A.** Based on a review and comparison of Caltrans ADT counts from year 2009 (the then existing conditions as presented in August 2011 memo) to latest available counts from year 2012, the traffic volume demands on US 101 mainline and Sanborn Road ramps have remained unchanged through recent years. US 101 mainline, in the vicinity of Sanborn Road Interchange, carried approximately 58,000 vehicles per day in 2009 as well as through year 2012. Therefore, "year 2012" traffic operations without and with proposed improvements as presented in the August 2011 traffic memo are now regarded as updated Project Opening Day (2015) traffic operations at this time.

OPENING DAY (YEAR 2015) INTERSECTION OPERATIONS

Table 1 summarizes the Opening Day (year 2015) conditions intersection traffic operations analysis results under the "No-Build" scenario and the proposed "With-Project" scenario during the AM and PM peak hours.

Table 1. Project Opening Day (Year 2015) Conditions Intersection Level of Service

		"No-Build" Condition					"With-Project" Condition				
			AM Peak Hour		PM Peak Hour			AM Peak Hour		PM Peak Hour	
#	Intersection	Control Type[1]	Delay	LOS	Delay	LOS	Control Type[1]	Delay	LOS	Delay	LOS
1	US 101 SB Ramps / Sanborn Rd / Elvee Dr.	Signal	29.2	C	**44.5**	**D**	Signal	20.6	C	30.4	C
2	US 101 NB Loop Off-Ramp / Sanborn Road / Fairview Avenue	TWSC	**70.8**	**F**	**Overflow**	**F**	Signal	10.8	B	14.6	B

Notes:
1. For TWSC intersections, worst-case movement delay (in seconds/vehicle) is reported. For signalized intersections, the overall average intersection delay (in seconds/vehicle) is reported.
SB = Southbound, NB = Northbound
***Bold text** indicates deficient traffic operations based on LOS C threshold.*
***Overflow** indicates very high projected levels of delay (the model's upper limit has been reached).*

As shown in Table 1, the US 101 Southbound Ramps / Sanborn Road / Elvee Drive intersection is projected to operate at LOS D under "Year 2015 No-Build", PM peak hour conditions. In addition, the US 101 Northbound Loop Off-Ramp / Sanborn Road / Fairview Avenue intersection is projected to operate at LOS F under "Year 2015 No-Build", AM peak hour and PM peak hour conditions.

With the proposed improvements, both the northbound and southbound ramp intersections are projected to operate at LOS B/C under year 2015 AM peak hour and PM peak hour conditions. At the southbound ramps intersection, traffic operations would improve due to the restriction of left turns to/from Elvee Drive. At the northbound off-ramp intersection, installation of a new traffic signal would improve traffic operation for the side-street/ramp movements.

PROJECT TRAFFIC IMPACTS EVALUATION

The main traffic operations related project features described above were reviewed/evaluated for potential traffic impacts. **Table 2** summarizes their Traffic/Transportation Impacts.

Table 2. Traffic/Transportation Impacts of Project Features

ID	Project Feature	Traffic Impact Discussion	Is Traffic Impact Significant?
A	US 101 NB Loop Off-Ramp / Sanborn Road / Fairview Avenue Intersection Improvements	The existing deficiencies and the need for operational capacity improvements at the US 101/Sanborn Road NB Loop Off-ramp interchange intersection was originally identified in the *Salinas Ag-Industrial Center EIR Traffic Impact Analysis* (dated December 2008). Subsequently the proposed operational improvements at this ramp terminal intersection were included in the City of Salinas *Traffic Fee Ordinance (TFO) Update 2010* as Project 37A. Subsequently in 2011, as part of a Caltrans *Project Initiation Document* (PID) process initiated by the City to design and construct the proposed operational improvements, a *Technical Memorandum* (Wood Rodgers, dated August 23, 2011) was prepared, that evaluated traffic operations specific to the ramp terminal improvement features proposed at the time. The aforementioned memo is included in its entirety in **"Appendix Exhibit A".** With the proposed project improvements, both US 101 Ramp terminal intersections with Sanborn Road are projected to operate at acceptable opening day (year 2015 AM and PM) peak hour LOS "C" or better conditions, and project impacts are considered less than significant.	No, with proposed improvements in place
B	US 101 SB Ramps / Sanborn Road / Elvee Drive Intersection Improvements	With the proposed project improvements, the Sanborn Road / Elvee Drive intersection is projected to operate at peak hour LOS "C" conditions. Access restriction of the left-turn ingress/egress movements at the Sanborn/Elvee intersection is projected to reduce project impacts to less than significant.	No, with proposed improvements in place
C	Ramp Metering of US 101 NB Loop On-ramp from Fairview Ave.	The existing deficiencies and the need for operational/safety improvements for the short "weave" section between the US 101 NB loop on-ramp "merge" (from Fairview Ave.) and the US 101 loop off-ramp "diverge" (to Sanborn Road) was originally identified in the *Salinas Ag-Industrial Center EIR Traffic Impact Analysis* (dated December 2008). A frontage road distributor-collector system was first proposed in the EIR as a feasible mitigation to alleviate the weave issue. Subsequently, pursuant to discussions between Caltrans and City staff, US 101 NB loop on-ramp "metering" was considered the preferred mitigation, and included as part of City of Salinas *Traffic Fee Ordinance (TFO) Update 2010* under Project 37A. The August 2011 Traffic Memo as well as the *US 101 Mainline Corridor Traffic Study* (August 2011) subsequently completed for the City identifies ramp metering as an adequate operational improvement through year 2020. Therefore, with the proposed improvements, project impacts are considered less than significant.	No, with proposed improvements in place

D	Sanborn Rd WB right-turn lane improvements	These operational improvements are proposed to provide safe and efficient channelization of westbound right-turn movements from Sanborn Road to the Pilot Travel Center and to northbound Work Street. This feature is not projected to cause a significant adverse traffic impact.	No, with proposed improvements in place
E	Elvee Drive Extension/Work St Intersection Control Improvements	Construction of a two-lane roadway extension of Elvee Drive from the existing north end of Elvee Drive to intersect with Work Street/Elvee Court intersection is a part of the City of Salinas' General Plan Circulation improvements and is included in *TFO 2010 Update* as Project #37B. This planned local street extension is intended to provide improved emergency/secondary access to existing/planned uses fronting Elvee Drive and improve circulation within the immediate area. This improvement is as such considered a planned GP circulation improvement whose impacts are already covered within the City's GP EIR. No incremental adverse traffic impact is projected with this proposed project feature. The new Work Street/Elvee Drive/Elvee Court intersection was preliminarily evaluated for signal warrants. Per the August 2011 traffic memo, Elvee Drive is projected to carry 53 vehicles in the AM peak hour and 66 vehicles in the PM peak hour by project opening day (2015). If all of this traffic was rerouted via the new proposed Elvee Drive extension to Work Street, the side-street traffic volume demands at the Work/Elvee intersection are projected to be still below the minimum threshold of 100 vehicles needed to meet California MUTCD 2012 based Peak Hour Warrant 3. Therefore, the Work Street/Elvee Drive intersection is not projected to meet the signal warrants by Project Opening Day (2015). Since a signal at this location is not anticipated to be warranted with Elvee Drive Extension, the Elvee Drive approach to Work Street is proposed to remain side-street stop-sign controlled, with provision for a long-term (cumulative) future signal only when warranted. The curb returns at this intersection are proposed to be reconstructed to accommodate long tractor trucks. With these proposed improvements, project impacts are projected to be less than significant.	No
F	Reclamation Ditch Access Roads	These proposed roads are not projected to carry significant traffic or cause an incrementally significant adverse traffic impact.	No
G	Granite's Driveway Reconstruction	On the west side of Elvee Drive, the existing driveway access to the City-owned parcel currently being used by Granite Construction will be reconstructed. A new driveway access to the parcel immediately north will be provided. These driveway reconstruction projects are not projected to cause an incrementally significant adverse traffic impact.	No

Appendix

Exhibit A: US 101/Sanborn Road Interchange Ramps Operational Improvements Traffic Operations, *Technical Memorandum* (Wood Rodgers, dated August 23, 2011)

Technical Memorandum

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

To:	*Caltrans District 5* – David Silberberger, John Fouche *City of Salinas* – Rob Russell, James Serrano *Transportation Agency for Monterey County* (TAMC) – Hank Myers, Don Bachman
Cc:	*Wood Rodgers, Inc.* – Ali Hemmati, Ravi Narayanan
From:	*Wood Rodgers, Inc.* – Luke McNeel-Caird, P.E., LEED GA
Date:	August 23, 2011
File:	8081_US101Sanborn_TOA_20110823.doc
Job No.:	8081.020
RE:	**US 101 / Sanborn Road Interchange Ramps Operational Improvements, City of Salinas Traffic Operations Analysis**

INTRODUCTION & BACKGROUND

The City of Salinas intends to address existing traffic operational improvements necessary at the Sanborn Road interchange with U.S. Route 101 (US 101). The *Salinas Ag-Industrial Center Traffic Impact Analysis Final Draft Report and Exhibits* (Higgins Associates, December 23, 2008) identified existing deficiencies and the need for operational improvements at the US 101/Sanborn Road interchange. A series of meetings were held between the City of Salinas, Caltrans District 5, and the Salinas Ag-Industrial Center development project applicants to identify a set of improvements at the US 101/Sanborn Road interchange. The purpose of this memo is to further evaluate the set of improvements identified and provide traffic operations analysis results in support of the Caltrans process for design and construction of the identified improvements. The City of Salinas proposes to construct the improvements using local funding from the traffic impact fee program and other local funding sources as needed.

This preliminary traffic operations analysis completed by Wood Rodgers is intended to provide the City, Caltrans, and TAMC with an evaluation of operations at the study interchange ramps both with and without the proposed operational improvements. The term "project", as used in this memorandum, refers to the proposed improvements/modifications to the US 101 interchange ramp terminal intersections at Sanborn Road. The project vicinity map and the project location are illustrated on **Figure 1**. An illustration of existing (2009) traffic volumes at the study interchange intersections is shown on **Figure 2.** It should be noted that throughout this memo, US 101 (along with Fairview Avenue and Elvee Drive) is referenced in the northbound and southbound direction, while Sanborn Road is referenced in the eastbound and westbound direction.

It is envisioned that this technical memorandum will be updated/revised through the course of the study process, as more project information becomes available and the project moves forward through subsequent stages of design evaluation and approvals. As needed, the finalized version of this memorandum will be ultimately attached as a "Traffic Operations Memo" exhibit to the Caltrans application.

CURRENT SETTING

The City of Salinas is located in Monterey County, approximately 20 miles east of the City of Monterey. The City is located along US 101, with the US 101/Sanborn Road interchange located within the southeast portion of the City. **Figure 1** illustrates the project area and vicinity map. The following describes the study area roadway system.

US 101 is a major freeway of statewide importance that traverses north-south along coastal California. US 101 serves as the principal inter-regional auto and truck travel route that connects Monterey County and other portions of the Central Coast with the San Francisco Bay Area to the north and Los Angeles urban basin to the south. US 101 begins near Route 10 in Los Angeles County, and extends northwards mostly parallel to the State's coastline, to the Oregon State Line in Del Norte County. Within Monterey County, US 101 serves as an important north-south commuter route, truck route, and recreational route, connecting the areas in the southern part of Monterey County to the City of Salinas and the North County.

The federal functional classification of US 101 is "Principal Arterial". US 101 is in the National Highway System (NHS) and Interregional Road System (IRRS) and is classified as a High Emphasis and Focus Route in the Caltrans Transportation Strategic Plan. US 101 is a designated National Truck Network route for Surface Transportation Assistance Act (STAA) trucks and a State Highway Extra Legal Load (SHELL) route. US 101 is also classified as a Strategic Highway Network (STRAHNET) route by the Department of Defense. Through the project study area, US 101 has a four-lane divided freeway cross-section with 65 mph posted speed limits. Caltrans District 5's *Transportation Concept Report for State Route 101* (TCR dated October 1, 2001) notes that for US 101 *Segment 8* (extending from City of Salinas south urban boundary to City of Salinas north urban boundary) the transportation concept is LOS "D" or better. Currently, *Segment 8* of US 101 generally is flat terrain, has four 12-foot wide lanes (two northbound, two southbound), 8-foot shoulders, and a 40 to 46-foot wide median. Based on the TCR, the recommended actions for this segment of US 101 include construction of system-wide operational improvements, ensure any improvements to the facility will accommodate a future six-lane facility, and widen the facility to six lanes.

