SOUTH TAHOE PUBLIC UTILITY DISTRICT

RECYCLED WATER FACILITIES MASTER PLAN

ENVIRONMENTAL IMPACT REPORT

FINAL SUPPLEMENTAL - AUGUST 2011

California State Clearing House Number 2007042116

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1 Introduction and Summary

1 Introduction and Summary

Pursuant to the California Environmental Quality Act (CEQA), discretionary decisions by public agencies regarding public projects are subject to environmental review. The purpose of an environmental impact report (EIR) is to identify the significant environmental effects of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided (§21002.1(a)). When feasible, the public agency is required to mitigate or avoid a project's significant environmental impacts.

The South Tahoe Public Utility District (District) prepared an EIR for the Recycled Water Facilities Master Plan (Project) and four specific Master Plan projects for implementation. The District certified the programmatic Recycled Water Facilities Master Plan along with Master Plan projects 1, 2, 11 and 12, which were analyzed at the project-level in December 2009. The Recycled Water Facilities Master Plan identifies facilities, improvements, and operations necessary to provide for the reliable reuse and disposal of recycled water generated by the District's wastewater treatment plant (WWTP) located in South Lake Tahoe, CA. Two of the Master Plan projects approved by the District Board in 2009 (Master Plan project 1 and Master Plan project 2) were modified to the extent that an updated environmental review is warranted.

In accordance with CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3 Section 15163) this Final Supplemental EIR (FSEIR) is prepared to incorporate revisions that update the Final EIR (FEIR) approved in 2009 for the Recycled Water Facilities Master Plan and Master Plan projects 1,2, 11 and 12 described therein.

This FSEIR has been prepared by the District as the lead agency for the Project in compliance with CEQA and the CEQA Guidelines (California Administrative Code §1500 et seq.). The FSEIR tiers off the FEIR by describing the revised Master Plan projects 1 and 2 in Chapter 2, Section 2.12 and updating environmental resource analyses to address potential effects of the revised projects. Environmental effects that are addressed include the significant adverse effects of the project, growth-inducing effects and significant cumulative effects of past, present, and reasonably anticipated future projects.

This FSEIR includes updated project descriptions for Master Plan Projects 1 and 2 in Chapter 2. Chapter 3 describes how the Environmental Analysis is updated due to the modifications of the projects. Chapters 4 through 18 provide updated environmental analysis for each of the resource areas analyzed for the FEIR. Chapters 19 and 20 discuss Alternatives and Mandatory Environmental Analysis respectively.

The entirety of the *South Tahoe Public Utility District Recycled Water Facility Master Plan FEIR* (December 2009) is incorporated herein by reference. Select pages that have been updated or modified based on the revised project descriptions for Master Plan Projects 1 and 2 are included in the FSEIR. Those sections or portions of the FEIR that have no changes are not duplicated or identified in this FSEIR and are referenced back to the FEIR. Changes to Chapters 3 through 20 are_presented in legislative format to display the changes made based on the revised project as described in Chapter 2. Only the pages where analysis was modified is included in the Final Supplemental EIR for Chapters 3 through 20 and Appendix D. The new text has been underlined and deleted text has been ~~struck out~~.

Appendix T provides responses to comments received on the Draft SEIR and includes copies of the original comment letters received.

1.2 Environmental Review – CEQA

As directed by CEQA, California Public Resources Code Section 21166, and CEQA Guidelines Section 15162 and 15163, when an EIR has been prepared for a project, no subsequent or supplemental EIR shall be prepared, unless one or more of the following circumstances occur:

1. Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

2. Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

3. New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:

   A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

   B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

   C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

   D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

The change in environmental impacts due to changes in the project descriptions for Master Plan projects 1 and 2 has been evaluated and measured against the standards set forth in paragraphs 1, 2, and 3 above and the determination was made that an SEIR is necessary and most appropriate. The environmental analysis in Chapters 4 through 20 provides the detailed examination of each of these issues.

This 2011 Final SEIR should be read together with the full text of the certified FEIR. The changes to the projects as described in Chapter 2 have been subjected to a detailed analytical process consistent with the methodology and thresholds of significance applied in the FEIR.

Section 15163 of the Guidelines implementing CEQA provides that a SEIR is the appropriate level of CEQA analysis when the circumstances defined in Section 15162 and 15163 are met. New significant impacts to land use and visual resources were identified based on analyses completed for the revised Master Plan projects 1 and 2. Thus, a SEIR is the appropriate level of CEQA analysis and the appropriate method of updating the analysis in the certified FEIR.

1.3 Public and Agency Involvement

The Draft EIR circulation started on July 23, and ended on September 7, 2009. A Notice of Completion (NOC) was submitted to the California State Clearinghouse on July 23. Two public meetings were held to take comments on the Draft EIR: September 2, 2009 at Turtle Rock Park in Markleeville, CA and September 3, 2009 at the South Tahoe Public Utility District Board of Directors Meeting in South Lake Tahoe, CA.

This 2011 Draft SEIR was available for review at the District's Office and at the following libraries:

- South Lake Tahoe Library - 1000 Rufus Allen Blvd. South Lake Tahoe, CA 96150; and
- Alpine County Library -Markleeville Library and Archives 270 Laramie Street Markleeville, CA 96120.

Public comment on the 2011 SEIR was taken at the District Board of Directors meeting on 21 April, 2011. The 45-day public comment period for the Draft SEIR commenced on 28, March 2011 and concluded on 12 May 2011. Comments received on the Draft SEIR are included with responses in Appendix T.

1.6 Uses of the SEIR

The District, as lead agency, must consider the information in this SEIR to make its decision on the Project. The District may approve, approve with conditions, or deny the amended project. The SEIRs conclusions do not control the District's decision. The lead agency may approve a project despite significant adverse impacts if it issues two sets of findings. The first set of findings must state how the lead agency has responded to the significant effects identified in the SEIR. The second set of findings must include a "statement of overriding considerations" which states the specific reasons the agency has approved the project despite significant environmental effects. After the District has certified the SEIR and issued the appropriate findings, the District may make a decision on the Project. The District will use the SEIR for approval of projects and operations pursuant to the Master Plan.

In accordance with CEQA Guidelines Section 15163 (e): When the District decides whether to approve the project, the District's Board of Directors shall consider the previous FEIR as revised by the SEIR. A finding under Section 15091 shall be made for each significant effect shown in the FEIR, as revised in the SEIR.

Other agencies have discretionary authority to approve part or all of the Project and will rely on the District to produce an EIR adequate for their needs. These agencies must use the EIR as the basis for their permit approvals. The District must confer with other interested public agencies that do not have approval authority over the Project, but which have expertise with regard to the Project or have responsibility for resources affected by the Project.

The following agencies may be Responsible Agencies under CEQA and may need to issue approvals for the Project:

- District - The District Board must approve the Recycled Water Master Plan and must approve the four Master Plan projects (Master Plan Projects 1, 2, 11 and 12) for implementation. The District will use the EIR in the review of future approvals of projects identified in the Master Plan.

- U.S. Army Corps of Engineers - Fill in wetlands or waters of the U.S. requires a Section 404 permit under the Clean Water Act.

- U.S. Fish and Wildlife Service - Impacts to Threatened or Endangered species will require Section 7 consultation with U.S. Fish and Wildlife Service.

- Lahontan Regional Water Quality Control Board (Lahontan) - Lahontan will issue new Water Quality Certifications for the projects (Section 401) and update the Waste Discharge Requirements (NO.R6T-2004-0010) including monitoring and reporting requirements. All construction projects that disturb greater than one acre of land must apply for a National Pollutant Discharge Elimination System (NPDES) permit as administered through the statewide general construction permit Board Order No. 2009-0009-DWQ, which requires the preparation a a Storm Water Pollution Prevention Plan (SWPPP) to be submitted concurrently with the Notice of Intent (NOI) and associated fees.

1.8 Summary of CEQA Required Sections

1.8.2 Growth Inducing Impacts

The amended project analyzed in this SEIR will not result in the removal of obstacles to growth. The Recycled Water Facilities Master Plan is the District's implementation program for expanding the reuse and/or application of recycled water to 5.8 million gallons per day (mgd). The Project does not require expansion of the District's WWTP, which has a capacity of 7.7 mgd. The impacts of the WWTP capacity and the District's plan for accepting new sewer connections have been evaluated in prior environmental documents. The Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the District Future Sewer Connections Plan concludes that growth-inducing impacts of that project were less than significant. The District's Recycled Water Facilities Master Plan will not allow for growth beyond that projected in the EIR/EIS for the District Future Sewer Connections Plan. Future development ultimately will be determined through the Tahoe Regional Planning Agency (TRPA) planning process.

1.8.2 Significant and Unavoidable Adverse Impacts

Section 2100(b)(2)(A) of CEQA requires that an EIR identify any significant environmental effects that cannot be avoided if the project were implemented. Significant unavoidable impacts are summarized in Chapter 1 and discussed in detail in Chapters 4 through 19. Significant unavoidable impacts are those impacts that remain significant after implementation of proposed mitigation measures. Although the Project Components have the potential to result in a number of significant environmental impacts, most of these are avoided through the adoption of appropriate mitigation measures that reduce those effects to a less than significant level.

Table 1-1

Summary of Significant Impacts and Mitigation Measures

Impact	Level of Significance	Mitigation Measure
GEO 2. Will the Project Components be subject to ground rupture due to location near a surface trace of an active fault?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32 ●	No additional mitigation is possible.
GW-1. Will the Project Components degrade groundwater quality in the Carson, Wade and Diamond Valleys?	1, 2, 3, 4, 5, 6, 14, 21, 22, 30 ●	**SW-33.** Surface and Groundwater Protection Plan **GW-1A.** Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water **GW-1B.** Do Not Exceed a Maximum Duration of Temporary Containment (100 Days)
SW-3. Will the Project Components cause numeric and narrative-based criteria to be exceeded at West Fork Carson River in California?	30 ●	**SW-3.** Develop Project-specific Nutrient Management Plan for the Jungle

Table 1-1

Summary of Significant Impacts and Mitigation Measures

Impact	Level of Significance	Mitigation Measure
BIO-1. Will the Project Components cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species directly or indirectly?	1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32 ⦿	**BIO-1**. Conduct Biological Resource Assessments **SP-25.** Sensitive Resource Program
BIO-2. Will the Project Components cause loss of individuals of CNPS List 2, 3, or 4 plant species?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32 ⦿	**SP-26.** Sensitive Plant Protection Program
BIO-3. Will the Project Components cause loss of active raptor nests, migratory bird nests or wildlife nursery sites?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32 ⦿	**SP-30.** Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries
BIO-7. Will the Project Components have an effect on federally protected wetlands as defined by Section 404 of the Clean Water Act or waters of the U.S. through direct removal, filling, hydrological interruption, or other means?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11 (HPR Bypass Pipeline, A, B, C), 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32 ⦿	**SP-23.** Delineate Wetlands, Waters of the United States, and Riparian Habitat **SP-24.** Prepare Wetland And Riparian Mitigation And Monitoring Plan **SP-27.** Avoid Impacts to Wetland and Riparian Areas **SP-32.** Pre-construction Marking and Fencing of Wetlands and Riparian Habitat **BIO-7.** Monitor Wetland And Riparian Mitigation Sites
ARCH-1. Will the Project Components disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/ traditional heritage resources?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 ⦿ 29, 30, 31, 32 ●	**ARCH-1.** Identification, Evaluation, and Avoidance of Cultural Resources
ARCH-2. Will the Project Components disturb unknown archaeological resources?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 ⦿ 29, 30, 31, 32 ●	**ARCH-1.** Identification, Evaluation, and Avoidance of Cultural Resources **ARCH-2.** Protect Undiscovered Cultural Resource Sites
VISUAL-2. Will structures constructed as part of the No Project Components be inconsistent with the protection of views of open areas, ridges, and peaks from any designated scenic route, scenic corridor, open space, residential or recreation area?	11 - Pump station ⦿	**VOS-1**. Pump Station Design

Source: Hauge Brueck Assoc. 2009

Notes: Level of Significance

--	Not applicable	==	No impact
●	Significant impact before and after mitigation	⊙	Significant impact; less than significant after mitigation
❍	Less than significant impact; no mitigation proposed		

1.9 Impact and Mitigation Summary

Table 1-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
1	8 – West Fork Pipeline 9 – On-Farm Pipeline	BIO-1. Conduct Biological Resource Assessments BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
2	13 – make Recycled Water Available to Irrigators in Nevada	BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
3	5 – Diamond Ditch Conveyance Improvements 6 – Waterfall Pipeline Forebay and Pipeline	BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
4	6 – Waterfall Pipeline Forebay and Pipeline 8 – West Fork Pipeline	BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
5	10 – Wade Valley Pipeline	BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites

Table 1-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
6	6 – Waterfall Pipeline Forebay and Pipeline 9 – On-Farm Pipeline	BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
7	7 – District Pasture Subsurface Irrigation Pilot Project 8 – West Fork Pipeline 9 – On-Farm Pipeline	BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
8	26 – Injection Well Program	BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
9		GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water BIO-1. Conduct Biological Resource Assessments BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
10	1 – Recycled Water Irrigation Fields on Diamond Valley Ranch	GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
11	1 – Recycled Water Irrigation Fields on Diamond Valley Ranch 2 – Harvey Place Reservoir Bypass System Pipelines and Ditches 3 – Diamond Valley Ranch Irrigation Fields Pump Back System	GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water GW-1B. Do Not Exceed a Maximum Duration of Temporary Containment (100 Days) BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites LU-1. Land Use Map and Zoning Amendment VOS-1. Pump Station Design

Table 1-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
12	1 – Recycled Water Irrigation Fields on Diamond Valley Ranch	BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
13	1 – Recycled Water Irrigation Fields on Diamond Valley Ranch	GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
14	7 – District Pasture Subsurface Irrigation Pilot Project 8 – West Fork Pipeline 9 – On-Farm Pipeline 10 – Wade Valley Pipeline	GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
15		GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
16	7 – District Pasture Subsurface Irrigation Pilot Project	BIO-7. Monitor Wetland and Riparian Mitigation Sites GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water BIO-1. Conduct Biological Resource Assessments BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
17	14 – Snowshoe Thompson No. 1 Conveyance Capacity Improvements	BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
18	11 – Prepare Nutrient Management Plan	ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites

Table 1-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
19	12 – Permitting for Recycled Water Use in Diamond Valley	GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
20	13 – Make Recycled Water Available to irrigators in Nevada	BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
21		BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
22	6 – Waterfall Pipeline Forebay and Pipeline 10 – Wade Valley Pipeline	BIO-1. Conduct Biological Resource Assessments BIO-4A. Fish Passage Structures and Deer Migration Corridors BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B. Monitor Habitat Restoration and Revegetation Sites BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
23	14 – Snowshoe Thompson No. 1 Conveyance Capacity Improvements 15 – Upper Dressler Ditch Conveyance Improvements 16 – Indian Creek Treatment Wetlands 19 – use Mud Lake Winter Flows for Indian Creek Reservoir Flushing	BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites
24	14 – Snowshoe Thompson No. 1 Conveyance Capacity Improvements 15 – Upper Dressler Ditch Conveyance Improvements 16 – Indian Creek Treatment Wetlands 20 – Storage of Water for Downstream Users	BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites
25	21- Develop Recycled Water Wholesale Program	Future Project Component - not analyzed in this EIR
26	22 – Biosolids Composting	Future Project Component - not analyzed in this EIR

Table 1-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
27	23 – Become a Water Rights Buyer/Broker to Maintain the Value of Recycled Water	Future Project Component - not analyzed in this EIR
~~28~~	~~24 – Power Generation~~	~~Future Project Component - not analyzed in this EIR~~
29	4 – Diamond Valley Freshwater/Recycled Water Irrigation System	GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
30	4 – Diamond Valley Freshwater/Recycled Water Irrigation System	BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
31	17 – Diversion Ditch for Stormwater Flow Away from Harvey Place Reservoir and to Indian Creek Reservoir	SW-4. Develop Erosion Control Methods for ICR SW-5. Implement Component 15 Prior to Component 32 BIO-1. Conduct Biological Resource Assessment BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
32	18 – Indian Creek Reservoir Spillway Channel	SW-5. Implement Component 15 Prior to Component 32 BIO-1. Conduct Biological Resource Assessments BIO-7. Monitor Wetland and Riparian Mitigation Sites ARCH-1. Identification, Evaluation and Avoidance of Cultural Resources ARCH-2. Protect Undiscovered Cultural Resource Sites
33	25 – Extend the C-Line to the State Line	Future Project Component - not analyzed in this EIR
34	26 – Injection Well Program	Future Project Component - not analyzed in this EIR

2 Project Description

2 Project Description

Refer to Section 2.12 "Project-Level (Current) Descriptions" for updated descriptions of Master Plan projects 1 and 2. Section 2.12 has been updated to provide a revised description of the Diamond Valley Ranch Irrigation Improvement Project (Project). The projects are designed to allow for the District to irrigate the Diamond Valley Ranch utilizing fresh water that will be later supplemented with recycled water. Master Plan projects 1 and 2 were originally outlined in the *South Tahoe Public Utility District Recycled Water Facilities Master Plan EIR* (FEIR) that was certified in December 2009 and analyzed at a level of detail to allow for approval and construction; however modifications to the design Project Component 11 that comprised portions of Master Plan projects 1 and 2 have occurred, requiring an updated environmental analysis.

A draft wetland delineation has been submitted (August 2011) to the United States Army Corps of Engineers (Corps) and is currently under review for use as a preliminary jurisdictional determination map. This draft wetland delineation identifies both perennial and seasonal wetland areas and was utilized for the redesign of Project Component 11. The seasonal wetlands include areas which are believed to be artificially irrigated, that is these are wetland areas that would revert to a non-wetland area should irrigation cease. Future site verification will be needed to determine whether the artificially irrigated wetlands are jurisdictional. Project component 11 is proposed to be completed in several phases. The initial phase (Phase 1) is designed to avoid potential wetlands that may be determined jurisdictional by the Corps and includes the DVR Pipeline Loop, three irrigation fields (Fields A, B and C); a freshwater pump station and supporting facilities. The final buildout of the project adds two temporary containment areas (Fields 1 and 2); one irrigation field that is outside the area of delineated wetlands (Field G) and four irrigation fields that overlap seasonal wetland areas (Fields D, E, F and H). The Master Plan projects 1 and 2 strive to avoid and minimize jurisdictional wetlands and Waters of the US as regulated by the Corps.

Additional environmental analysis will be required for the final buildout of the project as these irrigation fields have only been designed to a 50% level and therefore analyzed at a programmatic level. Additionally, wetland boundaries may change based on future site verifications as noted above.

2.12 Project-Level (Current Projects) Descriptions

Of the nine recommended Master Plan projects, Master Plan projects 1, 2, 11 and 12 are prioritized for expedited implementation (i.e., within the next 5-8 years) to resolve the issues of inadequacy with the On-Farm emergency disposal system (page 13-100, Stantec 2008). Project Components 11, 18 and 19 comprise Master Plan projects 1, 2, 11 and 12, the current projects that require project-level analysis in accordance with CEQA guidelines. The updated project descriptions for Master Plan projects 1 and 2 are provided below. Note that Master Plan projects 11 and 12 have not changed from the descriptions presented in the FEIR. Figure 2-6 attached shows the overall project build out and Figure 2-6.1 identifies the Phase 1 portion of the project that is to be implemented based on the information provided herein.

The main changes modifications to the project are the extension of the DVR pipeline loop from Diamond Valley southwest to match back with the C-Line at the south end of the District Pasture. The irrigation field locations have been modified to avoid potentially jurisdictional wetlands and the distribution pipeline locations have been identified.

2.12.1 Master Plan Project 1 – Recycled Water Irrigation Fields on Diamond Valley Ranch and Master Plan Project 2 – HPR Bypass System Pipelines and Ditches

Master Plan Project 1 implements Project Components 11 and 19 to enable the District to address the need for temporary containment facilities with adequate capacity to impound recycled waters from the WWTP in times of emergency (e.g., situations of extreme flooding) and increase operational flexibility for recycled water systems (Project Component 11 - temporary containment fields). This project requires recycled water direct land application permits from Lahontan (Project Component 19).

Master Plan Project 2 implements Project Components 11 and 18 for the construction of the DVR pipeline loop (Note that this component was termed the HPR Bypass System in the FEIR, the configure of which has been revised and renamed to express the loop configuration as described below) and irrigation systems components (Project Component 11- irrigation fields) to optimize application rates of recycled waters on irrigable lands (Project Component 18).

The following information, as detailed in Appendix S, the November 19, 2010 *Diamond Valley Ranch Irrigation Improvements Project 50% Pre-Design Engineering Repor*t, serves to update the FEIR project descriptions for Master Plan 1 and 2. Project Component 11 has been redesigned based on the data collected and reported to the Corps in preliminary delineations for potential wetlands and waters of the U.S. The reconfiguration of the irrigation fields, as shown in replacement Figure 2-6 as Fields A -H, reflect the likely reduction in irrigable acreage based on the presence of jurisdictional wetlands and waters of the U.S. The temporary containment fields (Fields 1 and 2 on replacement Figure 2-6) still total approximately 50 acres, but have been redesigned to implement mitigation measure GEO-1B - Do Not Exceed the Maximum Duration of Temporary Containment (100 Days) recommended in the FEIR.

As described in Appendix S, a number of options were analyzed for the freshwater irrigation system and the recycled water irrigation system. The District selected Option 2 for the freshwater system, which will install a future supply pipeline from ICR in addition to the supply lines form Millich Ditch and Snowshoe Thompson Irrigation Ditch #2 (SSTID #2). The District selected Option 2 for the recycled water system, which will implement a looped system with the project facilities centralized at the Ranch House.

Appendix S presents water balance, application rates, and land preparation and nutrient plans that have been determined as based on the implementation of mitigation measure GEO-1A (Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water) in the FEIR and the expected reduction of irrigable acreage from 904 acres, as analyzed in the FEIR, to 372 acres , as analyzed in this SEIR.

The following revised project description summarizes the information detailed in Appendix S.

Irrigation System Improvements

The DVR recycled water irrigation system will irrigate approximately 372 acres composed of:

- 322 acres of center pivot irrigation (i.e., spray irrigation); and
- 50 acres of level basins to confine flood irrigation (i.e., flood irrigation).

The system is designed to apply either fresh or recycled water. The system is first to be operated utilizing fresh water, and then upon approval from Lahontan recycled water will be utilized for irrigation. Fresh water is available to the District every other week from surface water rights and continuously (approximately 0.5 – 2.0 cfs) from seepage recovery within the property.

The primary method of irrigation will be through center pivots. Pivots have been selected because they are capable of achieving high uniformities, are commonly used on alfalfa, and are relatively simple to maintain and operate. The center pivot irrigation systems are designed to apply water with a known degree of control, thereby applying irrigation (fresh and/or recycled) water most effectively and efficiently.

A total of eight (8) pivots are proposed within the project area. Additional information on the center pivot design including crop plan, nutrition plan and irrigation scheduling can be found in Appendix S and is incorporated herein by reference.

The irrigation system distribution pipelines that extend from the pump station to supply the pivots are sized for a maximum velocity of 5 feet per second (fps). Trenches between the pump station and each center pivot are proposed at a depth of 3 feet.

Phase 1 of the project will involve three center pivots with approximately 70 acres of irrigation fields with filtration system and controls; and an 1,100 gallon per minute (gpm) booster pump station. The Phase 1 irrigation fields are as follows:

- Field A (21.19 acres)
- Field B (20.83 acres); and
- Field C (28 acres).

The overall project build out will add five center pivots with approximately 240 acres of irrigation fields with added filtration system and controls. The overall project irrigation fields are as follows:

- Field D (75.02 acres);
- Field E (37.54 acres);
- Field F (28.01 acres)
- Field G (36.91 acres); and
- Field H (28.01 acres).

The layout and final irrigation field acreages of Fields D, E, F and H are subject to change, pending future site verification and jurisdictional determination by the USACE and are subject to future environmental documentation and analysis based on final configuration.

Recycled Water System Improvements

The main components of the recycled water irrigation system improvements include:

- DVR Pipeline Loop;
- Center Pivot Irrigation System (described above); and
- Flood Irrigation/Temporary Containment Areas.

DVR Pipeline Loop

The DVR pipeline loop will comprise the mainline to reroute the existing 21-inch diameter C-Line through the DVR property, branching off the C-Line at the intersection of State Route (SR) 89 and Diamond Valley Road and continuing east towards the DVR within the alignment (Alternative C) approved in the December 2009 FEIR where the pipeline will intersect with the proposed pump station. From this intersection at the pump station, the C-Line then crosses Irrigation Field D to the south, crosses the Millich Ditch, travels along the edge of the District Pasture, and then ties back into the existing C-Line for discharge into Harvey Place Reservoir.

Figure 2-6 identifies the location of the proposed pipeline loop, emergency containment areas as well as the irrigation fields described below. The DVR pipeline loop crosses the Millich Ditch in two locations as shown on Figure 2-6. Millich Ditch Crossings are to be constructed using open cut excavation method. The Diamond Valley pipeline loop is regarded as a utility line extension which can be exempt from 404 permit requirements.

During the irrigation season, the pipeline loop will serve as the mainline for distributing recycled water under pressure to the irrigation areas of the DVR. During the non-irrigation season, the irrigation system will be bypassed and the loop will serve as the mainline for conveying recycled water to HPR. A hydro-electric station at the DVR pump station is proposed in the future. When construction is finished, the DVR loop will serve as the mainline for recycled water for irrigation and potentially for hydro-electricity generation.

In the case of an emergency, the DVR pipeline loop will also convey recycled water to the temporary containment areas for storage. A feeder line directly connecting the temporary containment areas and the DVR pipeline loop is also proposed. Following an emergency event that would require use of the temporary containment areas, the DVR pipeline loop will be used for conveying impounded water from containment areas to the irrigation areas or to HPR.

The District intends to retain the portion of the existing C-line between the new DVR pipeline at SR89 to the point where the C-line crosses the Snowshoe Thompson Irrigation Ditch #1 (SSTID #1), approximately 1,000 feet northwest of the end of the DVR pipeline loop. Fresh water from the SSTID #1 can then be routed through this abandoned portion of the existing C-Line.

The DVR Pipeline loop will be completed as part of the Overall Project Phase 1.

Temporary Containment Areas

Earthwork activities will consist of grading, excavation and fill and the creation of 7-foot high earthen embankments or berms. The temporary containment areas will consist of two level field areas totaling approximately 50 acres that will be bounded by 7-foot high earthen embankments or berms along the perimeter. The Project maintains the field location and sizing described and analyzed in the FEIR but has been slightly reconfigured to accommodate target temporary containment volumes while providing for sufficient field dimensions for growing and harvesting alfalfa. Within Fields 1 and 2 (Figure 2-6), a number of 100-feet wide by 500-feet long individual flood irrigation fields will be installed and sloped between 1 and 2 percent in the longitudinal direction.

During the irrigation season, Fields 1 and 2 will be flood irrigated for alfalfa and may be used for temporary containment of recycled water in the case of an additional storage need resulting from flooding or other emergency conditions. The containment areas will receive recycled water from a branch line off of the irrigation distribution system, but may also be filled directly from the DVR pipeline loop via a valved connection. Freshwater can be supplied to the containment areas through the irrigation distribution system via the pump station if desired. A field drainage pipeline will be constructed from each of the two containment areas back to the pump station sump for drawdown of temporarily contained recycled water. The containment volume will be a maximum of 300 acre-feet, which is approximately equivalent to 100 days of outflow from the District's WWTP.

The temporary containment areas will be constructed as part of the overall project build out.

Freshwater System Improvements

The main components of the fresh water irrigation system improvements include:

- Fresh Water Conveyance Pipelines; and
- Fresh Water Irrigation Pump Station.

The main fresh water sources located on the DVR are Millich Ditch and SSTID #2 and a natural spring. Millich Ditch and SSTID#2 Ditch both convey fresh water from the West Fork of the Carson River. A series of conveyance pipelines are proposed to divert water from these sources to a new pump station, supplying fresh water to the irrigation distribution system.

The start of the conveyance pipeline from Millich Ditch is approximately 2900 feet south of the existing Ranch House. It is proposed to connect the Millich Ditch conveyance pipeline to an existing diversion structure (Diversion No. 4). The diversion will be modified to include a grate to prevent trash and debris from entering the conveyance pipeline. The 24 inch pipeline is sized to convey the maximum amount of appropriated water rights allotted to DVR from Millich Ditch (i.e., approximately 5,000 gpm).

A portion of SSTID #2 Ditch runs through the layout of Pivot F irrigation area and the temporary containment areas. To ensure that irrigation water from the center pivot and temporary containment areas does not mix with fresh water from SSTID #2, a conveyance pipeline is proposed to replace that portion of SSTID #2 Ditch and connect to the modified turnout structure. The conveyance pipeline will daylight back into Snowshoe Thompson #2 Ditch east and downstream from Pivot F irrigation area. This pipeline shall be sized to convey the maximum flow in the ditch. A feeder pipeline will tee off of the conveyance pipeline approximately 900 feet downstream from the turnout and connect to the junction box at the pump station. This 12 inch feeder pipeline will be used to deliver fresh water to the irrigation distribution system and is sized to convey the maximum amount of appropriated water rights allotted to DVR from SSTID #2 Ditch (i.e., approximately 3,000 gpm).

The fresh water spring is located southwest of the Ranch House. A tile drain will collect the spring water and a conveyance pipeline will divert the collected spring water from the tile drain to a junction box at the pump station. The tile drain and conveyance pipeline are sized according to discharge measured in the field of 2 cfs, with a minimum velocity of 3 feet per second to prevent deposition of material in the pipeline. Currently the spring water collects in a small man-made pond immediately to the east and is used for flood irrigation in the area adjacent to the collection pond.

At the outfall of each of the freshwater pipelines a junction box will combine the flows before sending water to the pump station. This box housing float control valves will regulate the flows from the various sources and provide a smoother flow transition to the pump station. The valves close as the water in the box rises, regulating the flow from each source.

The Ranch House water well will be properly abandoned (filled and sealed with cement) prior to constructing field C. A replacement water supply well will be constructed outside the irrigation areas in a site to be determined in the future.

The freshwater system improvements will be completed as part of the Overall Project Phase 1.

Pump Station and Hydroelectric Generation Unit

Based on the water balance and application rates, the pump station will be designed for a maximum flow rate of approximately 5,000 gpm. The sump and irrigation pump station will be located east of the existing Ranch House. The sump is a concrete vault that is designed to contain enough water to minimize pump cycling. Three 10 inch discharge lines each including a 1,800 gallons per minute (gpm) vertical turbine pump, a flow meter, air release, butterfly valve and check valve, are necessary for build out of the Project.

Inside the pump station a Hydroelectric Generation Unit is proposed to be placed within the confines of the building. The Hydroelectric Generation Unit is proposed to generate power from the pressure in the C-Line. The Hydroelectric Generation Unit is proposed to generate enough power to offset the electrical use by the irrigation system. The power requirement to drive the eight pivot units at approximately 6 horse power (HP) per unit is 48 HP or 36 kilowatts (kW). In order to meet the pressure requirement to operate the pivot located in Field A and offset the power requirements for the pivots, the pressure in the C-Line would increase from 63 pounds per square inch (psi) to approximately 132 psi at the low point crossing he West Fork of the Carson River. The District replaced the portion of the C-Line that crosses CalTrans Bridge 31-25 above the West Fork of the Carson River as a part of the C-line Export Pipeline Emergency Replacement Project in 1997. The replacement pipe crossing the bridge is constructed of 18-inch steel (Class 250) cement mortar lined pipe. The steel pipe is connected to approximately 1,290 linear feet of 18-inch ductile iron, Class 250 cement mortar lined pipe. The increase in pressure to 132 psi is well within the 250 psi rated pipe at the low point. During the non-irrigation season the hydroelectric generation unit could generate an additional 509,000 kW-hours of power. The power is proposed to be sold back to Liberty Energy. New three-phase service will be brought to the pump station in electrical conduit along the DVR Pipeline Loop.

Phase 1 of the project will involve provisions for piping and space within the control building at the freshwater pump station location for a future single pump as turbine (PAT) hydro-electric system.

Irrigation Field Surface Improvements / Tailwater Control

The irrigation fields will be land smoothed to produce level or constant-sloped areas. Rather, the sharp surface features such as swales, rock outcroppings, and steeper sloped areas will be smoothed out for improved irrigation application and harvesting of the crops. Each area will be improved with containment berms at the low-end of the fields to stop tailwater runoff from entering adjacent wetland areas. The fields will also have cut-off ditches (e.g., brow-ditches) constructed uphill of the application areas to keep non-irrigation surface flows from entering the application areas. Grading in the application areas will be minimized to retain as much of the current topography as practical for the intended future use.

The every other week availability of surface water requires that the central pivots achieve high application rates. The pivots must be able to apply the required water volume in half the time seen with standard designs. The higher application rates have the potential to cause runoff, so the design and land preparation have been adjusted to include these hydrologic source controls to minimize tailwater and erosion.

To reduce the volume of grading, at least two of the fields (Pivots F and D) are anticipated to have pivots equipped with Variable Rate Irrigation (VRI). This feature allows the pivots to avoid irrigating selective sections of the irrigation fields.

Although the central pivot system design minimizes the potential for tailwater generation and was selected by the District for this reason, the Project implements standard practices to further reduce potential impacts to surface waters. Each field will have a ditch located on the upslope side to convey runon around the irrigation field and a berm located on the downslope side to capture and impound tailwater, preventing it from discharging from the irrigation field. Generation of tailwater can be difficult to predict, and the District plans to test irrigation applications first with fresh water to resolve potential tailwater discharges prior to application of recycled water.

The berms must be constructed up to 30 feet away from the irrigated circles, to provide turn-around room for harvesting equipment. At potential discharge points (e.g., low points) of each berm, a culvert with an upstream gate will allow for standing water to drain, if necessary. There may eventually be limitations to draining standing water (whether it be fresh water, precipitation-generated, or recycled water) and at this point removal of the water would be performed manually using a portable pump, stationed at the ranch.

Irrigation areas will include signage and public notification of the application of recycled water.

Diamond Valley Ranch SCADA System

The District's DVR Supervisory Control and Data (SCADA) System Irrigation Control and Monitoring System will consist of an integrated network of measurement and automatic control equipment for operating center pivots and pumping facilities, a high-speed data communications network, and new office computer workstations that permit 24/7 real-time access to the entire operation.

The SCADA system will enhance the reliability and performance of the center pivot irrigation systems. Other benefits of SCADA, besides real-time water accounting for operational decision-making, include comprehensive record keeping capabilities for historical analysis and forecasting and fast response times to user inputs and alarms. The Project implements automated pump controls, electronic flow measurement devices and sensors, field controllers on each center pivot, mobile interface terminals, and computer and communications support systems at the new SCADA base station with alarming, report generation, and data management capabilities. The new base station will be assembled within the existing ranch house.

Nutrient Management Plan

An updated Nutrient Plan is included in Appendix S and was prepared as a part of the design report for construction of the irrigation fields to reflect the removal of cattle grazing from DVR, soil investigation completed as part of preliminary wetland delineations in April 2010 and composite soil samples collected in September 2010 by ITRC and analyzed by A&L Western Agricultural Lab of Modesto. This nutrient plan addresses the use of center pivot irrigation and specific types of vegetation to optimize application of irrigation waters while controlling salt and nutrient concentrations in soils.

The District has applied for updated permits with Lahontan to apply recycled water to the irrigation fields. Restrictions on the duration of storage may be imposed for groundwater protection, which could affect the necessary pumping capacity pump back station.

Grading Volumes

The cut and fill volumes for the irrigation fields and temporary containment areas include all berms, brow ditches, and mass land grading. Total excavation volume for the construction of the DVR pipeline loop, freshwater, and irrigation pipelines is 24,042 cubic yards. Net cut and fill volumes for the eight irrigation fields are 52,712 and 85,930 cubic yards, respectively. Net cut/ fill volumes for temporary containment areas are 197,200 and 192,133 cubic yards, respectively. Excavation volume for vaults is 181 cubic yards.

