Proposed Modifications to Glenn-Colusa Canal Bridge Design for COLUSA GENERATING STATION Colusa County, California

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URS

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BRIDGE DESIGN MODIFICATION

1.0 SUMMARY OF BRIDGE DESIGN MODIFICATION

E&L Westcoast L.L.C. (E&L Westcoast) has refined and revised the design for the Glenn-Colusa Canal Bridge replacement and the associated road alignment for the Colusa Generating Station (CGS) project (Figure 1). Bridge replacement is required as part of the CGS project to allow for transportation of heavy equipment to the site. At the request of adjacent landowners, the bridge has been redesigned to minimize impacts to adjacent property. The modified bridge design proposes changing the location of the new bridge from north of the existing Glenn-Colusa Canal Bridge, as proposed in the Application for Certification (AFC) (URS, 2006) to a location south of the existing bridge, as described further below.

1.1 EXISTING GLENN-COLUSA CANAL BRIDGE

The Glenn-Colusa Canal Bridge currently provides vehicular access over the Glenn-Colusa Canal. This bridge was built in 1965 to provide access to, and support the construction of, the Pacific Gas & Electric (PG&E) Delevan Gas Compressor Station. This bridge is a four-span concrete-decked structure that is 74 feet long by 20 feet wide. The bridge provides weight-limited one-way truck traffic and speed-limited two-way automobile traffic (due to the reduced lane width of 8 feet) with 2-foot shoulders. The bridge was originally designed for a 40-ton load, but its rating from the American Association of State Highway and Transportation Officials (AASHTO) is currently H-20, which is a 20-ton load.

1.2 PREVIOUSLY PROPOSED GLENN-COLUSA CANAL BRIDGE DESIGN

A preliminary design for the new bridge located to the north of the existing Glenn-Colusa Canal Bridge was proposed in the AFC submitted to the California Energy Commission (CEC) in November 2006 (Figure 2). This previous bridge design provided for the installation of a new free-span steel beam and concrete bridge approximately 100 feet long by 30 feet wide, designed to support a new 30-foot-wide extension of Dirks Road, which will provide access to the CGS.

The original replacement bridge was proposed as a free-span bridge; construction would not have involved placing piers in the canal. The east approach was to be located 20 feet north of the existing bridge and the west approach approximately 40 feet to the north. Under the previous proposal, the existing bridge would have been left in place. The access road on both sides was proposed for realignment to straighten and widen the approaches to allow for unimpeded two-way traffic. Land disturbance associated with the previously proposed bridge replacement would have included 5.4 acres of temporary construction impact and 1 acre of permanent operational impact.

1.3 CURRENT PROPOSED GLENN-COLUSA CANAL BRIDGE DESIGN

The current proposal is to construct a replacement bridge to the south of the existing bridge rather than to the north (Figure 3). The east approach will be located approximately 75 feet south of the existing bridge, and the west approach will be located about 45 feet south. Similar to the previous bridge design, the access road on both sides will be realigned to straighten and widen the approaches to allow for unimpeded two-way traffic, re-aligning with the current Dirks Road right-of-way as soon as practical. A retainer wall will be placed along the northern side of Dirks Road, on the east side of the replacement bridge, to enable the continued use of the current irrigation canal.

The replacement bridge will be approximately 100 feet long by 30 feet wide and will be a three-span bridge (rather than a free-span design as previously proposed). This would provide for two 12-foot lanes with 3-foot shoulders giving unimpeded two-way traffic flow, rated for the heaviest equipment for the plant, and will exceed HS-20 rating per AASHTO standards. Two rows of five piers will be constructed in the canal to support the bridge; designed and oriented to reduce impeding the flow of water and to minimize the collection of floating debris. Sheet piles will be installed to construct a temporary cofferdam around each row of piers. The inside of the cofferdam will be dewatered and the water will be released back into the canal downstream of the cofferdam. The bridge will be fitted with side guard rails and will be striped to permit safe passage of traffic.

Table 1 provides details of temporary and permanent land disturbance for the project with the revised bridge design. The construction of the bridge is a relatively minor component of the project, requiring disturbance of 4.1 acres out of a total of 96 acres of temporary construction staging and laydown. The area of temporary disturbance has been reduced by 1.3 acres from the previously proposed design. The current proposed bridge design includes a 1.09-acre temporary construction staging and parking area on the east side of the Glenn-Colusa Canal as well as an approximately 135-foot construction right-of-way along the alignment (Figure 3). Land disturbance for the current bridge design will involve 4.1 acres of temporary construction impact (rather than 5.4 acres, as previously proposed). All disturbed areas will be returned to pre-project conditions after construction is complete.

Maximum permanent disturbance is limited to the realignment of the approach roads and backfilling the area (70 by 500 feet) on both sides of the bridge (rather than 40 by 100 feet, as previously proposed). Land disturbance for the current bridge design will involve 1.6 acres of permanent operational impact (rather than 1 acre, as previously proposed).

Under this proposal, the existing bridge will be removed (rather than left in place, as previously proposed). The removal of the existing bridge will occur after the new bridge is constructed to allow continued access over the Glenn-Colusa Canal. The concrete deck and the three sets of five piers associated with the existing bridge will be removed. The piers will be cut off at the mud line and removed during low water conditions, which will allow the work to be done without placing heavy equipment into the canal. Removal of the existing bridge piers will offset potential impacts of the new piers on the flow of water in the canal. The two bridge abutments supporting the existing bridge will be left in place to eliminate construction impacts to the canal embankments. This will not affect the operation of the canal. The original bridge approaches will be final-graded to match the surrounding land contours and seeded with grass native to the region.

Table 1
Estimated Land Disturbance Areas for Construction and Operation
(Revised Table 3.6-3 in the AFC)
(Page 1 of 2)