Based on 2009 traffic count data provided by Caltrans, the US 101 mainline currently carries approximately 54,000 vehicles per day south of Main Street and approximately 27,000 vehicles per day south of Airport Boulevard in the project vicinity. According to 2009 Caltrans truck traffic volume data (available from the Caltrans website), truck composition is approximately 18 percent of the average daily traffic on the US 101 mainline study segment. Caltrans District 5 has developed a *Transportation Planning Fact Sheet – U.S. Route 101 in Monterey County* (December 2009) and is currently in the process of updating the US 101 TCR.

Sanborn Road is a major arterial that serves the southeast and northwest portions of the City of Salinas and provides both auto and truck access to and from US 101. Sanborn Road begins as the continuation of Blanco Road at Abbott Street and continues northeasterly under US 101 to Boronda Road as a four-lane major arterial street. Sanborn Road is planned in the 2002 General Plan to continue as a four-lane major arterial street to Old Stage Road. The recently updated *City of Salinas Traffic Fee Ordinance* (TFO) in March 2010 includes the widening of Sanborn Road from four to six lanes between Abbott Street and John Street, including operational improvements at the US 101/Sanborn Road interchange. Fairview Avenue, which is a local two-lane street that provides access to retail and residential uses, provides a connection from the US 101 northbound on- and off-ramps to Sanborn Road, with an additional US 101 northbound loop off-ramp with direct connection to Sanborn Road. The US 101/Sanborn Road interchange northbound ramp terminal intersection is currently unsignalized with side-street stop-control. A direct connection to US 101 southbound is provided by both an on- and off-ramp at Sanborn Road. The US 101/Sanborn Road interchange southbound ramp terminal intersection is currently signalized with a fifth leg to Elvee Drive, which is a two-lane roadway that provides local access to office and industrial uses.

ANALYSIS METHODOLOGY

Traffic operations have been quantified through the determination of "Level of Service" (LOS). Level of Service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection or roadway segment, representing progressively worsening traffic operations. Levels of Service have been calculated for all intersection control types using methods

documented in the Transportation Research Board (TRB) Publication *Highway Capacity Manual, Fourth Edition, 2000* (HCM 2000) as shown in Table 1. For two-way-stop-controlled (TWSC) intersections, the "worst-case" movement delays and LOS are reported. For signalized and all-way-stop-controlled (AWSC) intersections, the intersection delays and LOS reported are the average values for the whole intersection.

Table 1. HCM-2000 Based Level-of-Service Definitions and Criteria for Intersections

Level of Service	Flow Type	Operational Characteristics	Intersection Control Delay (seconds/vehicle)	
			Signal Control	Two-Way-Stop or All-Way Stop Control
"A"	Stable Flow	Free-flow conditions with negligible to minimal delays. Excellent progression with most vehicles arriving during the green phase and not having to stop at all. Nearly all drivers find freedom of operation.	≤ 10	≤ 10
"B"	Stable Flow	Good progression with slight delays. Short cycle-lengths typical. Relatively more vehicles stop than under LOS "A". Vehicle platoons are formed. Drivers begin to feel somewhat restricted within groups of vehicles.	> 10 – 20	> 10 – 15
"C"	Stable Flow	Relatively higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant, although many still pass through without stopping. Most drivers feel somewhat restricted.	> 20 – 35	> 15 – 25
"D"	Approaching Unstable Flow	Somewhat congested conditions. Longer but tolerable delays may result from unfavorable progression, long cycle lengths, and/or high volume-to-capacity ratios. Many vehicles are stopped. Individual cycle failures may be noticeable. Drivers feel restricted during short periods due to temporary back-ups.	> 35 – 55	> 25 – 35
"E"	Unstable Flow	Congested conditions. Significant delays result from poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures occur frequently. There are typically long queues of vehicles waiting upstream of the intersection. Driver maneuverability is very restricted.	> 55 – 80	> 35 – 50
"F"	Forced Flow	Jammed or grid-lock type operating conditions. Generally considered to be unacceptable for most drivers. Zero or very poor progression, with over-saturation or high volume-to-capacity ratios. Several individual cycle failures occur. Queue spillovers from other locations restrict or prevent movement.	> 80	> 50

Source: HCM-2000, Exhibits 16-2, 17-2 and 17-22

According to the City of Salinas General Plan Circulation Element (September 2002), "the City will strive to maintain a traffic Level of Service (LOS) D or better for all intersections and roadways", which includes Sanborn Road, Elvee Drive, and Fairview Avenue.

The Caltrans' *Guide for the Preparation of Traffic Impact Studies* (dated December 2002) states that:

> *"Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not be always feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS."*

Based on Caltrans' policy above, the study intersections at the US 101/Sanborn Road interchange were analyzed assuming LOS "C" as the minimum acceptable standard threshold.

In this study, a general "Peak Hour Factor" (PHF) of 0.92 (as recommended by HCM 2000) has been used in the study intersection analyses under all analysis scenarios. Heavy vehicle percentages by turning movement were used at the study intersections based on traffic counts collected in 2008 as part of the *Salinas Ag-Industrial Center* traffic study. *Synchro 7* operations analysis software has been used to complete the HCM 2000 analysis procedures for the study intersections.

ACCIDENT DATA

Vehicle collision data was obtained from the Department of California Highway Patrol (CHP) website (http://www.chp.ca.gov, accessed April 20, 2011) for the latest available 3-year period of Statewide Integrated Traffic Records System (SWITRS) reports from May 1, 2007 through April 30, 2010.

Table 2 summarizes accidents that occurred within 500 feet of both the US 101 Southbound Ramps/Sanborn Road/Elvee Drive and US 101 Northbound Loop Off-Ramp/Sanborn Road/Fairview Avenue intersections.

Table 2. SWITRS Accident Data Summary for Sanborn Road Between May 1, 2007 and April 30, 2010

Intersection	*Number of Accidents/Significance*							
	Total	**Fatal**	**Injury**	**F+I[1]**	**Multi-Veh**	**Wet**	**Dark**	**P K/I[1]**
US 101 SB Ramps / Sanborn Road / Elvee Drive	33	0	1	1	31	4	6	0/1
US 101 NB Loop Off-Ramp Sanborn Road / Fairview Avenue	25	0	3	3	18	2	9	0/4

Notes: [1]F+I = Fatal + Injury, P K/I = Persons Killed/Injured
Source: Accident data from the Department of California Highway Patrol website (http://www.chp.ca.gov, accessed April 20, 2011) for the latest available 3-year period from May 1, 2007 through April 30, 2010.

As shown in Table 2, a total of 33 accidents were reported at the US 101 Southbound Ramps/Sanborn Road/Elvee Drive intersection and a total of 25 accidents were reported at the US 101 Northbound Loop Off-Ramp/Sanborn Road/Fairview Avenue intersection over the 3-year period. No fatal accidents were reported, but four injury related accidents were reported for the two study intersections, with five persons reported injured.

The CHP does not maintain statewide average accident rates for comparison to the accidents that occurred on Sanborn Road. However, the total of 58 accidents over the three-year period results in an accident rate of 6.97 accidents per million vehicle-miles based on the daily volume of approximately 26,800 on Sanborn Road. Historical accident data on State facilities in Caltrans District 5 for a 4-lane divided highway in an urban area shows an average accident rate of 2.6 accidents per million vehicle-miles. Although Sanborn Road may not necessarily be considered a highway, the average accident rate shows that the number of accidents on Sanborn Road may be relatively high for a four-lane divided roadway.

Table 3 summarizes the type of collisions that occurred at each of the two study intersections.

Table 3. SWITRS Accident Type Summary for Sanborn Road Between May 1, 2007 and April 30, 2010

Intersection	*Number of Accidents/Significance*												
		Type of Collision											
	Total	**A-Head-On**	**B-Sideswipe**	**C-Rear-End**	**D-Broadside**	**E-Hit Object**	**F-Overturn**	**G-Auto-Pedestrian**	**H-Other**	**Not Stated**	**Fatal**	**Injury**
US 101 SB Ramps / Sanborn Road / Elvee Drive	33	0	17	8	5	2	0	0	0	1	0	1
US 101 NB Loop Off-Ramp Sanborn Road / Fairview Avenue	25	2	5	2	11	3	0	1	1	0	0	3

Source: Accident data from the Department of California Highway Patrol website (http://www.chp.ca.gov, accessed April 20, 2011) for the latest available 3-year period from May 1, 2007 through April 30, 2010.

As shown in Table 3, the most common types of accidents at the two study intersections were sideswipe, rear-end, and broadside accidents, which represents 48 of the total 58 accidents. Other types of collisions at the study intersections included two head-on, five hit object, one auto-pedestrian, one other, and one not stated.

The proposed project would eliminate the Elvee Drive fifth leg at the US 101 Southbound Ramps/Sanborn Road signalized intersection, likely reducing some of the sideswipe and broadside accidents that occurred over the latest three-year period. In addition, the installation of a traffic signal at the US 101 Northbound

Loop Off-Ramp/Sanborn Road/Fairview Avenue intersection would likely reduce some of the broadside and sideswipe accidents that occurred over the latest three-year period. However, installation of a traffic signal can result in certain types of accidents increasing, such as rear-end accidents.

EXISTING TRAFFIC VOLUMES

As part of this traffic operations analysis, Wood Rodgers compiled the most recent traffic count data from the following sources:

- The *Salinas Ag-Industrial Center Traffic Impact Analysis Final Draft Report and Exhibits* (Higgins Associates, December 23, 2008) included turning movement traffic counts conducted in June 2008 at the US 101/Sanborn Road interchange during the harvest season.
- Caltrans Traffic Data Branch provided available hourly traffic count data for ramp and mainline locations near the study area collected throughout 2009, and Caltrans 2009 truck traffic count data publication for US 101 mainline truck composition.

Based on review of the available traffic count data, Year 2009 was determined to represent existing conditions. The AM peak hour is defined as the highest one hour of traffic flow counted between 7:00 AM and 9:00 AM on a typical weekday, and the PM peak hour is defined as the highest one hour of traffic flow counted between 4:00 PM and 6:00 PM on a typical weekday. **Figure 2** illustrates Existing (2009) traffic volumes, traffic control, and lane configurations at the study intersections.

EXISTING CONDITIONS' TRAFFIC OPERATIONS

Table 2 presents existing study intersection traffic operations under current intersection geometrics and control, with no improvements (see **Appendix** for technical calculations). The US 101 Northbound Off-Ramp/Sanborn Road/Fairview Avenue intersection is currently unsignalized, while the US 101 Southbound Ramps/Sanborn Road/Elvee Drive intersection is currently signalized.

Table 2. Existing (2009) Conditions Intersection Level of Service

#	Intersection	Control Type[1]	AM Peak Hour			PM Peak Hour		
			Delay (Sec/Veh)	LOS	Warrant Met?[2]	Delay (Sec/Veh)	LOS	Warrant Met?[2]
1	US 101 SB Ramps / Sanborn Road / Elvee Drive	Signal	22.5	C	-	**38.7**	**D**	-
2	US 101 NB Loop Off-Ramp / Sanborn Road / Fairview Avenue	TWSC	**36.5**	**E**	Yes	**387.6**	**F**	Yes

Notes:
1. For TWSC intersections, worst-case movement delay (in seconds/vehicle) is reported. For signalized intersections, the overall average intersection delay (in seconds/vehicle) is reported.
2. Warrant = California MUTCD 2010 based Peak-hour-Volume Warrant #3 (Urban Areas)
SB = Southbound, NB = Northbound
***Bold text** indicates deficient traffic operations based on LOS C threshold.*

As shown in Table 2, the US 101 Southbound Ramps/Sanborn Road/Elvee Drive intersection currently operates at LOS D during the PM peak hour. The US 101 Northbound Loop Off-Ramp/Sanborn Road/Fairview Avenue intersection operates at LOS E during the AM peak hour and LOS F during the PM peak hour. The high vehicle delay during the PM peak hour at the US 101 Northbound Loop Off-Ramp/Sanborn Road/Fairview Avenue intersection is for the side-street stop controlled northbound left-turn movement from Fairview Avenue to westbound Sanborn Road. Although the northbound left-turn volume is relatively low (21 vehicles during the PM peak hour), it is difficult for this movement to find acceptable gaps to turn from Fairview Avenue onto westbound Sanborn Road due to the relatively high traffic volumes during the PM peak hour on Sanborn Road.