Areas disturbed by trenching outside irrigation areas will be revegetated as outlined in standard practice SP-8, Repair Road Damage and Revegetate Temporarily Disturbed Sites.

Total cut and fill volumes for Phase 1 are 15,180 cubic yards (CY) for all pipeline excavation, 3,478 CY of cut for irrigation fields and 14,557 CY of fill. Excavation for vaults is 181 CY.

Total cut and fill volumes for the remainder of the project (not including Phase 1) are 8,862 cubic yards (CY) for all pipeline excavation, 49,234 CY of cut for irrigation fields and 71,473 CY of fill. Net cut/fill volumes for temporary containment areas are 197,200 and 192,133 cubic yards, respectively.

Phase 1 distribution pipelines will cross minor irrigation ditches (which are considered other Waters of the US) in 5 locations and cross the Millich Ditch in one location. These crossings will result in a total area of approximately 100 square feet of impact to Waters of the US. Total cubic volume is approximately 15 cubic yards of cut and backfill in the trenches across the minor irrigation ditches. All work will be completed during periods of no flow. Table 2-1 below outlines the total cut and fill resulting from the overall project buildout associated with potentially jurisdictional wetlands and waters of the US corresponding with the wetlands numbered in figures 2-6 and 2-6.1.

Table 2-1
Wetlands and Waters of the US

Waters of the US/Wetlands #	Cut (cubic yards)	Fill (cubic yards)
Pipelines (cut/fill)		
A3	251	251
C2	253	253
D3	244	244
Ditches		
Snowshoe Thompson #2 Ditch from turnout to daylight point	0	3,110
Snowshoe Thompson #2 Ditch reroute around field G	0	1,873
Fields (land smoothing cut/fill)		
A3	261	

<table>
<tr><th colspan="3">Table 2-1
Wetlands and Waters of the US</th></tr>
<tr><th>Waters of the US/Wetlands #</th><th>Cut (cubic yards)</th><th>Fill (cubic yards)</th></tr>
<tr><td>B3</td><td colspan="2">3,392</td></tr>
<tr><td>B4</td><td colspan="2">682</td></tr>
<tr><td>B5</td><td colspan="2">661</td></tr>
<tr><td>B6</td><td colspan="2">269</td></tr>
<tr><td>C1</td><td colspan="2">3,727</td></tr>
<tr><td>C2</td><td colspan="2">1,977</td></tr>
<tr><td>C3</td><td colspan="2">379</td></tr>
<tr><td>C4</td><td colspan="2">2,167</td></tr>
<tr><td>D2</td><td colspan="2">11,121</td></tr>
<tr><td>D3</td><td colspan="2">13,367</td></tr>
<tr><td>D20</td><td colspan="2">118</td></tr>
<tr><td colspan="3">Berms (fill)</td></tr>
<tr><td>A3</td><td></td><td>1,031</td></tr>
<tr><td>B3</td><td></td><td>975</td></tr>
<tr><td>C1</td><td></td><td>13</td></tr>
<tr><td>C4</td><td></td><td>1,132</td></tr>
<tr><td>D2</td><td></td><td>53</td></tr>
<tr><td>D3</td><td></td><td>1,227</td></tr>
<tr><td>D20</td><td></td><td>307</td></tr>
<tr><td colspan="3">Brow Ditches (cut)</td></tr>
<tr><td>A3</td><td>51</td><td></td></tr>
<tr><td>B3</td><td>108</td><td></td></tr>
<tr><td>C1</td><td>13</td><td></td></tr>
<tr><td>C2</td><td>13</td><td></td></tr>
<tr><td>C4</td><td>53</td><td></td></tr>
<tr><td>D2</td><td>44</td><td></td></tr>
</table>

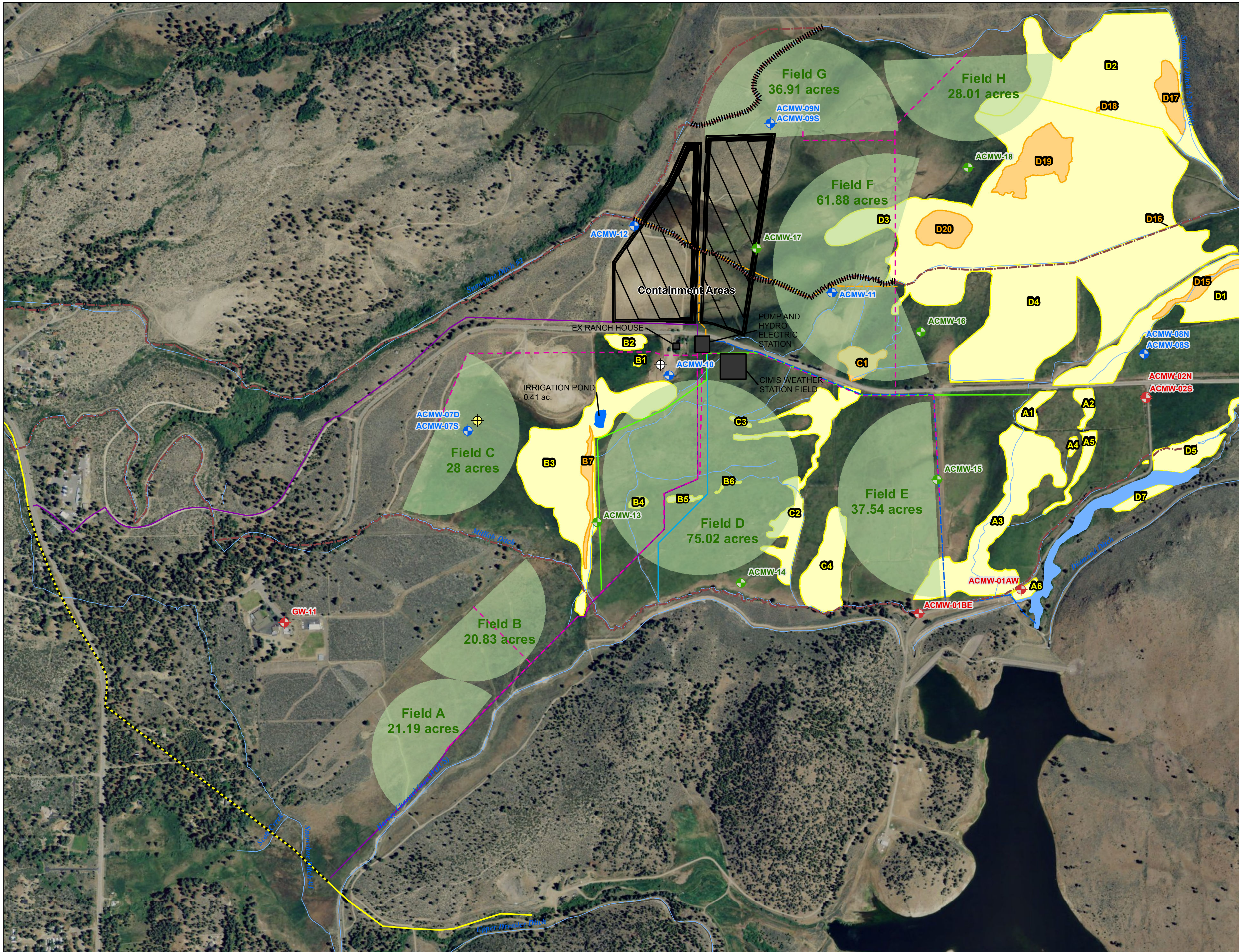

Figure 2.6: Diamond Valley Overall Project Buildout

District Monitoring Wells

- Current
- October 15, 2011
- October 15, 2012

Ranch House Water Well

- Replacement Water Well Supply - Preliminary
- Replacement Water Well Supply - Existing

Irrigation Alignments

- Indian Creek Pipeline
- Interceptor Drain and Overflow Pipeline
- Irrigation Distribution Pipeline
- Militch Ditch Pipeline
- Snowshoe Thompson #2 Pipeline
- DVR Pipeline Loop
- C-line
- C-line to be converted to Freshwater Use

Section 404 Wetlands

- Perennial Wetlands
- Seasonal Wetlands
- Potential Other Waters of the U.S.
- Irrigation Ditch
- Irrigation Ditch (Abandoned and Filled)

N

0 500 1,000 Feet

1 in = 1,000 ft

Data source: Dominicelli & Associates,
ArcGIS Online Bing Aerials.
Map date: August 12, 2011

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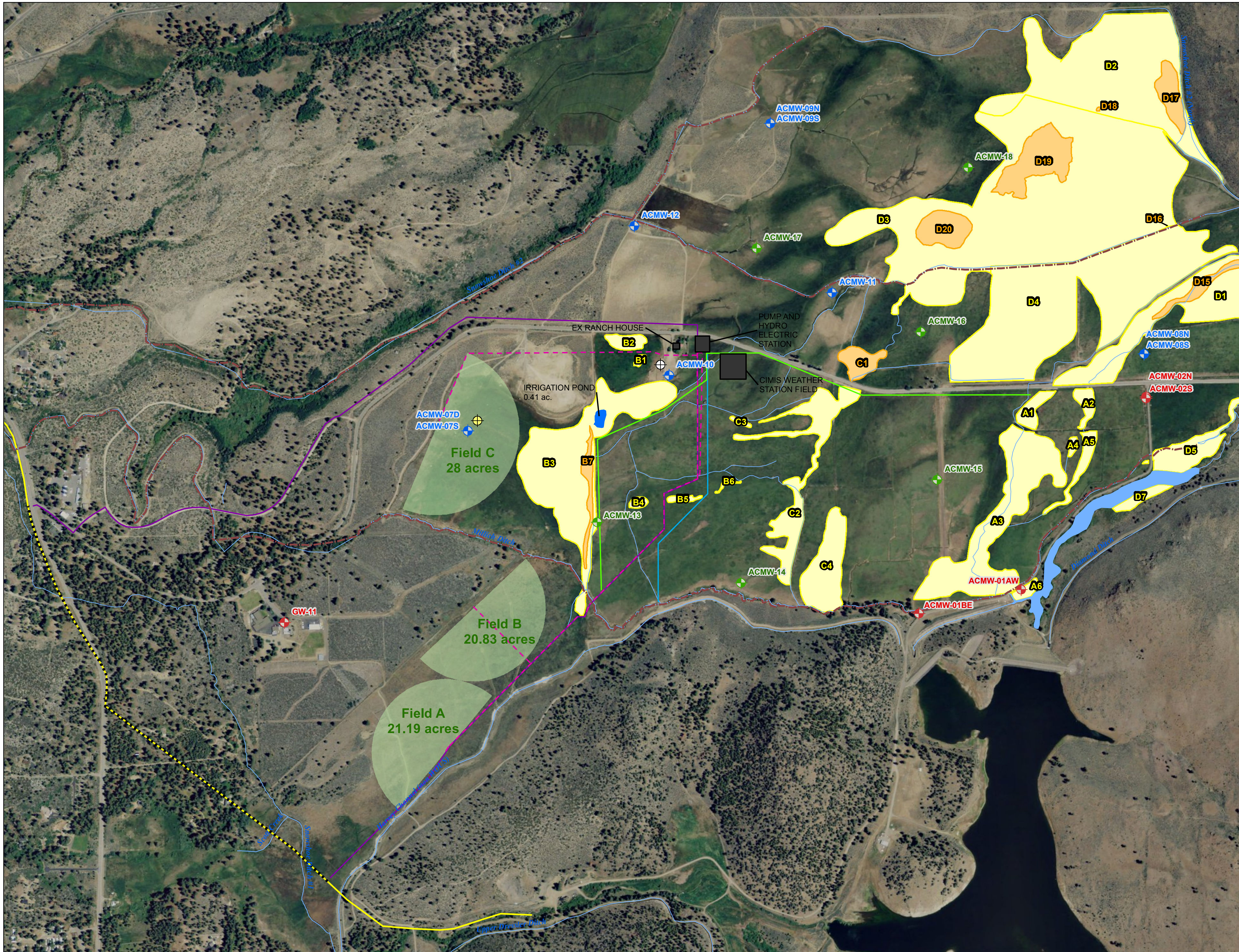
Figure 2.6-1: Diamond Valley Overall Project Phase 1



District Monitoring Wells
- Current
- October 15, 2011
- October 15, 2012

Ranch House Water Well
- Replacement Water Well Supply - Preliminary
- Replacement Water Well Supply - Existing

Irrigation Alignments
- Interceptor Drain and Overflow Pipeline
- Irrigation Distribution Pipeline
- Militch Ditch Pipeline
- DVR Pipeline Loop
- C-line
- C-line to be converted to Freshwater Use

Section 404 Wetlands
- Perennial Wetlands
- Seasonal Wetlands
- Potential Other Waters of the U.S.
- Irrigation Ditch

N

0 500 1,000 Feet

1 in = 1,000 ft

Data source: Dominicelli & Associates, ArcGIS Online Bing Aerials.
Map date: August 12, 2011

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3 Environmental Analysis Introduction

3 Environmental Analysis Introduction

Chapters 4 through 18 provide the analyses of Project Components for each environmental topic. Chapters 19 and 20 provide the analysis of Project Alternatives and the CEQA required sections. These chapters are organized in the following format:

3.1 Environmental Setting

The Environmental Setting describes the existing conditions as they relate to the attributes of the environment that may be affected by the Project as of February 2009. Pursuant to Section 15125 of the CEQA Guidelines, the environmental settings have been prepared at a level of detail necessary to provide an understanding of the significant effects of the Project and its alternatives.

3.2 Evaluation Criteria with Threshold of Significance

The Governor's Office of Planning and Research has published a guide to developing thresholds of significance to assist in determining whether a project may result in a significant environmental effect (OPR, 1994). A "threshold of significance" is the level at which the Lead Agency finds the effects of a project to be significant. It is a qualitative or quantitative standard based on health based standards, service capacity standards, ecological tolerance, or other standards relating to environmental quality issues such as those listed in the Initial Study checklist, agency regulatory standards, consultation with other agencies, and the Lead Agency's specific thresholds of significance. This section identifies the applicable state, federal, and local environmental standards (e.g., water quality standards, air quality standards, zoning provisions) and other criteria by which a significant change in the environment is assessed.

3.3 Impacts and Mitigation Measures

The impact analyses describe anticipated changes in the environment due to the Project. The impact analyses have been prepared to comply with Section 15143 of the CEQA Guidelines, which states that "significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence." The level of significance is identified for each impact based on a comparison with the impact evaluation criteria. Where the Project results in impacts that are considered significant with respect to the impact evaluation criteria, mitigation measures are proposed to avoid or minimize the impact where feasible. If impacts cannot be reduced to a level that is less than significant, the impact is identified as significant and unavoidable.

3.4 Alternatives Analysis

The analysis of impacts associated with the Project alternatives is presented in Chapter 19. For each significant impact associated with one or more of the alternatives, the analysis identifies if mitigation measures recommended for the Project would reduce impacts of the alternative to a level that is less than significant.

3.5 Cumulative Impacts

As stated in Section 15130 of the CEQA Guidelines, cumulative effects are discussed for each topic section when the Project's incremental effect is "cumulatively considerable," as defined in section 15065 (c) of the CEQA Guidelines. "Cumulatively considerable" means that the incremental effects of the Project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. A cumulative impact consists of an impact that results from the combination of the Project together with other related projects.

Chapter 18 of this EIR explains the approach used to analyze cumulative impacts. Analysis on specific environmental topics can be found at the end of each environmental impact chapter (e.g., cumulative impacts analysis on Groundwater Resources is found at the end of Chapter 7). Per communications with Brian Peters, the Planning and Public Works Director for Alpine County, the County has no planned or foreseeable future projects within or in the vicinity of the project area. As a result, there is no cumulative project list to present at this time.

4 Land Use

Table 4-4					
Land Use Impacts – Project Components					
Impact	Point of Significance	Level of Significance by Component			
		Significant Impact Before and After Mitigation	Significant Impact Before Mitigation; Less than Significant Impact After Mitigation	Less than Significant Impact; No Mitigation Proposed	No Impact
LU-1. Will the Project Components be inconsistent with the land use plan map of an adopted General Plan or Master Plan?	Greater than 0 acres of land		11(Irrigation Fields A, B and C)		1, 2, 3, 4, 5, 6, 7, 8, 9, 10,, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32, DVR Pipeline Loop, irrigation distribution pipeline, freshwater conveyance pipeline, pump station/ hydroelectric generation, irrigation fields D through H and containment fields
LU-2. Will the Project Components be inconsistent with zoning?	Greater than 0 acres of land		11(Irrigation Fields A, B and C)		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ~~11~~, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32, DVR Pipeline Loop, irrigation distribution pipeline, freshwater conveyance pipeline, pump station/ hydroelectric generation, irrigation fields D through H and containment fields

Table 4-4

LU-3. Will the Project Components increase potential for conflict as a result of incompatible land uses?	Greater than 0 acres of land				1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,
LU-4. Will the Project Components result in the loss of locally known and/ or important mineral resources?	Greater than 0 acres of land				1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,

Source: Hauge Brueck Assoc. 2009

Impact: **LU-1, LU-2, LU-3, LU-4. Will the Project Components impact land use and mineral resources based on evaluation criteria 1 through 4?**

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

The Project Components conform with the existing zoning, land use designations and allowable uses as defined in the Alpine County General Plan. The land use designations include: Open Space; Scenic Highway; Residential Low; Residential Rural; and Hazardous Waste Facility. Much of the project area is designated Open Space. The allowable use for Open Space in Alpine County include erection, construction, alteration of water and sewer treatment and disposal facilities (Alpine County General Plan page ~~37~~63).

Each of the Project Components will be contained within existing public rights-of-way, District land or protected easements. Any modifications in siting of Project Components will require County approval.

The Project Components will not implement mineral extraction or processing activities, and there will be no loss of mineral or geothermal resources.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ~~11~~, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Analysis: *Significant; Irrigation Fields A, B, and C (Component 11)*

The DVR Pipeline Loop, irrigation distribution pipeline, fresh water conveyance pipeline, irrigation fields D through H, containment fields, pump station, and associated fixtures are located on Open Space within District land or within right-of-way. A portion of the DVR Pipeline Loop along Diamond Valley Road is not located within Open Space , but on Residential Rural land; however the pipeline is located below ground on District land. Such pipelines are allowed on Residential Rural land with appropriate siting of the facilities. A small portion of the DVR Pipeline Loop is not located on District land, but is within right-of-way, as previously analyzed in the 2009 FEIR.

Irrigation fields A, B, and C are located near or partially within lands designated as Residential Rural in the Alpine County General Plan. Agricultural activities that are not hazardous or nuisance-causing are allowable in this area; however the General Plan does not indicate liquid waste disposal is allowed in Residential Rural areas, as is allowed in Open Space areas. Although these irrigation fields will be located on District owned land where residential development is not anticipated, the land use designation may require amendment and County approval is necessary.

Amendments to the General Plan map or additional text must be supported by findings that the amendment conforms with the General Plan. Extension of the Open Space designation into the area where irrigation fields A, B, and C are located is feasible given the Residential Rural and Open Space designations are adjacent at this location and given the land is District owned. Use of the land for irrigation as an Open Space use would not affect the open space, circulation, or conservation elements of the General Plan, nor would it result in traffic impacts, exceed noise levels, or substantially affect the amount of land available for residential development. However, until a land use map amendment is approved, irrigation fields A, B, and C are not entirely located with the Open Space land use designation, which allows liquid waste disposal.

Irrigation fields A, B, and C will not implement mineral extraction or processing activities, and there will be no loss of mineral or geothermal resources.

Mitigation: **LU-1 Land Use Map and Zoning Amendment**.

In accordance with the Alpine County General Plan and specified in Section 18.84 of the Alpine County Code, an amendment to the Land Use Map and zoning will be obtained to designate lands on which the fields will be located as Open Space. Where the Residential Rural designation is now located in conjunction with the location of the irrigation fields, an amendment application shall be submitted to extend the boundary of the adjacent Open Space designation onto these areas. An application, with environmental documentation and associated fees shall be submitted to the County Planner for review and development of staff report for review by the Planning Commission. Public hearings will be held by the Planning Commission and a recommendation will be made to the Board of Supervisors for adoption or denial.

After
Mitigation: *Less than Significant; Irrigation Fields A, B, and C (Component 11)*

Adoption of the amendments to the General Plan Land Use Map and extension of the open space boundary onto the land occupied by irrigation fields A, B, and C will reduce this impact to a less than significant level.

4.7 Cumulative Impacts

~~No l~~Land use impacts are identified for ~~the Project~~Open Space designation onto these areas which are currently designated Residential Rural. This amendment will be limited to the project area, specifically the land where irrigation fields A, B, and C will be located. This will not affect land use or zoning definitions and will not affect other land within Alpine County. ~~, and t~~The Project will not contribute to cumulative land use impacts. There are no projects in Alpine County and within the project vicinity that are reasonably foreseeable (personal communication, Brian Peters, Alpine County Planning Director, April 2009).

4.8 Summary of Significant Impacts and Mitigation Measures

4.8.1 Significant Impacts and Mitigation Measures by Project Component

~~No significant land use impacts are identified in the Land Use chapter.~~ Table4-5 summarizes the significant impacts by project component and identifies the mitigations measures required for each impact.

Table 4-5 Summary of Significant Impacts and Mitigation Measures – Land Use		
Impact	**Level of Significance**	**Mitigation Measure**
Project Components		
LU-1. Will the Project Components be inconsistent with the land use plan map of an adopted General Plan or Master Plan?	Irrigation Fields A, B, and C ⊙	LU-1. Land Use Map and Zoning Amendment
LU-2. Will the Project Components be inconsistent with zoning?	Irrigation Fields A, B, and C ⊙	LU-1. Land Use Map and Zoning Amendment

4.8.2 Environmentally Superior Alternative (Alternative 3) Significant Impacts and Recommended Mitigation Measures

No significant impacts to land use are identified for the environmentally superior alternative (Master Plan Recommended Project Alternative, Alternative 3).

5 Agriculture

Farmland in Alpine County is rated Class III and is not considered prime farmlands. There is one parcel within the project area that is under Williamson Act contract - Alpine County APN 001-150-032. Construction and operation of conveyance components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32 will not result in a loss of acreage of prime farmlands in Alpine County.

Portions of Douglas County in the project area are identified as prime farmland in the Douglas County Master Plan. The provision of recycled water under component 2 will pursue permitting of recycled water application to irrigators in Nevada with the possibility of strengthening the agricultural viability of this prime farmland.

Application components 1, 7, 9, 10, 12, 13, 14, 15, 16, 18, 19, 21, 29 and 30 will enhance agricultural viability of land receiving recycled water in Alpine County and will not alter agricultural uses.

The water management components 8, 23 and 24 will not affect the amount of water available in Alpine County or Douglas County and will not affect the agricultural use.

The locations of Project Component 9, 10, 11, 12, 13 and 15 will be located on District-owned land and not prime farmland or lands under Williamson Act contract. Currently there are no agricultural uses on District land and no impacts to agricultural lands will occur.

<u>The DVR Pipeline Loop, irrigation distribution pipeline and fresh water conveyance pipeline are located on District land. The irrigation fields, also located on District land, will enhance agricultural viability of land receiving recycled water. The pump station , hydroelectric generation unit and associated electrical facilities will not affect agricultural uses.</u>

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

5.7 Cumulative Impacts

~~There are no~~ Project impacts are <u>not</u> identified on prime farmland or land under Williamson Act contracts, and the Project will not contribute to any cumulative impacts on these agricultural resources. Project Components will involve no changes in the existing environment which, due to their locate or nature, will result in conversion of farmland, to non-agricultural use.

5.8 Summary of Significant Impacts and Mitigation Measures

5.8.1 Significant Impacts and Mitigation Measures by Project Component

No significant agricultural impacts are identified in this chapter.

5.8.2 Environmentally Superior Alternative (Alternative 3) Significant Impacts and Recommended Mitigation Measures

No significant impacts to agriculture are identified for the environmentally superior alternative (Master Plan Recommended Project Alternative, Alternative 3).

6 Geology, Soils, Seismicity

Source: Hauge Brueck Assoc. 2009

Impact: **GEO-1. Will Project Components be located within an area of unstable slope conditions?**

Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

The project area is located in relatively level to gently sloping areas with slopes less than 30 percent, and conveyance systems in these areas are not expected to experience slope stability problems. Conveyance components 3, 17 and 20 entail improvements to the stability of existing conveyance facilities. Components 2, 4, 5, 6, 14, and 22 required construction of new pipeline alignments. Application component 1, 7, 9, 10, 12, 13, 15, 16, 21 29 and 30 will entail new pipelines and facilities such as sprinkler systems, wetlands and infiltration basins.

The temporary containment facilities of Component 11 are not proposed in areas with slopes greater than 30 percent, as sited on Figure 2-6. The majority of the site has slopes of less than 2 percent, which accommodates irrigation practices and the function of a common sump pump to facilitate draining and water management of the area. Basins and impoundments may create embankments with slopes greater than 30 percent, and these areas will require implementation of SP-16, Slope Stabilization Design, to ensure stability of the structures.

Locations of new pipelines are determined at a preliminary level, and only generalized slope mapping is available. The DVR Pipeline Loop does not cross any slopes greater than 30 percent. Trenching required for installation of the DVR Pipeline Loop will be stabilized and revegetated in accordance with SP-8, Repair Road Damage and Revegetate Temporarily Disturbed Areas. Pipes may cross small areas with slopes greater than 30 percent, which may be subject to unstable conditions. All trenches will be stabilized and revegetated in accordance with SP-8 as noted above.

Components 31 and Component 32 will be located on fairly level grounds adjacent to HPR and ICR, respectively.

Requirements of standard design measure SP-16, Slope Stabilization Design, reduces impacts to a less than significant level by implementing standard geotechnical practices as part of project design to stabilize slopes. During project planning the District will retain a licensed geotechnical engineer to conduct a construction-level geotechnical investigation for physical facilities such as pipeline routes, irrigation systems and embankment locations. Results from this investigation will be used to refine the final project design. Compliance with this standard design measure will avoid and minimize adverse environmental impacts from unstable slopes. Implementation of SP-8 will revegetated disturbed areas and further reduce adverse environmental impacts from unstable slopes to a level of less than significant.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

Analysis: *No Impact; Components 8, 18, 19, 23, 24*

Components 8, 18, 19, 23 and 24 do not implement new physical structures that will be subject to unstable slope conditions. No impacts will result.

Mitigation: *No mitigation is needed. Components 8, 18, 19, 23, 24*

Impact: GEO-2. Will Project Components be subject to ground rupture due to location near a surface trace of an active fault?

Analysis: *Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

Conveyance components 4, 5, 6. 14, 17, 22, 31 and 32 cross an Alquist-Priolo earthquake fault zone. Conveyance components 3 and 20 are located in close proximity to an Alquist-Priolo earthquake fault zone.

Surface fault rupture associated with seismic activity will result in pipeline damage and/or rupture. Pipe rupture will result in release of recycled water and will cause substantial erosion at the discharge point. Damage to pipelines occurs throughout eastern California and western Nevada in the event of a large earthquake. The existing system as well as components proposed by the Project will be vulnerable to damage. Damage to pipelines is an unavoidable consequence of construction and operation of a recycled water system in a seismically active area.

Damage to components 31 and 32 from surface fault rupture will result in damage to ICR conveyance ditches or the spillway channel and will result in release of freshwater. Erosion could occur at the discharge point.

Application areas for components 10, 15, 29 and 30 cross an Alquist-Priolo earthquake fault zone. Components 1, 7, 9, 12, 13, 16, 18 and 21 are located in close proximity to an Alquist-Priolo earthquake fault zone. Surface fault rupture associated with seismic activity will result in damage to irrigation systems. Irrigation pipelines will have shut-off valves, which limit the amount of water released. Due to the small diameter of the pipes, and the small quantity of water that would be released, this impact will be contained in the immediate vicinity of the break and is thus not considered significant. Resulting spills from a new pipe rupture will not be substantially different than what occurs during potential pipe ruptures associated with the existing flood irrigation system. Surface fault rupture associated with seismic activity will result in pipeline damage and/or rupture. Pipe rupture will result in release of recycled water and will cause substantial erosion at the discharge point. The proposed location of the DVR Pipeline Loop crosses an active fault zone immediately east of the Millich Ditch crossing; and immediately west of temporary containment field S1. The nature of the pipeline is such that it must cross the fault second fault zone at two locations, the first north of Diamond Valley Road and the second just to the south of Irrigation Field D in order to match back up with the existing C-Line location at the south west end of the District Pasture. The pump station and hydroelectric generation unit are not located on a fault zone. Damage to pipelines occurs throughout eastern California and western Nevada in the event of a large earthquake. The existing system as well as components proposed by the Project will be vulnerable to damage. Damage to pipelines is an unavoidable consequence of construction and operation of a recycled water system in a seismically active area.

Temporary containment Component 11 is located on two ~~three~~ Alquist-Priolo earthquake fault zones~~, and crosses the end of a fourth.~~ The DVR Pipeline Loop crosses a fault trace at three locations: east of the Millich Ditch crossing, west of Field S1and south of the second Millich Ditch crossing. Temporary containment fields are located east of Alquist-Proliolo Fault Zones. Surface fault rupture associated with seismic activity could cause a breach in the substrate of the irrigation field or overtopping of the embankment. The impoundments will be designed with additional freeboard to reduce the risk of

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

Analysis: *No Impact; Components 8, 18, 19, 23, 24*

Components 8, 18, 19, 23 and 24 do not implement new physical structures that will be damaged by strong ground shaking during an earthquake. No impacts will result.

Mitigation: *No mitigation is needed. Components 8, 18, 19, 23, 24*

Impact: GEO-5. Will construction of the Project Components cause off-site water-related erosion?

Analysis: *Less than Significant; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

Project design and construction of the components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32 components will be in conformance with NPDES permit requirements and local grading ordinances. Regulatory compliance ensures erosion during construction will be contained on-site and will not be a significant impact.

Analysis: *No Impact; Components 8, 18, 19, 23, 24*

Components 8, 18, 19, 23 and 24 will not be subject to off-site erosion during construction because the components do not implement new physical facilities. No impact from erosion will result.

Mitigation: *No mitigation is needed. Components 8, 18, 19, 23, 24*

Impact: GEO-6. Will Project Components be exposed to damage due to expansive soils?

Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17,20, 21, 22, 29, 30, 31, 32*

Some of the soils within the project area contain clay and have a moderate to high shrink-swell potential (USDA 1971). These soil types typically expand when wet and contract when dry. These changes in soil moisture content will damage facilities and pipelines of components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32 if not properly managed during design and construction. Without a site specific soil evaluation, potential impacts from expansive soils are unknown. Prior to project design, the District will retain a certified professional soil scientist or licensed geotechnical engineer to conduct a pre-design soil analysis along all pipeline alignments. Implementation of standard engineering practice SP-19, Standard Engineering Methods for Expansive Soils, avoids impacts by removing the expansive soils, remediates the situation by changing the composition of the soil, or avoids impacts by providing deeper foundations, footings and other support structures.

A geotechnical investigation has been performed for the proposed DVR Pipeline Loop by Construction Material Engineers Inc. (March 2011). This report determined the proposed DVR Pipeline Loop is not located in a location with expansive soils, therefore this impact is not significant for this pipeline.

Components 9 and 10 involve the construction of infiltration and zero-discharge basins. Component 11 will install irrigation fields for temporary containment of recycled waters that will be surrounded by a six-foot high berm and diked. During construction of basins and containment fields, the construction manager will ensure that weak surficial deposits will be excavated and removed (SP-28 Remove Weak Surficial Deposits from Basin Footprints).

Additionally, although irrigation systems may also be subject to damage from expansion and contraction of soils, any release of recycled water will be confined to the immediate area of the damage as a result of irrigation pipelines have shut-off valves. This impact is considered to be at a level of less than significant.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

Analysis: *No Impact; Component 8, 18, 19, 23, 24*

Components 8, 18, 19, 23 and 24 do not implement new physical structures that will be damaged by expansive soils. No impacts will result.

Mitigation: *No mitigation is needed. Components 8, 18, 19, 23, 24*

Impact: GEO-7. Will Project Components be exposed to damage due to construction on corrosive soils?

Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

The project area soils have a high corrosivity rating and the facilities comprising components *1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, and 32* may be impacted. Steel, concrete, and other structures will be damaged by the highly corrosive soils. As part of the pre-design soil analysis for project siting, the certified professional soil scientist or licensed geotechnical engineer will conduct an additional analysis of soil properties and chemical interaction between soil groundwater and pipe materials. Should the analysis conclude that facilities and pipelines require corrosion prevention measures, SP-20 Standard Engineering Methods for Corrosive Soils, will be employed. This standard measure avoids impacts by removing corrosive soils or using materials that will not be affected by corrosive soils.

A geotechnical investigation has been performed for the proposed DVR Pipeline Loop by Construction Material Engineers Inc. (March 2011). This report determined the proposed DVR Pipeline Loop is not located in a location with corrosive soils, therefore this impact is not significant for this pipeline.

~~The~~ To further reduce potential impacts from expansive soils, standard practice SP-28, Remove Weak Surficial Deposits from Basin Footprints, will be incorporated during construction of irrigation fields for temporary containment of recycled water (Component 11) to ensure that weak surficial deposits, including all landslide deposits, unconsolidated alluvium and colluvium and soil are excavated and removed from the borrow excavation plan for the impoundment sites to stabilize the facilities to the extent feasible.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

Analysis: *No Impact; Components 8, 18, 19, 23 24*

7 Groundwater

Analysis: *Potentially Significant Impact; Component 11*

Degradation of groundwater quality will occur if the migration of recycled water into groundwater results from operations of the irrigation and temporary containment fields of Component 11. Implementation of Component 11 will increase access to and application of recycled water and/or irrigation of additional lands with recycled water that contains nutrients in concentrations above those measured in local groundwater sources. If application rates exceed site-specific hydraulic loading levels, recycled water will interact with shallow groundwater sources and groundwater quality could be degraded. The installation of the Hydroelectric Generation Unit to generate power from the pressure in the C-Line will occur within the proposed pumphouse with no direct or indirect effects to groundwater quality in the Carson, Wade or Diamond Valleys.

Through implementation of Component 11~~, Construct irrigation fields with pumping back to HPR, an~~ up to an additional 372~~904~~ acres of ~~direct~~ land application of recycled water will be possible. The irrigation fields will be used for surface and aerial irrigation of wheat and alfalfa~~ or native pasture grasses~~, the crops recommended in the ~~Diamond Valley NMP~~ Nutrition Plan in ~~(see~~ Appendix S~~F)~~, Land preparation is planned to include an initial planting of wheat to add nutrients and biomass to the soils prior to planting of alfalfa. Addition of nutrients will reduce nutrients addition by fertigation; addition of biomass will increase soil moisture retention capacity thereby reducing runoff potential. Diamond Valley Ranch Irrigation Project Improvement Plan 50% Pre-Design Report. Ten irrigation fields are proposed~~and are~~ , as illustrated in Figure 2-6. Eight~~Five~~ of the ten~~seven~~ fields (i.e., Fields A - H) will be central pivot irrigation fields (approximately 322~~34~~ acres) and two of the fields (i.e., Fields 1 and 2) will be flood irrigated during the growing season but utilized for temporary containment of recycled water (50~~49~~ acres) in response to emergency conditions (e.g., extreme flooding). The remaining water righted lands will continue to be flood irrigated with freshwater. Application of freshwater is discussed in the analysis for NP-1 and will not result in degradation to groundwater quality.

Component 11 will ~~first (project Phase 1A)~~ construct eight~~five~~ irrigation fields, ranging in size from 21~~47~~ to 73~~120~~ acres and install central pivot spray systems for irrigation with freshwater. The ~~HPR by-pass system~~DVR Pipeline Loop and connecting pipelines to the central pivot irrigation sites ~~will be installed in Phase 1B, which~~ will also allow for irrigation with recycled water. Over time the irrigation system will apply recycled water or a blend of fresh and recycled water. Central pivot systems were selected to allow for optimized controlled water application and metering of application rates.