Project Component Item	Unit Area		Proposed Length	Construction Right-of-Way (ROW)	Notes
	Construction	Operations			
Power Plant Area					
Power Generation Facility	20 acres	20 acres	N/A	N/A	Temporary construction includes laydown, topsoil storage, parking and construction office area, and construction area for switchyard. Permanent disturbance is the area within the fence line of the power generation facility, plus the stormwater detention basin.
Switchyard	8.2 acres	8.2 acres	N/A	N/A	Temporary construction area for switchyard is included with temporary construction area for power generation facility. Permanent disturbance is the area within the fenceline of the switchyard facility.
Stormwater Basin	2.5 acres	2.5 acres	N/A	N/A	Stormwater basin is located at the southwest section of the project site.
Temporary Construction Area					
Construction Area	43 acres	N/A	N/A	N/A	Temporary construction area includes laydown, parking, and construction trailer/office.
Linear Facilities					
Plant Access Road	4.1 acres	1.7 acres	2,500 feet	70-foot width	Temporary construction disturbance is 70 feet wide. Road length is approximately 2,500 feet from the end of pavement on the PG&E Road Easement 295 or 442 to the plant fenceline. Permanent disturbance is 30 feet wide (24-foot-wide pavement plus 3-foot shoulder on each side).
Transmission Line Interconnection	7.3 acres	0.3 acre	1,800 feet	10,000 square feet per tower (12) 400 square feet per footing (48)	Four PG&E transmission lines loop in and out from the site switchyard. They are approximately 1,800 feet long and each is supported by approximately three structures (a total of 48 tower footings). Thirty-two tower footings are outside of the temporary construction disturbance area of the switchyard and laydown area. Each tower footing will have a temporary disturbance averaging about 10,000 square feet per tower. Permanent average disturbance is estimated at 400 square feet per footing.
Natural Gas Pipeline, underground	1.7 acres	N/A	1,500 feet	50-foot width	No temporary or permanent access road. Construction disturbance will be 50 feet wide. Pipeline is approximately 1,500 feet in length (from PG&E Gas Compressor to termination at plant metering station fenceline). Permanent 50-foot easement, but surface restored to original condition.

Table 3.6-3
Estimated Land Disturbance Areas for Construction and Operation
(Revised Table 3.6-3 in the AFC)
(Page 2 of 2)

Project Component Item	Unit Area		Proposed Length	Construction Right-of-Way (ROW)	Notes
	Construction	Operations			
Water Supply Pipeline and Associated Unpaved Road	1.9 acres	0.74 acre	2,700 feet	30-foot width	Temporary disturbance is assumed to be 30 feet wide. Pipeline is approximately 2,700 feet in length. The raw water intake structure at the Tehama-Colusa Canal will require a permanent area of 10 by 10 feet, and a temporary area of disturbance of twice that area. The surface above the buried pipeline will be maintained as a 12-foot-wide unpaved dirt service road, with the remaining area of disturbance.
Other Areas					
Glenn-Colusa Canal Bridge	4.1 acres	1.6 acres	100 feet	30-foot width	Maximum temporary disturbance is assumed to be a 1 acre parcel, which includes the construction laydown and parking, as well as a 135-foot ROW during construction of the road and bridge. Maximum permanent disturbance is limited to the realignment of the approach roads and backfilling the area (70 by 500 feet) on both sides of the bridge.
Teresa Creek Bridge	3 acres	0.04 acre	75 feet	200-foot radius	Maximum temporary disturbance is assumed to be within a 200-foot radius, which includes laydown, temporary road, and bridge and parking. Maximum permanent disturbance is limited to backfilling the 40 × 40-foot area at the northwestern corner of the bridge to bring it up to grade.
Delevan/ McDermott Intersection	0.02 acre	0.02 acre	N/A	N/A	Shoulders on Delevan Road east of McDermott Road will be widened at the intersection to provide a wider turning radius. This includes relocation of the stop sign and telephone conduit box at the northeastern corner, and placement of gravel at the northeastern and southeastern corners of the intersection.
TOTAL	**95.82 acres**	**35.1 acres**			

2.0 ENVIRONMENTAL CONSEQUENCES

2.1 AIR QUALITY

2.1.1 Construction Emissions

The revised bridge design described in Section 1.3 is not expected to result in any substantial changes in generation of fugitive dust and construction emissions compared to those associated with the previous bridge design (discussed in Section 8.1.2.1 of the AFC). The construction of the bridge is a relatively minor component of the project, requiring disturbance of 4.1 acres out of a total of approximately 96 acres of temporary construction staging and laydown area. The area of temporary disturbance has been reduced by 1.3 acres from the previously proposed design. This smaller area will reduce the operating duration of construction equipment used to clear the staging and laydown area, resulting in lower emissions.

The revised design will not affect the project schedule, and therefore, will not contribute to increased fugitive dust emissions during the worst-case construction months (months 1 and 2 of the construction program).

Likewise, the revised bridge design will not result in any changes in equipment emissions during the anticipated worst-case months for such emissions (months 5 through 16 for NO_X and months 2 through 13 for all other criteria pollutants). No changes in vehicle trips associated with movement of workers and equipment during construction are expected with the revised bridge design (such trips are a secondary source of emissions of criteria pollutants). Section 8.1.5.10.2 of the AFC describes measures that will be employed during construction to control fugitive dust and construction equipment emissions. The revised bridge design would not change any of the conclusions presented in the AFC for construction emissions.

2.1.2 Operational Emissions

The revised bridge design will not result in any changes in operational emissions. Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. It will not affect operational emissions associated with the power plant, nor will it change traffic volumes or patterns compared to the previous bridge design. The revised design will not result in any operational emissions that differ from those analyzed in Section 8.1.2.2 of the AFC. The permanent disturbance of an additional 0.6-acre as a result of the revised bridge design would not change any of the conclusions presented in the AFC for operations emissions.

2.2 BIOLOGICAL RESOURCES

2.2.1 Construction

The revised bridge design is not expected to substantially change potential construction impacts on sensitive biological resources compared to those discussed in the AFC. No additional special-status species or sensitive habitats are expected to be affected by the revised bridge design. The following special-status species may use habitats that will have been affected by the previous bridge design, and similar effects could occur as a result of the revised design:

- giant garter snake (*Thamnophis gigas*), federal and state threatened;
- vernal pool fairy shrimp (*Branchinecta lynchi*), federal threatened;
- vernal pool tadpole shrimp (*Lepidurus packardi*), federal endangered;
- Swainson's hawk (*Buteo swainsoni*), state threatened;
- bald eagle (*Haliaeetus leucocephalus*), federal threatened, state endangered;
- tricolored blackbird (*Agelaius tricolor*), state species of special concern;
- western burrowing owl (*Athene cunicularia hypugea*), state species of special concern;
- golden eagle (*Aquila chrysaetos*), state species of special concern and fully protected;
- white-faced ibis (*Plegadis chihi*), state species of special concern;
- white-tailed kite (*Elanus leucurus*), state fully protected; and
- cliff swallow (*Hirundo pyrrhonota*), protected under the federal Migratory Bird Treaty Act.

These species and associated habitats are discussed in Section 8.2 of the November 2006 AFC. The mitigation measures proposed in the November 2006 AFC, BIO-1 through BIO-18, will be implemented to avoid and minimize potential impacts to special-status species and their sensitive habitats to a less-than-significant level.

Similar to the previous bridge design, the revised bridge design will not result in construction impacts on special-status species, except the vernal pool tadpole shrimp, the vernal pool fairy shrimp, and the giant garter snake. Unavoidable impacts to giant garter snake, vernal pool tadpole shrimp, and vernal pool fairy will be offset with compensatory mitigation.