The need to install a traffic signal at the unsignalized study intersection was determined based on the signal warrants outlined in the *California Manual on Uniform Traffic Control Devices (MUTCD)* (Caltrans, January 21, 2010), using Warrant 3 (Peak Hour). As shown in Table 1, Warrant 3 would be

met for both the AM and PM peak hours at the US 101 Northbound Loop Off-Ramp/Fairview Avenue/Sanborn Road intersection[1] (see **Appendix** for technical calculations).

PROJECT DESCRIPTION

The US 101/Sanborn Road interchange has a diamond configuration for the southbound direction including a single-lane diagonal off-ramp and on-ramp. In the northbound direction, there is a hook off-ramp and hook on-ramp that both connect to Fairview Avenue, which provides access to Sanborn Road, and a loop off-ramp that directly connects to Sanborn Road. Sanborn Road is a four-lane arterial that has an under-crossing of US 101. The currently observed operational issues primarily include excessive delays and queuing at the US 101 Southbound Ramps/Sanborn Road intersection due to the existing signalized intersection five-legged configuration with Elvee Drive, and high vehicle delays on the side-street stop-controlled approaches of the US 101 Northbound Loop Off-Ramp/Sanborn Road/Fairview Avenue intersection.

To address the above concerns, the City is considering implementation of the following set of improvements:

- Widening of the US 101 Southbound Off-Ramp intersection approach to Sanborn Road to include an exclusive left-turn lane, a shared through/left-turn lane, and two exclusive right-turn lanes. The existing signal will be modified to accommodate the widening.
- Construction of a new Elvee Drive connection from the existing Elvee Drive to Work Street. Approximately 600-feet of the existing Elvee Drive (from the intersection of Elvee Drive and Sanborn Road to 600 feet west) will be closed to accommodate the southbound off-ramp widening.
- Signalization of the intersection of Sanborn Road, Fairview Avenue, and the US 101 Northbound Loop Off-Ramp; and striping modifications to Sanborn Road and Fairview Avenue. The new traffic signal will be coordinated with the existing US 101 Southbound Off-Ramp signalized intersection.

Figure 3 shows a preliminary design layout of the proposed project improvements.

PROJECT ALTERNATIVES

This study examines the following two alternatives:

"No Build" Alternative – This is the *status quo* alternative that involves retaining existing facilities without any capacity, control, or timing improvements. The observed deficiencies associated with this alternative will represent findings that reinforce the "Need and Purpose" for this operational improvement project.

Build Alternative – This concept proposes widening the southbound off-ramp to include additional turn lanes, new Elvee Drive connection, and installation of a new traffic signal at the northbound off-ramp intersection as described in the project description above and shown on **Figure 3**.

PROJECT OPENING DAY (YEAR 2012) OPERATIONS

The Caltrans' *Highway Design Manual*, *Sixth Edition* (Section 103.2) states that operational improvement projects should be designed for acceptable current year operations. Conservatively, this study evaluates the proposed operational improvements for acceptable operations under "project opening day" conditions (i.e., the year at the time the improvements are anticipated to be operational). Per the current project schedule and discussions with City staff, it is anticipated that the proposed

[1] The decision to install a traffic signal should not be based solely upon the warrants, since the installation of signals can lead to certain types of collisions. Delay, congestion, approach conditions, driver confusion, future land use, or other evidence of the need for right of way assignment beyond that which could be provided by stop signs must be demonstrated.

operational improvement project will likely complete construction and be opened for operation by Year 2012. Therefore, "project opening day" is regarded as Year 2012 in this analysis. The *Salinas Ag-Industrial Center Traffic Impact Analysis* developed Year 2030 traffic volume forecasts for the study intersections based on the AMBAG travel demand forecasting model. A linear interpolation between the existing (Year 2009) traffic counts and the Year 2030 traffic volume forecasts was performed to yield Opening Day (Year 2012) traffic volume forecasts at the study intersections.

OPENING DAY (YEAR 2012) INTERSECTION OPERATIONS

Table 3 summarizes the Opening Day (Year 2012) conditions intersection traffic operations analysis results under the "No Build" Alternative and the proposed project ("Build" Alternative) conditions during the AM and PM peak hours.

Table 3. Opening Day (Year 2012) Conditions Intersection Level of Service

#	Intersection	"No Build" Alternative					With Proposed Project				
		Control Type[1]	AM Peak Hour		PM Peak Hour		Control Type[1]	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS		Delay	LOS	Delay	LOS
1	US 101 SB Ramps / Sanborn Road / Elvee Drive	Signal	29.1	C	**46.2**	**D**	Signal	17.3	B	21.2	C
2	US 101 NB Loop Off-Ramp / Sanborn Road / Fairview Avenue	TWSC	**79.2**	**F**	**Overflow**	**F**	Signal	15.4	B	18.8	B

Notes:
1. For TWSC intersections, worst-case movement delay (in seconds/vehicle) is reported. For signalized intersections, the overall average intersection delay (in seconds/vehicle) is reported.
SB = Southbound, NB = Northbound
***Bold text** indicates deficient traffic operations based on LOS C threshold.*

As shown in Table 3, vehicle delay at the US 101 Southbound Ramps/Sanborn Road/Elvee Drive intersection would increase under Year 2012 conditions without improvements compared to existing conditions. At the US 101 Northbound Loop Off-Ramp/Sanborn Road/Fairview Avenue intersection, traffic operations would be further exacerbated to LOS F during both the AM and PM peak hours under Year 2012 conditions without improvements compared to existing conditions.

With the proposed improvements, both study intersections would operate acceptably at LOS C or better during both the AM and PM peak hours. At the southbound ramps intersection, traffic operations would improve with the elimination of the fifth Elvee Drive intersection leg and widening of the off-ramp to provide dual right-turn and left-turn lanes. At the northbound off-ramp intersection, installation of a new traffic signal would improve traffic operations for the side-street movements. In addition, both signalized intersections would be coordinated, further improving traffic flow and operations along Sanborn Road.

OPENING DAY (YEAR 2012) VEHICLE QUEUING

Table 4 summarizes vehicle queuing under Year 2012 conditions at the study intersections with the proposed Build Alternative in place. As shown in Table 4, the estimated 95th percentile queues at the two study intersections is not anticipated to exceed the proposed available vehicle storage, except for the westbound left-turn at the US 101 Northbound Loop Off-Ramp/Sanborn Road/Fairview Avenue intersection. With installation of a traffic signal, the vehicle queue for the westbound left-turn movement from Sanborn Road onto Fairview Avenue is anticipated to increase under Year 2012 conditions compared to the existing uncontrolled movement. Extending this left-turn lane is limited by the eastbound left-turn into the existing gas station opposite of Mayfair Drive. Without additional storage beyond the existing 70 feet, vehicles would be anticipated to queue out of the westbound left-turn pocket and block westbound through traffic during both the AM and PM peak hours under Year 2012 conditions with the improvements in place.

Table 4. Year 2012 With Improvements 95th Percentile Queue Length Estimates (in Feet)

Intersection Movement	Existing	Year 2012 with Build Alternative			Available Storage with Proposed Project
			95th Percentile Queue Length (feet)[1]		
	Number of Lanes	Number of Lanes	AM Peak Hour	PM Peak Hour	
Sanborn Road / US 101 SB Ramps / Elvee Drive Intersection					
Sanborn Road Eastbound Left	1	Eliminated			
Sanborn Road Eastbound Through	2	2	200	550	800
Sanborn Road Eastbound Right	1	1	75	25	800
Sanborn Road Westbound Left	1	1	175	150	175
Sanborn Road Westbound Through	2	2	200	100	260
Southbound Left	1	2	75	275	360
Southbound Through	Shared w/ Left-Turn	Shared w/ Left-Turn	75	275	360
Southbound Right	1	2	150	50	360
Elvee Drive Shared Left-Right	1	Eliminated			
Sanborn Road / US 101 NB Loop Off-Ramp / Fairview Avenue Intersection					
Eastbound Through	2	3	50	225	280
Eastbound Right	Channelized	Channelized	0	0	0
Westbound Left	1	1	**225**	**275**	70
Westbound Through	2	2	225	100	700
Northbound Left	1	1	100	50	650
Northbound Right	1	1	75	125	650
Southbound Shared Left-Through-Right	1	1	25	125	400

Notes:
[1]95th Percentile AM and PM peak hour Queues presented in this table are based on Synchro 7 analysis
All indicated queue lengths are "per lane" estimates, expressed in feet. Queue length estimates were rounded up to the nearest 25-foot increment (assuming 1 average car length = 25 feet)
***Bold** = Represents 95th Percentile Queue greater than available storage*
NB = Northbound, SB = Southbound

As shown in Exhibit 1 (on the next page), there is currently a raised median for both the eastbound left-turn into the existing gas station driveway and the westbound left-turn onto Mayfair Drive. To accommodate the 275 feet of storage needed during the PM peak hour for the westbound left-turn from Sanborn Road onto Fairview Avenue, the left-turn pocket would need to be extended east of Mayfair Drive.

A preliminary concept to accommodate the westbound left-turn vehicle queue on Sanborn Road has been developed. Wood Rodgers is working with City staff to refine the concept, which will be incorporated into the project design. The improvement for the westbound left-turn pocket is outside of Caltrans right-of-way and is not anticipated to effect Caltrans facilities.

Exhibit 1 – View of Sanborn Road looking eastbound from Fairview Avenue toward John Street

RAMP METERING CONSIDERATIONS

As part of the discussions between the City, Caltrans, and the Salinas Ag-Industrial Center project applicants, the consideration of ramp metering was included as a potential improvement to the US 101/Sanborn Road interchange to be constructed through the City's Traffic Fee Ordinance (TFO) program. Specifically, ramp metering for the US 101 Northbound On-Ramp from Fairview Avenue was conceptually identified. Caltrans District 5's *Central Coast ITS Implementation Plan* (September 16, 2010) includes the District's Ramp Metering Development Plan, which identifies one existing isolated ramp meter (outside the study area) and no proposed near-term ramp meters in Monterey County. The report states that "Caltrans is committed to using ramp metering as an effective traffic management strategy to maintain an efficient freeway system and protect the investment made in constructing freeways by keeping them operating at or near capacity."

Wood Rodgers performed analysis under existing (Year 2009), Opening Day (Year 2012), Year 2020, and Year 2030 conditions of the weaving section between the US 101 Northbound On-Ramp from Fairview Avenue and the US 101 Northbound Loop Off-Ramp to Sanborn Road. The weaving section analysis was performed using the *Leisch Methodology* illustrated on *Figure 504.7A* in Caltrans' *Highway Design Manual*. The existing (Year 2009) northbound on-ramp volume is 260 vehicles during the AM peak hour and 524 vehicles during the PM peak hour. Table 5 summarizes the results of the weaving analysis (see **Appendix** for technical calculations).