Field 1 and Field 2 will be constructed with seven foot high berms to allow for the temporary containment of up to 97 million gallons (300 acre-feet) or 100 days of discharge from the WWTP during times of emergency, typically flooding events similar to the January 1997 precipitation event, while maintaining 1-foot of freeboard. Following an emergency event that would require use of the temporary containment fields, the DVR pipeline loop will be used for distributing temporarily contained water to the irrigation areas or to HPR during the period of April 1 through October 15. Increased inputs of recycled water into groundwater could result from the unlined containment fields depending on the timing and duration of containment, raising altering groundwater levels and potentially increasing Nitrate-Nitrogen concentrations in groundwater if mixing occurs in the unsaturated zone of shallow groundwater sources. Containment of recycled water could be between one and 60 days in duration under a worst-case scenario according to the District. Based on the District's last 20 years of application history, the emergency use of these temporary containment fields would not have been necessary and thus the future need is inferred to be low.

The soils in the project area are reported ~~(Wood Rodgers 2008)~~ to be loamy sand, sandy loam and sand, in order of dominance (Wood Rodgers 2008). These soil textures are very conducive to sprinkler or flood/furrow irrigation practices. There was one occurrence of clay loam, which is a layer or accumulation of clay; the clay content is not high enough to meet the criteria as a restrictive layer for infiltration of irrigation water suggesting that~~.~~ ~~The~~ misapplication of recycled water ~~will~~ could result in the migration of recycled water into shallow groundwater sources and the degradation of groundwater quality.

Composite soil samples collected from the Component 11 study area in September 2010 by ITRC and analyzed by A&L Agricultural Labs of Modesto determined soil pH (0 - 18 inches) at 6.0, soil salinity at 0.2 dS/m, low levels of nitrogen, phosphate, potassium, and micronutrients. Recommendations include: raising pH to 6.6 -7.0 prior to application of recycled water because conversion of ammonium to nitrate will reduce pH; amending the soils with gypsum prior to application of recycled water to address expected salinity changes and maintain soil infiltration properties; applying phosphate and potassium through fertigation (these nutrients are relatively immobile); applying micronutrients as chelates rather than salts; and applying a mix of nitrate and ammonium during alfalfa establishment because current levels are close to zero.

The ~~Diamond Valley Ranch~~ DVR is currently grazed in the spring through the early fall by approximately 1,000 head of cattle. Appendix S details the water balance and application rates for annual irrigation requirements for the 372 acres and an estimated evapotranspiration rate (ET) of 36-inches per growing season (see attachment B in appendix S for ET details), as based on the removal of cattle (Note the revised Project incorporates Mitigation Measure GW-1A), reduced irrigable acreage, and additional soil investigations in DVR.

Water Balance/Irrigation Rates. Using the estimated irrigation season ET of 36", and an Irrigation Efficiency of 85%, and ignoring precipitation during the growing season, the gross application volume per growing season will be approximately:

> Gross application = 36 inch/0.85 = 42 inch (1.14 MG/acre) per growing season for the pivots
>
> For the flood irrigation, the value is 33 inch/0.75 = 44 inch (1.19 MG/acre)
>
> The MG of irrigation water is estimated to be:
>
> Pivots: 1.14 MG/acre × 322 acres = 367 MG
>
> Flood: 1.19 MG/ac × 50 acres = 60 MG
>
> Total: = 427 MG

A pivot on an alfalfa field must be designed to apply the monthly ET in about 22 days during the middle of the summer, because there may be 8 to 9 days of down time due to cutting the hay and harvesting it. Assuming an average peak monthly ET of 9 inches, the gross to apply is 10.6 inches per month for the pivots.

If all the pivots were operated 24/7 during the 22 days, this would require a flow rate of 9.1 GPM/acre. For example, for 322 irrigated acres of pivots, the continuous flow rate requirement would be 2930 GPM. Adding in the flood irrigated fields (50 acres) requires about 3480 GPM.

However, if the system is designed to irrigate 2 weeks out of 4 weeks (which means two weeks per cutting during peak ET), the flow rate requirement would be based on irrigating for 14 days per month. This would require a flow rate of 14.3 GPM/acre. For 372 irrigated acres, the flow rate requirement would be about 5460 GPM.

The minimum available effluent flow rate is about 5.5 CFS, or 2470 GPM, which will likely be sufficient most of the summer if not all pivots are operated simultaneously. However, during hot periods, these flows will need to be supplemented with fresh water to meet the ET requirement.

The following provides a comparison of these numbers:

Gross requirement during peak ET, running 24/7, 22 days/month = 3480 GPM

Gross requirement during peak ET, irrigating 14 days/month = 5460 GPM

Minimum available effluent flow rate = 2470 GPM

The ultimate system will be designed for a capacity of 5460 GPM.

Surface Irrigation Effects. Based on the calculations presented in attachment A of Appendix S, the average Total Nitrogen concentration, 24 ppm (mg/L) in the District's recycled water is not sufficient to meet the overall needs of alfalfa crops. Therefore, the alfalfa will fix Nitrogen from the atmosphere to supply the deficit. During the first year of operation, small grain will be grown and will require Nitrogen applications on the ground and through the center pivot irrigation systems via fertigation to have good growth because the current levels of Nitrogen are close to zero, as measured in composite soil samples taken by ITRC on September 9, 2010. Once alfalfa is plated, no additional Nitrogen applications will be necessary.

The Nutrition Plan in Appendix S examines the annual Nitrogen balance in the District's recycled water supply in context with alfalfa yield and ET and gross application of recycled water throughout the growing season. Based on the estimated application rates for the DVR irrigation fields in comparison to study results reported for LA County Sanitation Districts (LACSDs) recycled water projects, there is no anticipated problem with uptake of the Nitrogen from the recycled water. The key points that create that opinion are:

1. The LA County Sanitation Districts (LACSDs) effluent at Palmdale has about 34 ppm nitrogen.

2. The District's recycled water has about 24 ppm average total nitrogen concentration.

3. At LACSDs, it is estimated that about 25 percent of the ammonium volatilizes. This depends upon the water and soil pH, as well as the temperature. It is expected that volatilization at DVR will be about 20 percent.

4. At LACSDs, the 34 ppm Nitrogen (minus volatilization) is insufficient to meet the nitrogen uptake demands of the alfalfa. It is estimated that 20% of the total nitrogen uptake is from rhizobium bacteria fixation of atmospheric nitrogen by the alfalfa plant.

5. During the hottest time of the summer, the effluent flow rate will likely not be great enough to supply the full irrigation demands of 370 +/- irrigated acres.

In summary, because the LACSDs nitrogen ppm is higher than at DVR and this high LACSDs Nitrogen concentration is not sufficient to meet the alfalfa nitrogen requirement, and the effluent water from the District will be supplemented with fresh water to meet peak crop evapotranspiration demand, it is not anticipated that the effluent water will need to be mixed with fresh water for the purposes of nitrogen management.

Based on the implementation of mitigation measure GEO-1A recommended in the FEIR ands the information provide in Appendix S of the SEIR, impacts to groundwater from applications of recycled water to grow alfalfa have been reduced to a level of less than significant.

Flood Irrigation Effects. Project-level Nitrate-Nitrogen investigations, as detailed in section 7.2.5, were completed in November and December of 2008. The Farr West Engineering report is attached in Appendix I-b and presents project-specific conditions and recommendations for Component 11. Water level data indicate that low to virtually impermeable material separates multiple permeable units. The study concludes that the northern portion of Diamond Valley Ranch could receive recycled water for irrigation and temporary containment with low infiltration rates into the upper most portion of the shallow alluvial zone because of the generally fine-grained and poorly sorted material. Movement of recycled water from the shallow alluvial zone to the lower semi-confined and confined alluvial zones are expected to be minimal because of the interbedded alluvial and morainal deposits that form confining layers that will retard infiltration.

Groundwater level measurements collected from well ACMW-11 during March and April 2009 show that the water table occurs at depths range from 12.3 to 17.3 feet bgs during spring soil conditions. The findings from project-level Nitrate-Nitrogen investigations show that potential groundwater impacts from the temporary containment of recycled water could cause an increase of Nitrate-Nitrogen concentrations of less than 2.0 mg/L in the underlying groundwater. This potential impact is based on the mass flux estimated and is independent of groundwater depth.

Transmissive losses from the temporary containment fields could occur under the extreme conditions that would warrant the use of the temporary containment fields, and significant impacts to groundwater quality could result if containment duration is prolonged. The combination of early spring soil conditions and an emergency event occurring prior to April 1st, the date on which recycled water is permitted to be released from HPR, represents the worst-case scenario for temporary containment. To reduce potential impacts to groundwater resources to a level of less than significant, a determination of the maximum duration of containment that site conditions can support ~~is~~was made in accordance with mitigation measure GW-1B~~ necessary.~~ Temporary containment Fields 1 and 2 have been designed to contain 300 acre-feet of water, which is approximately equivalent to 100 days of discharge from the WWTP.

Mitigation: **SP-33. Surface and Ground Water Protection Plan**

GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water

GW-1B. Do Not Exceed the Maximum Duration ~~for~~ of Temporary Containment (100 Days)

After Mitigation: *Less than Significant Impact; Component 11*

Implementation of standard practice SP-33 and recommended mitigation measures GW-1A and GW-1B will reduce potential impacts to groundwater quality from Component 11 to a level of less than significant.

The District will follow the Surface and Ground Water Protection Plan (SP-33) for continued characterization of groundwater quality for the project area. Should groundwater Nitrate-Nitrogen concentrations approach 7 mg/L, the ~~trigger~~ proposed action concentration level, the District will amend or suspend irrigation with recycled water as appropriate to reduce impacts to ground water ~~to a level of less than significant~~.

In order to determine the hydraulic loading based on nitrogen for the ~~Diamond Valley Ranch~~DVR NMP, Wood Rodgers consulted “WTS-1B: General Criteria for Preparing an Effluent Management Plan,” prepared by the Nevada Department of Environmental Protection (NDEP). Wood Rodgers set a conservative “red-flag” threshold level of 7 mg/l for C_p, as is common practice in developing a Nevada Effluent Management Plan (EMP). This was done to insure that the receiving groundwater resource will not be degraded to a point where it is no longer useable (please refer to the Appendix F, Assimilation Capacity-Technical Report 4). The District understands that Lahontan and the State Board can impose a more stringent trigger value if an additional factor of safety is desired.

Recommended mitigation measure GW-1A requires an amendment to the grazing regime and/or manure management to reduce Nitrogen loading if recycled water is used for irrigation. In lieu of amending the grazing timeframes, crop type, and manure management necessary for a nutrient neutral grazing regime, the District will commit to removing cattle from portions of the Diamond Valley Ranch when irrigating with recycled water. The removal of cattle during a recycled water irrigation regime is determined to result in deficiencies in the “whole ranch nutrient balance” for Phosphorus, Potassium, and Nitrogen, which assures the protection of groundwater resources. Balancing Nitrogen inputs with crop uptake while removing manure inputs will reduce impacts to groundwater quality to a level of less than significant.

Under recommended mitigation measure GW-1B, 100 days is the maximum duration of impoundment of recycled waters that will meet the needs of temporary containment situations without creating impacts to groundwater quality. The investigation of the northern ~~Diamond Valley Ranch~~ DVR portion of the project area, which is the proposed location for irrigation fields and temporary containment area, suggests that shallow confined layers will retard infiltration from the uppermost portion of the water tables into lower water bearing zones (FarrWest Engineering 2009). The study concludes that the northern portion of D~~iamond Valley Ranch~~VR could receive recycled water for irrigation and temporary containment with low infiltration rates into the upper most portion of the shallow alluvial zone because of the generally fine-grained poorly sorted material.

A containment duration of 100 days will meet the needs of the District to temporarily contain up to 97~~6~~ million gallons (approximately 300 acre-feet) of recycled water exported from the WWTP during an emergency situation while protecting groundwater quality of the water bearing unit. The District worked with Farr West Engineering to predict concentrations of mixed waters during a worst case scenario of 100 days of containment during saturated soil conditions, which is typically late May through late July.

A standard one dimensional mass flux equation was used to predict potential groundwater impacts from temporary containment of recycled water of a concentration of 1.53 mg/L of Nitrate-Nitrogen, which is the median concentration measured in the recycled water exported from the WWTP over the previous 20 months. The scenario predicts a resultant Nitrate-Nitrogen concentration of 2.16 mg/L, should mixing occur. This concentration is well below the proposed action level of 7.0 mg/L and the State of California maximum drinking water level of 10.0 mg/L.

Analysis: *Significant Impact; Components 1, 2, 3, 4, 5, 6, 14, 21, 22, 30*

A number of the Project Components could result in migration of recycled water into groundwater, which could adversely affect groundwater quality. Implementation of Project Components 1, 2, 3, 4, 5, 6, 14, 21, 22 and 30 will increase access to and application of recycled water and/or irrigation of additional lands with recycled water that contains nutrients in concentrations above those measured in local groundwater sources. If application rates exceed site-specific hydraulic loading limits, recycled water will interact with shallow groundwater sources and groundwater quality could be degraded.

Conveyance components 2, 3, 4, 5 and 6 will improve and expand the existing systems and additional lands will be irrigated with recycled water. Component 2 will make recycled water available to irrigators in Nevada. Under Component 3 the capacity of the Diamond Ditch system will be improved and the District will be able to provide uninterrupted flows. Components 4, 5 and 6 develop infrastructure appropriate to provide recycled water under pressure to irrigators, which allows for the irrigation of lands not currently irrigated but also allows for sprinkler irrigation as opposed to practices of flood and furrow irrigation.

Component 14 pipes recycled water to minimize setbacks and human contact. Component 22 parallels a recycled water pipeline along the existing Diamond Ditch. By piping the recycled water, the District will have greater control over the quantity of water delivered to any site. If irrigation rates exceed the site-specific hydraulic loading limits, recycled water has the potential to percolate past the root uptake zones of vegetation and mix with shallow groundwater. This is a significant impact.

Application components 1, 21 and 30 will construct infrastructure for irrigation and application of recycled waters. Changing native rangeland to irrigated pasture under Components 1 and 30 could cause adverse impacts to groundwater, depending on site conditions such as depth to groundwater, depth to restrictive layer, hydraulic loading limits, crop uptake capacity and grazing practices.

Component 21 develops tailwater control systems that include tailwater detention basins to reduce the likelihood of tailwater flowing off permitted lands and degrading surface water quality. The tailwater will either percolate and evaporate from detention basins or be pumped back to the irrigation ditches for re-application. All inputs into groundwater must be balanced with site-specific assimilative capacities (e.g. Nitrogen loading) to avoid and minimize impacts to groundwater quality.

NMPs are necessary to determine application rates that balance site-specific hydraulic loading limits to ensure the protection of groundwater quality in the project area and ultimately the Carson Groundwater Basin.

Mitigation: **SP-33. Surface and Ground Water Protection Plan**

After Mitigation: *Significant Impact; Components 1, 2, 3, 4, 5, 6, 14, 21, 22, 30*

Components 1, 2, 3, 4, 5, 6, 14, 21, 22 and 30 will be located in portions of the project area that have not been studied as part of the DVR~~iamond Valley Ranch~~ NMP. NMPs, as outlined in SP-33, Surface and Ground Water Protection Plan, ~~will~~ must Bbe completed for these portions of the project area. To adequately convey, apply and manage average daily flows projected for 2028, these portions of the project area must also be able to assimilate ~~approximately 1.0 MGD of~~ nutrient concentrations in recycled waters exported from the District's WWTP.

Improving the Diamond Ditch System (Component 3) will result in increasing the capacity of the system to transport higher volumes of recycled water. By stabilizing these segments of the system, erosion and flooding will be alleviated. Unlined portions of the system will be lined or piped. These system upgrades will decrease losses to groundwater due to ~~flooding~~ditch losses and leaks. The construction of conveyance infrastructure such as new underground lines to the Fredricksburg area, Wade Valley and the Ranchettes (Components 4, 5, and 6) and for piping recycled water to minimize setbacks and human contact (Component 14) will involve trenching across alluvial fans that may contain groundwater resources. Component 1 will provide recycled water to new non-irrigated, permitted land and Component 2 involves pursuing the permitting of land in Nevada by NDEP for receipt of recycled water from HPR, which will involve the construction of new underground lines and may also involve trenching activities. Trenching construction activities will require a NPDES permit, which includes surface water protection measures but not defined ground water protection measures. The recycled water will be delivered to users under pressure which will allow the irrigators to use sprinkler irrigation instead of the less efficient flood irrigation. A more structured application rate and volume will avoid potential impacts to groundwater by allowing for more controlled applications of recycled water that are matched to the hydraulic loading levels of the site.

Tailwater control systems will be constructed under Component 21 that will improve surface water quality and indirectly groundwater quality. Component 30 will spray irrigate the portion of the project area referred to as the "jungle" with recycled waters. This portion of the project area is located on the alluvium of the West Fork of the Carson River floodplain. Misapplication of recycled waters in the jungle could impact shallow groundwater sources.

Component 22 parallels a recycled water pipeline along the existing Diamond Ditch. By piping the recycled water, the District will have greater control over the quality of water delivered to any site. The recycled water will be delivered to users under pressure, which will allow the irrigators to use sprinkler irrigation instead of less efficient flood irrigation. A more structured application rate will avoid potential impacts to groundwater by allowing for more controlled applications of recycled water that do not not impact the root zones of crops.

To date, groundwater monitoring results have not measured degradation of groundwater quality in these portions of the project area, and as discussed above, a number of Project

Components will improve upon existing recycled water infrastructure, reducing transmissive losses and unmanaged surface water and groundwater interactions. Regardless of the potential benefits expected to result from construction and operation of Components 1, 2, 3, 4, 5, 6, 14, 21, 22 and 30, site-specific hydraulic loading limits have not been determined for these portions of the project area and optimized application rates have not been calculated. Until site-specific NMPs are developed which outline the appropriate application rates for water balance with hydraulic loading rates, the potential impact to groundwater quality remains significant.

Analysis: *Significant Impact; Components 9, 10, 12, 13, 15, 16, 19, 29*

A number of the Project Components could result in migration of recycled water into groundwater, which could adversely affect groundwater quality. Implementation of Project Components 9, 10, 12, 13, 15, 16, 19 and 29 will increase access to and application of recycled water and/or irrigation of additional lands with recycled water that contains nutrients in concentrations above those measured in local groundwater sources. If application rates exceed site-specific hydraulic loading levels, recycled water will interact with shallow groundwater sources and groundwater quality could be degraded.

Application components ~~1,~~ 9, 10, 12, 13, 15, 16, ~~18,~~ 19, ~~21~~ and 29 will construct infrastructure for irrigation and application of recycled waters. Changing native rangeland to irrigated pasture or sod, seed and pulp production areas under Components ~~1,~~ 12, 13, 15 and 29 could cause adverse impacts to groundwater, depending on site conditions such as depth to groundwater, depth to restrictive layer, hydraulic loading limits, crop uptake capacity and grazing practices.

The use of pesticides for cultivation of biomass crops and sod farms (Components 12 and 13) may occur. Pesticide application will be regulated by the District through its contracts for use of recycled water, but improper application of chemicals could impact groundwater resources. Application components 9 and 10 will construct infiltration basins and zero-discharge basins, respectively, and will facilitate the migration of recycled water into the soil profile and eventually groundwater. Component 21 develops tailwater control systems that include tailwater detention basins to reduce the likelihood of tailwater flowing off permitted lands and degrading surface water quality. The tailwater will either percolate and evaporate from detention basins or be pumped back to the irrigation ditches for re-application. All inputs into groundwater must be balanced with site-specific assimilative capacities to avoid and minimize impacts to groundwater quality.

SP-33. Surface and Ground Water Protection Plan

GW-1A. Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water

After Mitigation: *Less than Significant Impact; Components 9, 10, 11, 12, 13, 15, 16, 19, 29*

Components 9, 10, 12, 13, 15, 16, 19 and 29 will impact the Diamond Valley Ranch portion of the project area through application of recycled water. The District worked with Wood Rodgers, Inc. to develop a NMP specific to site conditions of the Diamond Valley Ranch and in fulfillment of the State Board's forthcoming Recycled Water Policy. Potential impacts to groundwater quality in the Diamond Valley will reduced to a level of less than significant through adherence to the application rates and volumes calculated for these sites along with implementation of surface and groundwater protection measures and monitoring outlined in the NMP and SP-33.

The Diamond Valley Ranch is presently flood irrigated with freshwater from Snowshoe Thompson No. 1 ditch and portions are grazed with approximately 1000 head of cattle in the late spring to early fall. Components 9 and 10 will apply recycled water through groundwater recharge infiltration basins and zero discharge basins, respectively. For the protection of groundwater quality, the application and recharge rates will be in concert with those calculated in the NMP. Nutrient uptake will result through growing biomass crops for pulp production and wetland sod and seed productions (Components 12 and 13, respectively), and the use of pesticides for these Project Components is not recommended. Component 16 installs subsurface recycled water irrigation in public contact or buffer areas, while Component 19 pursues permitting of more land in Alpine County. Component 29 will irrigate the District's pasture land. Maximum application rates and volumes recommended for these Project Components are discussed below.

The DVR NMP is developed primarily for use by the re-user and secondarily as a reporting mechanism for Lahontan. The purpose of the NMP is to provide guidance for irrigating with recycled water as listed:

- Provide a description of the recycled water delivery system and ancillary system components to inform responsible personnel of the system operation and capabilities;
- Identify responsibilities of the permittee/operator on the operation, maintenance and management of the recycled water reuse on the permitted site;
- Instruct system operators in the purpose and intended operation of components within the irrigation system under normal operating conditions and during emergency conditions, including procedures for emergency response and notification; and
- Annual monitoring and reporting requirements.

Wood Rodgers determined the area of potentially irrigable lands using recycled water on Diamond Valley Ranch as 904 acres. The irrigable acres are delineated in Figure 2 of Appendix F. Areas that are currently irrigated with fresh water and/or have been irrigated historically were considered. Protection of surface water and groundwater quality are incorporated through 25-foot setbacks from the District property lines along Diamond Valley Road, from the center line of irrigation ditches, and from the edge of stream courses. Areas of high groundwater are identified based upon field visits, aerial photography, the results of August 2008 soil sampling and the District's groundwater monitoring data.

<u>Based on preliminary wetland delineations completed in April 2010, the potential irrigable acreage was reduced to 372 acres. Site-specific soil investigations were completed in September 2010 and the DVR portion of the project area was reconfigured based on the new data and information. Appendix S presents in attachment B the corrected water balance and application rates, crop plan, land preparation recommendations, nutrient plan and monitoring needs that reflect the removal of cattle grazing and a crop selection of alfalfa.</u>

~~The maximum recycled water application rate is calculated at 71.89 inches per year (in/yr), which equates to 5.99 AF/yr for the 904 irrigable acres or a total flow of 1,765 million gallons per year (Mgal/yr) or 4.8 MGD. As stated in the Executive Summary of the Diamond Valley Ranch NMP (Appendix F, p.i), this is the maximum allowable~~

~~application rate that will meet the crop requirements for alfalfa as well as the District's objective to use the maximum recycled water for irrigation purposes. This application rate currently exceeds the District's average yearly daily flow of 4.0 MGD or 1460 Mgal/yr, which equates 4.95 AF/yr with no net annual storage in HPR. These This average yearly daily flow is reported to Lahontan in quarterly monitoring and annual monitoring reports. This total water volume is then used as the starting point to calculate the total available amount of recycled water that can be applied each month and to develop the Nitrogen balance for maximum assimilative capacity and uptake.~~

~~The recommended application rate calculated for growing alfalfa (recommended crop type) with surface irrigation is 66.80 in/yr or 5.99 acre-feet/acre for the 904 irrigable acres. This application rate is very close to the maximum allowable application rate for growing alfalfa with spray irrigation. To be on the conservative side, the District can select an aerial irrigation method for growing alfalfa with spray irrigation, with a maximum application rate of 66.75 in/yr or 5.57 acre-feet/acre with minimal resulting tailwater (reduced surface water impacts as discussed in Chapter 8. Chapter 3.0 of the Diamond Valley Ranch NMP, Recycled Water Irrigation Planning, presents the foundation for evaluating the hydraulic loading levels.~~

~~Currently the Diamond Valley Ranch is grazed from late spring through early fall by approximately 1000 head of cattle. Livestock grazing removes nutrient from the project area through harvesting of crop while also providing nutrient input in the form of manure to the system. As stated in the NMP, the level of grazing that is occurring is moderate, dispersed and managed based on available feed. No one portion of the Diamond Valley Ranch study area (as analyzed in the NMP) will be impacted by the production of manure and associated input of nutrients under a freshwater regime. Under a recycled water irrigation regime a small excess of Nitrogen will become available. As discussed above for the analysis of component 11, to continue cattle grazing in the Diamond Valley Ranch under a recycled water irrigation regime, the carrying capacity of the crop must be determined and livestock use be limited to a moderate level on a rotation system.~~

~~To reduce potential impacts to groundwater to a level of less than significant, under recommended mitigation measure GW-1A, the District will discontinue cattle grazing under a recycled water irrigation regime. The removal of cattle on the portions of the project area that are irrigated with recycled water will result in a deficit for Phosphorus, Nitrogen and Potassium. The calculations for the "whole ranch nutrient balance" under a recycled water irrigation regime including and excluding inputs from manure are detailed in Grazing Options tech Memo of Appendix F.~~

The monitoring program implemented under standard practice SP-33 will continue to offer concrete responses when baseline nutrient and salt concentrations from groundwater monitoring wells show degradation of groundwater quality attributable to the recycled water program. ~~Chapter 8.0~~ Appendix S~~of the Diamond Valley NMP~~ outlines monitoring and reporting requirements, including: recycled water volumes; recycled water quality; groundwater quality; Nitrogen balances; standard reporting procedures; emergency reporting; monitoring wells; recycled water sampling; flow monitoring; soils; ~~and~~ vegetation~~. The plan includes measures to curtail recycled water flows onto the project area either temporarily or permanently, and reduce the~~ and provides support that the potential impacts to groundwater quality from recycled water application have been reduced to level of~~to~~ a less than significant~~ level~~.

Analysis: *Less than Significant Impact; Components 7, 8, 17, 18, 20, 23, 24, 31, 32*

Components 7 and 8 will potentially provide a benefit to groundwater resources by respectively establishing non-flood irrigation application systems and improving the quality of recycled water exported from the WWTP in South Lake Tahoe, CA. Improved quality of recycled water supplied to irrigators will decrease the likelihood of groundwater degradation from irrigation. Transitioning from flood irrigation practices to more efficient sprinkler and sub-surface irrigation provides for more controlled application of recycled water and reduces the potential for tailwater flowing off of the intended reuse area.

Component 17 involves upgrades to the existing ~~Snowshoe Thompson No.~~SSTID # 1 systems. The ~~Snowshoe Thompson No. 1~~SSTID # 1 is an unlined open channel along the entire length. District personnel indicate that transmissive losses in the Snowshoe Thompson No. 1 are high. Increasing the capacity of the ditch will allow the District to convey full entitlement of water diverted from the West Fork of the Carson River. Increasing the conveyance capacity of the ditch can be accomplished by replacing the open channel with a pipeline or my making improvements to the existing open channel system. This system conveys freshwater diverted from the West Fork of the Carson River and does not pose a threat to groundwater quality because the freshwater conveyed is of comparable or superior water quality.

A recycled water allocation system will be developed for Component 18 for maximization of the volume of applied recycled water and minimization of the threat to groundwater and surface water quality. Optimization assures that there are no losses other than those intended (e.g. evapotranspiration and regulated percolation).

Component 20 involves the improved operations and maintenance of the Diamond Ditch system by determining whether ownership of portions of the ditch and appurtenances or modifications of existing easements best support the District's interest. Expanded control over the delivery schedule for recycled waters will improve management of water levels in HPR but will not impact groundwater quality.

Components 23 and 24 involve the management of fresh waters in ICR that will not impact groundwater quality. Component 32 will construct a spillway channel for ICR that conveys reservoir spillage around HPR to Indian Creek. This channel will route fresh water from ICR to Indian Creek and will not degrade groundwater quality as a result.

Component 31 will involve constructing a ditch to divert storm waters. The capture rate is estimated at 100 cfs for the diversion of storm water and drainage flows that currently flow into HPR. This freshwater will be captured and diverted to ICR. This diversion of freshwater will not degrade groundwater quality.

Mitigation: *No mitigation is needed. Components 7, 8, 17, 18, 20, 23, 24, 31, 32*

Impact: GW-2. Will the Project Components cause groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment?

Analysis: *No Impact; Components 2, 3, 4, 5, 6, 8, 14, 17, 20, 22, 23, 24, 31, 32*

Conveyance components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32 will implement improvements to existing systems by constructing lined ditches or pipelines or improving operations and maintenance and will not contribute to groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment.

These components will move fresh or recycled waters from one physical area to another. Conveyance infrastructure will be visually inspected annually (SP-35 Conveyance Infrastructure Maintenance Plan) for damage and leaks, but even with transmissive losses and leaks, the conveyance system will not contribute waters in volumes large enough to result in groundwater mounding or significantly increase groundwater levels. Conveyance components that include unlined ditches will be designed to eliminate groundwater interception.

Water management components 8, 23 and 24 will not result in groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment. These components improve the quality of recycled water being exported from the WWTP (Component 8) and reroute or store additional fresh water in ICR (Components 23 and 24).

Mitigation: *No mitigation is needed. Components 2, 3, 4, 5, 6, 8, 14, 17, 20, 22, 23, 24, 31, 32*

Analysis: *Less than Significant Impact; Components 1, 7, 9, 10, 11, 12, 13, 15, 16, 18, 19, 21, 29, 30*

Application components 1, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 29 and 30 and temporary containment component 11 will increase application of recycled water within the project area. If application rates are in excess of site-specific assimilative capacity, surface water and groundwater interactions will result. Specifically, components 9, 10 and 11 will create impoundment and infiltration basins and irrigation fields that will result in increased inputs of recycled water into groundwater. A site must have sufficient capacity to assimilate water in excess of natural infiltration, as insufficient capacity may result in significant groundwater mounding on low hydraulic conductivity lens or elevate the water table, which could alter saturated flow direction or reach the surface. Groundwater mounding, lateral spreading and potential breakout on ground surface or side slopes depends on the characteristics of the subsurface.

The Alisto report (2008) interpreted groundwater flow direction and potentiometric contour maps for monitoring events in September and December 2007 and in March and June 2008. Monitoring data interpretations conclude:

"It is apparent that the shallow groundwater bearing unit beneath Diamond Valley, Wade Valley and Carson Valley is hydraulically connected as one hydrogeologic unit. The volcanic and volcanistic blocks between Diamond Valley and Wade Valley are not acting as hydraulic barriers to groundwater flow for the south (Diamond Valley) towards Carson Valley and the California-Nevada border."

The District has performed monthly groundwater monitoring and completed quarterly and annual reporting within and in the vicinity of the project area since 1981. The September 2008 *Recycled Wastewater Monitoring Program Evaluation Repor*t (Appendix H) prepared for Alpine County discusses the regional hydrogeology of the project area. Soil borings were drilled to depths of 770 feet in Diamond Valley during hydrogeologic reconnaissance conducted by the District. Volcanic rock (andesite) was encountered as shallow as 45 feet bgs and as deep as 405 feet bgs and 770 bgs. The andesite encountered in these borings was interpreted as defining the bottom of the potentially water-bearing sands, gravels and other basin fill deposits in the project area. A shallow groundwater level of no less than 45 feet is inferred from soil boring results in the Diamond Valley. Groundwater mounding is not expected to occur with this depth to water table.

Groundwater wells in Wade Valley and Carson Valley were drilled in unconsolidated alluvial fan or basin-fill deposits. Groundwater monitoring results report that the infiltration of surface water through stream beds and ditches and percolation of recycled wastewater from the flood-irrigated fields have maintained the shallow water table beneath much of the valley floor. The water table level and the degree to which these levels fluctuate are influenced by the characteristics of the zone of saturation and hydraulic conductivities of soils.

Results from geologic logging, aquifer testing and water level monitoring, determine that the uppermost portion of the zone of saturation is confined on the west side of Diamond Valley (Component 30). Groundwater levels beneath alluvial fans on the west side of the valley increase to greater than 200 feet within one mile of the valley floor and depth to water reaches 200 feet on the eastern side of the valley approximately three miles from the valley floor (Alisto 2008). Additions to groundwater at these depths will not result in groundwater mounding or surface break-out.

The monitoring locations near the center of D~~iamond Valley~~VR (Components 9, 10, 11, 12, 13, 15 and 19) and Indian Creek measure the uppermost portion of the zone of saturation as unconfined. Groundwater level data suggests that the zone of saturation may be semi-confined in Wade Valley (Components 7 and 18), while the uppermost portion of the zone of saturation in the Carson Valley portion of the project area (Components 1, 7, 18 and 21) is unconfined. Groundwater mounding will not occur in these semi-confined and unconfined areas. The portions of the project area with shallow groundwater have been identified during hydrogeologic reconnaissance and preliminary wetland delineations (illustrated in Figure 2-6) and will be avoided~~ or studied further during future project-level analysis.~~

Misapplication of recycled waters to portions of the project area with shallow groundwater and soils with low hydraulic conductivities could result in surface breakout. Project-level analysis completed for Component 11, identified a perched water table was identified overlying the zone of saturation in the northern portion of ~~Diamond Valley Ranch~~ DVR (Component 11) at a depth of 32 to 37 ft bgs. A confining layer comprised of silt with variable gravel was encountered from 37 to 57 ft bgs. The water bearing zone was then encountered a depths of 57 ft bgs to the boreholes total depth of 73.5 ft bgs. A shallow alluvial and a lower alluvial zone are identified under this portion of the project area. Wells ACMW-08D, ACMD-09 and ACMW-12 are screened to measure the lower alluvial zone. Hydraulic mounding posed by infiltration and radial flow from the temporary containment and irrigation fields is not predicted because the hydraulic gradient represented by these wells will continue to the east during most conditions (Farr West Engineering 2009). This project-level analysis is supported by the potential for recharge from the Snowshoe Ditch #2 to the northeast, the probability that the lateral moraine deposits to the northwest are less permeable and that the water levels in the lower alluvial zone are more similar to Indian Creek (at 5550 ft msl) than the West Fork of the Carson River (at 5350 ft msl).

In conclusion of past and current groundwater monitoring results with consideration of site-specific hydraulic loading levels for the~~ Diamond Valley Ranch~~DVR, the soils and site conditions of the project area are not expected to produce incidences of groundwater mounding or increase groundwater levels that cause surface water discharge in a non-stream environment. The level of impact is less than significant.

Mitigation: *No mitigation is needed. Components 1, 7, 9, 10, 11, 12, 13, 15, 16, 18, 19, 21, 29, 30*

Impact: GW-3. Will the Project Components lower groundwater levels at existing wells?

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31 and 32*

The impact analysis for GW-2 serves as a reference for the following analysis concerning the lowering of groundwater levels.

Conveyance components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32 will implement improvements to existing systems by constructing lined ditches or pipelines or improving operations and maintenance and will not decrease groundwater levels. Upgraded systems will decrease transmissive losses currently occurring from aging infrastructure. Groundwater levels are not directly tied to these singular recharge areas but respond to the actions occurring within the project area as a whole. These components will move fresh or recycled waters from one part of the project area to another but not to a different groundwater basin, as the Carson, Wade and Diamond Valleys are determined to be hydrologically connected (McGraw 2006; Alisto Engineering Group 2008). Conveyance components that include unlined ditches will be designed to eliminate groundwater interception through design and location of facilities.

The application components 1, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 29 and 30 will not lower levels of groundwater. Levels may be maintained, especially during drought, from application of recycled waters.