In the November 2006 AFC, no direct impacts to listed branchiopod habitat were anticipated. The revised bridge design will directly impact the northern margins of two seasonal wetlands (direct impact = total of 0.018 acre), located on the southwest side of the Glenn-Colusa Canal, directly south of the existing PG&E access road (Figure 3). The two seasonal wetlands are potentially suitable habitat for listed branchiopod species. The presence of these species is assumed based on known occurrences in the project vicinity, as described in the November 2006 AFC. The wetland mitigation measures in the November 2006 AFC, BIO-1 through BIO-3, will be implemented to minimize impacts to seasonal wetland habitat which could potentially support listed branchiopod species.

Unavoidable permanent impacts to listed branchiopod habitat will be mitigated according to preservation and creation ratios defined in the U.S. Fish and Wildlife Service (USFWS) programmatic consultation for listed branchiopods (USFWS, 1996). Preservation and creation credits of listed branchiopod habitat will be purchased at a USFWS-approved mitigation bank. Table 2 summarizes the compensatory mitigation for branchiopod habitat. Implementation of the avoidance and minimization measures and the purchase of mitigation credits will reduce impacts to listed branchiopod species to a less-than-significant level.

Table 2
Proposed Compensatory Mitigation for Listed Branchiopod Habitat Following USFWS 1996 Vernal Pool Programmatic Consultation

Habitat	Direct Permanent Area of Impact (acres)	Total Area of Affected Wetland (acres)	Proposed Mitigation Ratio		Type of Mitigation
			Preservation 2:1	Creation 1:1	
Seasonal Wetland 1	0.005	0.113[1]	0.226	0.113	Offsite at a USFWS-approved mitigation bank
Seasonal Wetland 2	0.014	0.041[1]	0.082	0.041	Offsite at a USFWS-approved mitigation bank
Total Proposed Mitigation (acres)			**0.308[2]**	**0.154[2]**	

Notes:

[1] The U.S. Fish and Wildelife Service (USFWS) programmatic consultation with the U.S. Army Corps of Engineers (USACE) requires compensation to be based on the entire area of the affected pool rather than the area of fill or temporary disturbance (USFWS, 1996).

[2] Compensatory mitigation for impacts to seasonal wetlands will be the greater amount for either impacts to listed branchiopod habitat or wetlands, but not both.

The potential impacts to giant garter snake habitat would be less than the threshold required to append the CGS project to the USFWS programmatic biological opinion for giant garter snake (USFWS, 1997). The revised amounts of compensatory mitigation proposed for potential impacts to giant garter snake are listed in Table 4.

Removal of the existing Glenn-Colusa Canal Bridge will be implemented in accordance with the avoidance and minimization measures proposed in the November 2006 AFC, BIO-1 through BIO-18, to avoid potential adverse effects to listed species and sensitive habitats, including the giant garter snake and the nesting cliff swallow.

To minimize impacts to the flow of waters in the Glenn-Colusa Canal to a less-than-significant level, the mitigation measures proposed in the November 2006 AFC, BIO-1 through BIO-5, will be implemented along with the following additional measures:

- All in-channel work and the small steel cofferdams will be installed during the dry season.
- Pre-engineered steel girders that can support the concrete deck will be used to avoid the need for falsework.

Unavoidable impacts will be offset with compensatory mitigation (see Table 4). Table 5 summarizes total impacts as a result of the project.

Table 3
Impacts to Giant Garter Snake Habitat and Proposed Mitigation for the Colusa Generating Station Project

	November 2006 AFC	August 2007 Revised Bridge Design		
Habitat Impacted	**Area of Impact (acres)** [1]	**Area of Impact (acres)**	**Proposed Mitigation Ratio**[2]	**Proposed Mitigation**
Permanent Impacts				
freshwater marsh	0.035	0.279	3:1	0.837 acre[3]
cultivated rice field	0.270	0.362	3:1	1.086 acre[3]
irrigation ditch	0.294	0	3:1	0 acre[3]
Glenn-Colusa Canal	0	0.029	3:1	0.087 acre[3]
perennial stream (Teresa Creek)	0.014	0.014	3:1	0.042 acre[3]
Total permanent effects on aquatic habitat (acres)	0.613	0.684		2.052 acres of aquatic habitat and 4.104 acres of upland habitat[4]
Temporary Impacts				
freshwater marsh	0.094	0.120	1:1	Onsite restoration of affected area[3]
cultivated rice field	>1.643	1.401	1:1	Onsite restoration of affected area[3]
irrigation ditch	0.378	0.214	1:1	Onsite restoration of affected area[3]
Glenn-Colusa Canal	0	0.006	1:1	Onsite restoration of affected area[3]
perennial stream (Teresa Creek)	Exact acreage unknown at time of submittal of November 2006 AFC	0.040	1:1	Onsite restoration of affected area[3]
Total temporary effects on aquatic habitat (acres)	**>2.115**	**1.781**	1:1	Onsite restoration of affected area[3]

Notes:

1 This column includes information from Table 8.2-8 in the November 2006 AFC.
2 Proposed compensation will include offsite replacement of 2 acres of upland habitat for each acre of aquatic habitat permanently affected (USFWS, 1997).
3 Mitigation will be provided that is consistent with the USFWS Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California. November 13, 1997.
4 Resulting mitigation will be the greater amount for either impacts to giant garter snake habitat or wetlands, but not both.

Table 4
Impacts and Proposed Mitigation
for the Colusa Generating Station Project

Habitat Impacted	November 2006 AFC	August 2007 Revised Bridge Design			
	Area of Impact (acres) [1]	Area of Impact (acres)	Proposed Mitigation Ratio	Proposed Mitigation Acreage	Type of Mitigation
Wetlands					
Permanent Impacts					
freshwater marsh	0.035	0.279	3:1	0.837	Offsite compensatory mitigation.[2]
seasonal wetland	0	0.018	3:1	0.054	Offsite compensatory mitigation.[3]
cultivated rice field	0.270	0.362	1:1	0.362	Offsite compensatory mitigation.[2, 4]
Temporary Impacts					
freshwater marsh	0.094	0.120	1:1	0.120	Onsite restoration of affected area.[5]
seasonal wetland	>0.023	0.075	1:1	0.075	Onsite restoration of affected area.
cultivated rice field[6]	1.580	1.401	1:1	1.401	Onsite restoration of affected area.[5]
Non-Wetland Waters of the United States					
Permanent Impacts					
Glenn-Colusa Canal	0	0.029	--	--	Removal of existing bridge and piers.[2, 5]
irrigation ditch	0.294	0	1:1	0	No mitigation necessary.[2, 5]
perennial stream (Teresa Creek)	0.014	0.014	--	--	Onsite.[2, 5, 7]
Temporary Impacts					
Glenn-Colusa Canal	0	0.006	1:1	0.006	Onsite restoration of affected area.[5]
irrigation ditch	0.378	0.214	1:1	0.214	Onsite restoration of affected area.[5]