Table 5. US 101 NB Mainline Weaving Segment Between Fairview Avenue and Sanborn Road

US 101 Mainline Weaving Segment between Fairview Ave NB On-Ramp & Sanborn Rd NB Loop Off-Ramp	Weaving Distance (feet)	N	AM Peak Hour			PM Peak Hour		
			V_w	S (mph)	LOS	V_w	S (mph)	LOS
Existing (Year 2009) Conditions	1,000	2	402	-	ORW[1]	747	46	C
Opening Day (Year 2012) Conditions	1,000	2	438	53	B	805	45	C
Year 2020 Conditions	1,000	2	581	48	C	**1,036**	**<25**	**F**
Year 2030 Conditions With Six Lanes on US 101 Mainline	1,000	3	741	52	B	**1,333**	**34**	**E**

Notes:
1. ORW = Out of Realm of Weaving, the on-ramp merge area during the AM peak hour under existing conditions operates at LOS B (density of 14.9 passenger cars per mile per lane)
***Bold text** indicates unacceptable LOS conditions, N = Total Number of Lanes in Weave Section, V_w = Weave Volume, S = Speed of Composite Weaving Section, mph = Miles per Hour, SB = Southbound, NB = Northbound*

As shown in Table 5, the US 101 mainline weaving section operates acceptably at LOS C under existing conditions. In addition, the weaving section would continue to operate acceptably at LOS C under Opening Day (Year 2012) conditions. However, by Year 2020 it is anticipated that the weaving section will deteriorate to LOS F conditions without the widening of the US 101 mainline to six lanes or the addition of an auxiliary lane between the Fairview Avenue on-ramp and the Sanborn Road off-ramp.

If ramp metering was implemented for the northbound one-lane on-ramp, there would be approximately 350 feet of storage (14 vehicles) before vehicle queues would back onto Fairview Avenue. This limited amount of vehicle storage would result in a metering rate during the peak hours close to anticipated traffic volumes to avoid vehicle queues backing onto Fairview Avenue. Therefore, ramp metering would have a negligible effect on US 101 mainline operations without widening the on-ramp to provide two mixed-flow ramp metering lanes.

The weaving section between the Fairview Avenue on-ramp and the Sanborn Road off-ramp is anticipated to operate below LOS C between Year 2012 and Year 2020. Several potential improvement alternatives/strategies could be considered to improve US 101 mainline operations:

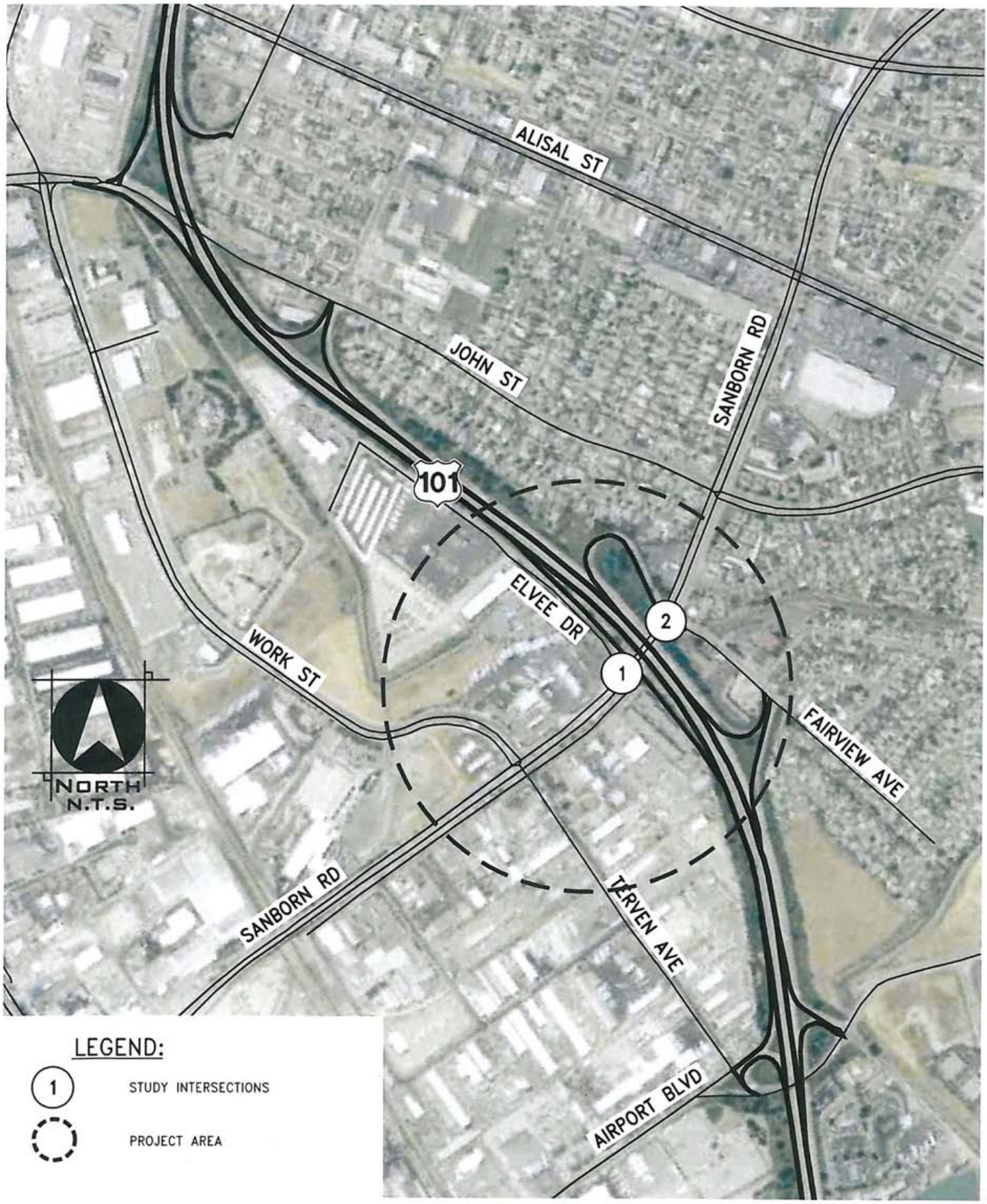
- Eliminate the Northbound Loop Off-Ramp to Sanborn Road and redirect traffic to the Northbound Off-Ramp to Fairview Avenue
- Construct an auxiliary lane between the Fairview Avenue on-ramp and the Sanborn Road loop off-ramp
- Install a ramp meter with adequate vehicle storage for the Fairview Avenue northbound on-ramp
- Modify US 101 signage to redirect traffic to use Fairview Avenue northbound off-ramp instead of the Sanborn Road northbound loop off-ramp (this may occur with or without modified signage with the installation of a new traffic signal at the US 101 Northbound Ramp/Sanborn Road/Fairview Avenue intersection)

It is recommended that the change in traffic patterns at the US 101 Northbound Loop Off-Ramp/Sanborn Road/Fairview Avenue intersection be monitored after the proposed improvements are in place to determine the appropriate long-term improvement for the US 101 Northbound Ramps.

SOUTHBOUND OFF-RAMP CONSIDERATIONS

Per email correspondence on February 8, 2011, Caltrans provided a conceptual layout of the improvements to the US 101/Sanborn Road interchange (*S Sanborn Rd Improvements – Option 1*). The layout shows a full deceleration auxiliary lane on the US 101 mainline for the southbound off-ramp to Sanborn Road. The heavy vehicle percentage is approximately 5 percent during the AM peak hour and 11 percent during the PM peak hour at the southbound off-ramp based on data collected as part of the *Salinas Ag-Industrial Center* study. This results in an existing (2009) southbound off-ramp volume of approximately 540 and 650 equivalent passenger cars per hour during the AM and PM peak hours, respectively. Based on Caltrans' *Highway Design Manual*, provisions for adding an auxiliary lane and an additional lane at the off-ramp does not need be considered until the off-ramp volume exceeds 900 equivalent passenger cars per hour and does not need to be constructed until the off-ramp volume exceeds 1,500 equivalent passenger cars per hour.

Under opening day (2012) conditions, the southbound off-ramp equivalent passenger cars per hour would be approximately 590 during the AM peak hour and 720 during the PM per hour, which is under the 900 equivalent passenger cars per hour to consider provisions for an auxiliary lane. Although an auxiliary lane is not needed under existing and near-term conditions, future improvements to the US 101/Sanborn Road interchange may need to consider the need for an auxiliary lane for the southbound off-ramp.



US 101/Sanborn Road Ramp Improvements, City of Salinas, CA

FIGURE 1

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PROJECT AREA AND VICINITY MAP

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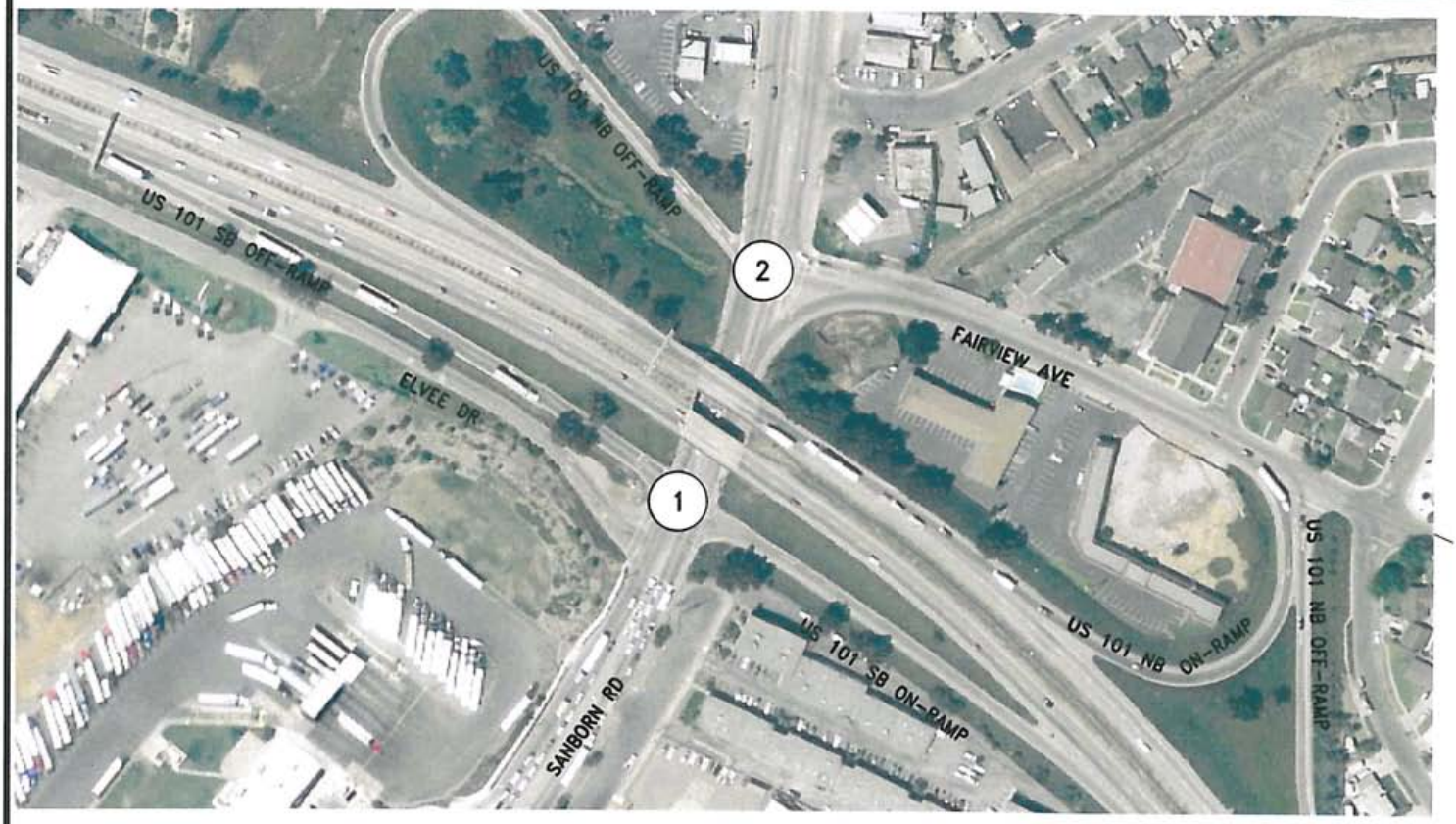