The temporary containment under component 11 will not lower levels of groundwater as a result of irrigating fields with fresh or recycled water or by temporarily containing recycled waters as a response to emergency situations. Component 11 applies recycled waters in such a way as to achieve groundwater recharge without compromising groundwater quality, as discussed under impact GEO-1. The water management components 8, 23, and 24 will not lower groundwater levels as a result of improving recycled water quality, routing winter flows through ICR or transferring additional water rights to ICR, respectively.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

7.7 Cumulative Impacts

There is one significant Project impact identified in the Groundwater chapter: degradation of groundwater quality should application rates exceed hydraulic loading limits for portions of the project area. The standard practices for the Project will avoid and reduce impacts to mitigate cumulative impacts on groundwater. Groundwater protection monitoring will continue to assess and report trends in groundwater quality and levels. If cumulative impacts to groundwater occur, the District will be in noncompliance with WDRs and application of recycled water may be suspended.

As stated in the ~~Diamond Valley Ranch~~ DVR NMP, the maximum annual volume of recycled water than can be applied in ~~Diamond Valley Ranch~~ DVR portion of the project area is 1,765 MG~~gal/yr~~ or 4.8 MG each day~~D~~. _Currently, the District's discharge from the WWTP is 4.0 MGD. _The projected discharge volume by 2028 is 5.8 MG per day~~D~~. The water balance/application rates discussed under impact GW-1 and detailed in Appendix S, estimate the gross application volume per season at approximately 427 MG for alfalfa production across 372 irrigable acres. This total volume is less than the projected discharge volume by 2028. Under certain circumstances, the District will need to supplement recycled water with fresh water to meet irrigation requirements of alfalfa, the mixing of which would further dilute Nitrogen concentrations.

No cumulative effect is observed in the calculations for Nitrogen loading from recycled water applications and Wood Rodgers concludes that the assimilative capacity of receiving waters will not be impacted when irrigating recycled water discharged from the WWTP. The trigger threshold of 7.0 mg/L for Nitrate-Nitrogen concentrations as measured for the monitoring of groundwater quality grants adequate opportunity and time to address potential impacts to groundwater from reuse of recycled water.

Alpine County has no projects in the planning or design stages within or in the vicinity of the project area to consider towards cumulative impacts.

7.8 Summary of Significant Impacts and Mitigation Measures

7.8.1 Significant Impacts and Mitigation Measures by Project Component

Table 7-6 summarizes the significant impacts by Project Component and identifies the mitigation measures required for each impact.

Table 7-6

Summary of Significant Impacts and Mitigation Measures – Surface Water

Impact	Level of Significance	Mitigation Measure
Project Components		
GW-1. Will the Project Components degrade groundwater quality in the Carson, Wade and Diamond Valleys?	1, 2, 3, 4, 5, 6, 14, 21, 22, 30 ● 11 ⊙	**SW-33.** Surface and Groundwater Protection Plan **GW-1A.** Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water **GW-1B.** Do Not Exceed A Maximum Duration of Temporary Containment (100 Days)

Source: Hauge Brueck Assoc. 2009

Notes: Level of Significance

--	Not applicable	==	No impact
●	Significant impact before and after mitigation	⊙	Significant impact; less than significant after mitigation
❍	Less than significant impact; no mitigation proposed		

7.8.2 Environmentally Superior Alternative (Alternative 3) Significant Impacts and Recommended Mitigation Measures

The significant impacts identified for the environmentally superior alternative (Master Plan Recommended Project Alternative, Alternative 3) are listed below. A discussion follows as to why the impact is significant and how the impact is mitigated to a level of less than significant. If impacts are significant and unavoidable, an explanation is provided.

GW-1. Will the Project Components degrade groundwater quality in the Carson Wade or Diamond Valleys?

8 Surface Water

Creek are used as flushing flows to improve the water quality of ICR, as water is diverted from Indian Creek into the Upper Dressler Ditch and is passed through the reservoir back to Indian Creek. Under the No Project Components, NP-1, these freshwater flows will not be altered.

Mitigation: *No mitigation is needed. NP-1*

8.6.2 Project Components

Table 8-5 presents surface water quality impacts, outlines points of significance, level of impact and type of impact and also ranks the level of significance for the Project Components.

Table 8-5

Surface Water Quality Impacts – Project Components

Impact	Point of Significance	Level of Significance by Component			
		Significant Impact Before and After Mitigation	Significant Impact Before Mitigation; Less than Significant Impact After Mitigation	Less than Significant Impact; No Mitigation Proposed	No Impact
SW-1. Will the Project Components cause numeric criteria to be exceeded at West Fork Carson River at Woodfords?	Exceeds numeric criterion			11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ~~11,~~ 12, 13, 14, 15, 16, 17, 18,19, 20, 22, 23, 24, 29, 30, 31, 32
SW-2. Will the Project Components cause numeric criteria to be exceeded at West Fork Carson River at Stateline?	Exceeds numeric criterion			1, 2, 4, 6, 7, 18, 21, 30	3, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19, 20, 22, 23, 24, 29, 31, 32
SW-3. Will the Project Components cause numeric and narrative-based criteria to be exceeded at West Fork Carson River in California?	Exceeds stated limits	30		1, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 29, 31, 32	2, 8, 15, 23, 24
SW-4. Will the Project Components cause TMDLs to be exceeded at Indian Creek Reservoir (ICR)?	Exceeds numeric criterion		31	23, 24, 32	1, 2, 3, 4, 5, 6, 7. 8. 9. 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30
SW-5. Will the Project Components cause narrative-based criteria to be exceeded in Indian Creek below Harvey Place Reservoir?	Exceeds stated limits		31, 32	11, 15, 22, 23, 24	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13 14, 16, 17, 18, 20, 21, 29, 30

Source: Hauge Brueck Assoc. 2009

Impact: **SW-1. Will the Project Components cause numeric-based criteria to be exceeded at West Fork Carson River at Woodfords?**

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ~~11,~~ 12, 13, 14, 15, 16, 17, 18,19, 20, 22, 23, 24, 29, 30, 31, 32*

No impacts to surface water quality of the West Fork of the Carson River at Woodfords will occur as a result of construction or operations of the conveyance, application, temporary containment or water management components because the facilities are located downstream.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ~~11,~~ 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 29, 30, 31, 32*

Analysis: *Less than Significant Impact; Component 11*

The installation of the Hydroelectric Generation Unit within the proposed pumphouse for the generation of power from the pressure of the C-Line will increase pressure along the C-line from 63 psi to 130 psi at the low point crossing at the bridge over the West Fork of the Carson River at Woodfords, California. The steel pipe is rated to 250 psi and the increase in pressure to 132 psi created the Hydroelectric generation Unit is well within the pipe rating. Acknowledging that a pipe bursts is unlikely but still possible, the potential impact to surface water is avoided through implementation of SP-17, Pipeline Design Features in Active Fault Zones, which installs both automatic and manually-operated isolation valves for pipeline crossings, and SP-35, Conveyance Infrastructure Maintenance Plan, which implements monitoring of infrastructure using water meters coupled with visual inspections of pipelines and periodic maintenance to prevent degradation of surface water quality from pipeline failure.

Mitigation: *No mitigation is needed. Components 11*

Impact: **SW-2. Will the Project Components cause numeric-base criteria to be exceeded at West Fork Carson River at Stateline?**

Analysis: *Less than Significant Impact; Components 1,2, 4, 6, 7, 18, 21, 30*

Through implementation of Component 1, the District will provide recycled water to new non-irrigated, permitted land (472 acres) in California to receive recycled water for irrigation purposes. New conveyance systems will be necessary. Due to proximity of lands to the West Fork of the Carson River, incorrect application of recycled water by irrigators could create tailwater and impact surface water quality at the Stateline. The potential impact will be avoided and reduced to a level of less than significant through implementation of the standard practices described below.

Through implementation of Component 2, the District will make recycled water available to irrigators in Nevada. The District will pursue permitting through NDEP of land in Nevada to receive recycled water from HPR, as currently only a secondary irrigator (tailwater) user agreement is in place to administer waters from the District's system entering Nevada. New conveyance systems will be necessary. Due to proximity of lands to the West Fork of the Carson River, incorrect application of recycled water by irrigators could create tailwater and impact surface water quality at the state line. The potential

The temporary containment Component 11 will be built in the Indian Creek watershed and not the West Fork of the Carson River catchment. No impacts to surface water quality of the West Fork of the Carson River will occur from the construction and operation of this Project Component. The configuration of Component 11 has been revised as presented in Figure 2-6, but changes in the configuration of the irrigation fields and temporary containment fields result in no impact to the West Fork of the Carson River at the Stateline.

Mitigation: *No mitigation is needed. Components 3, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 22, 23, 24, 29, 31, 32*

Impact: SW-3. Will the Project Components cause narrative-based criteria 3 to be exceeded at West Fork Carson River in California?

Analysis: *Significant Impact; Component 30*

Under Component 30, 150 acres of lands located northwest of Snowshoe Thompson No. 2 Ditch and north of Millich Ditch will be irrigated with recycled water. This area is referred to as the "Jungle" and at the nearest point the jungle is approximately 1,100 feet from the West Fork of the Carson River and characterized as sloping and bottom valley land. Spray irrigation methods will be used and recycled water will be supplied under pressure from a pipeline branching off the existing C-Line or from the pressurized line proposed for pumping water back to HPR. If recycled water is not optimally applied, tailwater will potentially enter the West Fork of the Carson River. Excessive irrigation will result in recycled water percolating past the active root zones of existing vegetation and entering shallow groundwater.

Unconsolidated sediments that form alluvial fans underlie the floodplain of the Carson River basin and can be present in thickness of up to 5,000 feet. The California Division of Mines and Geology map, Walker Lake Sheet, indicates the presence of alluvium in the northwestern and Diamond Valley portions of the Carson River Basin. Consolidated granitic and metamorphic bedrock surrounding and underlying portions of the Carson Valley are relatively impermeable to groundwater flow. The semi-consolidated Tertiary sediments, lens of sand and gravel that have been found in the project area during soil borings transmit most of the groundwater. and the general flow of groundwater in the Carson Valley is towards the north and towards the Carson River channel. If recycled water enters the shallow groundwater of the alluvial fans, surface water quality of the West Fork of the Carson River in California could be impacted as groundwater recharges surface water flows.

Misapplication or overuse of recycled water could cause degradation of water quality, violation of standards applicable to ground and surface waters and violation of permit requirements. The hydrogeologic characteristics of the region were considered in developing the ACGMP, which has the objective of assessing impacts of present and future recycled water application and discharges on groundwater quality within the project area and addressing the protection of water supply sources in the region.

Because a site-specific NMP has not been completed for the Jungle, the impacts to surface and ground water quality remain potentially significant until site-specific hydraulic loading levels and corresponding recycled water application rates are determined

Mitigation: **SW-3. Develop Project-Specific Nutrient Management Plan for the Jungle** water and minimize the threat to groundwater and surface water quality by balancing the application rates with the hydraulic loading levels and crop nutrient needs within the project area. Component 20 involves improved control of operations through ownership determinations. The District will assist irrigators with tailwater controls (Component 21), installing either percolation or evaporation basins or pumping waters back to irrigation systems for reapplication.

Components 1, 3, 4, 5, 6, 7, 14, 17, 18, 20, 21, 22 are expected to have a positive benefit to surface water quality in the West Fork of the Carson River in California.

Mitigation: *No mitigation is needed. Components 1, 3, 4, 5, 6, 7, 14, 17, 18, 20, 21, 22*

Analysis: *Less than Significant Impact; Components 9, 10, 11, 12, 13, 16, 19, 29, 31, 32*

Components 9, 10, 11, 12, 13, 16, 19, 29, 31 and 32 are located in the Indian Creek watershed and are topographically isolated from the West Fork of the Carson River. The watersheds have subsurface connections in the Carson River groundwater basin and groundwater flow direction is interpreted towards the north, generally following the flow of the Carson River. The small potential for surface water quality to be impacted during operations will be reduced to a level of less than significant through implementation of standard practices discussed above for impact SW-1.

<u>The configuration of irrigation fields and temporary containment fields of Component 11 has been revised as presented in Figure 2-6, but changes in the configuration of the irrigation fields and temporary containment fields do not alter the level of impact from less than significant. The installation of the Hydroelectric Generation Unit within the proposed pumphouse for the generation of power from the pressure of the C-Line will increase pressure along the C-line from 63 psi to 130 psi at the low point crossing at the bridge over the West Fork of the Carson River at Woodfords, California. The steel pipe is rated to 250 psi and the increase in pressure to 132 psi created the Hydroelectric generation Unit is well within the pipe rating. Acknowledging that a pipe bursts is unlikely but still possible, the potential impact to surface water is avoided through implementation of SP-17, Pipeline Design Features in Active Fault Zones, which installs both automatic and manually-operated isolation valves for pipeline crossings, and SP-35, Conveyance Infrastructure Maintenance Plan, which implements monitoring of infrastructure using water meters coupled with visual inspections of pipelines and periodic maintenance to prevent degradation of surface water quality from pipeline failure.</u>

Mitigation: *No mitigation is needed. Components 9, 10, 11, 12, 13, 16, 19, 29, 31, 32*

Analysis: *No Impact; Component 2, 8, 15, 23, 24*

Components 2, 8, 15, 23 and 24 will have no impact on surface water quality in the West Fork of the Carson River in California. Component 2 will be located downstream of the Stateline and will have no impact on surface water quality in California. Component 8 will improve recycled water quality at the District's WWTP in South Lake Tahoe, CA, which is not located in the Carson River watershed. Components 15, 23 and 24 will be implemented in the Indian Creek watershed and will involve the application or management of freshwater.

Mitigation: *No mitigation is needed. Components 2, 8, 15, 23, 24*

Impact: SW-4. Will the Project Components cause the TMDL to be exceeded in ICR?

Analysis: *Significant Impact; Components 31*

Diverting storm waters for Component 31, which originate from the small drainage east of the reservoirs, to ICR instead of HPR could impact the TMDL for ICR through the introduction of sediment into the reservoir. A method for erosion control is necessary to reduce sediment and nutrient loading to ICR from this small drainage.

Mitigation: **SW-4. Develop Erosion Control Methods for ICR**

After Mitigation: *Less than Significant Impact; Component 31*

Implementation of erosion control methods in the drainage upslope of ICR will stabilize slopes and capture sediment that may be mobilized, keeping sediment from entering ICR and potentially degrading water quality in the reservoir. The impact is reduced to a level of less than significant after mitigation

Analysis: *Less than Significant Impact; Component 23, 24, 32*

Components 23 will negotiate an agreement with owners of the Alpine Decree water rights stored in Mud Lake to route this freshwater through ICR. Implementation of this component will result in conveying Mud Lake winter flows from the West Fork of the Carson through Snowshoe Thompson No. 1 Ditch and the Upper Dressler Ditch into ICR. Component 24 will transfer existing water rights to storage in ICR by the District or other water right owners. Increased flows through ICR are expected to increase dissolved oxygen concentrations in the reservoir and transport phosphorus from the reservoir providing a benefit to surface water quality and fish habitat in the reservoir.

Under Component 32 a spillway channel will be constructed to convey reservoir spillage in a controlled manner around HPR to Indian Creek. Impacts to water quality in ICR could occur during construction. These potential impacts from construction will be reduced to a level of less than significant through compliance with the standard practices SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites and SP-11 Erosion Control/Stormwater Pollution Prevention Plan, which serve to stabilize slopes and control erosion.

Mitigation: *No mitigation is needed. Component 23, 24, 32*

Analysis: *No impact; Components 1, 2, 3, 4, 5, 6, 7. 8. 9. 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30*

The facilities constructed for operation of conveyance components 2, 3, 4, 5, 6, 14, 17, 20 and 22 will be located downstream of ICR and will create no impacts to water quality in the reservoir.

Due to the location of facilities within the project area and in reference to the reservoir, there will be no impact to water quality in ICR from construction and operation of application components 1, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 29 and 30 <u>and temporary containment component 11.</u>

Although Components 3 and 17 will result in an increase in the capacity of the Diamond Ditch and Snowshoe Thompson Ditch No.1, these actions will not divert additional freshwater away from the West Fork of the Carson River. Furthermore, the existing ditches will be lined or replaced with pipeline to reduce losses. The flood control quality. The system has been online since May 2009. Improvements to existing conditions within ICR will benefit surface water quality, fish habitat, and beneficial uses downstream in Indian Creek. This mitigation project was implemented separately from the Master Plan.

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 14, 16, 17, 18, 19, 20, 21, 29, 30*

Components 1, 2, 3, 4, 5, 6, 14, 16, 17, 21, 29 and 30 will not impact water quality in Indian Creek below HPR due to site topography and/or location of facilities within the project area.

Components 7, 8, 18, 19 and 20 will not degrade surface water quality in Indian Creek below HPR because the Project Components will improve recycled water quality or the manner in which recycled water is conveyed and applied. Component 8 will improve the quality of recycled water exported from the WWTP in South Lake Tahoe and subsequently the quality of recycled water applied to lands in the project area. The purpose of Components 7 and 18 is to improve application methods of recycled water on lands in the project area through non-flood irrigation systems and through optimization of application rates. Component 19 pursues land permitting in Alpine County and Component 20 determines ownership of portions of the Diamond Ditch for improvement of operations and will not impact water quality in Indian Creek.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 14, 16, 17, 18, 19, 20, 21, 29, 30*

Analysis: *Less than Significant Impact; Components 9, 10, 11, 12, 13, 15, 22, 23, 24*

Components 9, 10, 12, 13, 15 involve application of recycled water in the project area through infiltration basins and treatment wetlands and pose negligible impact to surface waters in Indian Creek below HPR if Project Components function properly. To further reduce impacts to surface water quality to a less than significant level, the District will implement the following standard practices as part of the Project:

- SP-34. Application and Temporary Containment Infrastructure Maintenance and Monitoring Plan;
- SP-11. Erosion Control/Stormwater Pollution Prevention Plan; and
- SP-33. Surface and Ground Water Protection Plan.

These standard practices are detailed above in the analysis for impact SW-1.

Under Component 11 impacts to surface water may occur due to overfilling of temporary containment areas with recycled water or misapplication of recycled water on irrigation fields. Tailwater could result and~~or~~ berms may breach and result in runoff into Indian Creek. Implementation of Standard practice SP-34, Application and Temporary Containment Maintenance and Monitoring Plan, will minimize the impacts from spillage of impounded recycled water into Indian Creek.

Slopes of ditches and ~~levees~~ berms may become undercut by rapid runoff from snowmelt or summer monsoonal storms or may fail if saturated. Regular quarterly inspection of these facilities and inspection during and immediately after high runoff events will minimize the chance of adverse impacts to surface water quality of Indian Creek. The District will prepare and implement a maintenance plan to monitor application and temporary containment infrastructure using water meters, coupled with quarterly visual inspection of pipelines and levees, and inspection during and immediately after high runoff events. Public works projects must be subject to periodic maintenance to prevent degradation of surface water quality from slope and ~~levee~~ berm failure or temporary containment ~~spills~~releases.

The every-other-week availability of surface water requires that central pivots be designed with high application rates. The pivots must be able to apply the required water volume in half the time seen with standard designs. The high application rates have the potential to cause runoff, so the design and land preparation presented in Appendix S have been adjusted to avoid or minimize such problems. To reduce the volume of land grading that is required within fields, at least two of the fields (Fields F and D in Figure 2-6) are anticipated to have pivots equipped with Variable Rate Irrigation (VRI). This feature will allow the pivots to not irrigate selective sections of ground that may be too steep or low. Each field will have a low ditch/;berm located on the upslope side to channel on-coming surface water away from the field. There will also be a berm located on the downslope side to capture and temporarily store any surface runoff, preventing it from reaching natural channels. The combination of correct sprinkler selection, high speed gearboxes, row hay, land grading, and treatment of the soil with gypsum prior to planting will minimize or completely eliminate surface runoff problems. Surface runoff can be difficult to predict, but the District's plan is to begin irrigation on each field with fresh water and resolve any potential problems before recycled water is used.

There is a small chance that slope failure at the site of the temporary containment facilities (Component 11) could cause localized flooding but will not impact the West Fork of the Carson River or Indian Creek. The temporary containment areas will require implementation of SP-16, Slope Stabilization Design, to ensure stability of the structures. Requirements of standard design measure SP-16 reduces impacts to a less than significant level by implementing standard geotechnical practices as part of project design to stabilize slopes. SP-34, Surface and Ground Water Protection Plan includes requirements for the protection of surface water quality in Indian Creek. These requirements outline 25-foot setbacks from District property lines, center lines of irrigation ditches and the edge of streams when determining irrigable acreages and selection of irrigation methods.

During project planning the District will retain a licensed geotechnical engineer to conduct a construction-level geotechnical investigation for physical facilities such as pipeline routes, irrigation systems and embankment locations. Results from this investigation will be used to refine the final project design. Compliance with this standard design measure will avoid and minimize adverse environmental impacts from unstable slopes. The temporary containment facilities will be designed with additional freeboard to reduce the risk of overtopping in the event of a seismic event and subject to standard practice SP-21, Temporary Containment and Impoundment Siting and Design. Embankments and berms will be inspected seasonally for structural integrity and maintained as needed to avoid slope failures and resultant flooding.

Installation of the Hydroelectric Generation Unit within the proposed pumphouse will have no effect on surface water in Indian Creek below HPR.

By implementing Component 22, the District will install a recycled water pipeline generally along the current route of the Diamond Ditch and will gain greater control over the quality of water delivered to any portion of the project area. The recycled water will be delivered to users under pressure and allow for irrigators to use sprinkler irrigation, which is more efficient than flood irrigation. The risk of a pipe burst is inherent. The potential for pipe burst is reduced to a level of less than significant through

9 Hydrology

Conveyance components 2, 4, 5, 6, 14 and 22 will not involve construction of above ground facilities that will increase the peak surface water elevation and contribute to flooding.

Conveyance components 3, 17, 20 and 22 will improve condition and operation of existing above ground infrastructure by increasing capacity, lining or piping unlined reaches, and securing maintenance costs. Improved structural integrity and increases in conveyance capacity will decrease the likelihood of flooding within the project area and downstream.

Components 31 will divert storm waters to ICR upstream of HPR and Component 32 will involve construction of a spillway channel for ICR that conveys reservoir spillage around HPR to Indian Creek downstream. This component has an added benefit of intercepting storm water flow entering the east side of the HPR and thereby increasing storage capacity in the reservoir for recycled water. Implementation of these two components is based on the likelihood of very large flood events and will reduce the potential of emergency spills from HPR and the associated flood risk.

Component 11 will construct eight~~five~~ irrigation fields that will be irrigated with central pivot irrigation systems and two ~~irrigation~~ containment fields that will be surrounded with six foot high berms and used for temporary containment of recycled waters during emergency situations, most likely during flood events.

The temporary containment facilities of Component 11 are not proposed in areas with slopes greater than 30 percent, as sited on Figure 2-6. The majority of the site has slopes of less than 2 percent, which accommodates irrigation practices and the function of a common sump pump to facilitate draining and water management of the area. Basins and impoundments may create embankments with slopes greater than 30 percent, and these areas will require implementation of SP-16, Slope Stabilization Design, to ensure stability of the structures. Requirements of standard design measure SP-16 reduces impacts to a less than significant level by implementing standard geotechnical practices as part of project design to stabilize slopes. During project planning the District will retain a licensed geotechnical engineer to conduct a construction-level geotechnical investigation for physical facilities such as pipeline routes, irrigation systems and embankment locations. Results from this investigation will be used to refine the final project design. Compliance with this standard design measure will avoid and minimize adverse environmental impacts from unstable slopes.

The temporary containment facilities are located on ~~three~~two Alquist-Priolo earthquake fault zones~~ and cross the end of a fourth.~~ Surface fault rupture associated with seismic activity could cause a breach in the substrate of the irrigation field or overtopping of the embankment. The temporary containment facilities will be designed with additional freeboard to reduce the risk of overtopping in the event of a seismic event and subject to standard practice SP-21, Temporary Containment and Impoundment Siting and Design. Embankments and berms will be inspected seasonally for structural integrity and maintained as needed to avoid slope failures and subsequent flooding.

The potential of the occurrence of an earthquake within the project area does exists and standard practices are identified to reduce the effects to structures and facilities from ground shaking and ground rupture. The temporary containment facilities will impound water during times of emergency for purposes of avoiding flooding of downstream infrastructure and streams. The likelihood of a high magnitude earthquake occurring while water is being temporarily contained and causing structural failure and flooding is inherently low. If slope failure results, flooding will be localized and will not significantly impact peak flows in the West Fork of the Carson River or Indian Creek.

Review of the Flood Emergency Management Agency (FEMA) maps for the project area indicates that the Master Plan planning level footprint, when extrapolated to a volume of displacement of the 100-year floodplain, is unlikely to cause more than a one-foot increase in flooding. The level of impact of components 2, 3, 4, 5, 6, 11, 14, 17, 20, 22, 31, and 32 on flooding in the 100-year floodplain along the West Fork of the Carson River and Indian Creek is less than significant.

Mitigation: *No mitigation is needed. Components 2, 3, 4, 5, 6, 11, 14, 17, 20, 22, 31, 32*

Analysis: *No Impact; Components 1, 7, 9, 8, 10, 12, 13, 15, 16, 18, 19, 21, 23, 24, 29, 30*

Application components 1, 7, 9, 10, 12, 13, 15, 16, 19, 29, 30 will not involve construction of above ground facilities that will increase the peak surface water elevation. Component 18, Optimize Application Rates on Irrigated Lands, will ensure that application rates are optimized, thus reducing the potential for runoff. Implementation of tailwater controls under Component 21, Develop Tailwater Control System, will ensure that tailwater does not result in flooding problems. The level of impact of application components on flooding in the 100-year floodplain along the West Fork of the Carson River and Indian Creek is less than significant.

Water management components 8, 23 and 24 will not involve construction of new above ground facilities. No impact will occur because increases in peak surface water elevation and flooding will not result from improve recycled water quality entering the project area or~~f~~ from rerouting and storing freshwater in ICR.

Mitigation: *No mitigation is needed. Components 1, 7, 9, 8, 10, 12, 13, 15, 16, 18, 19, 21, 23, 24, 29, 30*

Impact: HYDRO-2. Will the Project Components cause stream bank erosion?

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,18, 19, 20, 21, 22, 23, 24, 29, 30, 31*

Conveyance components 2, 3, 4, 5, 6, 14, 17, 20, 22 and 31 and water management component 8 will not cause stream bank erosion, as these components do not involve stream channels. Ditch erosion in open channels does occur. Unlined channels of the Diamond Ditch will be lined and Snowshoe Thompson No. 1 will be improved or replaced with a pipeline (Components 3, 17).

The application components 1, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 29 and 30 will have no direct impacts on stream bank erosion, as these components do not involve stream channels. Tailwater control systems, developed under Component 21, will avoid indirect impacts to stream bank. Tailwater control systems will intercept runoff for percolation and evaporation in detention ponds or pumping back to irrigation ditches for re-application.

Temporary containment, under component 11, will have no impacts on stream bank erosion. There is a small chance that slope failure at the site of the temporary ~~impoundment facility~~ containment facilities could cause local flooding but will not impact stream banks of West Fork of the Carson River or Indian Creek due to the location of the temporary containment areas within the project area. The revisions made to the

<u>configuration of the irrigation fields and containment facilities, as presented in Figure 2-6 does not change the level of impact to stream bank erosion.</u>

Mitigation: No mitigation is needed. *Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,18, 19, 20, 21, 22, 29, 30, 31*

Analysis: *Less than Significant Impact; Component 23, 24, 32*

Discharges to Indian Creek could result during extremely large flood events (Component 32) and cause stream bank erosion if emergency discharges are greater than bankfull discharge and result in overtopping and scouring of stream banks. The ICR spillway channel will assure that only freshwater is discharged to Indian Creek and that discharge occurs at a controlled rate that will not result in flooding of the stream channel or stream bank erosion.

The water management components 23, and 24 could have minor impacts on flooding or stream bank erosion if there are uncontrolled releases from ICR. Component 23 simply reroutes existing flows within the watershed through existing ditch systems for storage in ICR. Component 24 transfers additional water rights to storage in ICR. Increased flows into Indian Creek will be through controlled release. The potential for flooding from ICR is controlled through a spillway channel to be constructed under Component 32, which reduces the impact to a less than significant level.

Mitigation: *No mitigation is needed. Component 23, 24, 32*

Impact: HYDRO-3. Will the Project Components cause flooding due to rupture of ditches, pipelines, impoundments?

Analysis: *Less than Significant Impact; Components 1, 2. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Rupture or slope failure of proposed conveyance infrastructure could cause increased localized flooding. Components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32 will involve increases in the conveyance capacity of ditches and spillways, conversion of the type of water flowing through them, or entail moving fresh water and recycled water through pipelines.

All public works projects are subject to periodic maintenance to prevent destruction of private property, injury to persons, and to prevent loss of human life. Standard practice SP-35 Conveyance Infrastructure Maintenance Plan requires annual inspection of conveyance infrastructure and monitoring of sensing devices to comply with local General Plans and policies. The District institutes a maintenance and monitoring plan to monitor, inspect, and repair conveyance infrastructure. Annual maintenance reduces the chance of localized flooding due to rupture of conveyance structures to a level of less than significant.

Pipelines will be constructed with <u>manual and</u> automatic shut off valves that are activated in the instance of a pipe burst, and ditches will be built or improved to increase conveyance capacities. The potential for pipe line rupture can be minimize and resultant flooding reduced to a less than significant level. Increases in capacity of the system is expected to alleviate the potential for flooding.

Irrigation systems (Components 7, 16, 29 and 30) do not pose significant risks of flooding, even in the event of a pipeline rupture. Pipe sizes are small and automatic shut-off valves on systems allow any discharges to be stopped quickly. Flooding is not expected to result from irrigation systems, even in the event of a rupture because tailwater containment berms are proposed.

The water management components could have minor impacts on flooding if there are uncontrolled releases from ICR. Component 8 addresses the quality of water exported from the WWTP in South Lake Tahoe. Component 23 shuttles existing flows within the watershed through existing ditch systems for storage in ICR. Component 24 transfers additional water rights to storage in ICR. Increased flows into Indian Creek will be through controlled release. The potential for flooding from ICR is reduced to a less than significant level through construction of the spillway channel (Component 32).

The temporary containment components will have a less than significant impact on hydrology. There is a small chance that slope failure at the site of the temporary containment facilities (Component 11) or a pipeline rupture along the DVR pipeline loop could cause localized flooding but will not impact the flows of the West Fork of the Carson River or Indian Creek. The configuration of irrigation fields and temporary containment fields of Component 11 has been revised as presented in Figure 2-6, but changes in the configuration of the irrigation fields and temporary containment fields do not alter the level of impact from less than significant. The installation of the Hydroelectric Generation Unit within the proposed pumphouse for the generation of power from the pressure of the C-Line will increase pressure along the C-line from 63 psi to 130 psi at the low point crossing at the bridge over the West Fork of the Carson River at Woodfords, California. The steel pipe is rated to 250 psi and the increase in pressure to 132 psi created the Hydroelectric generation Unit is well within the pipe rating. Acknowledging that a pipe bursts is unlikely but still possible, the potential impact to surface water is avoided through implementation of SP-17, Pipeline Design Features in Active Fault Zones, which installs both automatic and manually-operated isolation valves for pipeline crossings, and SP-35, Conveyance Infrastructure Maintenance Plan, which implements monitoring of infrastructure using water meters coupled with visual inspections of pipelines and periodic maintenance to prevent degradation of surface water quality from pipeline failure.

The temporary containment areas will require implementation of SP-16, Slope Stabilization Design, to ensure stability of the structures. Requirements of standard design measure SP-16 reduces impacts to a less than significant level by implementing standard geotechnical practices as part of project design to stabilize slopes. During project planning the District will retain a licensed geotechnical engineer to conduct a construction-level geotechnical investigation for physical facilities such as pipeline routes, irrigation systems and embankment locations. Results from this investigation will be used to refine the final project design. Compliance with this standard design measure will avoid and minimize adverse environmental impacts from unstable slopes. The temporary containment facilities will be designed with additional freeboard to reduce the risk of overtopping in the event of a seismic event and subject to standard practice SP-21, Temporary Containment and Impoundment Siting and Design. Embankments and berms will be inspected seasonally for structural integrity and maintained as needed to avoid slope failures and resultant flooding.

Mitigation: *No mitigation is needed. Components 1, 2. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Impact: HYDRO-4 and HYDRO-5. Will the Project Components reduce quantities of surface water available to users or interfere with the maintenance of water rights?

10 Public Safety and Health

waters and posing a risk to drinking water quality. Persons could be exposed to chemicals or microorganisms in recycled water via inhalation, dermal absorption or inadvertent ingestion of spray irrigation. Persons could also be temporarily exposed to ponded recycled water from an accidental release, pipeline break or over watering.

- Temporary containment of recycled water under Component 11 will be subject to the same requirements as the application components described above. With the required safeguards, public health risk will not be significant.

- The water management components 8, 23 and 24 do not entail additional use of recycled water. With the required safeguards, public health risk will not be significant.

- The DVR Pipeline Loop and irrigation distribution pipelines will be located underground; therefore, public exposure to recycled water due to pipe rupture does not present a significant risk as discussed in the 2009 EIR. The fresh water conveyance pipeline will also be located underground and will not contain recycled water. The pump station and hydroelectric generation unit will be placed above ground, however measures are included in the design to contain spills that may occur onsite. Recycled water will be used for agricultural irrigation of Fields A through H using center pivot sprinklers. Tailwater controls are included to contain runoff and prevent recycled water mixing with surface waters. Berms will also be used to channel anterior runoff away from the irrigation field. As previously analyzed, persons could be exposed to chemicals or microorganisms in recycled water via inhalation, dermal absorption or inadvertent ingestion of spray irrigation. Persons could also be temporarily exposed to ponded recycled water from an accidental release, pipeline break or over watering. The DVR PIpeline Loop, irrigation distribution pipeline, freshwater conveyance pipeline, and irrigation fields will not result in new impacts not previously analyzed in the 2009 EIR, and the public health risk will not be significant,

- As recognized in recent literature, water recycling in the United States has not been documented as the cause of any disease outbreaks (National Research Council 1996). Water recycling has been practiced in California since 1929, when the City of Pomona began using recycled water for irrigation. Since that time no incidence of disease caused by the use of recycled water has been reported in California. The District has been providing recycled water to users in Alpine County for irrigation of pasture and forage crops since 1968.

- With an appropriate level of treatment and proper operational safeguards, recycled water is demonstrated to be safe for irrigation and industrial uses. To meet the Department of Health Services treatment requirements, the District provides disinfected secondary-23 recycled water, which is described in the setting section.

- Existing technology and regulatory requirements provide a high degree of reliability and safety for water recycling. The Department of Health Services Title 22 requirements for disinfected secondary-23 recycled water will continue to be followed as outlined below.

- Any hazardous materials used in construction or operation of conveyance facilities will be used and stored in accordance with state and federal regulations regarding hazardous materials and reduce the impact to a less than significant level.

- Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*

- **Impact:** **PHS-4. Will the Project Components expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?**

- Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*

  - Construction of conveyance facilities will use heavy machinery, vehicles, and equipment. All such equipment will be operated in accordance with state regulations regarding construction safety. There is no proposed construction equipment or technique that will be unsafe if mandated safety regulations are followed.

  - Construction of pipelines will create excavations within public rights-of-way. All excavations will be protected from the public at all times and constructed in accordance with state regulations regarding construction safety. There are no proposed excavations that will be unsafe if mandated safety regulations are followed. No new water bodies will be created because of construction or operation of the conveyance components.

  - Application areas (components 1, 7, 9, 10, 11, 12, 13, 15, 18, 19, 21, 29 and 30) will be constructed in areas that are generally not accessible to the public. Temporary containment areas (Component 11) will be constructed in areas that are generally not accessible to the public but in close proximity to Diamond Valley Road. The containment areas will hold recycled water behind six foot high berms for durations of one to 60 days in emergency situations. General construction safety practices such as site fencing, barricades, or signage will protect the public from these hazards during construction activities. Construction activities will not impact public safety. Any open bodies of water such as temporary containment areas, infiltration ponds and wetlands will be fenced and signed to prevent unauthorized access.