Table 4
Impacts and Proposed Mitigation
for the Colusa Generating Station Project

Habitat Impacted	November 2006 AFC	August 2007 Revised Bridge Design			
	Area of Impact (acres) [1]	Area of Impact (acres)	Proposed Mitigation Ratio	Proposed Mitigation Acreage	Type of Mitigation
perennial stream (Teresa Creek)	Exact acreage unknown at time of submittal of November 2006 AFC	0.040	1:1	0.040	Onsite restoration of affected area.[5]

Notes:

[1] This column includes information from in Table 8.2-7 of the November 2006 AFC.
[2] Resulting mitigation will be the greater amount for either impacts to giant garter snake habitat or wetlands, but not both.
[3] Compensation for impacts to seasonal wetlands will be consistent with the USFWS programmatic formal consultation agreement for listed branchiopods. This compensation may be greater than the compensation indicated in this table. The USFWS 1996 programmatic agreement requires a 2:1 preservation ratio and a 1:1 conservation ratio. Under the USFWS 1996 programmatic agreement, if any part of a pool that could potentially support listed branchiopods is destroyed, the entire pool is directly affected. The total area of the two seasonal wetlands that will be impacted is 0.154 acre. Therefore, at least 0.308 preservation credit and 0.154 conservation credit is proposed to be purchased at a USFWS and USACE approved mitigation bank.
[4] Permanent impacts to these features will require additional offsite compensation consistent with the USFWS Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California. November 13, 1997.
[5] Mitigation will be provided that is consistent with the USFWS 1997 programmatic consultation for giant garter snake.
[6] Temporary impacts to cultivated rice fields are not included in calculation of total temporary impacts to wetlands.
[7] Onsite mitigation consists of removing the existing Teresa Creek Bridge abutments. The existing Teresa Creek Bridge is approximately 31 feet long, while the new bridge will be 38 feet long. A longer bridge will set the bridge abutments bank an additional 3 feet, creating a wider channel. Removal of the abutments will increase the width of Teresa Creek by at least 0.014 acre.

Table 5
Summary of Total Impacts
for the Colusa Generating Station Project

Bridge Design	Impacts (acres)					
	Wetlands		Non-Wetland		Total (Wetland + Non-Wetland)	
	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary
November 2006 AFC	0.305	>0.117[1]	0.308	>0.378	**0.610**	**>0.495**
July 2007 Supplement	0.659	0.195[1]	0.043	0.260	**0.702**	**0.455**

Note:

[1] Temporary impacts to cultivated rice field are not included in the calculation of total temporary impacts to wetlands.

Updates to the December 2006 Biological Assessment and the 2007 U.S. Army Corps of Engineers (USACE) 404 Permit Application that reflect the revised Glenn-Colusa Canal Bridge design and associated impacts have been submitted to the USFWS and the USACE concurrent with this CEC submittal. The Biological Resources Mitigation Implementation and Monitoring Plan is currently being prepared and will be submitted to the CEC after further consultation with the USFWS, the USACE, National Marine Fisheries Service, the Regional Water Quality Control Board, and the California Department of Fish and Game.

2.2.2 Operation

The revised bridge design will not result in any impacts on biological resources during operation. Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in Section 8.2.2.4 of the AFC for operation impacts to biological resources.

2.3 CULTURAL RESOURCES

2.3.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in a significant change to impacts on cultural resources compared to those associated with the previous bridge design and discussed in Section 8.3.2 of the AFC. With respect to historic architectural resources, the removal of the existing bridge and subsequent construction of a replacement bridge at essentially the same location will not cause an adverse effect to the Glenn-Colusa Canal or irrigation system; both potentially significant cultural resources under the National Register of Historic Properties Criteria A and/or C. The canal at the Glenn-Colusa Canal Bridge location has already been affected by the extant bridge, which was constructed in 1965, well after the historic period. The revised bridge design will not further contribute to this loss of integrity nor will it result in any additional effects other than those evaluated in the AFC. It will result in a direct effect on the canal through the construction of piers within the canal which were not proposed in the original project description, but this will not affect the canal alignment and function and will not diminish the canal's overall integrity in a manner that will disqualify it as a contributor to the larger potential Glenn-Colusa Irrigation District historic district. The Area of Potential Effect (APE) for historical architecture identified in the AFC (see Section 8.3.1 and Figure 8.3-1) will not change as a result of the revised bridge design.

The removal of the existing bridge will not result in any adverse cultural impacts on the bridge itself. The bridge is less than 50 years old, is a small bridge of a common type and method of construction, and is not historically significant.

Archaeological surveys carried out for the original proposed facility (URS, 2001), which included the proposed replacement of the Glenn-Colusa Canal Bridge, indicated that there were no significant archaeological resources within the proposed project's APE. The APE for archaeological resources will not change as a result of the revised bridge design, and the design would not result in any impacts on archaeological resources. The revised bridge design would not change any of the conclusions presented in the AFC for construction impacts to cultural resources.

2.3.2 Operation

The revised bridge design will not result in any impacts on cultural resources (historic architectural and archaeological) during operation. Operation of the power plant will not affect any cultural resources identified in the study area. Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. The permanent disturbance of an additional 0.6 acre as a result of the revised project design would not change any of the conclusions presented in the AFC for operation impacts to cultural resources.

2.4 LAND USE

2.4.1 Construction

The evaluation of potential land use impacts in Section 8.4.2 the AFC indicated that the project, including the construction of a replacement bridge at the Dirks Road crossing of the Glenn-Colusa Canal, will not have any impacts on land use with respect to compatibility with existing land uses, consistency with adopted local goals and policies (other than those which will be resolved by a General Plan and Zoning Amendment). The existing Glenn-Colusa Canal Bridge is located in an area designated as Agriculture-General. The replacement of this bridge in the previous and revised locations will not be inconsistent with this zoning, but will require an encroachment permit. The construction of the new Glenn-Colusa Canal Bridge will not result in any other impacts on land use. E&L Westcoast has been working with the landowners regarding the refined bridge design. The landowners adjacent to the bridge prefer the refined bridge design over the previously proposed bridge design based on the reduced acreage of impacts on their property. Therefore, the refined bridge design is not expected to delay the schedule with regard to land acquisition. In addition, the GCID has been notified of the refined bridge design, including removal of the existing bridge and placing piers in the canal for the new bridge, and have approved of the refined bridge design. The revised bridge design would not change any of the conclusions presented in the aFC for land use construction impacts.