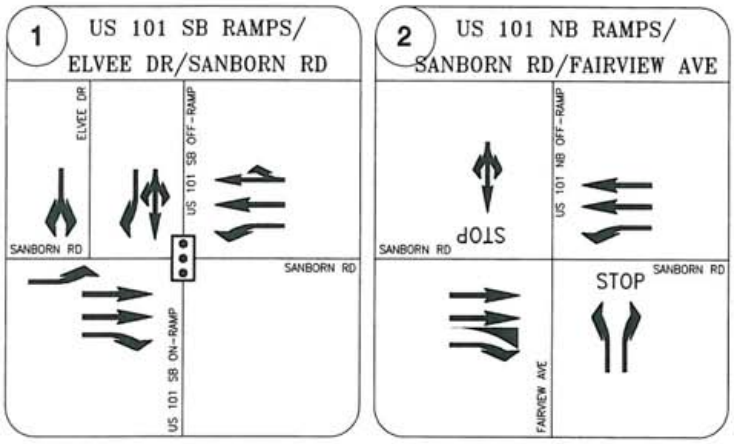

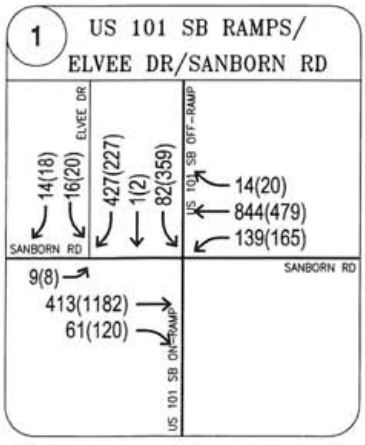

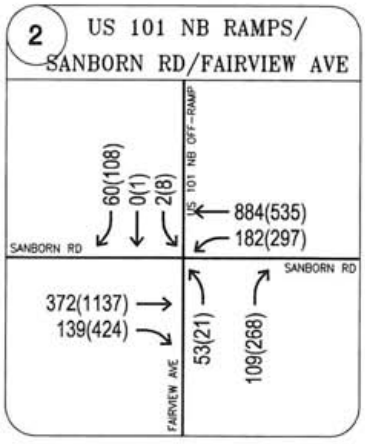

LEGEND:

(1)	Study Intersections
STOP	Stop Controlled Movement
XXX(XXX)	Weekday AM(PM) Peak Hour Volumes
	Traffic Signal

US 101/Sanborn Road Ramp Improvements, City of Salinas, CA

FIGURE 2

EXISTING INTERSECTION TRAFFIC VOLUMES, LANE GEOMETRICS AND CONTROL

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
3301 C St, Bldg. 100-B Sacramento, CA 95816
Tel 916.341.7760 Fax 916.341.7767

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FIGURE 3

PRELIMINARY EXHIBIT FOR PROPOSED IMPROVEMENTS

SANBORN ROAD / US 101 INTERCHANGE & ELVEE DRIVE

CITY OF SALINAS CALIFORNIA

MAY, 2011

100' 50' 0 100'

SCALE: 1" = 100'

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
3301 C St, Bldg. 100-B Tel 916.341.7760
Sacramento, CA 95816 Fax 916.341.7767

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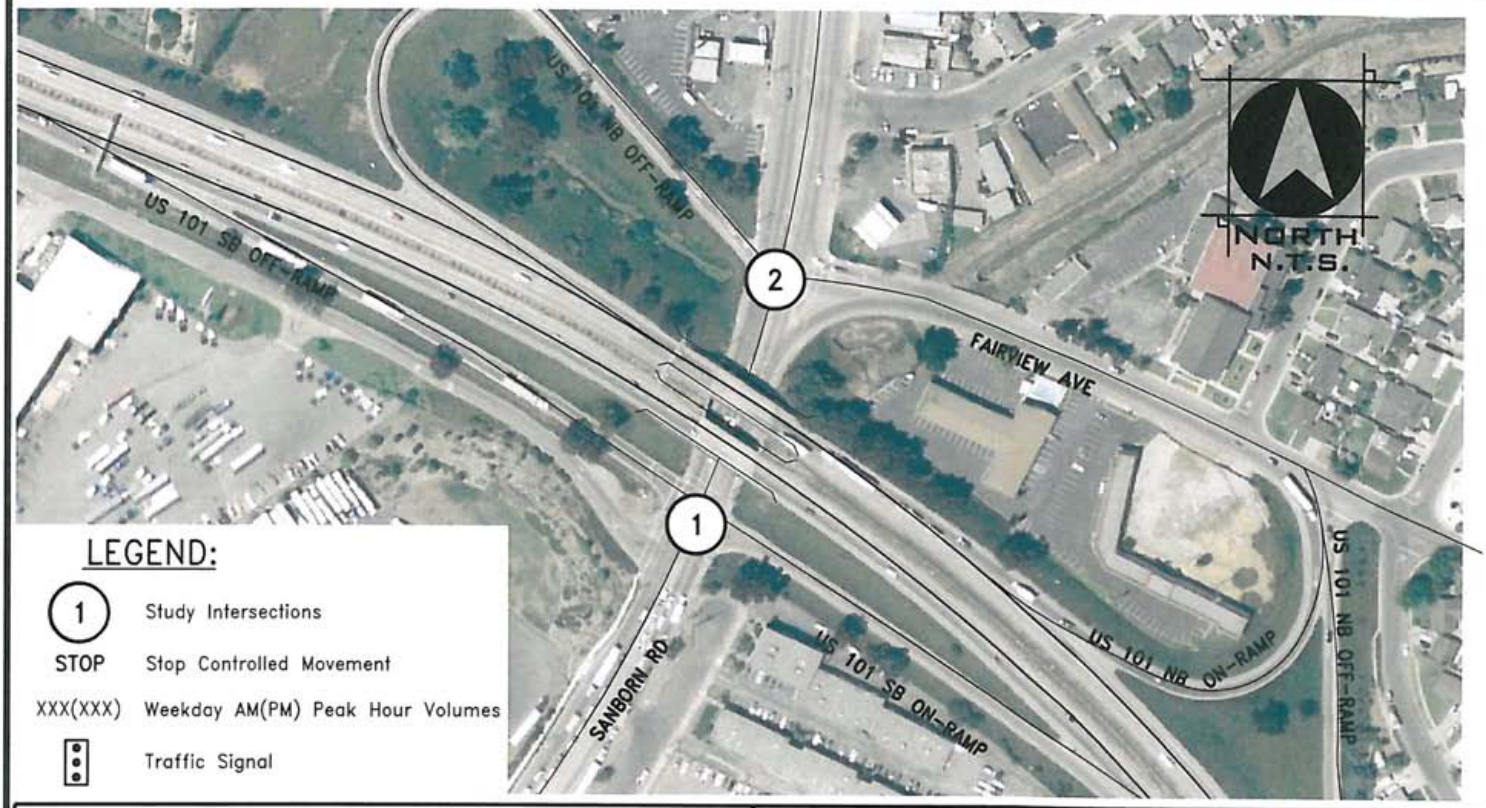
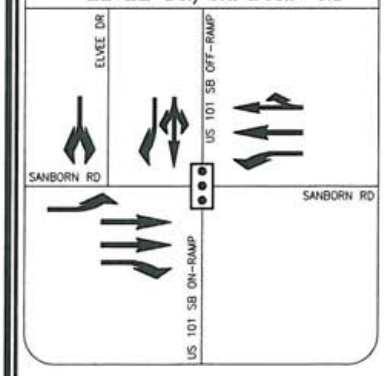
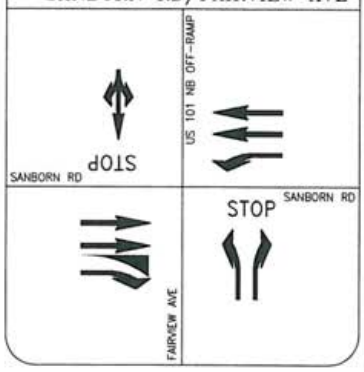


YEAR 2012 NO PROJECT

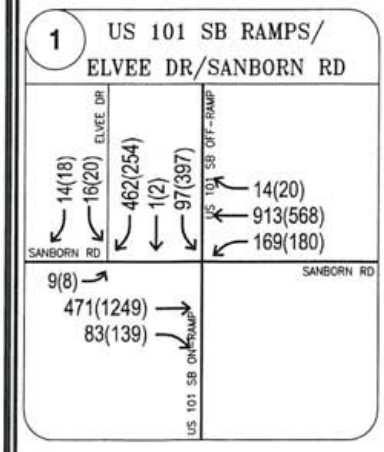
1 US 101 SB RAMPS/ ELVEE DR/SANBORN RD



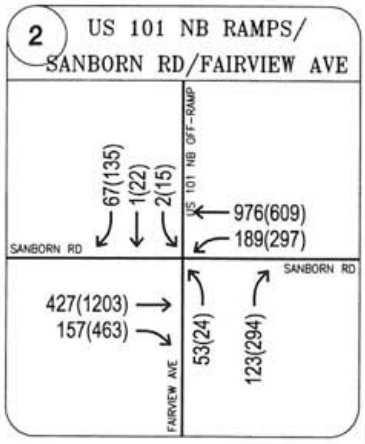
2 US 101 NB RAMPS/ SANBORN RD/FAIRVIEW AVE



1 US 101 SB RAMPS/ ELVEE DR/SANBORN RD

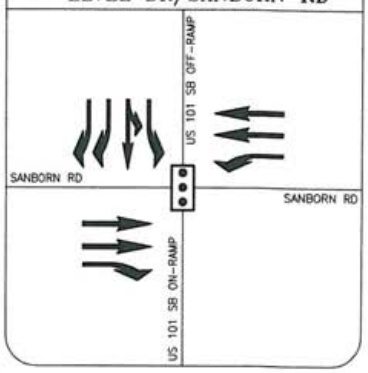


2 US 101 NB RAMPS/ SANBORN RD/FAIRVIEW AVE

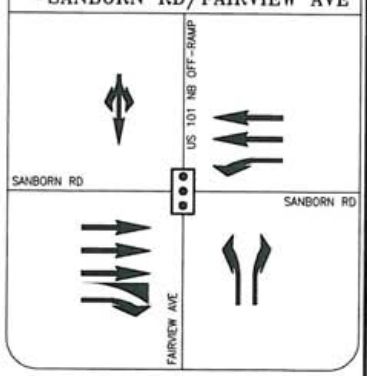


YEAR 2012 WITH PROJECT

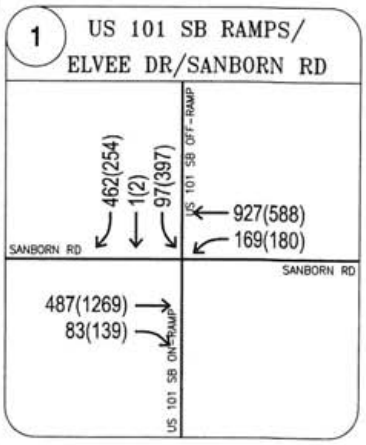
1 US 101 SB RAMPS/ ELVEE DR/SANBORN RD



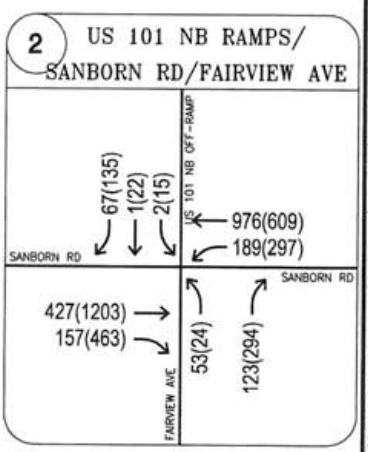
2 US 101 NB RAMPS/ SANBORN RD/FAIRVIEW AVE



1 US 101 SB RAMPS/ ELVEE DR/SANBORN RD



2 US 101 NB RAMPS/ SANBORN RD/FAIRVIEW AVE



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US 101/Sanborn Road Ramp Improvements, City of Salinas, CA

FIGURE 4

"YEAR 2012" INTERSECTION TRAFFIC VOLUMES, LANE GEOMETRICS, AND CONTROL

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
3301 C St, Bldg. 100-B Tel 916.341.7760
Sacramento, CA 95816 Fax 916.341.7767

Appendix

Traffic Operations Technical Calculations

HCM Signalized Intersection Capacity Analysis
1: S Sanborn Rd & US 101 SB Off Ramp