  - Component 16 proposes to irrigate using sub-surface irrigation methods because of close proximity to Alpine County's school complex. A shallow underground network of perforated pipe will be installed for distribution of recycled water to reduce the potential for the public to be exposed to a level of less than significant.

  - Components 8, 18, 19, 23 and 24 will require no new construction. Any new facilities will be constructed in areas that are generally not accessible to the public. General construction safety practices such as site fencing, barricades, or signage will protect the public from these hazards during construction activities. Construction activities will not impact public safety.

  - <u>The DVR Pipeline Loop, irrigation distribution pipeline, freshwater conveyance pipeline, irrigation fields, pump station and hydroelectric generation unit will be</u>

constructed on District land generally not accessible to the public or within public right-of-way. All excavations will be protected from the public at all times and constructed in accordance with state regulations regarding construction safety. There are no proposed excavations that will be unsafe if mandated safety regulations are followed. General construction safety practices such as site fencing, barricades, or signage will protect the public from these hazards during construction activities. Construction activities will not impact public safety. No new impacts to public safety will occur.

- Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*
- **Impact: PHS-5. Will the Project Components increase the potential exposure of the public to disease vectors (i.e., mosquitos)?**
- Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 12, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*
  - Neither construction nor operation of conveyance facilities (Components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32) will create new mosquito habitat. Some ditches will be replaced by pipelines, which reduce areas of potential mosquito habitat. New conveyance systems (Components 4, 5, 6, 14 and 22) are buried pipelines, which do not provide mosquito habitat. Components 31 and 32 will construct and operate new ditches to move fresh water and storm water runoff away from HPR to Indian Creek during significant precipitation events. These systems will not result in standing water for mosquito habitat. Application components 1, 7, 12, 16, 18, 19, 21, 29 and 30 will not create mosquito habitat as a result of sprinkler irrigation practices. Water management components 23 and 24 reroute fresh water for storage in reservoirs and component 8 addresses recycled water quality at the WWTP in South Lake Tahoe, CA. These Project Components do not create mosquito habitat.
  - The irrigation system will be operated in such a manner to balance application rate with field measured evapotranspiration which will minimize the potential for ponding. Construction and operation of the DVR Pipeline Loop, freshwater conveyance pipeline, irrigation distribution pipeline, sprinkler irrigated fields A through H, and the pump station will not create new mosquito habitat.
- Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 12, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*
- Analysis: *Less than Significant Impact; Components 9, 10, 11, 13, 15*
  - Creation of wetlands and impoundment of water in basins for capturing tailwater (components 9, 10, 13 and 15) creates potential habitat for mosquitoes. Wetlands, which have a large surface area to volume ratio and an irregular shoreline are more likely to create mosquito habitat than deeper impoundments.
  - Creation of temporary containment areas (Component 11) will create potential habitat for mosquitoes. Any impoundments with a large surface area to volume ratio and irregular shoreline are more likely to create mosquito habitat than deeper impoundments. Two temporary containment areas of 24 and 25 acres will be created with six foot high berms and diked. The temporary containment areas will impound recycled water during emergency situations from one to 60 days

and depending on climatic conditions could create temporary mosquito habitat during times of impoundment.

- The two emergency containment areas will be flood irrigated during the irrigation season. in addition, the containment areas may be used as a temporary impoundment for recycled water in the case of an additional storage need or other emergency condition. A field drainage pipeline will be constructed from each impoundment back to the pump station sump for drawdown of stored water in the containment areas. The impoundment volume of the containment areas will be around 300 acre-feet, which is approximately equivalent to 100 days of outflow from the District's recycled water operations. These containment areas may create temporary mosquito habitat when they are flooded for extended periods.

- Through standard practice SP-22, Mosquito Prevention, the District consults with Alpine County in designing and developing wetlands and basins and comply with requirements for mosquito prevention. Measures include proper grading of shallow water areas to facilitate drainage with ditches to provide habitat for mosquitofish or other biological controls. Biological control agents will be employed based on consultation with California Department of Fish and Game. Mosquito larvae may also be controlled with microbial insecticides such as *Bacillus thuringensis.* Performance criteria conform to the Mosquito and Vector Control Association of California standards and incorporate the California Mosquito-borne Disease/Virus Surveillance and Response Plan.

- Mosquito abatement measures will reduce the potential exposure of the public to disease vectors to a less than significant level by avoiding habitat creation and managing mosquito populations.

- Mitigation: *No mitigation is needed; Components 9, 10, 11, 13, 15*

- **Impact: PHS-6. Will the Project Components expose people or structures to fire hazards?**

- Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

- Although conveyance facilities (components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32) are located in an area of high fire hazard, construction and operation will not expose people to fire hazards. Neither existing nor proposed conveyance facilities will be subject to fire damage. Buried pipes will be unaffected by a fire, and open ditches contain recycled water and are made of materials that are not adversely affected in a fire.

- Although application components (components 1, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 29 and 30) are located in an area of high fire hazard, construction and operation will not expose people to fire hazards. Irrigation systems, wetlands and ponds are not subject to substantial damage from fires. Buried pipes will be unaffected by a fire, and ponds and wetlands are full of recycled water and made of materials that are not adversely affected in a fire.

- Although temporary containment facilities (Component 11) are located in an area of high fire hazard, construction and operation will not expose people to fire hazards. Irrigation systems, wetlands, temporary containment areas and infiltration basins are not subject to substantial damage from fires. Buried pipes will be unaffected by a fire, and ponds and wetlands are full of recycled water and made of materials that are not adversely affected in a fire.

- Although water management components (components 8, 23 and 24) are located in an area of high fire hazard, operation will not expose people to fire hazards. Mechanical systems for improvement of water quality in HPR and ICR will be installed in the reservoirs themselves, and would thus be protected from fire damage.

- The DVR Pipeline Loop, freshwater conveyance pipeline, and irrigation distribution pipeline, will be located underground and will not be affected by wildfire. A new fire hydrant will be added at the pump station for emergency fire suppression. The new hydrant will be fed from the DVR Pipeline Loop. Sprinkler irrigated fields A through H and the two containment areas are not subject to substantial damage from fires. The pump station and hydroelectric generation unit, like the pipelines and irrigation fields, will be located in an area of high fire hazard, however, operation of the pump station will not expose people to fire hazards. With the pump station centrally located among the irrigation fields, it would be somewhat protected from fire damage. No new impacts will result.

- Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*

10.7 Cumulative Impacts

- Project Components will not contribute to significant cumulative impacts associated with hazardous materials use, existing hazardous waste sites, recycled water production, construction safety hazards, disease vectors or fire risk in the project area. The No Project Components for recycled water (NP-2) do not adequately address existing concerns regarding potential nitrate contamination of groundwater which potentially impacting public health and safety for drinking water. Under NP-2, tailwater may not be confined to permitted land, reaching stream course and degrading drinking water quality downstream. This is a significant impact.

- Hazardous materials and hazardous waste will be managed in compliance with Federal, State and local laws and regulations. Standard practices will reduce hazardous materials and hazardous waste impacts to levels that are less than significant. Recycled water will be handled in a manner compliant with California's and Nevada's laws and regulations governing the wastewater reuse, thus there will be no cumulative impact from increased storage and discharge of recycled water under the Project Components.

- None of the identified construction safety impacts will increase cumulative safety hazards. All activities will be performed in accordance with State and Federal labor laws and regulations.

- Additional basins and wetlands will be managed according to the requirements of the Douglas and Alpine Counties, as are other facilities in the project area. After mitigation the impact is less than significant and the additional basins and wetlands will not contribute to cumulative impacts.

- Any new facilities with the potential for fire risk will incorporate appropriate fire protection measures and defensible space.

11 Biological Resouces

Component 3 - Capacity and Conveyance Improvements in the Diamond Ditch System, will involve the replacement of in-stream control structures and will not have an impact on Lahontan cutthroat trout as the Diamond Ditch is not connected to any tributary streams in the area.~~ The Diamond Ditch system may contain strays of Lahontan cutthroat trout, a federally threatened species which may be impacted as a result of project implementation.~~

Component 4 - Provide Pressurized Recycled Water to the Fredericksburg System, will involve the construction of conveyance infrastructure across native rangeland, which may contain occupied wildlife habitat. Most tributary streams in the area contain Lahontan cutthroat trout, a federally threatened species which may be impacted as a result of project implementation.

Component 5 - Provide Pressurized Recycled Water Through Wade Valley, will entail construction of new water conveyance infrastructure within fish and wildlife habitat, and in native plant communities. There is potential habitat for several special-status fish and wildlife species (Table 11.2) along the proposed new Wade Valley pipeline alignments that may be impacted as a result of project implementation. As the exact alignments of the pipeline have yet to be determined, it is assumed that the impact to these species is significant until future surveys are performed.

Component 6 - Provide Pressurized Recycled Water to the Ranchettes, will entail construction of new water conveyance infrastructure within fish and wildlife habitat, and in native plant communities. There is potential habitat for several special-status fish and wildlife species (Table 11.2) along the proposed new pipeline alignments that may be impacted as a result of project implementation. As the exact alignments of the pipeline have yet to be determined, it is assumed that the impact to these species is significant until future surveys are performed.

Component 7 - Non-Flood Irrigation Application System, ~~will~~ may involve the construction of subsurface application infrastructure in previously undisturbed areas and native rangeland, which may contain occupied wildlife habitat.

Component 9 - Groundwater Recharge Using Infiltration Basins, ~~will~~ may result in conversion of rangeland to infiltration basins, which may cause loss of individuals or occupied habitat of sensitive species. Construction of these basins may also create new habitat for sensitive species.

Component 10 - Construct Zero-Discharge Basins, will create wetlands in what is currently upland vegetation with range forbs, shrubs, and possibly trees. Federal and state regulations do not allow creation of mitigation sites in sensitive or occupied habitat. It is unknown whether the proposed site is currently occupied habitat as the area has not been surveyed for project specific locations and details. Creation of wetland areas often leads to the establishment of migratory waterfowl populations including sensitive species.

Component 11 - Construct Irrigation Fields with Pumping Back to HPR, will result in conversion of rangeland and installation of two temporary containment basins on the Diamond Valley Ranch. Suitable habitat for pygmy rabbits exists in the area of the irrigation fields as well as the alternative HPR bypass pipelines. These areas were surveyed to protocol in January of 2009. No evidence of pygmy rabbits was located during the survey. The area was subsequently surveyed on May 29 for the presence of migratory bird nests and raptor nests. No nesting birds were located within the project area. No other suitable habitat for sensitive species exists in the proposed location of the irrigation fields, temporary containment basins or alternative bypass pipeline alignments.

The location of the DVR pipeline loop and associated center pivot irrigation systems and fields will result in the conversion of existing grazed pastureland to agricultural cropland. These areas were surveyed previously in 2010 and it was determined no suitable habitat for sensitive species exists within the areas to be converted to agricultural lands. The pump station is located in a previously disturbed area and will not impact suitable habitat.

Installation of the hydroelectric generation station and the proposed pump station is not location in any suitable habitat for any sensitive species. The increase in pressure of the C-line to approximately 130 psi is well within the design pressure (250 psi) for the low point of the pipeline crossing the West Fork of the Carson River. The West Fork of the Carson River contains Lahontan Cutthroat Trout, a federally Threatened Species. The increase in pressure is not likely to result in a break and subsequent release of recycled water into the Carson River.

Component 12 - Growing Biomass Crops for Pulp Production Using Recycled Water, will result in conversion of existing grazed pastureland to biomass agricultural cropland, which may cause loss of individuals or occupied habitat of sensitive species.

Component 13 - Basin Sod and Seed Production, may result in conversion of existing grazed pastureland to agricultural land, which may cause loss of individuals or occupied habitat of sensitive species.

Component 14 - Pipe Recycled Water Systems to Minimize Setbacks and Human Contact, will involve the construction of pipelines adjacent to open channel flow and ditch systems. Construction may occur in previously undisturbed areas and native rangeland, which may contain occupied wildlife habitat.

Component 15 - Mitigation Wetland Creation Using Freshwater will involve the construction of wetlands in areas where they currently do not exist. The locations for the mitigation wetlands may be located in disturbed riparian areas which may contain occupied wildlife habitat.

Component 16 - Subsurface Recycled Water Irrigation in Public Contact and Buffer Areas, will involve the construction of subsurface application infrastructure in previously grazed pastureland, which may contain occupied wildlife habitat.

Component 17 - Increase Snowshoe Thompson No. 1 Conveyance Capacity, will entail replacement of the open ditch (which is Waters of the State, according to Lahontan) with a pipeline, or will include improvements to the existing channel. The ditch may contain strays of Lahontan cutthroat trout from the Carson River. As stated in a letter to the District, Caltrans will require an encroachment permit application to include the full suite of biological and environmental surveys, including fisheries surveys, before allowing the project to be located within the State Route 89 right-of-way.

Component 19 - Pursue Permitting of More Land in Alpine County, may result in conversion of existing grazed pastureland or native rangeland to irrigated pasture which may cause loss of individuals or occupied habitat of sensitive species. Construction of irrigated pasture may create new habitat for sensitive species.

Component 21 - Develop Tailwater Control System, will involve construction of detention ponds and pumping facilities on permitted land for the re-use of tailwater. These facilities may result in the disturbance of native rangeland which may cause the loss of individuals or occupied habitat of sensitive species.

Component 22 – Parallel Recycled Water Pipeline Along Existing Diamond Ditch, may entail construction of new water conveyance infrastructure across native rangeland, which may contain occupied wildlife habitat.

Components 23 (Route Mud Lake Winter Flows Through Indian Creek Reservoir) and 24 (Transfer Additional Water Rights to Storage in Indian Creek Reservoir) are fisheries enhancing components. These components include physical facilities that could affect sensitive species in native rangeland, including pygmy rabbit, northern sagebrush lizard, Carson Valley wood nymph, Carson Valley sandhill skipper, Webber's ivesia, and three-bracted onion.

Component 29 – Irrigate the District Pasture, will include irrigation of the District Pasture with recycled water. Currently the District Pasture is not irrigated and is beginning to revert from grass pastureland to a more xeric state as noted by increased sagebrush encroachment. Currently there are no known TES species present within the District Pasture and implementation of this component will not result in impacts to special status species.

Component 30 - Irrigate the Jungle with Recycled Water, will include irrigation of the Jungle with recycled water. The Jungle is a mixture of Jeffrey Pine Forest and Great Basin Mixed Scrub habitats. Introduction of irrigation to this area may modify the habitat to promote more grasses and riparian vegetation to occupy the Jungle area. Snowshoe Thompson Ditch #2 flows on the top of the hillside adjacent to the Jungle on the southeast side. As a result of seepage from the ditch (transmissive losses), hydrophilic vegetation occurs below the ditch. Additional irrigation will likely result in an increased amount of riparian vegetation in the lower portion of the Jungle area. While no known TES species are present within the Jungle Area, the potential exists for them to occur, and with the minor shifts in habitat composition, modifications may result to habitat suitability.

Component 31 – Divert Stormwater Flow Away from Harvey Place Reservoir and to Indian Creek Reservoir, will entail construction of a new stormwater diversion trench across undisturbed lands adjacent to HPR and ICR and will involve the construction of conveyance infrastructure across native rangeland, which may contain occupied wildlife habitat.

Component 32 – ICR Spillway Channel, will entail construction of a new channel between ICR and Indian Creek. This channel will be located adjacent to HPR along native rangeland and may contain occupied wildlife habitat.

Mitigation: **BIO-1. Conduct Biological Resource Assessments**

SP-25. Sensitive Resource Program

After Mitigation: *Less Than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32*

The proposed mitigation will allow the District to avoid or protect biological resources, it cannot be anticipated that the Sensitive Resource Program will allow for full mitigation of impacts that have yet to be determined as the details of the components have not been finalized. The District will compensate, in kind, for disturbance or alteration of habitat that may occur as a result of project implementation. Following implementation of the Standard Practices and recommended mitigation measure BIO-1, it is unable to be determined if the impact will be reduced to a level of less than significant. This impact is considered significant after mitigation.

Analysis: *Less than Significant Impact; Component 18*

Component 18 - Optimize Application Rate on Existing Irrigated Lands, will result in specific management measures to decrease the amount of tailwater generated on irrigated lands and also minimize groundwater impacts. Modifying the application rates on these existing irrigated lands in order to maximize water usage will not result in changes to native rangeland that may contain occupied habitat or sensitive species. This impact level is considered less than significant.

Mitigation: *No mitigation is needed. Component 18*

Analysis: *No Impact; Components 8, 20*

Component 8 - Improve Recycled Water Quality, will involve measures taken at the District Treatment Plan in South Lake Tahoe to upgrade the plant and improve the quality of the recycled water. No known sensitive species will be impacted as a result of the upgrades and no impact will occur.

Component 20 - Improve Operation of the Diamond Ditch System to Meet District and User Needs, involves modifications to the ownership of the Diamond Ditch and will not have an impact on sensitive species or habitat.

Mitigation: *No mitigation is needed.*

Impact: BIO-2. Will the Project Components cause loss of individuals of CNPS List 1A, 1B, 2, 3, or 4 plant species?

Analysis: *Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32*

A search of the CNDDB and the CNPS databases found no records for CNPS List 2, 3, or 4 plant species within the project area. Aerial photographs of the project vicinity indicate the presence of native rangeland that could contain CNPS List 1A, 1B, 2, 3, or 4 plant species, including rocky or clayey openings in shrub land and woodland, where CNPS List 1A, 1B, 2, 3, or 4 plant species may occur. Floristic surveys have not been performed for the entirety of the project area and it is necessary to develop a Sensitive Plant Protection Program for potentially significant impacts to BLM Sensitive, CNPS and Nevada Natural Heritage Program Special Status Plant Species.

Expansion of the DVR pipeline loop through the south west portion of the District Pasture will not impact any CNPS Listed 1A, 1B, 2, 3, or 4 plant habitats as described in Table 11-1 above. SP 26 below will require the area be surveyed again in 2011 prior to construction to confirm presence/absence of CNPS listed plant species.

Mitigation: **SP-26. Sensitive Plant Protection Program**

After Mitigation: Less Tha*n Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32*

The standard practice will require the avoidance or protection of listed native plant species. When needed, mitigation will allow the Project to compensate, in kind, for loss of individuals of listed species. Many of the projects outlined in the Master Plan may be implemented in the future. Following implementation of the Sensitive Plant Protection Program, it is unable to be determined if the impact will be reduced to a level of less than significant. This impact is considered significant after mitigation.

Analysis: *Less than Significant Impact; Component 18*

Component 18 - Optimize Application Rate on Existing Irrigated Lands, will result in specific management measures to decrease the amount of tailwater generated on irrigated lands and also minimize groundwater impacts. Modifying the application rates on these existing irrigated lands in order to maximize water usage will not result in changes to native rangeland that may contain CNPS species. This impact level is considered less than significant.

Mitigation: *No mitigation is needed, Component 18*

Analysis: *No Impact; Components 8, 20*

Component 8 - Improve Recycled Water Quality, will involve measures taken at the District Treatment Plant in South Lake Tahoe to upgrade the plant and improve the quality of the recycled water. No known CNPS species will be impacted as a result of the upgrades to the District Treatment Plant; no impact will occur.

Component 20 - Improve Operation of the Diamond Ditch System to Meet District and User Needs, involves modifications to the ownership of the Diamond Ditch and will not have an impact on sensitive plant species or habitat.

Mitigation: *No mitigation is needed.*

Impact: BIO-3. Will the Project Components cause loss of active raptor nests, migratory bird nests, or wildlife nursery sites?

Analysis: *Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 29, 30, 31, 32*

The following project components could have adverse effects on nests or nursery sites.

Component 1 - Provide Recycled Water to New Non-Irrigated, Permitted Land, ~~will~~ may result in conversion of rangeland to irrigated pasture, which may contain occupied wildlife habitat including nests and nurseries.

Component 2 - Make Recycled Water Available to Irrigators in Nevada, ~~will~~ may involve the construction of conveyance infrastructure across native rangeland that may contain occupied wildlife habitat including nests and nurseries.

Component 3 - Capacity and Conveyance Improvements in the Diamond Ditch System, may involve the replacement of in-stream control structures. These improvements may have impacts to adjacent habitats that may contain occupied wildlife habitat including nests and nurseries.

Component 4 - Provide Pressurized Recycled Water to the Fredericksburg System, ~~will~~ may involve the construction of conveyance infrastructure across native rangeland that may contain occupied wildlife habitat including nests and nurseries.

Component 5 - Provide Pressurized Recycled Water Through Wade Valley, ~~will~~ may entail construction of new water conveyance infrastructure within fish and wildlife habitat, and in native plant communities. There is potential habitat for raptors including the northern goshawk, bald eagle, ferruginous hawk, American peregrine falcon, California spotted owl, and the great gray owl. Noise and visual disturbance associated with construction activities occurring during the nesting season may disrupt nesting raptors leading to nest abandonment and nest failure. Construction activities may destroy active nest sites and nurseries.

Component 6 - Provide Pressurized Recycled Water to the Ranchettes, may entail construction of new water conveyance infrastructure within fish and wildlife habitat, and in native plant communities. There is potential habitat for raptors including the northern goshawk, bald eagle, ferruginous hawk, American peregrine falcon, California spotted owl, and the great gray owl. Noise and visual disturbance associated with construction activities occurring during the nesting season may disrupt nesting raptors leading to nest abandonment and nest failure. Construction activities may destroy active nest sites and nurseries.

Component 7 - Non-Flood Irrigation Application System, may involve the construction of subsurface application infrastructure in previously undisturbed areas and native rangeland, which may contain occupied wildlife habitat including nests and nurseries.

Component 9 - Groundwater Recharge Using Infiltration Basins, may result in conversion of rangeland to infiltration basins, which may cause loss of individuals or occupied habitat of sensitive species including nests and nurseries.

Component 10 - Construct Zero-Discharge Basins, may create wetlands in what is currently upland vegetation with range forbs, shrubs, and possibly trees. Specific areas have not been surveyed and these areas may convert rangeland which may cause the loss of individuals or occupied habitat of sensitive species including nests and nurseries.

Component 11 - Construct Irrigation Fields with Pumping Back to HPR, will result in conversion of pastureland, the installation of two temporary containment basins and installation of the irrigation fields, pump station, and the ~~bypass pipeline~~DVR pipeline loop from the C-line through Diamond Valley and back to the C-line adjacent to Indian Creek.~~to the basins~~. Additionally a total Suitable habitat for pygmy rabbits exists in the area, which was surveyed to protocol in January of 2009. No evidence of pygmy rabbits was located during the survey (HBA 2009). The area was subsequently surveyed on May 29 2010 for the presence of migratory bird nests and raptor nests. No nesting birds were located within the project area. As the last field visit was performed in the winter and spring of 20~~09~~10, it cannot be determined if new nests or nursery sites will be impacted as a result of implementation of the project~~,~~ therefore SP-30 shall be implemented again to ensure no new nests are established prior to commencement of project construction.

Component 12 - Growing Biomass Crops for Pulp Production Using Recycled Water, may result in conversion of existing grazed pastureland to biomass agricultural cropland, which may cause loss of individuals or occupied habitat of sensitive species including nests and nurseries.

Component 13 - Basin Sod and Seed Production, may result in conversion of existing grazed pastureland to agricultural land, which may cause loss of individuals or occupied habitat of sensitive species including nests and nurseries.

Component 14 - Pipe Recycled Water Systems to Minimize Setbacks and Human Contact, will involve the construction of pipelines adjacent to open channel flow and ditch systems. Construction may occur in previously undisturbed areas and pastureland, which may contain occupied wildlife habitat including nests and nurseries.

Component 15 - Mitigation Wetland Creation Using Freshwater will involve the construction of wetlands in areas where they currently do not exist. The locations for the mitigation wetlands may be located in previously ~~un~~disturbed riparian areas and ~~native range~~ pastureland, which may contain occupied wildlife habitat including nests and nurseries.

Component 16 - Subsurface Recycled Water Irrigation in Public Contact and Buffer Areas, ~~will~~ may involve the construction of subsurface application infrastructure in previously ~~undisturbed areas and native range~~ grazed pastureland, which may contain occupied wildlife habitat including nests and nurseries.

Component 17 - Increase Snowshoe Thompson No. 1 Conveyance Capacity, will entail replacement of the open ditch with a pipeline, or by making improvements to the existing channel. The existing channel may be lined with small trees and shrubs that will be destroyed by excavation that may contain nests. The portion of the ditch that is within the SR 89 right-of-way also contains trees and shrubs that could contain nests or nursery sites. As stated in a letter to the District, Caltrans will require an encroachment permit application to include the full suite of biological and environmental surveys, including surveys for nesting raptors and wildlife nursery sites, before allowing the project to take place along the State Route 89 right-of-way.

Component 19 - Pursue Permitting of More Land in Alpine County, ~~will~~ may result in conversion of existing pastureland or native rangeland to irrigated pasture which may cause loss of individuals or occupied habitat including nests and nurseries. See component 11 above for results of surveys.

Component 21 - Develop Tailwater Control System, will involve construction of detention ponds and pumping facilities on permitted land for the re-use of tailwater. These facilities may result in the disturbance of native rangeland which may cause the loss of individuals or occupied habitat including nests and nurseries.

Component 22 – Parallel Recycled Water Pipeline Along Existing Diamond Ditch, may impact wildlife nursery sites, migratory bird nests and raptor sites in areas along the pipeline adjacent to the Diamond Ditch.

Component 29 – Irrigate the District Pasture, will include irrigation of the District Pasture with recycled water. The District Pasture may contain active migratory bird nests and nurseries sites.

Component 30 - Irrigate the Jungle with Recycled Water, will include irrigation of the Jungle with recycled water. The Jungle is a mixture of Jeffrey Pine Forest and Great Basin Mixed Scrub habitats. These habitats are suitable for raptor nests locations as well as nursery sites. The introduction of irrigation to the Jungle may have impacts to active nests and to nursery sites.

Component 31 – Divert Stormwater Flow Away from HPR and to ICR, ~~will~~ may entail construction of a new stormwater diversion trench across undisturbed lands adjacent to HPR and ICR. This land may contain occupied raptor bird nests as well as nursery sites for pygmy rabbits.

Component 32 – ICR Spillway Channel, will entail construction of a new channel between ICR and Indian Creek. This channel will be located adjacent to HPR along native rangeland and may contain occupied raptor bird nests as well as nursery sites for pygmy rabbits.

Mitigation: **SP-30. Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries**

After Mitigation: *Less Than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 29, 30, 31, 32*

The standard practice will allow the District to avoid and protect active raptor nests, migratory bird nests as well as nursery sites. Following implementation of the pre-construction surveys, it is unable to be determined if the impact will be reduced to a level of less than significant. This impact is considered significant after mitigation.

Analysis: *No impact; Components 8, 18, 20, 23, 24*

Component 8 - Improve Recycled Water Quality, will involve measures taken at the District WWTP to upgrade the plant and improve the quality of the recycled water. No nests or nursery sites will be impacted as a result of the upgrades; no impact will occur.

Component 18 - Optimize Application Rate on Existing Irrigated Lands, will result in specific management measures to decrease the amount of tailwater generated on irrigated lands and also minimize groundwater impacts. Modifying the application rates on these existing irrigated lands in order to maximize water usage will not result in changes to native rangeland that may contain nests or nursery sites.

Component 20 - Improve Operation of the Diamond Ditch System to Meet District and User Needs, involves modifications to the ownership of the Diamond Ditch and will not have an impact on nests or nursery sites.

Components 23 and 24 are fisheries enhancing components that have the potential to enhance fish spawning and rearing. These components do not have physical facilities that will affect nursery sites or nests.

Mitigation: *No mitigation is needed.*

Impact: BIO-4. Will the Project components substantially block or disrupt major fish or wildlife migration or travel corridors?

Analysis: *Significant Impact; Components 2, ~~3~~, 4, 5, 6, 11, 14, 17, ~~22~~*

The following components could affect migration or travel corridors and will result in significant impacts

Component 2 - Make Recycled Water Available to Irrigators in Nevada, ~~will~~ may involve the construction of conveyance infrastructure across native rangeland that may contain streams occupied by Lahontan cutthroat trout, a federally Threatened species.

~~Component 3 - Capacity and Conveyance Improvements in the Diamond Ditch System, will involve the replacement of instream control structures. The Diamond Ditch system may contain strays of Lahontan cutthroat trout, a federally Threatened species.~~

Component 4 - Provide Pressurized Recycled Water to the Fredericksburg System, ~~will~~ may involve the construction of conveyance infrastructure across native rangeland that may contain occupied wildlife habitat. Most tributary streams in the area contain Lahontan cutthroat trout, a federally Threatened species.

Component 5 - Provide Pressurized Recycled Water Through Wade Valley, may entail construction of new water conveyance infrastructure within fish and wildlife habitat, and in native plant communities. These activities could cause temporary and permanent blockage or disruption of major fish and/or wildlife migration and travel corridors.

Component 6 - Provide Pressurized Recycled Water to the Ranchettes, may entail construction of new water conveyance infrastructure within fish and wildlife habitat, and in native plant communities adjacent to~~t~~ the Upper and Lower Fredericksburg and Diamond Ditch systems. These activities could cause temporary and permanent blockage or disruption of major fish and/or wildlife migration and travel corridors as the Diamond Ditch system may contain strays of Lahontan cutthroat trout, a federally Threatened species. The Diamond Ditch system may result in blockage of deer migration corridors due to the inability of deer to escape and become trapped in the ditch system.

Component 11 - The Alternative B alignment for the ~~HPR bypass pipeline~~ DVR Pipeline Loop and the freshwater conveyance lines will cross the Millich Ditch in ~~three~~ two locations, which may block the movement of strays of Lahontan cutthroat trout. The Alternative A alignment will not have any interruptions of the Millich Ditch and will not cause any interruptions to wildlife migration. The Alternative C pipeline alignment will cross the Millich Ditch in one location. These construction activities may result in blockage of movement of strays of Lahontan cutthroat trout that may occupy the Millich Ditch. This impact is considered significant for Alternative B and C HPR bypass pipeline alignments. The pipeline crossings of Millich Ditch will be installed below the ditch bed and therefore will not result in any permanent obstruction.

Construct Irrigation Fields , will result in the construction of temporary containment basins and irrigation fields in Diamond Valley. These facilities will not result in any blockage of any stream that will contain migrating fish. The Carson River Deer Heard Management Plan (CDFG 1985) delineates migration corridors on the east side of the Carson River with some smaller corridors denoted through Wade Valley. The proposed location of the irrigation fields are outside the delineated critical winter range. When full, the irrigation fields may present a temporary interruption to the movements of the Carson River Deer Herd, but the duration of such an interruption will be short and the impact will be less than significant.

Construction of the alternative pipeline alignments for the HPR bypass pipeline will not have an impact on wildlife movements as no blockage will occur to deer migration corridors that have been mapped in the area.

Component 14 - Pipe Recycled Water Systems to Minimize Setbacks and Human Contact, will entail construction of new water conveyance infrastructure within fish and wildlife habitat, and in native plant communities. These activities could cause temporary and permanent blockage or disruption of major fish and/or wildlife migration and travel corridors.

Component 17 - Increase Snowshoe Thompson No. 1 Conveyance Capacity, will result in the replacement of the existing ditch with a pipeline. The ditch may contain strays of Lahontan cutthroat trout from the Carson River.

~~Component 22 – Parallel Recycled Water Pipeline Along Existing Diamond Ditch, will entail construction of new water conveyance infrastructure within fish and wildlife habitat, and in native plant communities. These activities could cause temporary and permanent blockage or disruption of major fish and/or wildlife migration and travel corridors as the Diamond Ditch system may contain strays of Lahontan cutthroat trout, a federally Threatened species.~~

Mitigation: **BIO-4A. Fish Passage Structures and Deer Migration Corridors**

BIO-4B. Schedule Construction to Avoid Breeding and Migrating Wildlife

After Mitigation: *Less than Significant Impact; Components 2, 3, 4, 5, 6, 11, 14, 17, 22*

The proposed mitigation will require design changes to the Project to facilitate fish and deer passage and limit construction timing to periods when fish are not spawning and when deer are not migrating. These mitigation measures will reduce the Project's potential adverse effects on wildlife movements and breeding to a level of less than significant.

Analysis: *Less than Significant Impact; Components* 3, 11, 22, *23, 30*

Component 3 - Capacity and Conveyance Improvements in the Diamond Ditch System, will involve the replacement of instream control structures. The Diamond Ditch system is a closed system and is not connected to any streams and therefore does not contain Lahontan cutthroat trout.

~~Component 11 - Construct Irrigation Fields with Pumping Back to HPRr, will result in the construction of temporary containment basins along with a pipeline from the C-line located at the junction of Diamond Valley Road and SR 89. These facilities will not result in any blockage of any stream that will contain migrating fish. The Carson River Deer Heard Management Plan (CDFG 1985) delineates migration corridors on the east side of the Carson River with some smaller corridors denoted through Wade Valley. The proposed location of the irrigation fields are outside the delineated critical winter range. When full, the irrigation fields may present a temporary interruption to the movements of the Carson River Deer Herd, but the duration of such an interruption will be short and the impact will be less than significant.~~

~~Construction of the alternative pipeline alignments for the HPR bypass pipeline will not have an impact on wildlife movements as no blockage will occur to deer migration corridors that have been mapped in the area.~~

Component 22 – Parallel Recycled Water Pipeline Along Existing Diamond Ditch, will not result in the blockage of any fish or wildlife corridor as the Diamond Ditch is a closed system and does not contain any Lahontan cutthroat trout.

Component 23 - Route Mud Lake Winter Flows through ICR, will divert flows from Indian Creek into Upper Dressler Ditch through ICR. As the Upper Dressler Ditch only operates during spring flows when Indian Creek is flowing, routing the flows through ICR will result in equal flow out of ICR and into the portion of Indian Creek below the reservoir. The impact to fish passage that will occur as a result of Component 23 will be less than significant due to the equal flows reaching Indian Creek below the HPR.

Component 30 - Irrigate the Jungle with Recycled Water, will involve surface irrigation to the area known as the Jungle. Pipelines will be constructed to provide water for irrigation. No existing streams will be crossed and construction activities in the area will not block migration corridors for deer and fish passage.

Mitigation: *No mitigation is needed. Components 11, 23, 30*

Analysis: *No Impact; Components 1, 7, 8, 9, 10, 12, 13, 15, 16, 18, 19, 20, 21, 24, 29, 31, 32*

Component 1 - Provide recycled water to new non-irrigated, permitted land, ~~will~~ may involve the conversion of rangeland to irrigated pasture. This conversion will not result in barriers to deer migration corridors or fish passage. No impact will occur.

Component 7 - Non-Flood Irrigation Application System, will result in the conversion of irrigation methods from flood irrigation to sprinkler or subsurface irrigation. No impact to deer migration corridors or fish passage will occur.

Component 8 - Improve Recycled Water Quality, will involve measures taken at the District WWTP to upgrade the plant and improve the quality of the recycled water. No impact to deer migration corridors or fish passage will occur.

Component 9 - Groundwater Recharge Using Infiltration Basins, ~~will~~ may result in conversion of rangeland to infiltration basins, which will not result in any impact to deer migration corridors or fish passages.

Component 10 - Construct Zero-Discharge Basins, ~~will~~ may create wetlands in what is currently upland vegetation with range forbs, shrubs, and possibly trees. No impact to deer migration corridors or fish passage will occur.

Component 12 - Growing Biomass Crops for Pulp Production Using Recycled Water, ~~will~~ may result in conversion of ~~rangeland~~ existing grazed pasture to biomass agricultural cropland, which ~~will~~ may not result in any impact to deer migration corridors or fish passages.

Component 13 - Basin Sod and Seed Production, ~~will result in conversion of native~~ may result in conversion of existing grazed pasture ~~rangeland~~ to agricultural land, which will not result in any impact to deer migration corridors or fish passages.

Component 15 - Mitigation Wetland Creation Using Freshwater may involve the construction of wetlands in areas where they currently do not exist. The locations for the mitigation wetlands may be located in previously grazed pastureland: they will not result in blockage of fish migration corridors or deer migration corridors.