2.4.2 Operation

The revised bridge design will not result in any changes in land use compared to those discussed in the AFC. Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in the AFC for land use operation impacts.

2.5 NOISE

2.5.1 Construction

Project construction will result in a short-term temporary increase in the ambient noise level associated with the use of construction equipment for the bridge replacement. Noise associated with construction of a replacement bridge at Dirks Road is not expected to differ substantially from that associated with the previous bridge design. The construction of the bridge is a relatively minor component of the project, requiring disturbance of 4.1 acres out of a total of approximately 96 acres of temporary construction staging and laydown area. The area of temporary disturbance has been reduced by 1.3 acres from the previously proposed design. This smaller area will reduce the operating duration of construction equipment used to clear the staging and laydown area. The removal of the existing bridge, which was not proposed in the previous bridge design, will cause temporary increases in noise levels. However, since these noise level increases would be short-term and intermittent, they are not expected to be significant. The revised bridge design would not change any of the conclusions presented in Section 8.5.2 of the AFC for construction noise.

2.5.2 Operation

The revised bridge design will not result in any changes in operation noise levels compared to those discussed in the AFC. Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in the AFC for operations noise.

2.6 PUBLIC HEALTH

2.6.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any changes to impacts on public health compared to those associated with the previous bridge design and discussed in Section 8.6.2 of the AFC. The removal of the existing bridge and subsequent construction of a replacement bridge will not significantly increase construction emissions in comparison to the previous bridge design and will not be expected to result in any adverse health impacts, similar to the findings in the AFC.

The construction of the bridge is a relatively minor component of the project, requiring disturbance of 4.1 acres out of a total of approximately 96 acres of temporary construction staging and laydown area. The area of temporary disturbance has been reduced by 1.3 acres from the previously proposed design. This smaller area will reduce the operating duration of construction equipment used to clear the staging and laydown area, resulting in an overall decrease in total emissions. This minor area of disturbance will result in only a small portion of the total fugitive dust and equipment emissions generated during the construction of the project. The revised bridge design will not require any significant changes in the location or size of this area. As proposed for the previous bridge design, safe work practices will be adhered to during the construction of the new bridge, as described in Section 8.7 of the AFC. The revised bridge design would not change any of the conclusions presented in the AFC for construction emissions.

2.6.2 Operation

The revised bridge design will not result in any changes in operational phase pollutant emissions compared to those discussed in the AFC. Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in the AFC for operation emissions.

2.7 WORKER SAFETY AND HEALTH

2.7.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any changes to impacts on worker safety and health compared to those associated with the original project design and discussed in Section 8.7 of the AFC. The removal of the existing bridge and subsequent construction of a replacement bridge will not increase the risk of worker illness or injury when compared to the previous bridge design and is not expected to result in any adverse health impacts, similar to the findings in the AFC. For the revised bridge design, the construction of the replacement bridge will be undertaken using the same health and safety practices, programs and legal and regulatory compliances as described in the original project proposal in Section 8.7 of the AFC. The revised bridge design would not change any of the conclusions presented in the AFC for worker and safety construction impacts.

2.7.2 Operation

The revised bridge design will not result in any changes in the risk of adverse effects on worker safety and health during the operational phase of the project. The revised design will not affect operational activities associated with the power plant. Use of the proposed replacement bridge, will fulfill the same function as in the previous bridge design in the AFC, providing access to the power plant via Dirks Road. The new bridge design will not result in any changes in operational activities or associated impacts on worker safety and health. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in the AFC for worker and safety operation impacts.

2.8 SOCIOECONOMICS

2.8.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any substantial changes to socioeconomic impacts during construction. The replacement of the Glenn-Colusa Canal Bridge is a relatively minor portion of the overall project in terms of construction cost and labor requirements. Construction schedule, labor requirements and costs, and local population and housing (see AFC Sections 8.8.2.3 and 8.8.2.4) are not expected to change substantially as a result of the revised bridge design. Requirements for public services and utilities during construction will likewise not be expected to differ from those discussed in the AFC (Section 8.8.2.5) as a result of the revised bridge design. The revised bridge design includes the removal of the existing Glenn-Colusa Canal Bridge, which is a relatively minor component of the overall project in terms of labor requirements and will not have any substantial socioeconomic effects. The revised bridge design would not change any of the conclusions presented in the AFC for socioeconomic construction impacts.

2.8.2 Operation

The revised bridge design will not result in any socioeconomic impacts during the operational phase of the project. The proposed amendment will not affect operational activities associated with the power plant. Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. The revised bridge design would not change any of the conclusions presented in the AFC for socioeconomic operations impacts.

2.9 AGRICULTURE AND SOILS

2.9.1 Construction

The revised bridge design will not have any additional or different impacts on agriculture and soils compared to those described in the AFC (Section 8.9.2). The construction of the bridge is a relatively minor component of the project, requiring disturbance of 4.1 acres out of a total of approximately 96 acres of temporary construction staging and laydown area. The area of temporary disturbance has been reduced by 1.3 acres from the previous bridge design. The smaller area will reduce potential impacts, such as soil erosion and vegetation loss, that could arise from land clearance. As the replacement bridge will be constructed in a different location from the existing bridge, there will be additional soil compaction and potential erosion during construction, similar to that under the previous bridge design. As described in the AFC, temporary erosion control measures and ongoing Best Management Practices (BMPs) will be employed to reduce erosion, minimize runoff, and protect water quality and surrounding agricultural land. The construction of the revised bridge design will not result in any other impacts on agricultural resources or soils. The revised bridge design would not change any of the conclusions presented in the AFC for construction impacts to agriculture and soils.

2.9.2 Operation

The revised bridge design will not result in any changes in impacts on agricultural resources or soils during the operational phase of the project compared to those described in the AFC. The revised bridge design will not affect operational activities associated with the power plant. The replacement of the bridge in the revised bridge design will result in permanent disturbance of an additional 0.6 acre of land when compared to the previous bridge design. As described in the AFC, BMPs will be employed to prevent impacts from runoff from new areas of impervious surface onto surrounding agricultural land. The permanent disturbance of an additional 0.6 acre would not change any of the conclusions presented in the AFC for operation impacts to agriculture and soils.

2.10 TRAFFIC AND TRANSPORTATION

2.10.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any substantial impacts on traffic and transportation compared to those associated with the previous bridge design and discussed in Section 8.10.2.2 of the AFC. The existing Glenn-Colusa Canal Bridge will be operational until the new bridge is constructed, minimizing any potential disruption to traffic flow during construction. The construction of the replacement bridge south of the existing bridge (rather than north, as presented with the previous bridge design) is not expected to result in changes to traffic flow or patterns, as the proposed replacement bridge will fulfill the same function as in the previous bridge design; providing access to the power plant via Dirks Road. The revised bridge design would not change any of the conclusions presented in the AFC for construction traffic.