3/2/2011

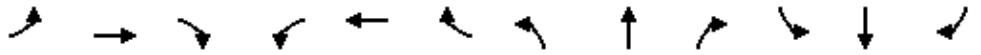
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SEL	SER2
Lane Configurations											
Volume (vph)	9	413	61	139	844	14	82	1	427	16	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			0.95	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.90	0.85	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98	1.00	0.97	
Satd. Flow (prot)	1770	3282	1313	1736	3531			1534	1461	1665	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98	1.00	0.97	
Satd. Flow (perm)	1770	3282	1313	1736	3531			1534	1461	1665	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	449	66	151	917	15	89	1	464	17	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	10	449	66	151	932	0	0	280	274	18	0
Heavy Vehicles (%)	2%	10%	23%	4%	2%	2%	2%	2%	5%	6%	2%
Turn Type	Prot		Perm	Prot			Split		Perm		
Protected Phases	5	2		1	6		4	4		8	
Permitted Phases			2						4		
Actuated Green, G (s)	1.3	17.1	17.1	16.5	32.3			20.8	20.8	3.6	
Effective Green, g (s)	1.3	17.1	17.1	16.5	32.3			20.8	20.8	3.6	
Actuated g/C Ratio	0.02	0.23	0.23	0.22	0.44			0.28	0.28	0.05	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	31	758	303	387	1541			431	411	81	
v/s Ratio Prot	0.01	0.14		c0.09	c0.26			0.18		c0.01	
v/s Ratio Perm			0.05						c0.19		
v/c Ratio	0.32	0.59	0.22	0.39	0.60			0.65	0.67	0.22	
Uniform Delay, d1	35.9	25.3	23.0	24.5	16.0			23.4	23.5	33.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2	6.0	1.2	0.4	0.7	0.7			3.4	4.1	1.4	
Delay (s)	41.9	26.6	23.4	25.1	16.6			26.8	27.6	35.2	
Level of Service	D	C	C	C	B			C	C	D	
Approach Delay (s)		26.5			17.8			27.2		35.2	
Approach LOS		C			B			C		D	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: S Sanborn Rd & US 101 Loop NB-Off Ramp

3/2/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	372	139	182	884	0	53	0	109	2	0	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	404	151	198	961	0	58	0	118	2	0	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		333										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	961			404			1346	1761	202	1618	1761	480
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	961			256			1251	1690	42	1539	1690	480
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.6	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.4	3.5	4.0	3.4
p0 queue free %	100			84			38	100	88	96	100	87
cM capacity (veh/h)	712			1209			93	73	955	57	71	513

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	202	202	151	198	480	480	176	67
Volume Left	0	0	0	198	0	0	58	2
Volume Right	0	0	151	0	0	0	118	65
cSH	1700	1700	1700	1209	1700	1700	285	408
Volume to Capacity	0.12	0.12	0.09	0.16	0.28	0.28	0.62	0.17
Queue Length 95th (ft)	0	0	0	15	0	0	95	15
Control Delay (s)	0.0	0.0	0.0	8.6	0.0	0.0	36.5	15.6
Lane LOS				A			E	C
Approach Delay (s)	0.0			1.5			36.5	15.6
Approach LOS							E	C

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	40.7%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
1: S Sanborn Rd & US 101 SB Off Ramp

3/2/2011

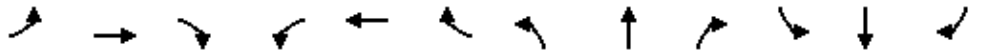
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SEL	SER2
Lane Configurations											
Volume (vph)	8	1182	120	165	479	20	359	2	227	20	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			0.95	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.99	0.85	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.97	
Satd. Flow (prot)	1770	3505	1380	1770	3421			1652	1218	1592	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.97	
Satd. Flow (perm)	1770	3505	1380	1770	3421			1652	1218	1592	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	1285	130	179	521	22	390	2	247	22	20
RTOR Reduction (vph)	0	0	67	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	9	1285	63	179	543	0	0	417	222	23	0
Heavy Vehicles (%)	2%	3%	17%	2%	5%	2%	2%	2%	26%	15%	2%
Turn Type	Prot		Prot	Prot			Split		Prot		
Protected Phases	5	2	2	1	6		4	4	4	8	
Permitted Phases											
Actuated Green, G (s)	3.2	39.0	39.0	17.1	52.9			23.0	23.0	4.9	
Effective Green, g (s)	3.2	39.0	39.0	17.1	52.9			23.0	23.0	4.9	
Actuated g/C Ratio	0.03	0.39	0.39	0.17	0.53			0.23	0.23	0.05	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	57	1367	538	303	1810			380	280	78	
v/s Ratio Prot	0.01	c0.37	0.05	c0.10	0.16			c0.25	0.18	c0.01	
v/s Ratio Perm											
v/c Ratio	0.16	0.94	0.12	0.59	0.30			1.10	0.79	0.29	
Uniform Delay, d1	47.1	29.4	19.5	38.2	13.2			38.5	36.3	45.9	
Progression Factor	0.78	0.47	0.17	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2	1.1	12.2	0.4	3.1	0.4			75.0	14.2	2.1	
Delay (s)	37.7	25.9	3.8	41.3	13.6			113.5	50.5	48.0	
Level of Service	D	C	A	D	B			F	D	D	
Approach Delay (s)		24.0			20.5			91.6		48.0	
Approach LOS		C			C			F		D	

Intersection Summary				
HCM Average Control Delay	38.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	83.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: S Sanborn Rd & US 101 NB Loop Off Ramp

3/2/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1137	424	297	535	0	21	0	268	8	1	108
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1236	461	323	582	0	23	0	291	9	1	117
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									6			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		333										
pX, platoon unblocked				0.68			0.68	0.68	0.68	0.68	0.68	
vC, conflicting volume	582			1236			2290	2463	618	1991	2463	291
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	582			407			1957	2211	0	1517	2211	291
tC, single (s)	4.1			4.2			7.6	6.5	7.0	7.6	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	100			58			0	100	60	61	94	83
cM capacity (veh/h)	989			776			14	17	733	22	17	682

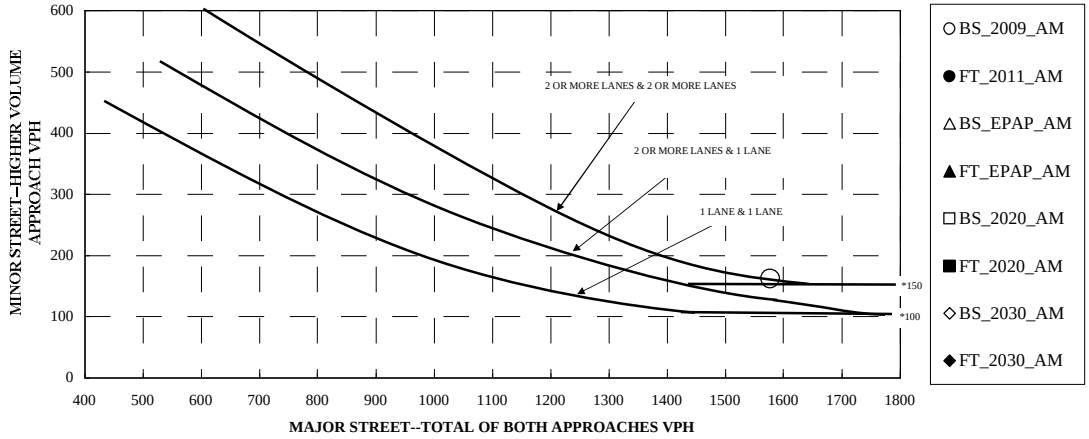
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	618	618	461	323	291	291	314	127
Volume Left	0	0	0	323	0	0	23	9
Volume Right	0	0	461	0	0	0	291	117
cSH	1700	1700	1700	776	1700	1700	183	202
Volume to Capacity	0.36	0.36	0.27	0.42	0.17	0.17	1.71	0.63
Queue Length 95th (ft)	0	0	0	52	0	0	544	92
Control Delay (s)	0.0	0.0	0.0	12.9	0.0	0.0	387.6	49.0
Lane LOS				B			F	E
Approach Delay (s)	0.0			4.6			387.6	49.0
Approach LOS							F	E

Intersection Summary				
Average Delay	43.4			
Intersection Capacity Utilization	71.7%	ICU Level of Service	C	
Analysis Period (min)	15			

CA SIGNAL WARRANT 3 ANALYSIS

SCENARIOS: "AM PEAK HOUR" CONDITIONS

FIGURE 4C-3 WARRANT 3 PEAK HOUR VOLUME
(CALIFORNIA MUTCD, DATED SEPTEMBER 26, 2006)



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

SCENARIO	APPROACH(ES)		WARRANT MET?
	MAJOR	MINOR	
BS_2009_AM	1577	162	YES
FT_2011_AM			
BS_EPAP_AM			
FT_EPAP_AM			
BS_2020_AM			
FT_2020_AM			
BS_2030_AM			
FT_2030_AM			

Note: Major approach is the total of both approaches. Minor approach is the highest of both approaches.

Date: **March 1, 2011** Intersection No.: **2**

Intersection: **Sanborn Road / US 101 NB Off / Fairview Av**

Number of lanes on MAJOR street: **2**

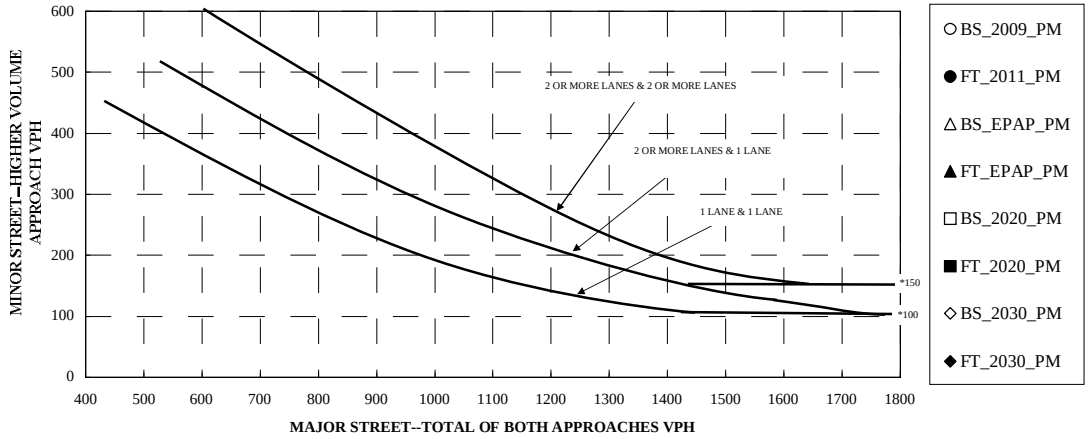
Number of lanes on MINOR street: **1**

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

CA SIGNAL WARRANT 3 ANALYSIS

SCENARIOS: "PM PEAK HOUR" CONDITIONS

FIGURE 4C-3 WARRANT 3 PEAK HOUR VOLUME
(CALIFORNIA MUTCD, DATED SEPTEMBER 26, 2006)



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

SCENARIO	APPROACH(ES)		WARRANT MET?
	MAJOR	MINOR	
BS_2009_PM	2393	289	YES
FT_2011_PM			
BS_EPAP_PM			
FT_EPAP_PM			
BS_2020_PM			
FT_2020_PM			
BS_2030_PM			
FT_2030_PM			

Note: Major approach is the total of both approaches. Minor approach is the highest of both approaches.