Component 16 - Subsurface Recycled Water Irrigation in Public Contact and Buffer Areas, ~~will~~ may involve the construction of subsurface application infrastructure in previously ~~undisturbed areas and native range~~ grazed pastureland, which will not result in the blockage of wildlife migration corridors or fish passage.

Component 18 - Optimize Application Rate on Existing Irrigated Lands, will result in specific management measures to decrease the amount of tailwater generated on irrigated lands and also minimize groundwater impacts. Modifying the application rates on these existing irrigated lands in order to maximize water usage will not result in blockage of wildlife corridors or fish passages.

Component 19 - Pursue Permitting of More Land in Alpine County, ~~will~~ may result in conversion of native rangeland to irrigated pasture which will not result in the blockage of wildlife migration corridors or fish passage.

Component 20 - Improve Operation of the Diamond Ditch System to Meet District and User Needs, involves modifications to the ownership of the Diamond Ditch and will not have an impact on wildlife migration corridors or fish passage.

Component 21 - Develop Tailwater Control System, will involve construction of detention ponds and pumping facilities on permitted land for the re-use of tailwater. These facilities may result in the disturbance of native rangeland but will not have any impact on wildlife migration corridors or fish passage.

Component 24 - Transfer Additional Water Rights to Storage in ICR, will result in more water in ICR which will result in improved water quality and improved fish habitat. This component does not have any physical facilities and will not have an impact on wildlife migration corridors or fish passage.

Component 31 - Divert Stormwater Flow Away from HPR to ICR, ~~will~~ may increase the amount of freshwater in ICR as a result of project implementation. This diversion will not result in the blockage of wildlife or fish passages. No impact will occur.

Component 32 - ICR Spillway Channel, will result in decreased chances of spilling recycled water from HPR which protects the water quality of Indian Creek. The physical facilities associated with this component will not result in any blockage of wildlife migration corridors or fish passage.

Mitigation: *No mitigation is needed. Components 1, 7, 8, 9, 10, 12, 13, 15, 16, 18, 19, 20, 21, 24, 29, 31, 32*

Impact: BIO-5. Will the Project Components have a substantial adverse effect on or result in the permanent loss of any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS?

Analysis: *Significant Impact; Components 1, 3, 4, 5, 6, 9, 11, 14, 16, 17, 22*

Sensitive wildlife habitats are defined as habitats that provide high suitability for foraging and breeding for state and federal species of special concern and California fully protected species, and important nesting, foraging, and breeding habitat for migratory songbirds and other wildlife. Montane riparian scrub, Modoc/Great Basin riparian forest, and montane freshwater marsh are sensitive wildlife habitats identified within the project area. Section 401, Waters of the State and Section 404 Waters of the U.S. are addressed in BIO-7 below. Component 3 - Capacity and Conveyance Improvements in the Diamond Ditch System, Component 17 - Increase Snowshoe Thompson No. 1 Conveyance Capacity, and Component 22 - Parallel Recycled Water Pipeline Along Existing Diamond Ditch all involve the improvements to the conveyance capacity of existing ditches. These ditches all have evidence of high transmissive losses which results in seepage of both recycled (Diamond Ditch) and freshwater (Snowshoe Thompson No. 1, ~~and~~ Snowshoe Thompson No. 2, and Millich Ditch). This seepage over time has resulted in the establishment of riparian vegetation on the banks of the earthen portions of the ditches and downslope from the ditches. The proposed improvements to increase capacity and reduce the transmissive losses has the potential to decrease the water available to this established riparian vegetation. The existing vegetation that will be impacted will be minimal and project construction will not reduce the riparian vegetation by 10 percent or more in Alpine County, but will result in the permanent loss of riparian vegetation: this impact is considered significant. Implementation of SP-31 and SP-32 will allow the District to map, avoid and protect sensitive riparian habitat. The District will monitor the recovery and restoration of altered and/or created habitat.

Component 11 - ~~Construct Storage Facility with Pumping Back to HPR~~ Construct irrigation fields and DVR Pipeline Loop will result in the minor removal of riparian vegetation. This vegetation is associated with the transmissive losses associated with Millich Ditch. Due to the size of the area involved with the pipeline alignments, it is not possible for project construction to permanently reduce sensitive habitat by 10 percent or more in Alpine County but will result in the permanent loss of riparian vegetation due to construction activities. Alternative bypass pipeline alignment A crosses Millich Ditch in three locations and would likely result in minor removal of individual Salix bushes. Alternative bypass pipeline alignment C would follow the dirt roadway and would cross the ditch in one location, and would not result in the removal of riparian vegetation. Alternative bypass pipeline alignment B crosses the Millich ditch (which is contained to the culvert under the roadway) and would not result in the removal of riparian vegetation. A Lake or Streambed Alteration agreement would be required to be issued by California Department of Fish and Game for Alternatives A and C due to disturbance to the Millich Ditch and associated minor removal of riparian vegetation.

The irrigation fields have been designed to avoid wetland areas as delineated by the Draft Preliminary Wetland Delineation. The US Army Corps of Engineers is currently reviewing the delineation and is scheduled to finalize the boundaries in the early Spring of 2011. The irrigation fields and associated pipelines were located to avoid wetland areas and waters of the US to the greatest extent possible. As the delineation has not been verified by the US Army Corps of Engineers exact amounts of impact to wetlands and waters can not be determined at this time and therefore this impact is considered significant.

Components 1, 4, 5, 6, 14, 16 are all conveyance components that will cross native rangeland which may contain sensitive natural communities. Due to the limited area of linear disturbance of these components, it is not possible for project construction to permanently reduce sensitive habitat by 10 percent or more in Alpine County but may result in the permanent loss of riparian vegetation: this impact is considered significant.

Mitigation: **SP-31. Pre-construction Marking and Fencing of Sensitive Native Plant Communities**

SP-32. Pre-construction Marking and Fencing of Wetlands and Riparian Habitat

BIO-5A. Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan

BIO-5B. Monitor Habitat Restoration and Revegetation Sites

environmental documentation determines the level of impact based on project details and final locations.

Component 9 - Groundwater Recharge Using Infiltration Basins, depending on its location may have an impact on wetlands and waters of the U.S. As stated in the EPA definition of Waters of the U.S. 40 CFR 230.3(s)(7) "Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA are not waters of the United States." Based on this definition, creation of infiltration basins with the use of recycled water are not determined waters of the U.S. and will not have an impact. Created infiltration basins that are immediately adjacent to existing waters of the U.S. may have an impact through the leakage of recycled water from the basins. Inclusion of Standard Practices into the project cannot ensure the elimination of all impacts to wetlands and waters of the U.S.: this impact is considered significant until further environmental documentation determines the level of impact based on project details and final locations.

Component 10 - Construct Zero-Discharge Basins, depending on its location may have an impact on wetlands and waters of the U.S. As stated in the USEPA definition of Waters of the U.S. 40 CFR 230.3(s)(7) "Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA are not waters of the United States." Based on this definition, wetlands created with the use of recycled water are not determined waters of the U.S. and will not have an impact. Created wetlands (zero-discharge basins) that are immediately adjacent to existing waters of the U.S. may have an impact through the leakage of recycled water from the lined ponds. Inclusion of Standard Practices into the project cannot ensure the elimination of all impacts to wetlands and waters of the U.S.: this impact is considered significant until further environmental documentation determines the level of impact based on project details and final locations.

Component 11 - ~~—~~Construct Irrigation Fields ~~with Pumping Back to HPR~~ and DVR Pipeline Loop, includes three alternatives of the ~~HPR bypass pipeline~~ DVR Pipeline Loop location between the junction of SR 89 and Diamond Valley road and the locations of the proposed irrigation fields.

A preliminary wetland delineation has been prepared for Diamond Valley ranch and has was submitted to the US Army Corps of Engineers (Corps) for review in August 2010. The Corps approved a preliminary wetland delineation map in August 2011 identifying potential jurisdictional wetlands and waters of the US. These wetlands and waters are shown on Figure 2-6. The irrigation fields proposed for Phase 1 have been designed to avoid wetland areas as delineated by the Preliminary Wetland Delineation, and to only occupy upland areas. Pipelines that are proposed to cross the minor irrigation ditches would utilize open trenching that would result in 100 sq. ft of impact to the Waters of the US. The Corps do not require a permit for disturbance less than 0.1 acre but will require post project notification. This impact is considered less than significant for this portion of the project.

Construction of the tile drain to the west of wetland B3 and B7 is proposed to collect subsurface water and convey it north to the pumphouse for distribution. The purpose of this tile drain is to prevent subsurface irrigation of Field D thereby allowing for even irrigation utilizing the center pivot irrigation system. Installation of the drain will not have any impact to the wetlands to the west as discussed in Appendix U (Interceptor Drain Discussion) prepared by Dr. Charles Burt. Baseflow measurement from the existing irrigation ditch, between the neighboring wetland and the interceptor drain, are substantially greater than the anticipated seepage rate along the eastern margin of the wetland using available saturated hydraulic conductivity values for local soils and Darcy's equation. The baseflow is also substantially greater than the anticipated flow that would be captured by the interceptor drain. Therefore, the interceptor drain is not anticipated to have any hydraulic influence west of the irrigation ditch and therefore, would not impact the adjoining wetland. To insure that that there is not any impact to this wetland, in-line valves could be added as a potential mitigation measure to reduce flow through the interceptor drain, thereby raising the neighboring water table, if needed.

The remaining project buildout irrigation fields and pipelines will impact wetlands as described in Table 2-1 of the project description. Additional measures are included for each of the irrigation fields to prevent tailwater from entering wetland areas adjacent to the fields and will be finalized upon final design of the overall project buildout. Upon finalization of the wetland delineation, the District will modify the design of irrigation fields and pipelines to minimize disturbance to wetland areas and Waters of the US.

Of the three alternative alignments shown in Figure 2-5**,** Alignment B crosses the Millich Ditch in three separate locations. Millich ditch conveys fresh water from the West Fork of the Carson River. No survey has been performed to determine if the areas adjacent to the ditch are considered wetlands and waters of the U.S. This ditch and associated riparian habitats that are adjacent, will likely be considered waters of the U.S. and will be directly impacted as a result of project implementation. Construction activities could result in fill entering waters of the U.S. (Millich Ditch) and impacts to the adjacent riparian areas/wetlands. This impact is considered significant.

Alternative A alignment follows the shoulder of Diamond Valley Road from the junction of SR 89/Diamond Valley Road to the location of the infiltration basins. No delineations of wetlands have been performed for the three pipeline alignments and impacts to wetlands and waters of the U.S. cannot be ascertained at this time. This impact is considered significant.

Alternative B will cross the Millich Ditch in three locations, as illustrated in Figure 2-5. Details on this crossing are not included in the project description. Construction activities could result in fill entering waters of the U.S. (Millich Ditch) and this impact is considered significant.

Alternative C follows the dirt roadway as shown in Figure 2-6~~5~~ that intersects with the Millich Ditch in ~~one~~ two locations. ~~Details on this crossing are not included in the project description~~The Millich Ditch bed will be restored to original as noted in the project description, construction of the pipeline crossing the Millich Ditch will not result in any impact as these pipelines are extension of utility lines and are exempt from Section 404 permitting and therefore not impact potential Waters of the U.S. Therefore, this impact is considered less than significant for this alternative alignment. ~~Construction activities could result in fill entering waters of the U.S. (Millich Ditch) and this impact is considered significant.~~

Component 12 - Growing Biomass Crops for Pulp Production Using Recycled Water and Component 13 - Basin Sod and Seed Production, depending on its location may have an impact on wetlands and waters of the U.S. As stated in the EPA definition of Waters of the U.S. 40 CFR 230.3(s)(7) "Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA are not waters of the United States." Based on this definition, area of the component, and details of the diversion have not been designed, a determination of impacts to waters of the U.S. and wetlands cannot be made; this impact is considered significant.

Component 32 – ICR Spillway Channel, will entail construction of a new channel between ICR and Indian Creek to allow for freshwater to pass from Indian Creek Reservoir to Indian Creek and bypass freshwater from entering HPR. As a wetland delineation has not been performed in the area of the component, and details of the diversion have not been designed, a determination of impacts to waters of the U.S. and wetlands can be made; this impact is considered significant.

Mitigation: **SP-23. Delineate Wetlands, Waters of the United States, and Riparian Habitat**

SP-24. Prepare Wetland And Riparian Mitigation And Monitoring Plan

SP-27. Avoid Impacts to Wetland and Riparian Areas

SP-32. Pre-construction Marking and Fencing of Wetlands and Riparian Habitat

BIO-7. Monitor Wetland And Riparian Mitigation Sites

After Mitigation: *Less Than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

The standard practices and recommended mitigation measure BIO-7 will allow the District to avoid or protect Wetlands and waters of the U.S.: it cannot be anticipated that these measures/practices will allow for full mitigation of impacts that have yet to be determined as the details of the components have not been finalized. Standard practices require the District to compensate, in kind, for disturbance or alteration of wetlands that may occur as a result of project/component implementation. Following implementation of the Standard practices, it is unable to be determined if the impact will be reduced to a level of less than significant as wetland delineations have yet to be performed. This impact is considered less than significant after mitigation.

Analysis: *Less Than Significant; Component 11 (~~Irrigation~~ Temporary Containment Fields)*

Component 11 - Construct Temporary Containment Fields ~~Irrigation Fields with Pumping Back to HPR~~, will have no impact on wetlands and waters of the U.S. As stated in the USEPA definition of Waters of the U.S. 40 CFR 230.3(s)(7) "Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA are not waters of the United States." Based on this definition, creation of infiltration basins with the use of recycled water are not determined waters of the U.S. and will not have an impact. Created infiltration basins that are immediately adjacent to existing waters of the U.S. may have an impact through the interception of groundwater from the basins to waters of the U.S. (Carson River and Snowshoe Thompson Ditch #2). Inclusion of Standard Practices and compliance with the NMP prepared for the Diamond Valley (Wood Rodgers 2009) ensures less than significant impacts to groundwater from Component 11, and will not result in contaminated groundwater reaching waters of the U.S. and resultant negative effects to associated wetlands. Standard Practice SP-16, Slope Stabilization Design, will ensure the irrigation fields will be contained by berms and adequately maintained to prevent surface

Because of the small geographic area affected by project components as well the general lack of development and population growth in the agricultural areas of the Carson Valley that will impact habitat where the project facilities are located, it is unlikely that the Project impacts will contribute to significant cumulative impacts to biological resources.

11.8 Summary of Significant Impacts and Mitigation Measures

11.8.1 Significant Impacts and Mitigation Measures by Project Component

Table 11-7 summarizes the significant impacts by project component and identifies the mitigations measures required for each impact.

Table 11-7

Summary of Significant Impacts and Mitigation Measures – Biological Resources

Impact	Level of Significance	Mitigation Measure
No Project Components		
BIO-1. Will the No Project Components cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species directly or indirectly?	NP-1, NP-2 ●	No mitigation can be implemented under the No Project Alternative
BIO-2. Will the No Project Components cause loss of individuals of CNPS List 2, 3, or 4 plant species?	NP-1, NP-2 ●	No mitigation can be implemented under the No Project Alternative
BIO-3. Will the No Project Components cause loss of active raptor nests, migratory bird nests or wildlife nursery sites?	NP-1, NP-2 ●	No mitigation can be implemented under the No Project Alternative
BIO-5. Will the No Project Components have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	NP-1, NP-2 ●	No mitigation can be implemented under the No Project Alternative
BIO-7. Will the No Project Components have an effect on federally protected wetlands as defined by Section 404 of the Clean Water Act or waters of the U.S. through direct removal, filling, hydrological interruption, or other means?	NP-1, NP-2 ●	No mitigation can be implemented under the No Project Alternative
Project Components		
BIO-1. Will the Project Components cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species directly or indirectly?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32 ⊙ ●	**BIO-1**. Conduct Biological Resource Assessments **SP-25.** Sensitive Resource Program
BIO-2. Will the Project Components cause loss of individuals of CNPS List 2, 3, or 4 plant species?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32 ⊙ ●	**SP-26.** Sensitive Plant Protection Program
BIO-3. Will the Project Components cause loss of active raptor nests, migratory bird nests or wildlife nursery sites?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32 ⊙ ●	**SP-30.** Pre-construction Surveys for Nesting Raptors and Wildlife Nurseries

Table 11-7

Summary of Significant Impacts and Mitigation Measures – Biological Resources

Impact	Level of Significance	Mitigation Measure
BIO-4. Will the Project Components substantially block or disrupt major fish or wildlife migration or travel corridors?	2, ~~3,~~ 4, 5, 6, 11, 14, 17, ~~22~~ ⊙	**BIO-4A**. Fish Passage Structures and Deer Migration Corridors **BIO-4B.** Schedule Construction to Avoid Breeding and Migrating Wildlife
BIO-5. Will the Project Components have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	1, 3, 4, 5, 6, 9, 11, 14, 16, 17, 22 ⊙	**SP-31.** Pre-construction Marking and Fencing of Sensitive Native Plant Communities **SP-32.** Pre-construction Marking and Fencing of Wetlands and Riparian Habitat **BIO-5A.** Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan **BIO-5B**. Monitor Habitat Restoration and Revegetation Sites
BIO-7. Will the Project Components have an effect on federally protected wetlands as defined by Section 404 of the Clean Water Act or waters of the U.S. through direct removal, filling, hydrological interruption, or other means?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11 (HPR Bypass Pipeline, A, B, C), 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32 ⊙ ~~●~~	**SP-23.** Delineate Wetlands, Waters of the United States, and Riparian Habitat **SP-24.** Prepare Wetland And Riparian Mitigation And Monitoring Plan **SP-27.** Avoid Impacts to Wetland and Riparian Areas **SP-32.** Pre-construction Marking and Fencing of Wetlands and Riparian Habitat **BIO-7.** Monitor Wetland And Riparian Mitigation Sites

Source: Hauge Brueck Assoc. 2009

Notes: Level of Significance

--	Not applicable	==	No impact
●	Significant impact before and after mitigation	⊙	Significant impact; less than significant after mitigation
❍	Less than significant impact; no mitigation proposed		

11.8.3 Environmentally Superior Alternative (Alternative 3) Significant Impacts and Recommended Mitigation Measures

The significant impacts identified for the environmentally superior alternative (Master Plan Recommended Project Alternative, Alternative 3) are listed below. A discussion follows as to why the impact is significant and how the impact is mitigated to a level of less than significant. If impacts are significant and unavoidable, an explanation is provided.

BIO-1. Will the Project Components cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species directly or indirectly?

The level of significance of this impact is reduced by the following standard practices that are part of the Project and recommended mitigation measures:

- SP-25. Sensitive Resource Program; and
- BIO-1. Conduct Biological Resource Assessment.

The standard practices and mitigation measures are outlined in Appendix D.

This impact is considered significant before mitigation due to the possibility of impacts to endangered, threatened or rare fish wildlife or plant species in areas that have not been surveyed for components 3, 4, 6, 22, 29 and 30 that compromise Alternative 3. Mitigation Measure BIO-1. Conduct Biological Resource Assessments and Standard Practice-25, Sensitive Resource Program, will allow the District to avoid or protect biological resources; it cannot be anticipated that the Sensitive Resource Program will allow for full mitigation of impacts that have yet to be determined as the details of the project components are not finalized. The District will compensate, in kind, for disturbance or alteration of habitat that may occur as a result of project component implementation. After ~~Until~~ implementation of the standard practices and recommended mitigation measure BIO-1,the level of impact ~~cannot be determined~~ is less than significant. This impact is considered less than significant after mitigation.

BIO-2. Will the Project Components cause loss of individuals of CNPS List 2, 3, or 4 plant species?

The level of significance of this impact is reduced by the following standard practice that is part of the Project:

- SP-26. Sensitive Plan Protection Program

This impact is considered significant before mitigation due to the possibility of impacts to CNPS List 2, 3, or 4 plant species in areas that have not been surveyed for components 3, 4, 6, 22, 29 and 30 that compromise Alternative 3. Standard Practice-26, Sensitive Plant Protection Program, will require the avoidance or protection of listed native plant species. When needed, mitigation will allow the Project to compensate, in kind, for loss of individuals of listed species. Many of the projects components may be implemented in the future. After ~~Until~~ implementation of the Sensitive Plant Protection Program, the level of impact ~~cannot be determined~~ is less than significant. This impact is considered less than significant after mitigation.

BIO-3. Will the Project Components cause loss of active raptor nests, migratory bird nests or wildlife nursery sites?

The level of significance of this impact is reduced by the following standard practice that is part of the Project:

- SP-30. Pre-Construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries

This impact is considered significant before mitigation due to the possibility of impacts to active raptor nests, wildlife nursery sites, or migratory bird nests in areas that have not been surveyed for components 3, 4, 6, 22, 29 and 30 that compromise Alternative 3. Standard Practice-30, Pre-construction Surveys for Nesting Raptors and Wildlife Nurseries, will allow the District to avoid and protect active raptor nests, migratory bird nests as well as nursery sites. After ~~Until~~ implementation of the Pre-Construction Surveys, the level of impact ~~cannot be determined~~ is less than significant. This impact is considered less than significant after mitigation.

BIO-7. Will the Project Components have an effect on federally protected wetlands as defined by Section 404 of the Clean Water Act or waters of the U.S. through direct removal, filling, hydrological interruption, or other means?

The level of significance of this impact is reduced by the following standard practices that are part of the Project and recommended mitigation measures:

- SP-23. Delineate Wetlands, Waters of the United States and Riparian Habitat;
- SP-24. Prepare Wetland and Riparian Mitigation and Monitoring Plan;
- SP-27. Avoid Impacts to Wetland and Riparian Areas;
- SP-32. Pre-construction Marking and Fencing of Wetlands and Riparian Habitat; and
- BIO-7. Monitor Wetland and Riparian Mitigation Sites.

This impact is considered significant before mitigation because wetland delineations have not been performed on District, private or public lands in the locations of components 3, 4, 6, 22, 29 and 30 that compromise Alternative 3. Because delineations have yet to be performed, the level of impact to wetlands cannot be determined. Standard Practice-23, Delineate Wetlands, Waters of the United States, and Riparian Habitat, Standard Practice-24, Prepare Wetland And Riparian Mitigation And Monitoring Plan, Standard Practice-27 Avoid Impacts to Wetland and Riparian Areas, Standard Practice-32, Pre-construction Marking and Fencing of Wetlands and Riparian Habitat, and BIO-7, Monitor Wetland And Riparian Mitigation Sites, will allow the District to avoid or protect wetlands and waters of the U.S. The level to which these measures and practices reduce impacts cannot be determined until details of project components are finalized. The proposed Mitigation and Standard Practices require the District to compensate, in kind, for disturbance or alteration of wetlands that may occur as a result of project component implementation. This impact is considered less than significant after mitigation.

12 Traffic and Circulation

Components generating only a few trips per day, based upon the typical component construction traffic, as shown in Table 12-6. Traffic increases will be well under 10 percent of existing traffic. State and County roadway capacities in the project area are sufficient to handle the additional traffic, and therefore the impact will be less than significant. No new access points to State Routes will be constructed as part of the conveyance components.

All of the application components 1, 7, 9, 10, 12, 13, 15, 16, 21, 29 and 30 will result in temporary increases in traffic due to construction activity associated with the on-site and off-site construction or installation of pipelines and other equipment, although temporary construction activity associated with these components will not result in significant daily traffic or circulation impacts. Project implementation is over an extended period of time with individual Project Components generating only a few trips per day, based upon the typical component construction traffic, as shown in Table 12-6. Traffic increases will be well under 10 percent of existing traffic. State and County roadway capacities in the project area are sufficient to handle the additional traffic and therefore the impact will be less than significant. No new access points to State Routes will be constructed as part of the application components.

The temporary containment component and construction of the irrigation fields, pump station and hydroelectric generation unit, and associated pipelines (Component 11) will result in temporary increases in traffic due to construction activity, although temporary construction activity associated with these components will not result in significant daily traffic or circulation impacts. The previously approved ~~three alternative~~ alignment for ~~s of~~ the HPR bypass pipeline will have minor impacts on traffic as ~~the three alternative alignments~~ it crosses Diamond Valley Road and SR 89 at the junction. Minor delays may result from this construction activity within the right-of-way (ROW). This Project Component will generate only a few trips per day, as shown in Table 12-6. The increase in traffic will be well under 10 percent of the existing traffic volume. State and County roadway capacities in the project area are sufficient to handle the additional traffic and therefore the impact will be less than significant. No new access points to State Routes will be constructed as part of ~~the temporary containment component~~construction of t~~.~~he DVR Pipeline Loop, irrigation distribution pipeline, fresh water conveyance pipeline, irrigation fields, pump station and hydroelectric generation unit, and associated fixtures.

Water management Component 8 may result in increased traffic associated with construction of improvements at the District's wastewater treatment plant in South Lake Tahoe, CA. Construction traffic will be short-term in duration, will only involve minimal construction equipment at the treatment plant, and will not increase traffic more than 10% on state routes. This impact is less than significant.

Mitigation: *No mitigation is needed. Components 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32*

Analysis: *No Impact; Components 8, 18, 19, 23, 24*

Application components 18 and 19 and water management components 8, 23 and 24 will not result in new traffic on project area roadways, as they do not involve new facilities.

Mitigation: *No mitigation is needed. Components 8, 18, 19, 23, 24*

Impact: traffic **TRAFFIC-2. Will lane closures due to Project Component construction cause delays, restricted access, increased traffic hazards, and rerouting of traffic, including emergency vehicles?**

13 Air Quality

As shown in Table 13-7, construction of the temporary containment Component 11 will not exceed the significance criteria for CO, reactive organic gases, oxides of nitrogen, oxides of sulfur, or PM_{10} and $PM_{2.5}$. The expansion of the DVR Pipeline Loop through the District Pasture, construction of the pump station, hydroelectric generation unit, and irrigation fields will not result in any signifiant increase in emissions that would result in significance criteria being exceeded. This impact is less than significant.

As shown in Table 13-7, construction of the water management components 8, 23 and 24 will not exceed the significance criteria for CO, reactive organic gases, oxides of nitrogen, oxides of sulfur, or PM_{10} and $PM_{2.5}$. This impact is less than significant.

Mitigation: *No mitigation is needed. Components 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Impact: AQ-2. Will Project Components operational emissions cumulatively exceed allowable limits?

Analysis: *Less than Impact; Components 2, 3, 4, 5, 6, 8, 11, 14, 17, 20, 22, 23, 24, 31, 32*

Operation of conveyance component facilities (components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32) will not cause air significant contaminant emissions. Worst-case day construction phase emissions were calculated for construction of Project. Details of the conveyance component calculation assumptions, methodology and results are presented in Appendix L.

Operation of temporary containment facilities (Component 11) will cause less than significant air contaminant emissions from a diesel-powered water pump. Five electrically-powered central pivot irrigation systems will apply recycled water over approximately 3~~93~~22 acres and temporary containment will occur over ~~49~~50 acres in the Diamond Valley Ranch. The hydroelectric generation unit contained within the pump station will supply the irrigation systems with necessary electricity. As discussed in Chapter 2, the hydroelectric generation unit is proposed to generate power from the pressure in the C-Line, and will therefore result in clean energy. The potential impact from aerial applications of recycled water is addressed in Chapter 10, Public Health and Safety. Operation of the central pivot irrigation systems will not cause significant air contaminant emissions~~from electric generation~~. Operation of the hydroelectric generation unit will not result in a significant increase in emissions and would decrease dependence on other sources of electricity that may potentially generate emissions. Details of the temporary containment facilities calculation assumptions, methodology and results are presented in Appendix L.

Implementation of water management components 8, 23 and 24 will not cause air contaminant emissions.

Mitigation: *No mitigation is needed. Components 2, 3, 4, 5, 6, 8, 11, 14, 17, 20, 22, 23, 24, 31, 32*

Analysis: *Less than Significant Impact; Components 1, 7, 9, 10, 15, 16, 18, 19, 21, 29, 30*

Operation of application components 1, 7, 9, 10, 15, 16, 18, 19, 21, 29 and 30 will not cause air contaminants. Operation of application components 12 and 13 will cause emission of criteria air contaminants from transportation and agricultural equipment operation and maintenance. Daily emissions will be highly variable depending upon activity or phase (biomass crop planting, growing, and harvesting), and type of biomass production or education/resource conservation activity being conducted.

Worst-case day emissions will be controlled to a level of less than significant with the utilization of the operational phase emission control measures described above under Evaluation Criteria with Points of Significance.

Mitigation: *No mitigation is needed. Components 1, 7, 9, 10, 15, 16, 18, 19, 21, 29, 30*

Impact: AQ-3. Will the Project components cause impacts from objectionable odors or expose sensitive receptors to substantial pollutant concentrations?

Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32*

Conveyance, application, and temporary containment of recycled water does not create objectionable odors or degrade air quality. There is a small potential for impacts from odors from HPR. This facility is located more that one half miles from the nearest sensitive receptors and thus will not cause odor complaints. Discharge of recycled water does not create objectionable odors or degrade air quality.

Component 11 will irrigate approximately 322~~93~~ acres through central pivot aerial application and temporarily contain recycled waters over ~~49~~50 acres for a ~~during~~ duration of one to ~~60~~100 days during emergency situations. There is a small potential for impacts from odors from temporary containment fields. Sensitive receptors (located at the Alpine County School and associated residential neighborhood) are located approximately 1,000 feet from the proposed location of the Irrigation Fields A and B. ~~over one half mile from the closest proposed location of the containment and irrigation fields.~~ Odor complaints are not expected due to distance and the location of the irrigation fields being downwind from the receptors. Design of the irrigation system will include selection of appropriate flow flow sprinkler nozzles and nozzle heights to avoid runoff and potential odor impacts. Recycled water is treated and disinfected prior to use for irrigation.

Component 16 will be located in close proximity to a Diamond Valley Elementary School. Irrigation with recycled water in this portion of the project area will be subsurface application to reduce the potential to expose sensitive receptors to substantial pollutant concentrations.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32*

Analysis: *Less than Significant Impact; Components 23, 24*

Components 23 and 24 will reroute freshwater for storage in ICR. The storage of freshwater will not cause impacts from objectionable odors or expose sensitive receptors to substantial pollutant concentrations.

Mitigation: *No mitigation is needed. Components 23, 24*

Impact: AQ-4. Will the Project Components result in substantial GHG emissions and/or substantially contribute to global warming?

Analysis: *Less than Significant; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

The Project Components will result in short-term GHG emissions from construction vehicle/equipment emissions during construction of the conveyance components. The Project Components will result in permanent/on-going direct and indirect GHG emissions associated with motor vehicle operation, energy consumption and other activities associated with the operation of the conveyance, application and emergency containment components.

GHG emissions totaling approximately 363.7 metric tons per year will occur as a result of electricity consumption, as shown in Appendix L. These emissions will occur at the source of production and could be located hundreds of miles distant from the Project; nonetheless, these emissions will contribute to total worldwide GHG emissions. The average 2002-2004 California Statewide GHG emissions are estimated at approximately 468.8 million metric tons of CO2 and CO2 equivalents (CARB, 2009). The California forecast CO_2 and CO_2 equivalents in 2020 is approximately 596.4 million metric tons. Thus, the proposed project represents approximately 0.6-millionth of the 2020 total.

There are no established legally binding or advisory federal, state, county or air district thresholds of significance to which emissions can be compared. The issue is really a matter of cumulative impacts, as the Project's GHG emissions, singularly, are so tiny as a percentage of statewide and worldwide GHG emissions as to create no discernible effects of the kind occurring cumulatively (rising temperatures, changed weather, etc.). The question becomes whether the Project Components incremental contribution to a significant worldwide cumulative impact is itself "cumulatively considerable."

Another factor to consider is how well the Project Components accord with Statewide policy set forth in AB 32, which envisions a changing regulatory climate in California over the next 12 years leading to dramatic reductions in overall Statewide GHG emissions. AB 32 sets forth the State's goals (a) of achieving by 2020 a statewide GHG emissions limit no higher than total 1990 Statewide GHG, and (b) of continuing after 2020 to achieve even further reductions in GHG emissions. The Act requires the CARB to adopt lists, plans, and regulations to advance these goals.

In enacting AB 32 the Legislature does not intend to so burden project proponents acting within the State economy as to render projects financially infeasible or uncompetitive. The State's heavy reliance on fossil fuels for transportation and energy sources is the primary problem to be addressed in achieving the Act's objectives. Land use decisions can exacerbate climate change by contributing to the needless consumption of electricity and GHG-emitting vehicle fuels; but, even so, good planning can achieve limited results as long as the energy and transportation sectors remain highly dependent on fossil fuels.

The Project Components include elements that are intended to promote energy efficiency, such as standard design guidelines, carbon sequestration methods, construction phasing, hydroelectric generation, and optimization of irrigation rates. These elements will directly reduce Project Component contribution to GHG emissions. During the non-irrigation season the hydroelectric station could generate an additional 509,000 kW-hours of power. The power is proposed to be sold back to Liberty Energy, which could replace electricity generated with higher emissions output. The project will also increase areas of irrigation, thereby increasing the abundance and health of project area vegetation.

Based on the District's approach to assessing the significance of the Project Component GHG emissions, implementation of standard measures to reduce construction related air quality effects will reduce impacts to a less than significant level, but will not completely avoid impacts.

14 Noise

Table 14-9					
NOISE-3. Will construction of the Project Components cause temporary or periodic increases in ambient noise levels from construction traffic?	Greater than 10 % increase in traffic volume			1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 29, 30, 31, 32	

Source: Hauge Brueck Assoc. 2009

Impact: **NOISE-1. Will construction of the Project Components expose the public to high noise levels?**

Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 29, 30, 31, 32*

Construction of the Project Components will not exceed the significance criteria for sensitive receptors or expose persons to excessive ground borne vibration or ground borne noise levels. The standard noise control practices, SP-12, are incorporated as part of the Project and will be complied with during construction to reduce noise and ground borne impacts to a less than significant level.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 29, 30, 31, 32*

Impact: **NOISE-2. Will operation and maintenance of the Project Components expose the public to high noise levels?**

Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 29, 30, 31, 32*

Operation and maintenance of Project Component facilities will not exceed the significant criteria for sensitive receptors, expose persons to excessive ground-borne vibrations or ground-borne noise levels, or cause substantial permanent increase in noise levels.

Operation of Project Components will involve the use of pumps and some aerial irrigation systems that produce some periodic increases in noise levels. Component 11 pumps and the hydroelectric generation unit will be housed in the pump house, which will reduce noise generated by these facilities. The increase in noise levels are not permanent, excessive or persistent and will not exceed the significant criteria for sensitive receptors.

The standard noise control practices, SP-13, are incorporated as part of the Project and will be complied with during operation and maintenance activities to reduce noise and ground borne impacts to a less than significant level.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 29, 30, 31, 32*

Impact: **NOISE-3. Will construction of the Project Components cause temporary or periodic increases in ambient noise levels from construction traffic?**

15 Historical and Archeological Resources and Paleontology

must be conducted in a manner consistent with 36 CFR Part 1210, Appendix B and with the recommendations of the SHPOs.

After Mitigation: *Significant Impact; Components 29, 30, 31, 32*

The impacts to prehistoric and historic archaeological sites for portions of the project area not yet surveyed remain significant until surveys are completed as outlined in mitigation measure ARCH-1.

Analysis: *Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22*

The Project involves construction of conveyance facilities (components 2, 3, 4, 5, 6, 14, 17, 20 and 22) that could result in impacts to cultural resources. The Project involves ground disturbance associated with the placement of the pipelines or modification of ditches, including the effects of heavy equipment activity and possibly ongoing maintenance activities that will result in the destruction or alteration of known prehistoric and historic archaeological sites.

Construction of the irrigation systems, irrigation fields and infiltration basins for components 1, 7, 9, 10, 12, 13, 15, 16, 17, 18, 19 and 21 could result in impacts to cultural resources. Ground disturbance associated with the placement of the pipes, irrigation fields and infiltration basins, including the effects of heavy equipment activity and possibly ongoing maintenance activities, will result in the destruction or alteration of known prehistoric and historic archaeological sites.