2.10.2 Operation

The revised bridge design will not result in any changes in impacts on traffic or transportation during the operational phase of the project compared to those described in the AFC. The revised design will not affect operational activities associated with the power plant. The construction and operation of the replacement bridge in both proposals will not adversely affect the traffic Level of Service on Dirks Road (see Section 8.10.2.3 of the AFC). The new bridge may actually benefit traffic flow by allowing the access road to the new bridge to be straightened and widened to facilitate unimpeded two-way traffic flow, rather than the weight-limited and speed-limited flow currently allowed. Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. The revised bridge design would not change any of the conclusions presented in the AFC for operations traffic.

2.11 VISUAL RESOURCES

2.11.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any changes to impacts on visual resources during construction compared to those associated with the previous bridge design (Section 8.11.2 of the AFC). Temporary soil exposure and soil and vegetation removal will not differ substantially between the revised design and the previous bridge design; and affected areas will be restored and revegetated following construction. The revised bridge design would not change any of the conclusions presented in the AFC for construction visual impacts.

2.11.2 Operation

The revised bridge design is not expected to result in any substantial impacts on visual resources during operation compared to the previous bridge design. The revised design will not affect operational activities associated with the power plant. The proposed bridge will replace an existing bridge, which was not noted in the AFC as being of any substantial visual integrity or value and is not located within an area that makes any substantial contribution to the visual quality or character of the locality. The replacement bridge will be slightly longer and of a different design that the existing bridge but will be appropriate for its function and visual context and will not create an adverse visual impact. It will also be considerably lower in height than the former design, which will reduce its visual impact. As in the previous bridge design, the bridge approaches will be final-graded to match the surrounding land contours and seeded with native grass species. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in AFC Section 8.11.2 for operations visual impacts.

2.12 HAZARDOUS MATERIALS HANDLING

2.12.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any changes to impacts with respect to handling of hazardous materials during construction. Similar to the previous bridge design, potential handling of hazardous materials during construction will most likely be associated with small-scale spills of cleaning materials or fuels, which will be appropriately removed and disposed in order to avoid adverse human or environmental impacts. There will not be any substantial changes in the use and/or storage of hazardous materials as a result of the revised bridge design, including the removal of the existing bridge. No other hazardous materials handling impacts are expected during construction. The revised bridge design would not change any of the conclusions presented in Section 8.12.2.1 of the AFC for hazardous materials handling construction impacts.

2.12.2 Operation

The revised bridge design will not result in any increased handling of hazardous materials during the operational phase of the project. The revised design will not affect operational activities associated with the power plant. Use of the proposed replacement bridge, which will fulfill the same function as in the previous bridge design in the AFC, providing access to the power plant via Dirks Road, will not affect the use or handling of hazardous materials in the operation of the power plant. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in Section 8.12.2.2 of the AFC for hazardous materials handling operation impacts.

2.13 WASTE MANAGEMENT

2.13.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any substantial impacts with respect to waste management during construction when compared to the previous bridge design. Similar to the previous bridge design, small amounts of solid nonhazardous and solid and liquid hazardous waste will be generated during construction. Nonhazardous waste will be disposed of through recycling wherever possible, or disposed at an approved landfill in accordance with relevant federal, state, and local regulations. Hazardous waste associated with bridge construction, which could include spent welding materials, fuel and containers, spent batteries, will be the responsibility of the construction contractor and will be appropriately removed and disposed in accordance with all federal, state, and local regulations. Waste generated from removal of the existing bridge will include nonhazardous materials such as concrete, steel, and other bridge components, and small quantities of hazardous materials such as fuel oil, lube, and hydraulic oil used in the operation of heavy equipment; solvents for machine maintenance; welding materials; concrete forms release agents; and other such materials used in construction. No adverse impacts associated with waste management are expected during construction. The revised bridge design would not change any of the conclusions presented in Section 8.13.4.1 the AFC for waste management construction impacts.

2.13.2 Operation

The revised bridge design will not result in any increased generation of non-hazardous or hazardous waste during the operational phase of the project. Use of the proposed replacement bridge, which will fulfill the same function as in the previous bridge design in the AFC, providing access to the power plant via Dirks Road, will not result in the generation of any waste, any changes in operational activities, or increases in the generation of waste materials associated with the operation of the power plant. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in Section 8.13.4.2 of the AFC for waste management operation impacts.

2.14 WATER RESOURCES

2.14.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any substantial impacts on water quality or flooding during construction when compared to the previous bridge design. As described in Section 8.14.5 of the AFC, appropriate measures will be employed during construction. All construction activities will be performed in accordance with the California National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharge Associated with Construction Activities, requiring the implementation of BMPs to control sediment and other pollutants mobilized from construction activities. The revised bridge design includes the removal of the existing bridge, including piles, and installation of new piers in the Glenn-Colusa Canal. The existing bridge is currently supported by three sets of five piers. The existing piers will be cut off at the mud-line and removed during low water conditions, which will avoid the need to place heavy equipment in the canal.

Two sets of five piers will be constructed in the canal to support the replacement bridge. These will be designed and oriented to reduce impedance of water flow and to minimize the collection of floating debris. The precise design of the piers will not be known until a geotechnical survey of the canal bed is undertaken, but the anticipated approach includes the installation of piles under each pier to a depth to be determined by the geotechnical survey. A pile cap spanning all five piers will cap each pile. If the findings of the geotechnical survey indicate piles are not required, then a slab foundation will be placed in the canal bed under and spanning all five piers of each set.

During this process, the canal bed will be disturbed. To avoid water quality impacts, piers will be installed during low water conditions. The slab foundation construction area will be cofferdammed to exclude water, with the dammed area being dewatered and extracted water being pumped back into the canal downstream of the cofferdam. Vegetation along the canal embankment will also be disturbed, but will be restored following construction.

2.14.2 Operation

Use of the replacement bridge will not differ between the previous bridge design and the revised bridge design and will not affect operational activities at the power plant. However, as the canal is unlined, the presence of piers could increase the risk of scour, where soil is washed away from the bed of a water body as a result of the placement of a structure in flowing water. To minimize this risk, the new piers will be designed to minimize scour. As the new bridge will have two sets of piers instead of the existing three sets of piers, the level of potential contraction that could cause scour is expected to be similar to or less than existing levels. Therefore, impacts on water quality due to scour are considered less than significant.