Date: **March 1, 2011** Intersection No.: **2**

Intersection: **Sanborn Road / US 101 NB Off / Fairview Av**

Number of lanes on MAJOR street: **2**

Number of lanes on MINOR street: **1**

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

HCM Signalized Intersection Capacity Analysis
1: S Sanborn Rd & US 101 SB Off Ramp

3/2/2011

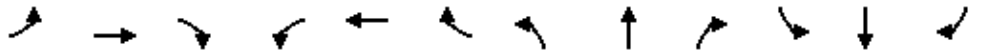
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SEL	SER2
Lane Configurations											
Volume (vph)	9	471	83	169	913	14	97	1	462	16	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			0.95	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.90	0.85	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98	1.00	0.97	
Satd. Flow (prot)	1770	3282	1313	1770	3531			1538	1461	1665	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98	1.00	0.97	
Satd. Flow (perm)	1770	3282	1313	1770	3531			1538	1461	1665	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	512	90	184	992	15	105	1	502	17	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	10	512	90	184	1007	0	0	312	296	18	0
Heavy Vehicles (%)	2%	10%	23%	2%	2%	2%	2%	2%	5%	6%	2%
Turn Type	Prot		Prot	Prot			Split		Prot		
Protected Phases	5	2	2	1	6		4	4	4	8	
Permitted Phases											
Actuated Green, G (s)	3.2	44.2	44.2	19.3	60.3			25.8	25.8	4.7	
Effective Green, g (s)	3.2	44.2	44.2	19.3	60.3			25.8	25.8	4.7	
Actuated g/C Ratio	0.03	0.40	0.40	0.18	0.55			0.23	0.23	0.04	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	51	1319	528	311	1936			361	343	71	
v/s Ratio Prot	0.01	0.16	0.07	c0.10	c0.29			c0.20	0.20	c0.01	
v/s Ratio Perm											
v/c Ratio	0.20	0.39	0.17	0.59	0.52			0.86	0.86	0.25	
Uniform Delay, d1	52.1	23.3	21.1	41.7	15.7			40.4	40.4	50.9	
Progression Factor	0.79	0.51	0.53	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.8	0.7	3.0	1.0			18.8	19.5	1.8	
Delay (s)	42.9	12.8	11.8	44.7	16.7			59.3	59.9	52.8	
Level of Service	D	B	B	D	B			E	E	D	
Approach Delay (s)		13.1			21.0			59.6		52.8	
Approach LOS		B			C			E		D	

Intersection Summary			
HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: S Sanborn Rd & US 101 NB Loop Off-Ramp

3/2/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	427	157	189	976	0	53	0	123	2	1	67
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	464	171	205	1061	0	58	0	134	2	1	73
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		333										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	1061			464			1479	1936	232	1771	1936	530
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1061			282			1370	1860	34	1682	1860	530
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.6	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.4	3.5	4.0	3.4
p0 queue free %	100			82			19	100	86	95	98	85
cM capacity (veh/h)	652			1165			71	56	954	43	54	475

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	232	232	171	205	530	530	191	76
Volume Left	0	0	0	205	0	0	58	2
Volume Right	0	0	171	0	0	0	134	73
cSH	1700	1700	1700	1165	1700	1700	218	339
Volume to Capacity	0.14	0.14	0.10	0.18	0.31	0.31	0.88	0.22
Queue Length 95th (ft)	0	0	0	16	0	0	174	21
Control Delay (s)	0.0	0.0	0.0	8.8	0.0	0.0	79.2	18.7
Lane LOS				A			F	C
Approach Delay (s)	0.0			1.4			79.2	18.7
Approach LOS							F	C

Intersection Summary				
Average Delay	8.5			
Intersection Capacity Utilization	43.2%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
1: S Sanborn Rd & US 101 SB Off Ramp

3/2/2011

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR	SEL	SER2
Lane Configurations											
Volume (vph)	8	1249	139	180	568	20	397	2	254	20	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			0.95	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.99	0.85	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.97	
Satd. Flow (prot)	1770	3505	1380	1770	3424			1652	1218	1592	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.97	
Satd. Flow (perm)	1770	3505	1380	1770	3424			1652	1218	1592	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	1358	151	196	617	22	432	2	276	22	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	9	1358	151	196	639	0	0	462	248	23	0
Heavy Vehicles (%)	2%	3%	17%	2%	5%	2%	2%	2%	26%	15%	2%
Turn Type	Prot		Prot	Prot			Split		Prot		
Protected Phases	5	2	2	1	6		4	4	4	8	
Permitted Phases											
Actuated Green, G (s)	3.2	43.7	43.7	18.2	58.7			27.0	27.0	5.1	
Effective Green, g (s)	3.2	43.7	43.7	18.2	58.7			27.0	27.0	5.1	
Actuated g/C Ratio	0.03	0.40	0.40	0.17	0.53			0.25	0.25	0.05	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	51	1392	548	293	1827			405	299	74	
v/s Ratio Prot	0.01	c0.39	0.11	c0.11	0.19			c0.28	0.20	c0.01	
v/s Ratio Perm											
v/c Ratio	0.18	0.98	0.28	0.67	0.35			1.14	0.83	0.31	
Uniform Delay, d1	52.1	32.6	22.4	43.1	14.7			41.5	39.3	50.7	
Progression Factor	0.79	0.50	0.47	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2	1.4	17.2	1.1	5.7	0.5			89.0	17.1	2.4	
Delay (s)	42.6	33.5	11.7	48.8	15.2			130.5	56.4	53.1	
Level of Service	D	C	B	D	B			F	E	D	
Approach Delay (s)		31.4			23.1			104.6		53.1	
Approach LOS		C			C			F		D	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: S Sanborn Rd & US 101 NB Loop Off-Ramp

3/2/2011

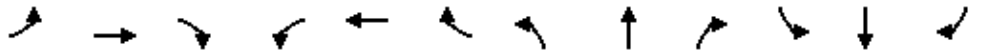
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1203	463	297	609	0	24	0	294	15	22	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1308	503	323	662	0	26	0	320	16	24	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		333										
pX, platoon unblocked				0.65			0.65	0.65	0.65	0.65	0.65	
vC, conflicting volume	662			1308			2443	2615	654	2121	2615	331
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	662			397			2143	2408	0	1648	2408	331
tC, single (s)	4.1			4.2			7.6	6.5	7.0	7.6	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	100			57			0	100	54	0	0	77
cM capacity (veh/h)	923			749			0	12	701	15	12	642

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	654	654	503	323	331	331	346	187
Volume Left	0	0	0	323	0	0	26	16
Volume Right	0	0	503	0	0	0	320	147
cSH	1700	1700	1700	749	1700	1700	0	56
Volume to Capacity	0.38	0.38	0.30	0.43	0.19	0.19	Err	3.32
Queue Length 95th (ft)	0	0	0	55	0	0	Err	Err
Control Delay (s)	0.0	0.0	0.0	13.4	0.0	0.0	Err	Err
Lane LOS				B			F	F
Approach Delay (s)	0.0			4.4			Err	Err
Approach LOS							F	F

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	76.7%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
1: S Sanborn Rd & US 101 SB Off Ramp

3/2/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	487	83	169	927	0	0	0	0	97	1	462
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	0.88
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		3282	1313	1736	3539					1681	1687	2707
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		3282	1313	1736	3539					1681	1687	2707
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	529	90	184	1008	0	0	0	0	105	1	502
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	0	0	0	164
Lane Group Flow (vph)	0	529	42	184	1008	0	0	0	0	52	54	338
Heavy Vehicles (%)	2%	10%	23%	4%	2%	2%	2%	2%	2%	2%	2%	5%
Turn Type			Perm	Prot						Prot		Perm
Protected Phases		2		1	6					7	4	
Permitted Phases			2									4
Actuated Green, G (s)		51.8	51.8	16.9	72.7					29.3	29.3	29.3
Effective Green, g (s)		51.8	51.8	16.9	72.7					29.3	29.3	29.3
Actuated g/C Ratio		0.47	0.47	0.15	0.66					0.27	0.27	0.27
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1546	618	267	2339					448	449	721
v/s Ratio Prot		0.16		c0.11	c0.28					0.03	0.03	
v/s Ratio Perm			0.03									c0.13
v/c Ratio		0.34	0.07	0.69	0.43					0.12	0.12	0.47
Uniform Delay, d1		18.4	15.9	44.1	8.8					30.5	30.6	33.8
Progression Factor		0.48	1.00	0.85	0.69					1.00	1.00	1.00
Incremental Delay, d2		0.6	0.2	6.8	0.5					0.1	0.1	0.5
Delay (s)		9.5	16.1	44.4	6.6					30.7	30.7	34.3
Level of Service		A	B	D	A					C	C	C
Approach Delay (s)		10.4			12.5			0.0			33.7	
Approach LOS		B			B			A			C	

Intersection Summary				
HCM Average Control Delay	17.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	48.5%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: S Sanborn Rd & US 101 NB Loop Off Ramp

3/2/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	427	157	189	976	0	53	0	123	2	1	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91	1.00	1.00	0.95		1.00		1.00		1.00	
Frt		1.00	0.85	1.00	1.00		1.00		0.85		0.87	
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00		1.00	
Satd. Flow (prot)		4940	1380	1703	3471		1770		1538		1518	
Flt Permitted		1.00	1.00	0.95	1.00		0.71		1.00		1.00	
Satd. Flow (perm)		4940	1380	1703	3471		1318		1538		1518	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	464	171	205	1061	0	58	0	134	2	1	73
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	122	0	69	0
Lane Group Flow (vph)	0	464	171	205	1061	0	58	0	12	0	7	0
Heavy Vehicles (%)	2%	5%	17%	6%	4%	2%	2%	2%	5%	2%	5%	9%
Turn Type			Free	Prot			custom		custom	Split		
Protected Phases		2		1	6					4	4	
Permitted Phases			Free				8		8			
Actuated Green, G (s)		59.5	110.0	18.5	82.0		10.2		10.2		5.8	
Effective Green, g (s)		59.5	110.0	18.5	82.0		10.2		10.2		5.8	
Actuated g/C Ratio		0.54	1.00	0.17	0.75		0.09		0.09		0.05	
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)		2672	1380	286	2587		122		143		80	
v/s Ratio Prot		0.09		c0.12	c0.31						0.00	
v/s Ratio Perm			c0.12				c0.04		0.01			
v/c Ratio		0.17	0.12	0.72	0.41		0.48		0.09		0.09	
Uniform Delay, d1		12.8	0.0	43.3	5.1		47.4		45.6		49.6	
Progression Factor		0.82	1.00	1.00	1.00		1.00		1.00		0.75	
Incremental Delay, d2		0.1	0.2	8.3	0.5		2.9		0.3		0.5	
Delay (s)		10.7	0.2	51.6	5.6		50.3		45.9		37.5	
Level of Service		B	A	D	A		D		D		D	
Approach Delay (s)		7.8			13.1			47.2			37.5	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: S Sanborn Rd & US 101 SB Off Ramp

3/2/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1269	139	180	588	0	0	0	0	397	2	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	0.88
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		3505	1380	1770	3438					1681	1686	2256
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		3505	1380	1770	3438					1681	1686	2256
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1379	151	196	639	0	0	0	0	432	2	276
RTOR Reduction (vph)	0	0	83	0	0	0	0	0	0	0	0	229
Lane Group Flow (vph)	0	1379	69	196	639	0	0	0	0	216	218	47
Heavy Vehicles (%)	2%	3%	17%	2%	5%	2%	2%	2%	2%	2%	2%	26%
Turn Type			Perm	Prot						Prot		Perm
Protected Phases		2		1	6					7	4	
Permitted Phases			2									4
Actuated Green, G (s)		45.0	45.0	26.0	75.0					17.0	17.0	17.0
Effective Green, g (s)		45.0	45.0	26.0	75.0					17.0	17.0	17.0
Actuated g/C Ratio		0.45	0.45	0.26	0.75					0.17	0.17	0.17
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1577	621	460	2579					286	287	384
v/s Ratio Prot		c0.39		c0.11	0.19					0.13	c0.13	
v/s Ratio Perm			0.05									0.02
v/c Ratio		0.87	0.11	0.43	0.25					0.76	0.76	0.12
Uniform Delay, d1		24.9	15.9	30.8	3.8					39.5	39.6	35.2
Progression Factor		0.47	0.28	0.92	1.00					1.00	1.00	1.00
Incremental Delay, d2		6.1	0.3	0.6	0.2					10.8	11.0	0.1
Delay (s)		17.9	4.8	29.0	4.0					50.3	50.5	35.3
Level of Service		B	A	C	A					D	D	D
Approach Delay (s)		16.6			9.9			0.0			44.5	
Approach LOS		B			A			A			D	

Intersection Summary				
HCM Average Control Delay	21.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	66.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: S Sanborn Rd & US 101 NB Loop Off-Ramp