Table 15-7 shows the number of prehistoric and historic archaeological sites occurring within the project area that must be avoided during construction and operation of components 1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 and 22.

Table 15-7

Number of Known Historic and Archaeological Sites Affected by Project Components

Prehistoric[1]	Historic[2]	Architectural[3]	Prehistoric/ Historic[4]	Total
13	6	4	4	27

Source: Hauge Brueck Assoc. 2009

Notes: 1 - Prehistoric archaeological site
2 - Historic archaeological site
3 - Historic architectural site/rock walls
4 - Site with both prehistoric and historic components

Construction of the impoundment facility for temporary containment (Component 11) could result in impacts to cultural resources. Ground disturbance associated with the placement of pipelines, central pivot systems and impoundments including the effects of heavy equipment activity and possibly ongoing maintenance activities will result in the destruction or alteration of known prehistoric and historic archaeological sites. Table 15-8 shows the number of prehistoric and historic archaeological sites potentially affected by temporary containment Component 11. <u>The expanded project area for Component 11 including the expanded DVR Pipeline Loop was surveyed by Peak & Associates, Inc. on January 31, 2011. No additional cultural resources were noted in the vicinity of the expanded pipeline.</u>

16 Visual Resources and Open Space

involving grading, vegetation removal, road construction or other construction activities?

Analysis: *Less than Significant Impact; Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 32*

Portions of the conveyance facilities for components 3, 4, 6, and 17 are located along Caltrans designated scenic highways. Construction of these components, as well as component 2, 5, 14, 20, 22 and 32 will be visible from designated residential areas. Construction activities along these routes will involve removal of vegetation, grading and trenching of the landscape edge within the public right-of-way. This will result in a temporary bare, scarred appearance with a moderate degree of contrast to the existing vegetated edge. The scale of construction will not be sufficient to create strong visual contrast with the predominantly agricultural character of the surroundings, and the scale of construction will not be unlike that which may occur on adjacent agricultural lands. In addition, after the pipelines and other conveyance components are in place, the area will be restored to the current conditions as required by standard practice SP-8, Repair Road Damage and Revegetate Temporarily Disturbed Sites. There will be no permanent changes in visual contrast, landscape colors, textures, and scale of visual components that are inconsistent with the natural surroundings.

<u>A 100 linear foot portion of the DVR Pipeline Loop, will be constructed within the scenic corridor along SR 89. Construction of this pipeline, as well as the irrigation distribution pipeline and freshwater conveyance will involve vegetation removal, grading, and trenching; however the scale of the activities will not be sufficient to create strong visual contrast and implementation of standard practice SP-8 will restore the disturbed areas. Development and operation of the irrigation and containment fields will not create a strong visual contrast due to the existing agricultural character of the area. The pump station will be a permanent above-ground structure located behind the existing ranch house over a mile from scenic SR 89. Although the pump station is a visible structure, its location away from the road and behind an existing structure substantially reduce the visibility of the pump station while integrating the structure into the existing landscape to maintain the visual character of the area. There will be no permanent changes in visual contrast, landscape colors, textures, and scale of visual components that are inconsistent with the rural visual character and surroundings.</u>

Application components 1, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 29 and 30 will involve temporary construction activities for the installation of irrigation pipelines and equipment. This may involve construction activities along or visible from scenic routes and corridors that will require removal of vegetation, grading and trenching of the landscape edge. This will result in a temporary bare, scarred appearance with a moderate degree of contrast to the existing vegetated edge. In addition, construction may be visible from designated residential areas. The scale of construction will not be sufficient to create strong visual contrast with the predominantly agricultural character of the surroundings, and the scale of construction will not be unlike that which may occur for other activities on agricultural lands. In addition, after the pipelines and other irrigation equipment are in place, areas along public rights-of-way will be restored to essentially the same conditions as currently exist are required by standard practice SP-8, Repair Road Damage and Revegetate Temporarily Disturbed Sites. There will be no permanent changes in visual contrast, landscape colors, textures, and scale of visual components that are inconsistent with the rural visual character and surroundings.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 32*

Analysis: *No Impact; Component 8, 11, 23, 24, 31*

The temporary containment facilities, irrigation fields, pump station and hydroelectric generation unit, and associated pipelines of Component 11 and conveyance system of Component 31 are not located within the viewsheds of any designated scenic route, scenic corridor, residential area or recreation area, and will not generate impacts on any views from these areas.

The water management components, components 8, 23 and 24 do not include any physical improvements. There will be no permanent changes in visual contrast, landscape colors, textures, and scale of visual components that are inconsistent with the surrounding visual character.

Mitigation: *No mitigation is needed. Components 8, 11, 23, 24, 31*

Impact: VISUAL-2. Will structures constructed as part of the Project Components be inconsistent with the protection of views of open areas, ridges, and peaks from any designated scenic route, scenic corridor, open space, residential or recreation area?

Analysis: *Potentially Significant Impact; Component 11 (Pump Station)*

No information is currently available regarding the sizing or exterior of the pump station. The pump station will be somewhat obscured by the existing ranch house, however not completely obscured and will remain somewhat visible from adjacent open space areas. The pump station is not expected to obscure views of ridges or peaks, but may be visible within an open area from surrounding open space. The aboveground structures at the pump station will include the control building and filtration system, media tank and piping. The control building is proposed to be a prefabricated metal building and will be designed to resemble a barn structure. The hydroelectric generation unit will be located within the pump station and will not be visible outside the structure. Although the pump station will not be visible from any designated scenic route, scenic corridor or designated residential or recreation areas, this impact is potentially significant due to its location within open space ~~and the absence of design data.~~

Mitigation: VOS-1. Pump Station Design

Earth tones that mimic surrounding landscape colors shall be used on the exterior of the pump station structure and the surface of the structure shall not be reflective. Structural design shall utilize the presence of the ranch house to obscure views and the structure shall not be sized greater than necessary.

After Mitigation: Less than Significant. Component 11

Implementation of VOS-1 will integrate the pump station structure into the surrounding landscape to reduce structural visibility and contrast. This impact level is considered less than significant.

Analysis: *Less than Significant Impact; Component 11*

Impoundment facilities of the temporary containment component 11 will be visible from surrounding open space. The berms surrounding the facility will be approximately six feet in height, and under standard practice SP-8**,** Repair Road Damage and Revegetate Temporarily Disturbed Sites, the berms will be covered with vegetation. The vegetated appearance and low height of the berms will tend to blend into the landscape, particularly from middleground and background viewpoints, and while there may be a slight visual contrast from foreground views, the facilities will not create a strong visual contrast. The facilities will not be visible from any designated scenic route, scenic corridor or designated residential or recreation areas.

<u>The containment fields and berms associated with tailwater control will be visible from surrounding open space. The berms will be vegetated so that they will blend into the landscape and reduce views of the containment fields from middleground and background viewpoints. While there may be a slight visual contrast from foreground views, a strong visual contrast will not result. The facilities will not be visible from any designated scenic route, scenic corridor or designated residential or recreation areas.</u>

Mitigation: *No mitigation is needed. Component 11*

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Conveyance components 2, 3, 4, 5, 6, 14, 17, 20 and 22 do not involve any permanent above ground structures and will not generate permanent impacts on any views. Components 31 and 32 will construct a new ditch to divert storm flow away from HPR and to ICR and a new spillway channel from ICR to Indian Creek, respectively. These facilities are above ground but at grade earthen structures that will not create inconsistencies with the protection of views of open areas, ridges and peaks.

The application components do not involve any permanent above ground structures and will not generate permanent impacts on any views.

The water management components 8, 23 and 24 do not involve any permanent above ground structures and will not generate permanent impacts on any views.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Impact: VISUAL-3. Will the Project Components create a new light source?

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*

No new light sources will be constructed as part of the conveyance, application components, temporary containment or water management components.

<u>No new light sources will be constructed as part of the DVR Pipeline Loop, irrigation distribution pipeline, freshwater conveyance pipeline, application fields or containment fields. The hydroelectric generation unit will be housed within the pump station and will not create light visible outside the pump station structure.</u>

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*

Analysis: *Less Than <u>Significant Impact; Pump Station</u>*

New lighting proposed for the pump station is proposed to be cut-off style that directs 100% of the light downwards to comply with dark sky requirements. Based on the design of the fixtures proposed, impacts from the new lighting are less than significant.

Mitigation: *No mitigation is needed*

Implementation of lighting controls will limit visual impacts of nighttime lighting. This impact level is considered less than significant.

Impact: VISUAL-4. Will the Project Components result in the conversion of open space land, including agricultural open space, to non-open space uses?

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*

Conveyance components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32 and application components 1, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 29 and 30 will not result in the conversion of open space, as all of the uses associated with these components are considered open space uses.

Implementation of the temporary containment component 11 and water management components 8, 23, and 24 will not result in the conversion of open space, as the use associated with these components is considered open space use.

Construction and operation of the DVR Pipeline Loop, irrigation distribution pipeline, freshwater conveyance pipeline, irrigation and containment fields, and pump station and hydroelectric generation unit will not result in the conversion of open space, as all of these facilities are considered open space uses.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32,*

16.7 Cumulative Impacts

There is one impact identified in the Visual Resources and Open Space section as less than significant. The less than significant impacts are temporary and associated with short-term construction of project facilities. There is one impact identified as potentially significant. This impact is associated with the pump station and the visual contrast that may result from pump station development. However, implementation of mitigation measure VOS-1 will reduce the impact to a less than significant level. Although implementation of Project Components will occur over a 15- to 20-year period, ongoing construction for other future projects in the project area may overlap in time with project construction activities. Construction impacts on viewsheds are temporary and will affect only a limited number of specific viewsheds at any given time. There will be no significant cumulative construction impacts on viewsheds from designated scenic routes and corridors, or residential or recreation areas.

Project impacts on views of open areas, ridges and peaks are less than significant because the structures to be constructed as part of Project Components are typically small accessory structures or landforms that will tend to blend into the landscape, particularly in the middleground and background views. The Project Components will not have significant cumulative impacts on protection of views of open areas, ridges, and peaks from any designated scenic route, scenic corridor, open space, residential or recreation area.

16.8 Summary of Significant Impacts and Mitigation Measures

16.8.1 Significant Impacts and Mitigation Measures by Project Component

~~No significant impacts to visual resources and open space are identified in this section.~~The potentially significant impact to visual resources and open space are in relation to the pump station and the lack of current design detail to determine whether the structure will be significantly visible in open space areas~~result in lighting impacts~~. Without such detail, the analysis conservatively provides mitigation to ensure impacts do not occur.

Table 16-5 summarizes the significant impacts by project component and identifies the mitigation measures required for each impact.

Table 16-5

Summary of Significant Impacts and Mitigation Measures –
Visual Resources and Open Space

Impact	**Level of Significance**	**Mitigation Measure**
Project Components		
VISUAL-2. Will structures constructed as part of the No Project Components be inconsistent with the protection of views of open areas, ridges, and peaks from any designated scenic route, scenic corridor, open space, residential or recreation area?	Pump station	VOS-1. Pump Station Design

16.8.2 Environmentally Superior Alternative (Alternative 3) Significant Impacts and Recommended Mitigation Measures

No significant impacts to visual resources or open space are identified for the environmentally superior alternative (Master Plan Recommended Project Alternative, Alternative 3).

17 Public Services and Utilities

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31 and 32.*

Construction of the conveyance components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32 will not add population or new facilities that would create increased demand for utilities or other public services.

Construction of the application components 1, 7, 9, 10, 12, 13, 15, 18, 19, 21, 29 and 30 will not add population or new facilities that will create increased demand for utilities or other public services. Acceptable service standards will be maintained. There is no impact.

Construction of the temporary containment component 11 will not add population or new facilities that would create increased demand for utilities or other public services. Acceptable service standards will be maintained. There is no impact.

Implementation of the water management components 8, 23, 24 will not add population or new facilities that would create increased demand for utilities or other public services. Acceptable service standards will be maintained. There is no impact.

<u>Construction of the DVR Pipeline Loop, freshwater conveyance pipeline, irrigation distribution pipeline, irrigation fields, temporary containment fields, pump station and hydroelectric generation unit will not create increased demand for utilities or other public services. Acceptable service standards will be maintained. There is no impact.</u>

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32.*

Impact: PU-2. Will the Project Component construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?

Analysis: *Less than Significant Impact; Component 16*

Title 22 of the California Code of Regulations restricts irrigation on, or directly adjacent to, public areas. Component 16 will install and operate subsurface irrigation systems in close proximity (less than 1000 feet) of Alpine County's School Complex. A shallow groundwater network of perforated pipe will be installed on the property for distribution of recycled water and to reduce potential impacts to schools to a less than significant level.

Mitigation: *No mitigation is needed. Component 16*

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32.*

Construction of components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32 will not occur within 500 feet of a police or fire station, public service or utility provider, school, or park. Construction of these components will have no impact on emergency response times for fire and police services. There is no impact.

Implementation of components 8, 23, and 24 will not occur within 500 feet of a police or fire station, public service or utility provider, school, or park. Implementation of these components will have no impact on emergency response times for fire and police services. There is no impact.

The DVR Pipeline Loop, irrigation distribution pipeline, freshwater conveyance pipeline, pump station, hydroelectric generation unit, irrigation fields and containment fields will not be located within 500 feet of a police or fire station, public service or utility provider, school, or park. Construction and operation of these facilities will have no impact on emergency response times for fire and police services. The nearest facilities to the Alpine County's school complex, irrigation fields A and B, are at a distance of over 1,000 feet. There is no impact.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32,*

Impact: PU-3. Will the Project Components increase public use of services other than recreation, to a degree that accepted service standards are not maintained?

Analysis: *Less than Significant Impact; Components 11, 16,*

Construction of Components 11 and 16 will not disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained. Operation of Component 11 will result in a minor increase in electricity consumption due to pumping of water from the storage facility back to HPR and operations of central pivot irrigation systems; however the electricity used by the irrigation facilities will be generated onsite through the hydroelectric generation unit and will not create a demand on area electricity services. The hydroelectric generation unit is proposed to generate enough power to offset the electrical use by the irrigation system. The power requirement to drive all eight pivot units at approximately 6 horse power (HP) per unit is 48 HP or 36 kilowatts (kW). During the non-irrigation season the hydroelectric station could generate an additional 509,000 kW-hours of power, which is proposed to be sold back to Liberty Energy. Minor increases in electricity consumption will result from operation of the pump station and containment fields; however the increase will be minimal, and the impact will be less than significant. The unused electricity generated by the hydroelectric station offsets some of the demand created by other project facilities. Operation of Component 16 will likely result in a minor increase in electricity consumption due to pumping for subsurface irrigation. Due to the minimal increase that will result, the level of impact is considered less than significant.

~~Operation of the pump station, containment fields, and the irrigation fields will result in a minor increase in electricity consumption due to pumping of water; however, the increase will be minimal and the impact is considered less than significant. Construction and operation of these facilities will not disrupt police, fire, schools, or parks and recreation facilities.~~

Mitigation: *No mitigation is needed. Component 11, 16*

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31 and 32 will not cause an increase in population due to the nature of the project facilities. There will be no increase in public use of service and acceptable service standards will be maintained.

18 Population and Housing

Table 18-4

Population and Housing Impacts – Project Components

Impact	Point of Significance	Significant Impact Before and After Mitigation	Significant Impact Before Mitigation; Less than Significant Impact After Mitigation	Less than Significant Impact; No Mitigation Proposed	No Impact
HOUSING-1. Will the Project Components result in a net loss, through conversion or demolition, of homes occupied by low- or moderate-income households?	Greater than zero dwelling unit occupied by a low- or moderate-income household or farm worker				1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32
HOUSING-2. Will the Project Components result in a net loss, through conversion or demolition, of multifamily rental housing?	Greater than zero net units lost				1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32
HOUSING-3. Will the Project Components increase the demand for housing, thereby causing indirect environmental impacts?	More than zero additional housing units				1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32

Source: Hauge Brueck Assoc, 2009

Impact: **HOUSING-1. Will the Project Components result in a net loss, through conversion or demolition, of homes occupied by low- or moderate-income households?**

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Construction and operation of the Project Components will not result in the loss of low- or moderate-income dwelling units, since it will not be necessary to take any units for the facilities. No population or housing impacts will result.

Construction and operation of the DVR Pipeline Loop, irrigation distribution pipeline, freshwater conveyance line, irrigation fields, pump station, hydroelectric generation facility, or other associated facilities will not result in the loss or take of dwelling units. No population or housing impacts will result.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32.*

Impact: HOUSING-2. Will the Project Components result in a net loss, through conversion or demolition, of multifamily rental housing?

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Construction and operation of the Project Components will not result in the loss of multifamily rental housing, since it will not be necessary to take any units for the facilities. There will be no population or housing impacts.

Construction and operation of the DVR Pipeline Loop, irrigation distribution pipeline, freshwater conveyance line, irrigation fields, pump station, hydroelectric generation unit, or other associated facilities will not result in the loss or take of multifamily rental units. No population or housing impacts will result.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Impact: HOUSING-3. Will the Project Components increase the demand for housing, thereby causing indirect environmental impacts?

Analysis: *No Impact; Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

Construction and operation of the conveyance components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31 and 32 will not impact housing demand, since they will be constructed and operated by existing District and contractor personnel and will not require new employees.

Construction and operation of application components 1, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 29 and 30 will not impact housing demand since they will be constructed and operated by existing District and contractor personnel, and will not require new employees. Operation of application Components 12 (Grow Biomass Crops for Pulp Production Using Recycled Water) and 13 (Basin Sod and Seed Production) will involve planting and harvesting operations. These operations will typically be conducted over relatively short periods of time occurring at varying intervals of up to six or more years in length. Because the size of the areas planted or harvested will be relatively small, those operations will utilize contract personnel who will either be current residents of Alpine County or from nearby locations and not need to relocate to Alpine County and obtain housing in order to perform their work. The application components will not create demand for new housing.

Construction and operation of the temporary containment component 11 or water management components 8, 23 and 24 will not impact housing demand, since they will be constructed and operated by existing District and contractor personnel and will not require new employees.

Construction and operation of the DVR Pipeline Loop, irrigation distribution pipeline, fresh water conveyance pipeline, pump station, hydroelectric generation unit, and associated electrical facilities will be constructed and operated by existing District and contractor personnel and will not require new employees. Harvesting operations of the additional irrigation fields will be conducted by local or nearby contract personnel as previously analyzed in the 2009 FEIR, and will not create demand for new housing.

Mitigation: *No mitigation is needed. Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32*

18.7 Cumulative Impacts

No impacts on population and housing from the Project have been identified and the Project would not contribute to cumulative population and housing impacts.

18.8 Summary of Significant Impacts and Mitigation Measures

18.8.1 Significant Impacts and Mitigation Measures by Project Component

No significant population and housing impacts are identified in this chapter.

18.8.2 Environmentally Superior Alternative (Alternative 3) Significant Impacts and Recommended Mitigation Measures

No significant impacts to population and housing are identified for the environmentally superior alternative (Master Plan Recommended Project Alternative, Alternative 3).

19 Alternatives Comparison

Table 19-1

Alternative Comparison Table of Impacts

Impact	Alternative 1 No Project Alternative	Alternative 2 Master Plan Projects Alternative	Alternative 3 Master Plan Recommended Projects Alternative	Alternative 4 Master Plan Trigger Projects Alternative
LU-1. Will the Project Components be inconsistent with the land use plan map of an adopted General Plan or Master Plan?	❍	⦿	⦿	⦿
LU-2. Will the Project Components be inconsistent with zoning?	❍	⦿	⦿	⦿
GEO-2 Will Project facilities be subject to ground rupture due to location near a surface trace of an active fault?	●	●	●	●
GEO-3 Will Project facilities be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake?	●	❍	❍	❍
GEO-4 Will earthquake-induced strong ground shaking damage Project facilities?	●	❍	❍	❍
HYDRO-1 Will the Project cause flooding?	●	❍	❍	❍
HYDRO-2 Will the Project cause stream bank erosion?	●	❍	❍	❍

Table 19-1				
Alternative Comparison Table of Impacts				
Impact	**Alternative 1 No Project Alternative**	**Alternative 2 Master Plan Projects Alternative**	**Alternative 3 Master Plan Recommended Projects Alternative**	**Alternative 4 Master Plan Trigger Projects Alternative**
VISUAL-2. Will structures constructed as part of the No Project Components be inconsistent with the protection of views of open areas, ridges, and peaks from any designated scenic route, scenic corridor, open space, residential or recreation area?	❍	⊙	⊙	⊙

Table 19-2 summarizes the level of impact associated with each Alternative followed by Figure 19-1 which graphically displays the information provided in Table 19-2.

Table 19-2				
Alternative Level of Impacts Comparison				
Impact	**Alternative 1 No Project Alternative**	**Alternative 2 Master Plan Projects Alternative**	**Alternative 3 Master Plan Recommended Projects Alternative**	**Alternative 4 Master Plan Trigger Projects Alternative**
No Impact	~~7~~ 6	0	1	0
Less than Significant	0	~~7~~ 6	6	~~7~~ 6
Less than Significant with Mitigation	0	~~5~~ 8	~~5~~ 8	~~5~~ 8
Significant and Unavoidable	14	5	5	5

20 Mandatory Environmental Analysis

20.2 Significant and Unavoidable Adverse Impacts

Section 2100(b)(2)(A) of CEQA requires that an EIR identify any significant environmental effects that cannot be avoided if the project were implemented. Significant unavoidable impacts are summarized in Chapter 1 and discussed in detail in Chapters 4 through 18 and summarized in Chapter 19. Significant unavoidable impacts are those impacts that remain significant after implementation of proposed mitigation measures. Although the Project Components have the potential to result in a number of significant environmental impacts, most of these can be avoided through the adoption of appropriate mitigation measures that reduce those effects to a less than significant level.

Table 20-1

Summary of Significant and Unavoidable Impacts and Mitigation Measures

Impact	Level of Significance	Mitigation Measure
GEO 2. Will the Project Components be subject to ground rupture due to location near a surface trace of an active fault?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32 ●	No additional mitigation is possible.
GW-1. Will the Project Components degrade groundwater quality in the Carson, Wade and Diamond Valleys?	1, 2, 3, 4, 5, 6, 14, 21, 22, 30 ●	**SW-33.** Surface and Groundwater Protection Plan **GW-1A.** Determine a Nutrient Neutral Grazing Regime for the Diamond Valley Ranch **GW-1B.** Determine Maximum Duration for Temporary Containment
SW-3. Will the Project Components cause numeric and narrative-based criteria to be exceeded at West Fork Carson River in California?	30 ●	**SW-3.** Develop Project-specific Nutrient Management Plan for the Jungle
ARCH-1. Will the Project Components disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/ traditional heritage resources?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 ⦿ 29, 30, 31, 32 ●	**ARCH-1.** Identification, Evaluation, and Avoidance of Cultural Resources
ARCH-2. Will the Project Components disturb unknown archaeological resources or human remains?	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 ⦿ 29, 30, 31, 32 ●	**ARCH-1.** Identification, Evaluation, and Avoidance of Cultural Resources **ARCH-2.** Protect Undiscovered Cultural Resource Sites

Source: Hauge Brueck Assoc. 2009

Notes: Level of Significance

--	Not applicable	==	No impact
●	Significant impact before and after mitigation	⦿	Significant impact; less than significant after mitigation
❍	Less than significant impact; no mitigation proposed		

20.3 Significant Irreversible and Irretrievable Commitment of Resources

Section 21100(b)(2)(B) of CEQA requires that an EIR identify any significant irreversible changes that will result from project implementation. Section 15126.2(c) of CEQA provides guidance as to what sorts of changes might be considered irreversible. Such changes include use of nonrenewable resources, commitment of future generations to similar uses, and environmental accidents that could occur as a result of the project.

The Project will involve construction activities that commit non-renewable resources including fuels, construction materials and land. Once constructed, Project facilities will continue to use energy. Construction of new facilities will irretrievably commit lands to use for public facilities.

CEQA notes that environmental accidents can cause irreversible damage. The Project will use common construction-related hazardous materials during construction, but does not propose the use of such materials during project operation. Adequate procedures are in place to guard against accidental releases of hazardous materials or hazardous waste during construction. Measures to protect against these hazards are detailed in Chapter 10, Public Health and Safety.

20.4 Environmentally Superior Alternative

Alternative 3 Master Plan Recommended Projects is the Environmentally Superior Alternative. Typically Alternative 1, No Project, would be considered environmentally superior because no action is required. The analysis in Chapters 4 through 18 demonstrate Alternative 1 has four significant and unavoidable impacts. The Master Plan has been prepared to mitigate the impacts of the No Project alternative.

Alternative 3 meets the purpose, need, and objectives of the District and has a reduced footprint of activities by implementing nine components in comparison to Alternative 2, which implements 28 components, and Alternative 4, which implements 18 components.

Appendix D - Mitigation and Monitoring Plan

Appendix D - Mitigation and Monitoring Program

D.1 Mitigation Program Approach

This appendix presents the Mitigation and Monitoring Program (MMP) for the District Recycled Water Facilities Master Plan (Project). The purpose of this detailed MMP is to make clear to the reader the responsibilities of the District in implementing the Project.

Included in the MMP are measures required by law or regulation, standard engineering and design practices adopted and implemented by the District as part of planning, construction, operation and maintenance of the Project, or mitigation measures recommended by the District's consultant team to mitigate specific impacts identified in Chapters 4 through 18 of this EIR. These recommended mitigation measures are identified in Chapter 4 through 18 resource sections under the subheading Environmental Consequences (Impacts) and Recommended Mitigation, as feasible and effective in mitigating project-related environmental impacts. The District will adopt mitigation measures at the time of approval of the Master Plan. At that time, the District has the option of approving alternate mitigation measures, if they are shown to be equally effective and feasible.

Mitigation measures must be designed to minimize significant environmental impacts, not necessarily to eliminate them (Pub Res C§21100(b)(3); 14 Cal Code Regs §15126.4(a)(1)). Any action that is designed to minimize, reduce, or avoid an environmental impact or to rectify or compensate for the impact qualifies as a mitigation measure under 14 Cal Code Regs §15370. The following specific requirements for mitigation measures are set forth in 14 Cal Code Regs §15126.4:

- Mitigation measures should be identified for each significant effect described in the EIR;
- Mitigation measures are not required for impacts that are less than significant;
- If several measures are available to mitigate a significant adverse impact, the EIR should discuss each measure and identify the reason for selecting a particular measure;
- If a mitigation measure would itself create significant environmental impacts, those effects must be discussed in the EIR but in less detail than the significant effects of the proposed project;
- Although formulation of mitigation measures ordinarily should not be deferred, measures may identify performance standards for mitigation that can be accomplished in more than one way;
- When relevant, an EIR must discuss measures that could minimize inefficient and unnecessary consumption of energy;
- The description must distinguish between mitigation measures that are included in the Project as proposed and other measures that the lead agency determines could reasonably be expected to reduce significant impacts as conditions of the project approval;
- Mitigation measures must either be incorporated into the design of the project (Standard Practices) or be fully enforceable through conditions, agreements, or other means; and
- Mitigation measures imposed by the lead agency must be consistent with applicable constitutional standards limiting actions by public agencies, including "nexus" and "rough proportionality."

The legal basis for the development and implementation of a MMP lies within CEQA. CEQA Sections 21002 and 21002.1 state that:

- Public agencies are not to approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects;

- Each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so;

- CEQA Section 21081.6 further requires that: the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation; and

- The monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of project approval in order to mitigate significant effects on the environment. The program must be designed to ensure compliance with mitigation measures during project implementation to mitigate or avoid significant environmental effects.

D.2 Mitigation Program Format

D.2.1 Compliance with Existing Laws, Policies and Regulations/Compliance Measures

This section presents the applicable federal, State, regional, and county laws, policies and regulations with which the Project must comply and must be included as part of the Project Description. Compliance with these policies and regulations will result in avoidance and/or minimization of adverse environmental impacts and are referred to as Compliance Measures.

D.2.2 Standard Practices Included in the Project

This section presents a listing and descriptions of standard practices that the District is either currently implementing as standard engineering and design practices or that are incorporated into the Project Description for the Master Plan. The District adopted these practices and incorporated them as part of the Project in order to avoid or minimize potential environmental impacts identified during Project planning and design. These practices represent standard engineering, design, construction, operation and maintenance practices.

These practices are part of the Project and do not fit under the normal definition of mitigation. These standard practices are included in this chapter to provide a mechanism to ensure that they are implemented and monitored, and to assist the reader in understanding the commitments made by the District.

D.2.2.1 Planning Measures

This section contains standard practices to be implemented during the final planning and detailed design of projects implemented under the Project. These measures require that a project be designed to accommodate particular environmental constraints. Compliance with these standard practices during planning and design of Project Components will result in avoidance and/or minimization of adverse environmental impacts.

D.2.2.2 Construction Measures

This section contains standard practices to be implemented prior to, during, and immediately following project construction. These measures generally require the District to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the Project. Compliance with these standard practices during construction will result in avoiding, minimizing, or reducing adverse environmental impacts.

D.2.2.3 Operation and Maintenance Measures

This section contains standard practices to be implemented during operation of the Project. These measures generally require monitoring of system operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with these standard practices results in the reduction of adverse environmental impacts.

D.2.3 Mitigation Measures

This section presents the mitigation measures proposed to avoid, reduce and further mitigate significant environmental impacts identified during environmental impact analysis in the resource sections for land use, agriculture, geology, soils and seismicity, groundwater, surface water, hydrology, public health and safety, biological resources, traffic and circulation, air quality, noise, cultural resources, visual resources, public utilities and services, and population and housing.

D.3 Measure Format

Figure D-1 presents the format for each compliance measure, standard practice or mitigation measure and the information and requirements that each contains.

Figure D-1. Mitigation Measure Format

Title: Title of Measure

Description: Description of the requirements of the compliance measure, standard practice or mitigation measure.

Impacts Mitigated and Mitigation Level (for Recommended Mitigation Measures)

Impacts Mitigated	Level of Significance After Mitigation
A list of impacts, by number and text, to which the mitigation measure applies. *This list directly corresponds to the impact numbers and impact statements presented in Chapters 4 through 18.*	The level to which the impact is anticipated to be mitigated.

Component: The component(s) for which this measure is recommended.

Lead Agency: The agency or individual that has the responsibility for insuring that the measure is carried out.

Implementing Agency: The agency or individual that has the responsibility for implementing or performing the measure.

Timing: **Start:** The appropriate time at which the measure is to be implemented.

Complete: The appropriate time at which the measure is to be complete.

Monitoring Agency: The public agency that has the responsibility for monitoring to insure that the mitigation measure is effective in mitigating the impact.

Validation: The means by which the monitoring agency will verify that the measure has been carried out.

D.4 Compliance with Existing Laws, Policies and Regulations/ Compliance Measures

This section presents the applicable federal, State, regional, county, and local agreements, policies and regulations and laws with which the Project Components are required to comply. Compliance with these laws, policies and regulations, and future modifications thereof, is required and results in avoidance and/ or minimization of adverse environmental impacts.

D.4.1 County

- Alpine County General Plan
- Alpine County Zoning Ordinance
- Alpine County Building Codes
- Agreement Between South Tahoe Public Utility District (District) and the County of Alpine and Alpine County Water Agency, 1967, as amended <u>and consolidated on November 5, 2002</u>
- Douglas County Master Plan
- Douglas County Zoning Ordinance
- Douglas County Building Codes

D.4.2 Regional

- Carson Water Subconservancy District Rules and Regulations
- Great Basin Unified Air Pollution Control District Rules and Regulations

D.4.3 State

- California Environmental Quality Act (CEQA)
- California Endangered Species Act (CESA)
- California Clean Air Act (CCAA)
- California Occupational Safety and Health Administration (Cal-OSHA)
- California Department of Fish and Game Stream Bed Alteration Agreement (Fish and Game Code Section 1601-1603)
- California Department of Fish and Game (CDFG)Hardwood Management Guidelines (Revised 1994)
- California Health and Safety Code, Section 25500 et seq. - Hazardous Materials Release Response Plans and Inventory
- California Regional Water Quality Board, Lahontan Region/ Water Quality Control Plan for the Lahontan Basin Plan and Wastewater Discharge Requirements

- Native Plant Protection Act (Fish and Game Code Section 1900-1913)
- Nevada Department of Environmental Protection Regulations, Regulations for Water Recycling (Nevada Administrative Code, §445A.275 through 445A.280)
- Public Resources Code, Sections 5097.5 and 30244
- Public Resources Code, Sections 5020-5024 (California Register of Historic Places)
- Public Resources Code, Section 6301 et seq.
- Public Resources Code, Section 6501 et seq.
- Title 8, California Code of Regulations, Section 1539 - 1541.1 - Excavations
- Title 8, California Code of Regulations, Sections 1539 - 1541.1 - Excavations
- Title 8, California Code of Regulations, Sections 1509 & 3203 - Injury and Illness Prevention Program
- Title 8, California Code of Regulations, Sections 1597 - 1599 - Vehicles, Traffic Control, Flaggers, Barricades, and Warning Signs
- Title 8, California Code of Regulations, Section 5194 - Hazard Communication
- Title 22, California Code of Regulations, Section 60301 et seq. - Reclaimed Water
- Title 22, California Code of Regulations, Section 66260.1 et seq. - California Hazardous Waste Regulations

D.4.4 Federal

- Archaeological and Historic Data Preservation Act of 1974
- Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977; Section 404
- Code of Federal Regulations, Title 40 Parts 6, 51, and 93
- Federal Antiquities Act of 1906
- Clean Air Act (CAA), amended 1977 and 1990
- Federal Endangered Species Act (FESA) of 1973, as amended
- Mining Law of 1872, amended 1988
- National Environmental Policy Act (NEPA) of 1969
- National Historic Preservation Act of 1966, amended 1976 and 1980 Sections 106 and 110
- National Natural Landmarks Program, Historic Sites Act of 1935
- Rivers and Harbors Act of 1899, Section 10

- Surface Mining Control and Reclamation Act of 1977

Table D-1 summarizes the permits and approvals that are necessary for compliance with federal, State, regional, county laws, policies and regulations. Table D-1 discloses the permit or approval type, the activity regulated and the anticipated review period.

Table D-1

Potentially Applicable Federal, State, Regional, and County Permits and Approvals

Agency	Type of Permit or Approval	Alternative No.	Regulated Activity	Review Period	Authority
Federal Agency Permits and Approvals					
U.S. Army Corps of Engineers	Department of the Army Permit (Section 404)	2, 3, 4	Discharge of dredged or fill material into waters of the U.S. (including wetlands)	Six to eight months	Section 404 Clean Water Act (33 USC 1344)
U.S. Army Corps of Engineers	Department of the Army Permit (Section 10)	2, 3, 4	Structures or work in or affecting navigable waters of the U.S.	Up to seven months	Section 10 of Rivers and Harbors Act of 1899 (33 USC 403)
Advisory Council on Historic Preservation/State Office of Historic Preservation	Section 106 Review and Compliance	2, 3, 4	Consideration of a Section 404/10 permit by USACE.	Up to six months	National Historic Preservation Act 36 CFR 800
U.S. Fish and Wildlife Service/ National Marine Fisheries Service	Section 7 Consultation	2, 3, 4	Consideration of a Section 404/10 permit by USACE.	Four to six months	16 USCA 1531 et seq.: 50 CFR Part 17, Sections 17.94-17.96 Endangered Species
State Agency Permits and Approvals					
California Department of Transportation (Caltrans)	Encroachment Permits	2, 3, 4	Use of State rights-of-way for installation of pipelines along state freeways and roads	Two months	21 CCR14.11.1-14.11.6
California Department of Transportation (Caltrans)	Transportation Permit	2, 3, 4	Transport of heavy or oversized loads on state roads during construction	Same day as applied for	California Vehicle Code Section 35780; California Streets and Highway Code 117, 660-711
State Lands Commission	Land Use Lease	2, 3, 4	Placement of fill or structures in navigable waterways or Section 16 or 36 lands	Six months	California Public Resources Code Section 6000 et seq.