The presence of piers can also increase flood elevations. The piers that will be installed under the revised bridge design will be designed with appropriate spacing, orientation, and pier shape to minimize these impacts and ensure that flood elevations were similar to or less than existing. Since the new bridge will have two sets of piers instead of three, the new design may even result in lowering the flood elevations. Under the revised bridge design, there will not be any significant impacts to flood flows and flood elevations in the Glenn-Colusa Canal. Therefore, the impact to flooding is considered less than significant. The permanent disturbance of an additional 0.6 acre as a result of the revised project design would not significantly affect water resources.

2.15 GEOLOGIC HAZARDOUS AND RESOURCES

2.15.1 Construction

The revised bridge design described in Section 1.3 is not expected to result in any changes to impacts with respect to geologic hazards and resources during construction. Similar to the previous bridge design, the construction of the replacement bridge will be undertaken using BMPs to control erosion and siltation. These BMPs are described in Section 8.14 of the AFC. The construction of the bridge will not require any deep excavations or fills. A geotechnical soil boring program conducted for the project site indicated the presence of a highly expansive surficial clay layer which could cause potentially damaging heave pressures on any medium-weight to lightweight structure constructed upon it, such as a bridge. A geotechnical study will be performed for the new bridge area, and should similar clays be found, they will be appropriately removed and disposed prior to the construction of the replacement bridge, in order to avoid adverse human or environmental impacts. No other geological impacts are expected during construction. The revised bridge design would not change any of the conclusions presented in Section 8.15.2.1. of the AFC for geologic hazards and resources construction impacts.

2.15.2 Operation

There are no substantial differences between the revised bridge design and the previous bridge design with respect to potential geological impacts during operation. The proposed amendment will not affect operational activities associated with the power plant. The operation of the bridge will not affect, or be affected by, geological resources. Potential impacts associated with the presence of expansive soils will be avoided through the removal of such soils. The potential hazards associated with seismically induced ground shaking that could affect the bridge will be avoided through appropriate design and construction, as described in Section 8.15.2.2 of the AFC. The permanent disturbance of an additional 0.6 acre as a result of the revised bridge design would not change any of the conclusions presented in the AFC for geologic hazards and resources operation impacts.

3.0 REFERENCES

URS Corporation, 2001. Application for Certification for Colusa Power Plant Project, Colusa County, California. June.

URS Corporation, 2006. Application for Certification for Colusa Generating Station, Colusa County, California, prepared for E&L Westcoast, LLC. Volume I and Volume II (Appendices). November.

USFWS (U.S. Fish and Wildlife Service), 1996. Programmatic Formal Endangered Species Act Consultation on Issuance of 404 Permits for Projects with Relatively Small Effects on Listed Vernal Pool Crustaceans Within the Jurisdiction of the Sacramento Field Office, California. February 28, 1996.

USFWS (U.S. Fish and Wildlife Service), 1997. Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California. November 13, 1997.

Source:
USGS Topographic Maps, 7.5 Minute Series:
Logan Ridge, California, 1973
Logandale, California, 1973
Sites, California, 1973
Maxwell, California, 1994

Construction Laydown Area

Construction Parking Area

Water Intake Location

Construction Office

PROJECT SITE

Existing PG&E Compressor Station

Glenn-Colusa Canal Bridge Replacement

230 kV Transmission Line

Teresa Creek Bridge Replacement

Intersection Improvements

LEGEND

- 100-acre Project Site
- Plant Layout
- Proposed Transmission Line Interconnection
- Proposed Water Supply Pipeline
- Proposed Natural Gas Pipeline
- Proposed New Roadway
- Proposed Bridge/Intersection Improvements
- Construction Areas

N

0 2000 4000

Scale in Feet
1:24,000

PROJECT LOCATION MAP

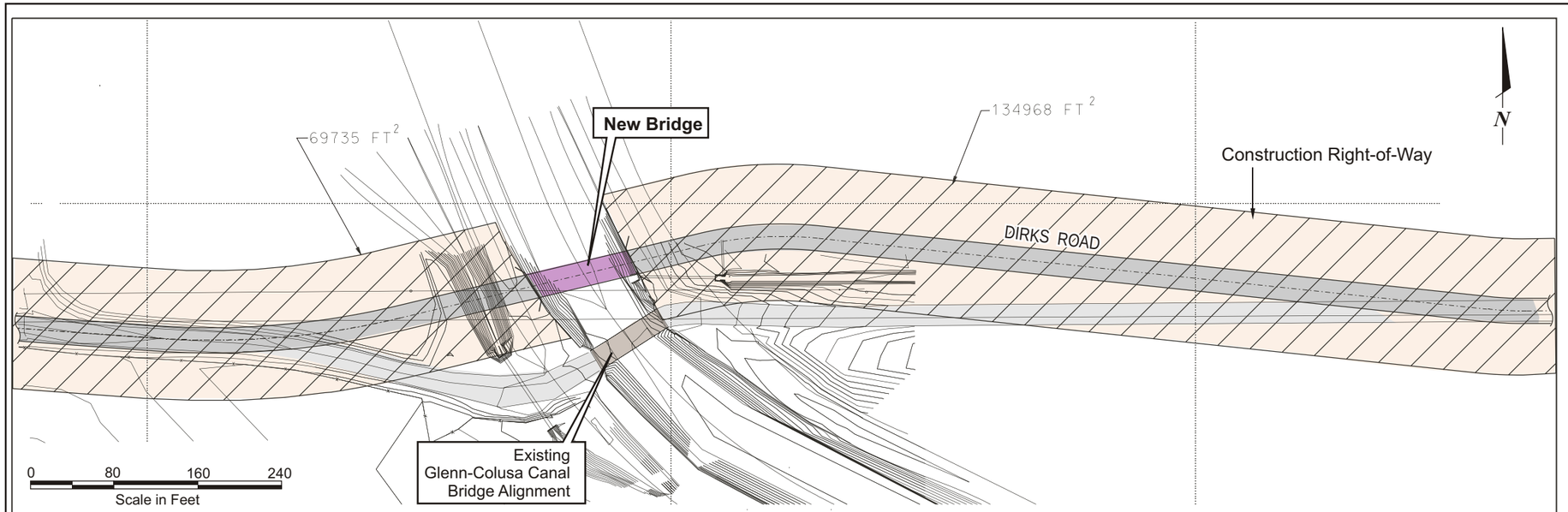
Colusa Generating Station
E&L Westcoast, LLC
Colusa County, California