3/2/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1203	463	297	609	0	24	0	294	15	22	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91	1.00	1.00	0.95		1.00		1.00		1.00	
Frt		1.00	0.85	1.00	1.00		1.00		0.85		0.89	
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00		1.00	
Satd. Flow (prot)		5036	1509	1752	3438		1752		1553		1558	
Flt Permitted		1.00	1.00	0.95	1.00		0.64		1.00		1.00	
Satd. Flow (perm)		5036	1509	1752	3438		1180		1553		1558	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1308	503	323	662	0	26	0	320	16	24	147
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	297	0	134	0
Lane Group Flow (vph)	0	1308	503	323	662	0	26	0	23	0	53	0
Heavy Vehicles (%)	2%	3%	7%	3%	5%	2%	3%	2%	4%	5%	2%	10%
Turn Type			Free	Prot			custom		custom	Split		
Protected Phases		2		1	6					4	4	
Permitted Phases			Free				8		8			
Actuated Green, G (s)		45.7	100.0	23.9	73.6		7.2		7.2		7.2	
Effective Green, g (s)		45.7	100.0	23.9	73.6		7.2		7.2		7.2	
Actuated g/C Ratio		0.46	1.00	0.24	0.74		0.07		0.07		0.07	
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)		2301	1509	419	2530		85		112		112	
v/s Ratio Prot		c0.26		c0.18	0.19						0.03	
v/s Ratio Perm			c0.33				0.02		0.01			
v/c Ratio		0.57	0.33	0.77	0.26		0.31		0.21		0.48	
Uniform Delay, d1		19.9	0.0	35.5	4.3		44.0		43.7		44.6	
Progression Factor		0.76	1.00	1.00	1.00		1.00		1.00		1.04	
Incremental Delay, d2		0.5	0.3	8.5	0.3		2.0		0.9		3.1	
Delay (s)		15.7	0.3	44.0	4.6		46.1		44.6		49.4	
Level of Service		B	A	D	A		D		D		D	
Approach Delay (s)		11.5			17.5			44.7			49.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
1: S Sanborn Rd & US 101 SB Off Ramp

2/28/2011

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	529	90	184	1008	52	54	502
v/c Ratio	0.34	0.14	0.69	0.43	0.12	0.12	0.57
Control Delay	10.8	5.2	49.7	7.5	28.0	28.1	20.3
Queue Delay	0.0	0.0	0.1	0.2	0.0	0.0	0.0
Total Delay	10.8	5.2	49.7	7.6	28.0	28.1	20.3
Queue Length 50th (ft)	122	10	125	204	27	28	88
Queue Length 95th (ft)	196	59	158	186	58	61	144
Internal Link Dist (ft)	442			244		1048	
Turn Bay Length (ft)			125		250		250
Base Capacity (vph)	1544	666	442	2339	520	449	991
Starvation Cap Reductn	0	0	14	456	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.14	0.43	0.54	0.10	0.12	0.51

Intersection Summary

Queues
2: S Sanborn Rd & US 101 NB Loop Off Ramp

2/28/2011

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBT
Lane Group Flow (vph)	464	171	205	1061	58	134	76
v/c Ratio	0.17	0.12	0.71	0.41	0.48	0.51	0.46
Control Delay	12.3	0.2	56.7	6.4	59.0	14.7	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	0.2	56.7	6.4	59.0	14.7	18.3
Queue Length 50th (ft)	44	0	138	122	40	0	11
Queue Length 95th (ft)	50	0	204	216	80	56	19
Internal Link Dist (ft)	244			520			600
Turn Bay Length (ft)		75	150			55	
Base Capacity (vph)	2707	1380	449	2612	240	389	309
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	65	0	0	1
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.12	0.46	0.42	0.24	0.34	0.25

Intersection Summary

Queues
1: S Sanborn Rd & US 101 SB Off Ramp

3/2/2011

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1379	151	196	639	216	218	276
v/c Ratio	0.87	0.21	0.43	0.25	0.76	0.76	0.45
Control Delay	18.6	1.4	31.7	4.1	57.6	57.9	7.1
Queue Delay	1.2	0.0	0.9	0.5	0.0	0.0	0.0
Total Delay	19.7	1.4	32.6	4.5	57.6	57.9	7.1
Queue Length 50th (ft)	429	2	89	50	140	141	0
Queue Length 95th (ft)	529	8	m145	77	#255	#258	38
Internal Link Dist (ft)	449			244		1048	
Turn Bay Length (ft)			155		250		250
Base Capacity (vph)	1577	704	460	2579	286	287	613
Starvation Cap Reductn	0	0	99	1388	0	0	0
Spillback Cap Reductn	67	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.21	0.54	0.54	0.76	0.76	0.45

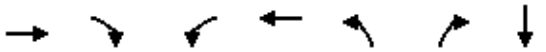
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues
2: S Sanborn Rd & US 101 NB Loop Off-Ramp

3/2/2011



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBT
Lane Group Flow (vph)	1308	503	323	662	26	320	187
v/c Ratio	0.57	0.33	0.77	0.26	0.31	0.78	0.76
Control Delay	16.9	0.3	47.6	4.8	53.3	19.7	33.4
Queue Delay	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	0.3	47.6	4.8	53.3	19.7	33.4
Queue Length 50th (ft)	126	0	193	64	16	0	20
Queue Length 95th (ft)	m222	m0	262	87	43	#113	m#111
Internal Link Dist (ft)	244			520			600
Turn Bay Length (ft)		75	150			55	
Base Capacity (vph)	2299	1509	631	2529	94	419	257
Starvation Cap Reductn	569	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.33	0.51	0.26	0.28	0.76	0.73

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

US 101/Sanborn Ramp Improvement Project, City of Salinas
Existing Conditions Mainline Weaving Analysis Worksheet

Existing Conditions Weaving and Composite Section Volumes

Weaving Segment	L (FT)	Vw AM	Vw PM	V AM	V PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	1,000	402	747	1,928	3,527

Vw = Total Weaving Volume (pcph equivalent, Vw = [V (A-D) + V (B-C)]*(1+Truck Percentage)]
Truck Percentage 18%
Percent of Onramp to Off-Ramp 10%

Existing Conditions Ramp and Mainline Volumes

Weaving Segment	Ramp Volumes AM	Ramp Volumes PM	Mainline Vol AM	Mainline Vol PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	133	214	1,252	2,319
	260	524		

Year 2012 Conditions Weaving and Composite Section Volumes

Weaving Segment	L (FT)	Vw AM	Vw PM	V AM	V PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	1,000	438	805	2,091	3,807

Vw = Total Weaving Volume (pcph equivalent, Vw = [V (A-D) + V (B-C)]*(1+Truck Percentage)]
Truck Percentage 18%
Percent of Onramp to Off-Ramp 10%

Year 2012 Conditions Ramp and Mainline Volumes

Weaving Segment		Ramp Volumes AM	Ramp Volumes PM	Mainline Vol AM	Mainline Vol PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	Sanborn Rd NB-Off	134	225	1,368	2,509
	Fairview Ave NB-On	296	571		

Year 2020 Weaving and Composite Section Volumes

Weaving Segment	L (FT)	Vw AM	Vw PM	V AM	V PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	1,000	577	1,036	2,739	4,929

Vw = Total Weaving Volume (pcph equivalent, Vw = [V (A-D) + V (B-C)]*(1+Truck Percentage)]
Truck Percentage 18%
Percent of Onramp to Off-Ramp 10%

Year 2020 Conditions Ramp and Mainline Volumes

Weaving Segment		Ramp Volumes AM	Ramp Volumes PM	Mainline Vol AM	Mainline Vol PM
	Sanborn Rd NB-Off	137	270	1,830	3,270
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	Fairview Ave NB-On	440	760		

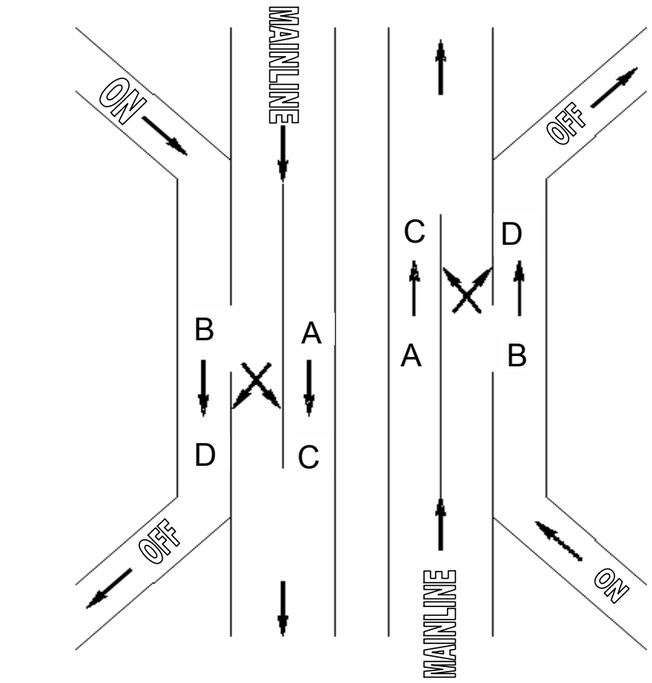
Year 2030 Weaving and Composite Section Volumes

Weaving Segment	L (FT)	Vw AM	Vw PM	V AM	V PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	1,000	741	1,333	3,551	6,335

Vw = Total Weaving Volume (pcph equivalent, Vw = [V (A-D) + V (B-C)]*(1+Truck Percentage)]
Truck Percentage 18%
Percent of Onramp to Off-Ramp 10%

Year 2030 Conditions Ramp and Mainline Volumes

Weaving Segment		Ramp Volumes AM	Ramp Volumes PM	Mainline Vol AM	Mainline Vol PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	Sanborn Rd NB-Off	140	330	2,410	4,220
	Fairview Ave NB-On	610	1,000		



Existing	V (B-D) AM	V (B-D) PM	V (A-D) AM	V (A-D) PM	V (B-C) AM	V (B-C) PM	V (A-C) AM	V (A-C) PM	Vw = V(A-D)+B(B-C) Pcph AM	Vw = V(A-D)+B(B-C) Pcph PM	Total V (PCPH) AM	Total V (PCPH) PM	R = Vw2/Vw AM	R = Vw2/Vw PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	31	62	126	191	276	556	1,201	2,180	402	747	1,928	3,527	0.31	0.26

Year 2012	V (B-D) AM	V (B-D) PM	V (A-D) AM	V (A-D) PM	V (B-C) AM	V (B-C) PM	V (A-C) AM	V (A-C) PM	Vw = V(A-D)+B(B-C) Pcph AM	Vw = V(A-D)+B(B-C) Pcph PM	Total V (PCPH) AM	Total V (PCPH) PM	R = Vw2/Vw AM	R = Vw2/Vw PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	35	67	123	198	314	606	1,300	2,354	438	805	2,091	3,807	0.28	0.25

Year 2020	V (B-D) AM	V (B-D) PM	V (A-D) AM	V (A-D) PM	V (B-C) AM	V (B-C) PM	V (A-C) AM	V (A-C) PM	Vw = V(A-D)+B(B-C) Pcph AM	Vw = V(A-D)+B(B-C) Pcph PM	Total V (PCPH) AM	Total V (PCPH) PM	R = Vw2/Vw AM	R = Vw2/Vw PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	52	90	110	229	467	807	1,692	3,051	577	1,036	2,739	4,929	0.19	0.22

Year 2030	V (B-D) AM	V (B-D) PM	V (A-D) AM	V (A-D) PM	V (B-C) AM	V (B-C) PM	V (A-C) AM	V (A-C) PM	Vw = V(A-D)+B(B-C) Pcph AM	Vw = V(A-D)+B(B-C) Pcph PM	Total V (PCPH) AM	Total V (PCPH) PM	R = Vw2/Vw AM	R = Vw2/Vw PM
US 101 NB - Fairview Ave NB On-Ramp to Sanborn Rd NB Loop Off-Ramp	72	118	93	271	648	1,062	2,196	3,918	741	1,333	3,551	6,335	0.13	0.20

Note: All volumes in this table are expressed in PCPH = Passenger Car per Hour
Vw2 = Smaller Weaving Volume