28067004
August 2007

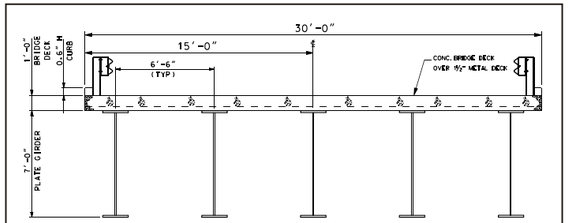
URS

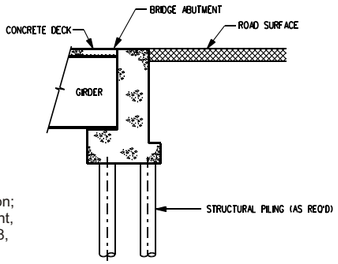
FIGURE 1

8/7/07 rk ..\28067004 CPV Colusa 2007\AFC Supplement\F1_plm.cdr



PREVIOUS BRIDGE DESIGN

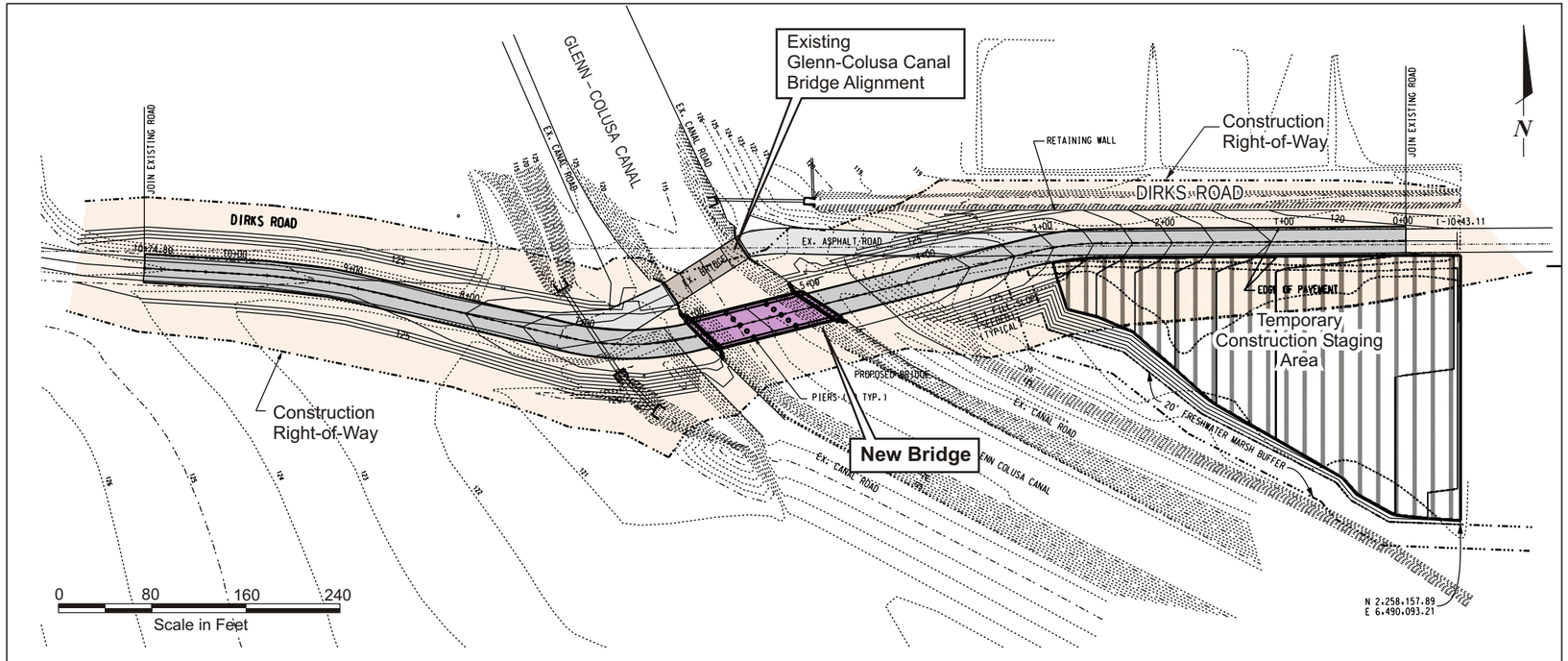




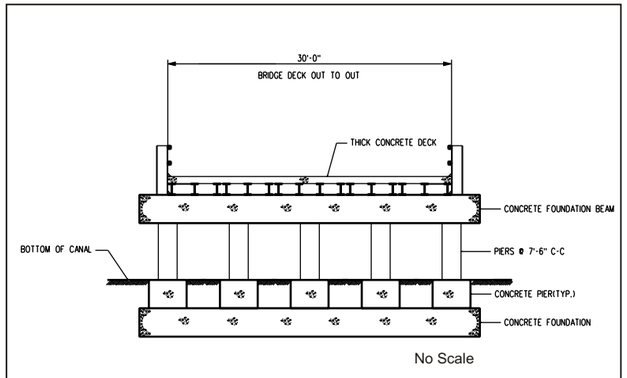
Source:
Bechtel Corporation;
Colusa Power Plant,
Dwg. No. 3.6-6, V8,
October 24, 2006

No Scale

CROSS SECTION OF PREVIOUS BRIDGE DESIGN



REVISED BRIDGE DESIGN



No Scale

CROSS SECTION OF REVISED BRIDGE DESIGN

Source:
Bechtel Corporation; Colusa Power Plant, Dwg. No. 7.2-1,
October 5, 2006, and
Dirks Road Bridge (CG-0200-00001-CONSTRUCTION-MER-062607.dgn)
June 26, 2007

PREVIOUS AND REVISED PROPOSED CONCEPTUAL DESIGN GLENN-COLUSA CANAL BRIDGE

28067004
August 2007

Colusa Generating Station
E&L Westcoast, LLC
Colusa County, California

URS

FIGURE 2

Temporary Impact Boundary

Permanent Impact Boundary

1.09 Acre Temporary Construction Staging Area (Includes Fill Embankment on South Side)

20-ft Buffer

Freshwater Marsh

N

LEGEND

- Temporary Impact
- Permanent Impact
- Temporary Construction Staging Area
- California Annual Grassland
- Disturbed
- Seasonal Wetland
- Vernal Pool
- Freshwater Marsh
- Vernal Pool Grassland
- Canal
- Rice
- Irrigation Ditch

REVISED GLENN-COLUSA CANAL BRIDGE DESIGN AND STAGING AREA

Colusa Generating Station
E&L Westcoast, LLC
Colusa County, California

28067004
August 2007

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FIGURE 3

8/17/07 rk/vsa ..\28067004 CPV Colusa 2007\AFC Supplement\F3_revised bridge.ai

URS Corporation L:\Projects\Colusa_28067004\MXD\Current Working Documents\Construction_Staging_Areas.mxd Date: 7/2/2007 9:10:48 AM Name: smlewis0