Table D-1

Potentially Applicable Federal, State, Regional, and County Permits and Approvals

Agency	Type of Permit or Approval	Alternative No.	Regulated Activity	Review Period	Authority
California Department of Water Resources, Division of Safety of Dams (DSOD)	Approval of plans and specifications for the construction or enlargement of a dam or reservoir	2, 3, 4	Construction of impoundments with greater than 50 acre/feet capacity or with dam heights greater than 6 to 25 feet	Six months	California Water Code Division 3, Dams and Reservoirs Parts 1 and 2
State Water Resources Control Board	Water Rights Permit	2, 3, 4	Transfer or modifications of existing water rights	Six to twelve months	
California Occupational Safety and Health Administration (CalOSHA)	Permits for construction, trench excavations, and demolition	2, 3, 4	Construction of trenches or excavations five feet or deeper and into which a person is required to descend; Construction or demolition of any building, structure, scaffolding or falsework more than three stories high; The underground use of diesel engines in working mines and tunnels	One week	California Labor Code Section 6500
California Department of Fish and Game	Streambed Alteration Agreement	2, 3, 4	Crossing of streams, rivers, or lakes (also for reservoirs which interrupt streams)	One month	Sections 1601-1603 of the California Fish and Game Code
California Department of Fish and Game	Section 2081 Management Agreement	2, 3, 4	Potential adverse effects to state endangered or threatened species or species proposed for state listing; Incidental “take” of state protected species by a non-state entity	Seven months	Section 2081 California Fish and Game Code

Table D-1

Potentially Applicable Federal, State, Regional, and County Permits and Approvals

Agency	Type of Permit or Approval	Alternative No.	Regulated Activity	Review Period	Authority
State Office of Historic Preservation	See Advisory Council on Historic Preservation under U.S. Army Corps of Engineers	2, 3, 4			
Regional Agency Permits and Approvals					
Lahontan Regional Water Quality Control Board	General Construction Stormwater National Pollution Discharge Elimination System (NPDES) Permit	2, 3, 4	Stormwater discharges when clearing, grading, and excavation result in a land disturbance of five or more acres	Prior to construction	Clean Water Act
Lahontan Regional Water Quality Control Board	Waste Discharge Requirements	2, 3, 4	Discharge of recycled water on land and to groundwater	Six months to one year	Porter-Cologne Water Quality Act
Lahontan Regional Water Quality Control Board	Section 401 Water Quality Certification	2, 3, 4	Discharge of fill materials to waters of the U.S.	Two months	Clean Water Act
Great Basin Unified Air Pollution Control District (GBUAPCD)	Authority to Construct and Permit to Operate	2, 3, 4	Any project that emits criteria pollutants; Project also subject to reporting under Toxic Hot Spots legislation (AB 2588); District oversees criteria pollutant emissions and odor control	One year or longer	New Source Review regulations; Clean Air Act; BAAQMD Regulation 2, Rule 2, Sections 301.2 and 302
County Permits and Approvals					
Alpine County Planning Department	Use Permit	2, 3, 4	Development of proposed facilities	Three to four months	County Codes
Alpine County	Construction and dust control permits	2, 3, 4	Required prior to construction	One month	County Codes
Alpine County Public Works Department	Road Encroachment Permit	2, 3, 4	Encroachment onto roads and county drainages	One to two months	County Codes

Table D-1

Potentially Applicable Federal, State, Regional, and County Permits and Approvals

Agency	Type of Permit or Approval	Alternative No.	Regulated Activity	Review Period	Authority
Alpine County Public Works Department	Grading Permit	2, 3, 4	Certain grading activities	One months	County Codes (Uniform Building Code)
Alpine County Public Works Department	Oversize Load Encroachment Permit	2, 3, 4	Transport of heavy or oversized loads on county roads	One day	County Codes

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D.5 Standard Practices Included in the Project

This section presents a listing and description of standard practices that are incorporated into the description of the Project for compliance with District Standard Practices for Engineering, Design, Construction, Operation and Maintenance. The District is either currently implementing these standard practices or has adopted and incorporated these standard practices as part of the Master Plan in order to avoid or minimize potential environmental impacts. Because these standard practices are part of the Project and are at times required by law, they do not fit under the normal definition of mitigation**.** These standard practices are included in the MMP to provide a mechanism to ensure implementation and monitoring responsibilities are met and to disclose to the Public the commitments the District has made.

The following standard practices will be implemented during the course of the Project, including planning and design, construction, and system operation and maintenance. Compliance with these standard practices will result in avoidance and/or minimization of adverse environmental impacts.

SP-1 Dam Safety

Description: Indian Creek Dam, No. 1062 and Harvey Place Dam, No. 1062-3, are currently under the jurisdiction of Division of Safety of Dams. If any alteration to the Dams or their appurtenances is anticipated, an alteration application, together with plans and specifications, shall be filed with the Division of Safety of Dams. All dam safety-related issues shall be resolved prior to approval of the application and the work shall be performed under the direction of a civil engineer registered in California.

The State of California requires that an inundation map be prepared for any dam that is either 6 to 25 feet or more in height or impounds 50 acre-feet or more of water (California Water Code, §6002 and California Government Code §8589.5). The District shall prepare an inundation map for any site that is subject to these requirements. The map for proposed temporary containment locations shall be submitted to the Office of Emergency Services (OES) for review and approval. Following approval, OES shall transmit the map back to District who shall then produce evacuation plans within six months. These plans, which are subject to OES review, may be required to include:

- Traffic control measures;
- Shelters for evacuees;

- Movement of people without their own transportation;
- Perimeter security for the evacuation area; and
- Reentry of evacuation area.

Component: Components 11, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** Upon approval of temporary containment sites requiring inundation maps.

Complete: District shall develop and submit an inundation map to the OES within two months of selecting a Project Component that include temporary containment sites requiring such mapping. An evacuation plan shall be developed and submitted to OES within six months of receiving the approved inundation map.

Monitoring Agency: OES

Validation: District shall maintain a copy of the OES approved inundation map and evacuation plan**.**

SP-2 Standard Traffic Control Procedures

Description: Prior to construction of a Project Component, the District shall implement standard traffic control measures to avoid potential impacts to roads and traffic congestion. The District shall obtain necessary Encroachment and Transportation Permits from the appropriate agencies. At a minimum, the procedures to be implemented by the District shall contain Measures SP-3 through SP-10, discussed below.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During construction of each Project Component.

Complete: Implementation shall continue throughout construction.

Monitoring Agency: Caltrans/Alpine County

Validation: The District shall comply with this measure prior to starting construction of a Project Component.

SP-3 Emergency Response Vehicles Shall Not be Impeded

Description: The District shall ensure that construction of the Project does not impede emergency response vehicles. For each Project Component, the District shall inventory the locations of emergency response providers (hospitals, police, fire, and ambulance) and their primary response routes.

Where project facilities are to be constructed along emergency response routes, the District shall recommend and obtain approval of alternate emergency response routes from the affected service, at a minimum of one week prior to construction.

During construction, the District shall notify the emergency services on a weekly basis of the timing, location, and duration of construction activities throughout the project area for that week and a schedule of construction activities by area and date.

A copy of the construction activity schedule shall be maintained at selected public libraries and District Offices.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** The inventory shall be started during component design. Notification of construction activities shall occur on a weekly basis.

Complete: At the completion of the construction period.

Monitoring Agency: District

Validation: The District shall comply with this measure prior to starting construction of a Project Component.

SP-4 Maintain Maximum Number of Open Lanes on Roadways

Description: Where project construction occurs in or along roadways, the maximum number of through traffic lanes shall be kept open. A minimum of one lane of through traffic shall be maintained at all times.

Where single-lane, one-way operation is required, the construction manager shall mark construction zones and provide traffic control in accordance with Caltrans "Manual of Traffic Controls for Construction and Maintenance of Work Zones" (Caltrans 1990). This shall include, but not be limited to, appropriate signage marking construction zones and flag persons or electronic signal control at each end of the restricted lanes.

Prior to construction of a Project Component, the District shall implement standard traffic control measures to avoid potential impacts to roads and resultant traffic congestion. The District shall consult with the Alpine County Department of Public Works staff and other affected agencies regarding site-specific details of the project prior to the preliminary design stage. Construction drawings shall be provided to affected agencies before the start of construction.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** Prior to preliminary design stage.

Complete: At the completion of construction.

Monitoring Agency: Caltrans/Alpine County

Validation: The District shall comply with this measure prior to starting construction of a Project Component.

SP-5 Avoid Traffic Disruption on Major Highways

Description: The District shall design pipelines crossing State Route 88 in accordance with Caltrans requirements so as not to disrupt the flow of traffic and commerce.

Component: Components 4, 6

Lead Agency: District

Implementing Agency: District

Timing: **Start:** Design phase of each Project Component.

Complete: Upon certification of Final Engineering Drawings.

Monitoring Agency: Caltrans

Validation: The District shall comply with this measure prior to certifying the Final Engineering Drawings.

SP-6 Fence or Cover Trenches

Description: During construction, the District shall require trenches to be backfilled on the same day of completion of component installation.

While under construction, the District shall cover open trenches with steel plating where the trench crosses roadways or prevents access to businesses or residences, if feasible.

When possible, the District shall not leave trenches uncovered overnight. Trenches left uncovered shall be fenced and marked with appropriate signage in accordance with Caltrans “Manual of Traffic Controls for Construction and Maintenance of Work Zones” (Caltrans 1990).

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** At the beginning of component construction. The District shall monitor compliance on a daily basis at the end of each workday.

Complete: At the completion of construction.

Monitoring Agency: District

Validation: The District shall check compliance with this measure daily, throughout construction.

SP-7 Access to Businesses and Residences

Description: Ninety days prior to construction of a Project Component, the District shall provide public facilities, businesses, and residences within 500 feet of the construction zone with a notification packet that describes scheduled Project construction activities. Notification shall be provided in local newspapers.

The notification packet shall include:

(1) Notice to residences and businesses if parking and access shall be disrupted.

(2) Name of the project sponsor, project purpose, and a brief project description.

(3) Affected roadway segments in area, construction schedule in affected area, affected travel lanes, and reference to the traffic control plan.

(4) Alternate access and/or parking for affected land uses.

(5) Name and phone number of a project manager the public can contact with questions or comments regarding any aspect of the Project.

During construction, the District shall maintain pedestrian and vehicular access to public facilities, businesses, and residences along the route.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District and Construction Manager

Timing: **Start:** Ninety days prior to construction.

Complete: At the completion of construction.

Monitoring Agency: District

Validation: The District shall perform daily checks to ensure access is maintained to private and public uses. The District shall respond to complaints from private citizens regarding restricted access within 24 hours.

SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites

Description: Roads. Prior to construction, the District shall consult with the Alpine County Department of Public Works staff and other affected agencies regarding site-specific details of the Project Component prior to the preliminary design stage including construction drawings. Prior to construction, the District shall survey and videotape the condition of roads scheduled to have construction on or adjacent to them. The survey shall identify road name, length, and width; surface type and condition; and shoulder surface type and condition.

Wherever pavement is removed, roads shall be repaved as soon as possible. Within one year of completion of construction, roads damaged by construction traffic or pipeline construction shall be repaired to a condition equal to or better than existing prior to the construction activity.

Temporarily Disturbed Sites. Prior to construction, a site-specific revegetation plan shall be prepared. Upon Project Component completion, sites disturbed during construction shall be revegetated in accordance with revegetation standards as outlined below. Topsoil removed during construction activities shall be stockpiled and returned to the site and used for revegetation activities. Topsoil contains the seed stock for native and representative plant communities. Mulch application and additional seeding and planting may be necessary depending on site conditions.

Revegetation plans shall be in accordance with the Alpine County Scenic Highway Ordinance and Guidelines for Project Components that are visible SR 88. Revegetation Plans shall include at a minimum:

(1) A description of the site, including the soil type and existing vegetation;

(2) A list of appropriate plant species to be used at the site and a plan showing where they shall be planted;

(3) The number and size of shrubs and trees to be used, if any;

(4) A description of the extent and methods of irrigation, if any;

(5) Specifications for site preparation and installation of plant materials;

(6) Specifications and schedule for onsite care, including amount and method of application of fertilizers if necessary;

(7) Specifications for long term plant care and protection, including the amount and method of application of fertilizers, if necessary; and

(8) A description of mulches or tackifiers to be used.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** Prior to construction of a Project Component. The District shall review the road survey prior to authorizing construction along roads.

Complete: Within one year after completion of construction of a Project Component.

Monitoring Agency: Caltrans/Alpine County

Validation: The District shall complete road repairs within one year of completion of construction of a Project Component. The District shall demonstrate compliance with this measure by videotaping the conditions of roads where construction activities occurred.

SP-9 Park Within Construction Easements

Description: The District shall establish construction easements for staging areas. Construction worker vehicles, construction equipment, and materials shall be kept within the staging area. Construction easements shall be expanded if necessary to accommodate construction related activity.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** Prior to the start of construction.

Complete: At completion of construction.

Monitoring Agency: District

Validation: The District shall check compliance with this measure daily, throughout construction.

SP-10 Limit Ingress/Egress of Construction Equipment

Description: During construction, the District shall ensure that ingress and egress of construction equipment onto highways from construction parking areas and access roads is conducted in accordance with Caltrans "Manual of

Traffic Controls for Construction and Maintenance of Work Zones" (Caltrans 1990).

Adequate traffic controls shall be provided at access road intersections in accordance with Caltrans "Manual of Traffic Controls for Construction and Maintenance of Work Zones" (Caltrans 1990).

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** At the beginning of construction. The District shall monitor compliance on a daily basis during construction.

Complete: At the completion of construction.

Monitoring Agency: District

Validation: The District shall check compliance with this measure daily, throughout construction.

SP-11 Erosion Control/Storm Water Pollution Prevention Plan

Description: The District shall implement appropriate temporary and permanent erosion control measures for construction and operation of Project Component, including preparation of a project-level SWPPP. The SWPPP is required by the State Board NPDES General Construction Activity Storm Water Permit. Erosion control measures shall follow the Lahontan Region Project Guidelines for Erosion Control. These guidelines are typically attached to construction permits. At a minimum, the SWPPP shall include the following elements:

Temporary Construction BMPs

1. Surplus or waste materials shall not be placed in drainage ways or within the 100-year flood plain of surface waters.

2. All loose piles of soil, silt, clay, sand, debris, or earthen materials shall be protected in a reasonable manner to prevent discharge of pollutants to waters of the State. Material stockpiles should be placed on the upgradient side of excavation whenever possible. Stockpiles may also be protected by covering to prevent contact with precipitation and by placing sediment barriers around the stockpiles.

3. Dewatering shall be done in a manner so as to prevent the discharge of pollutants, including earthen materials, from the site. The first option is to discharge dewatering waste to land. A separate permit may be required if, due to site constraints, dewatering waste must be discharged to surface waters. Contact the Regional Board for information on discharging to surface waters.

4. All disturbed areas shall be stabilized by appropriate erosion and/or sediment control measures by October 15 of each year.

5. All work performed between October 15th and May 1st of each year shall be conducted in such a manner that the project can be winterized within 48 hours. Winterized means implementing erosion and/or sediment controls that will prevent the discharge of earthen materials from the site and the controls will remain effective throughout the rainy/ snow season without requiring maintenance. In general, this requires stabilizing bare disturbed soils with mulch, erosion protection blankets, or other suitable materials, and installing perimeter sediment controls such as fiber logs or other similar materials that will remain effective during significant rain and snow events.

6. After completion of a construction project, all surplus or waste earthen material shall be removed from the site and deposited at a legal point of disposal.

7. All non-construction areas (areas outside of the construction zone that will remain undisturbed) shall be protected by fencing or other means to prevent unnecessary encroachment outside the active construction zone.

8. During construction, temporary erosion control facilities (e.g., impermeable dikes, filter fences, hay bales, etc.) shall be used as necessary to prevent discharge of earthen materials from the site during periods of precipitation or runoff.

9. Control of run-on water from offsite areas shall be managed (protected, diverted, treated, etc.) to prevent such water from degrading before it discharges from the site.

10. Where construction activities involve the crossing and/or alteration of a stream channel, such activities require a prior written agreement with the California Department of Fish and Game and shall be timed whenever possible to occur during the period in which streamflow is expected to be lowest for the year. Other control measures may be used as necessary to prevent adverse effects from work in surface waters.

Permanent Construction BMPs

1. Impervious surfaces should be constructed with infiltration trenches or comparable infiltration structures along downgradient sides to infiltrate the increase in runoff resulting from the new impervious surfaces. Infiltration structures should also be constructed to accept runoff from structural (roof top) drip lines. Other control measures may be considered if design and/or site constraints are such that construction of infiltration devices is infeasible. Additional specific design specifications are required for the Truckee, Little Truckee and Long Hydrologic Units/Areas (see specific requirements below).

2. Where possible, existing drainage patterns shall not be significantly modified.

3. Drainage swales disturbed by construction activities shall be stabilized by the addition of crushed rock or riprap, as necessary, or other appropriate stabilization methods.

4. Revegetated areas shall be regularly and continually maintained in order to assure adequate growth and root development. Physical erosion control measures (controls other than live vegetation) shall be placed on a routine maintenance and inspection program to provide continued erosion control integrity.

A site-specific SWPPP shall be prepared for each construction area greater than one (1) acre, and if special measures are necessary for a site, these measures shall be incorporated into the plan.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During the project design phase.

Complete: At the completion of construction.

Monitoring Agency: State Board and Lahontan must approve the SWPPP.

Validation: The State Board and Lahontan shall review the adequacy of the SWPPP prior to the issuance of the NPDES General Construction Activity Storm Water Permit.

The District shall check compliance with this measure throughout construction.

SP-12 Standard Noise Control Practices - Construction Phase

Description: During construction, the District and its contractors shall utilize the following standard noise control practices, which are included as part of the Project to minimize noise disturbances at sensitive receptors during construction activities:

- Newer construction equipment with improved noise muffling shall be used and all construction equipment items shall have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators intact and operational;
- All construction equipment shall be inspected weekly to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding, etc.);
- Wherever possible, hydraulic tools shall be used instead of pneumatic impact tools;

- Construction activities after 7:00 p.m. or before 7:00 a.m. shall not be allowed within 2,000 feet of residential units, hotels, hospitals or convalescent homes. Noise generating construction shall be restricted within 1,600 feet of these facilities on Saturdays, Sundays, or holidays;

- Heavy construction truck trips shall be routed over streets that shall cause the least noise disturbance to residences or businesses in the vicinity of the project area;

- Construction staging areas, maintenance yards, and other construction-oriented operations shall not be located within 1,600 feet of a sensitive receptor; and

- Blasting shall be keep to a minimum to reduce ground-borne vibrations

- Where construction occurs within 1,600 feet of a school, the construction manager shall implement measures to insure that construction noise does not interfere with the learning activity of the students. The following noise control practices may be implemented:

- Limit construction to non-school hours or weekends; or

- Utilize temporary noise barriers, as needed, to protect schools from excessive noise levels from construction activities. Noise barriers may be made of heavy plywood, vinyl curtain material, or natural or temporary earth berms.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** At the beginning of construction. The District shall monitor compliance on a daily basis during construction.

Complete: At the completion of construction.

Monitoring Agency: District

Validation: The District shall check compliance with this measure daily, throughout construction.

SP-13 Standard Noise Control Practices - Operation Phase

Description: During the operation of the pressurized recycled water conveyance and distribution pipelines, the potential for noise exists due to pressurized water flow in the pipelines. Generally, noise is caused by high velocity water turbulence, water surge or thrust, and water hammering. The pipeline systems will be buried below the ground surface along their routes, which provide a natural noise barrier. The operation of pipelines will not produce significant noise impacts.

Some Project Components shall require the use of pumps in their operations. The following standard noise control practices shall be used to reduce pump noise.

- The District shall retain a qualified noise engineer to determine if there would be noise impacts from pumps. If noise modeling shows that there would be potentially significant noise impacts, a noise engineer would assist in the final design of the pump stations. The noise engineer shall be responsible for ensuring that the following noise reduction measures are incorporated into the design of the pump stations.

- Outdoor pump stations that exceed the noise criteria shall be designed to include noise barriers to reduce the noise at nearby sensitive receptors to a level that is within the noise criteria. Noise barriers reduce noise by approximately 20-30 dBA.

- The design of pump stations shall be such that all openings, such as for ventilation and doors, shall face away from sensitive receptors. This provides for approximately a 10-15 dBA noise reduction.

- All exterior doors for the pump stations shall be constructed of metal assemblies and weather-stripped. This will provide for approximately a 3-5 dBA noise reduction.

- Acoustical louvers or an air intake/exhaust plenum shall be used for pump station housing air ventilation openings. This will provide for approximately a 7-10 dBA noise reduction.

- During operation of the biomass production activities (including planting, growing, harvesting, and transportation phases), noise will be generated by mobile equipment such as trucks and other motor vehicles, and agricultural and related equipment.

To minimize impacts from these activities, the following measures will be used to reduce motor vehicle, biomass production, and related equipment noise.

- Newer motor vehicle and agricultural equipment with improved noise muffling shall be used and all equipment items shall have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators intact and operational.

- All operational equipment shall be inspected weekly to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding, etc.).

- Biomass production and harvesting activities after 7:00 p.m. or before 7:00 a.m. shall not be allowed within 2,000 feet of residential units, hotels, hospitals or convalescent homes. Noise generating equipment use shall be restricted within 1,600 feet of these facilities on Saturdays, Sundays, or holidays.

- Heavy operational-phase truck trips shall be routed over streets that will cause the least noise disturbance to residences or businesses in the vicinity of the project area.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** At the beginning of operations of a Project Component.

Complete: On-going.

Monitoring Agency: District

Validation: The District shall check compliance weekly during operations.

SP-14 Standard Air Quality Control Practices - Construction Phase

Description: Project Components shall involve the construction of infrastructure and operation of facilities. For purposes of air quality impact analysis, a "worst case day" for construction activity is assumed as the basis for developing construction equipment usage and resulting equipment exhaust and fugitive dust emissions. This worst-case day involves the construction of a buried pipeline with equipment used for trenching, pipe laying, backfilling, pipe and debris hauling, and construction worker vehicles.

There are a number of measures available to control construction equipment and vehicle exhaust emissions. The District shall require that contractors implement the following vehicle and equipment exhaust control program during the construction of recycled water facilities:

- Construction vehicles and equipment shall be maintained and tuned at the intervals recommended by the manufacturers to minimize exhaust emissions.

- Equipment idling shall be kept to a minimum when equipment is not in use. No piece of unused equipment shall idle in one place for more than 5 minutes, as mandated by the California Air Resources Board and under California Health and Safety Code section 39674. The District adopted an Idling Policy on March 7, 2009.

- Construction truck work trips for trucks using nearby roadways shall be scheduled during non-peak hours to reduce the amount of additional emissions that may be generated due to slower traffic on the affected roadways.

- The distance of a trip to and from the construction site shall be kept to the shortest distance possible.

- The GBUAPCD, in its Rule 401 - Fugitive Dust, requires control of visible particulate matter from activities under normal wind conditions. Rule 401 does not apply to agricultural activities. The rule lists the following control measures for the control of fugitive dust:

  - Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;

  - Application of asphalt, oil, water or suitable chemicals on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dusts;

  - Installation and use of hoods, fans, and fabric filters, to enclose and vent the handling of dusty material. Adequate contaminant methods shall be employed during such handling operations;

  - Use of water, chemicals, chuting, venting, or other precautions to prevent particulate matter from becoming airborne in handling dusty materials to open stockpiles and mobile equipment; and

  - Maintenance of roadways in a clean condition.

- Construction of recycled water facilities by the District or its contractors shall utilize the above emission control measures or their equivalents to reduce the amount of fugitive particulate matter escaping the construction site. Water spraying to reduce dust for example, shall reduce fugitive particulate emissions from this source by approximately 50 percent. For analytical purposes, the emissions calculations in the following section do not take emissions controls into account in order to estimate a maximum worst case day emissions case for comparison with the evaluation criteria. With the planned implementation of construction emissions controls as part of the Project, actual PM10 emissions would be approximately one-half the estimated amounts.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** At the beginning of construction. The District shall monitor compliance on a daily basis during construction.

Complete: At the completion of construction.

Monitoring Agency: District

Validation: The District shall check compliance with this measure daily, throughout construction.

SP-15 Standard Air Quality Control Practices - Operations Phase

Operation of facilities that utilize electric-powered pumps and equipment shall not generate air contaminant emissions. Operation of fossil-fueled equipment such as motor vehicles and agricultural equipment used in biomass production, and in educational and conservation activities, shall generate air contaminant emissions. The District shall require that the following motor vehicle and equipment exhaust emission control actions be implemented during the operational phase.

- Motor vehicles and agricultural equipment shall be maintained and tuned at the intervals recommended by the manufacturers to minimize exhaust emissions.
- Equipment idling shall be kept to a minimum when equipment is not in use. No piece of unused equipment shall idle in one place for more than 5 minutes, as mandated by the California Air Resources Board and under California Health and Safety Code section 39674. The District adopted an Idling Policy on March 7, 2009.
- Operational phase truck trips for trucks using nearby roadways shall be scheduled during non-peak hours to reduce the amount of additional emissions that may be generated due to slower traffic on the affected roadways.
- The distance of a trip to and from an operational phase activity site shall be kept to the shortest distance possible.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** At the beginning of operations.

Complete: On-going.

Monitoring Agency: District

Validation: The District shall check compliance with this measure weekly during operation activities.

D.5.1 Planning Measures

This section contains standard practices to be implemented during the final planning and detailed design of the Project. These measures often require the refinement of the final project design to accommodate particular environmental constraints. Compliance with these standard practices during planning ands design phases of the Project will result in avoidance and/or minimization of adverse environmental impacts.

SP-16 Slope Stabilization Design

Description: The District shall retain a licensed geotechnical engineer to conduct a construction level geotechnical investigation for physical facilities such as pipeline routes, irrigation systems, embankment locations, and hydroelectric facilities. The investigation shall identify slope stability risk areas, liquification, and fault zone identification and provide engineering design and construction recommendations to stabilize slopes where needed. Slope stability recommendations could include, but are not limited to:

- Removal and replacement of unstable materials in an existing landslide with a stronger material;
- Grading to an acceptably stable topographic configuration by terracing, reducing slope angles, and reducing the height of cut and fill slopes;
- Drainage facilities, such as subdrains and dewatering wells to reduce pore water pressure and reduce the risk of slope failure;
- Buttressing the toe of slopes to provide additional support to the slope;
- Where buttressing is not feasible, internal reinforcement such as a pinning system or lattice grid incorporated in the slope design to strengthen the slope;
- Retaining walls or other external applications to strengthen slopes; and
- In addition, pipeline alignments and electrical lines can be adjusted to avoid areas with slope stability problems.

Component: Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During Final Design.

Complete: Prior to issuance of a grading permit.

Monitoring Agency: District

Validation: District shall comply with this measure prior to certifying the Final Engineering Drawings or issuance of a grading permit.

SP-17 Pipeline Design Features in Active Fault Zones

Description: The District shall design pipelines crossing active fault zones with isolation valves. During final design, the engineers shall consider both automatic and manually operated isolation valves. Automatic valves are recommended if they are determined to be feasible, as they shall cut off water more quickly in the event of a pipeline break. The isolation valves shall be on both sides of the pipeline crossing, located at a distance of one thousand feet from the fault zone. Where pipelines run parallel to an active fault zone, final design shall be include a detailed geotechnical evaluation of pipeline siting, and the pipeline route shall be designed to remain outside of the fault zone.

Component: Components NP-1, NP-2, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During design.

Complete: Prior to certification of the final Engineering Drawings.

Monitoring Agency: District

Validation: District shall comply with this measure prior to certifying the Final Engineering Drawings.

SP-18 Liquefaction Stabilization Design

Description: The District shall be responsible for performing a site-specific evaluation of liquefaction potential at proposed facility locations and shall retain a registered geotechnical engineer to conduct a detailed, facility specific, soil analysis in areas mapped as having a "high" liquefaction potential. The analysis shall determine locations where facilities could be damaged by liquefaction and shall include:

- Identification of density profiles;
- Determination of maximum shallow groundwater levels; or
- Characterization of the vertical and lateral extent of saturated sand/ silt layers that could undergo liquefaction during strong ground shaking.

Where facility specific testing indicates that conditions are present that could result in liquefaction and damage to project facilities, appropriate feasible measures shall be included in the site-specific soils analysis and shall be incorporated into project design. These measures shall include the following, unless the site-specific soils analysis dictates otherwise:

- Densification or dewatering of surface and subsurface soils;

- Construction of concrete foundations to support pipelines or pile foundations to support buildings; and

- Removal of material that could undergo liquefaction in the event of an earthquake and replacement with stable material.

Project facilities shall be designed in accordance with requirements based on Seismic Zone 3. In areas that are especially prone to liquefaction, such as the pipeline crossing of the West Fork of the Carson River, additional design features shall be considered to avoid or minimize ruptures and spills during a seismic event. Such features may include:

- Use of restrained joint pipe in the area prone to liquefaction;

- Installation of shut-off valves at key locations;

- Provision of sensors to detect pipe ruptures (these could include use of pressure sensors or flow meters); and

- Use of manual or automated control valves to limit water release in the event of a pipe rupture.

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During Final Design.

Complete: Upon completion of construction.

Monitoring Agency: District

Validation: District shall retain a Registered Geotechnical Engineer to verify compliance with this measure.

SP-19 Standard Engineering Methods for Expansive Soils

Description: Prior to Project Component design, the District shall hire a Certified Professional Soil Scientist or licensed geotechnical engineer to conduct a pre-design soil analysis along each pipeline alignment. The survey shall record soil type and soil properties (including shrink-swell potential, pH, salinity, and active sulfides).

Where the analysis has identified the presence of expansive soils, the following standard engineering methods shall be used to reduce or eliminate potential impacts from expansive soils:

- Removal of native soil and replacement with an engineered fill material that is not prone to shrinking and swelling;

- Soil stabilization, such as lime treatment to alter soil properties to reduce shrink-swell potential to an acceptable level; and

- Deepening footings or other support structures in the expansive soil to a depth where soil moisture fluctuation is minimized.

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During design.

Complete: Upon completion of construction.

Monitoring Agency: District

Validation: District shall retain a Registered Geotechnical Engineer to verify compliance with this measure.

SP-20 Standard Engineering Methods for Corrosive Soils

Description: As part of the pre-design soil analysis (SP-18), the Certified Professional Soil Scientist or licensed geotechnical engineer shall conduct an analysis of soil properties and the chemical interaction between soil, groundwater, and pipe materials. The analysis shall include a determination of pipeline alignments requiring corrosion prevention measures.

The District shall design pipelines that traverse highly corrosive soils to utilize non-corrodible materials such as PVC or have an active cathodic protection system (one that applies a current to the pipe and protects metals from the effects of low pH).

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During design.

Complete: Prior to certification of the final Engineering Drawings.

Monitoring Agency: District

Validation: The District shall retain a Registered Geotechnical Engineer to verify compliance with this measure.

SP-21 Temporary Containment and Impoundment Siting and Design

Description: Final siting of temporary containment sites shall avoid locations within Alquist-Priolo Earthquake Fault Zones (as identified in Figure 4-3-1), if possible. Embankment and berm design shall meet the requirements of the Division of Safety of Dams (if applicable). If temporary containment sites are located within active fault zones, embankments shall be designed with additional freeboard to reduce the risk of overtopping during a seismic event. Embankments and berms shall be inspected seasonally for structural integrity and maintained as needed to avoid slope failures and subsequent flooding.

Component: Component 11

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During design.

Complete: Prior to certification of the final Engineering Drawings.

Monitoring Agency: District

Validation: The District shall retain a Registered Geotechnical Engineer to verify compliance with this measure.

SP-22 Mosquito Prevention

Description: District shall consult with Alpine County in designing and developing temporary containment sites, impoundments or wetlands. The District shall comply with requirements for mosquito prevention. Measures shall include proper grading of shallow water areas to facilitate drainage, with ditches to provide habitat for mosquitofish or other biological controls. Sites should not have small coves or irregularities, side slopes should be as steep as possible, and dead algae, vegetation, and debris should be routinely removed to minimize mosquito habitat. Biological control agents include mosquitofish, and other predators such as backswimmers, beetles, and flatworms. District shall consult with the CDFG to determine which mosquito larvae predators are appropriate for the project area. Mosquito larvae may be controlled with microbial insecticides such as Bacillus thuringensis. Performance criteria shall conform to the Mosquito and Vector Control Association of California standards and incorporate the California Mosquito-borne Disease/Virus Surveillance and Response Plan (found at http://www.mvcac.org).

Component: Components 9, 10, 11, 13, 15

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During Final Design.

Complete: Prior to the beginning of construction.

Monitoring Agency: Alpine County Health Department

Validation: Design features to reduce mosquito habitat shall be incorporated in design of temporary containment sites. Mosquito prevention measures shall be developed prior to operation of new temporary containment facilities.

SP-23 Delineate Wetlands, Waters of the United States, and Riparian Habitat

Description: Formal delineations of potential wetlands and waters of the United States and Waters of the State within defined project areas, using CAD-based topographic maps, shall be conducted six (6) months to one (1) year prior to Project construction. Delineations shall be suitable for Clean Water Act Section 401 and 404 permitting purposes. A riparian census of palustrine scrub-shrub and forested wetlands, including stem counts and identification of stems to species, and top-of-bank surveys (against horizontal and vertical survey control) shall be conducted. Coordination with agencies to determine mitigation ratios shall be implemented prior to Project construction. <u>If impacts are unavoidable, then mitigation shall be provided which reduces the impacts below a level that is significant.</u>

Delineate Wetlands and/or Waters of the United States. The District shall hire a qualified consultant to conduct a wetland delineation of each project site and/or ROW according to the USACE 1987 Manual. If private lands are involved, the District shall obtain written permission from individual landowners to obtain access to the property, to conduct the investigation, and to report the results to federal and state agencies.

Each wetland delineation shall clearly show topography against horizontal and vertical survey control, property lines, and the project boundary and/or ROW. The consultant shall stake and flag wetland edges in the field for later survey by District. Jurisdictional edges shall be plotted on the topographic base sheets as a separate CAD layer for later sandwiching with the project footprint. Standard USACE data forms and supplementary text shall accompany the preliminary and final wetland delineation maps.

The wetland delineation shall be submitted to the USACE at least six (6) months prior to construction. The submittal shall be at a level of detail suitable for USACE permitting purposes. At the same time the wetland delineation is submitted, the District or a qualified consultant shall prepare a Department of the Army application to include a Conceptual Wetland Mitigation Plan (see Mitigation 2.3.15), and an application to Lahontan for Section 401 Certification.

Prepare a Riparian Census and Top-of-bank Survey. If applicable, a qualified biologist shall conduct a census of riparian woody vegetation from the top-of-bank and/or drip-line of the tree or shrub canopy within the project area or ROW. The census shall include identification of riparian tree and shrub species, counts of stems, and diameter at breast height for those stems greater than 24-inches in diameter within the construction footprint. Top-of-bank shall be determined against vertical and horizontal survey control. The riparian census shall be performed in sufficient detail for a CDFG 1601 Lake or Streambed Alteration Agreement.

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: USACE

Implementing Agency: District

Timing: **Start:** Prior to Project Design

Complete: One year prior to the beginning of construction.

Monitoring Agency: USACE, CDFG

Validation: The wetland delineation shall be submitted to USACE six (6) months prior to construction concurrently with an application for a Department of the Army Permit and request to Lahontan for Section 401 Certification. The riparian and top-of-bank determination shall be submitted to the CDFG together with a 1601 Streambed Alteration Agreement application.

SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan

Description: Prepare a wetland and riparian mitigation and monitoring plan. The plan shall include a proposed planting palette, provisions for the establishment of permanent conservation easements, and a maintenance and monitoring plan to include performance criteria. Replace wetlands and waters of the United States at a ratio negotiated with the state and federal regulatory agencies.

Wetland Mitigation and Monitoring Plan. The District shall prepare a Wetland Mitigation and Monitoring Plan to accompany a Department of the Army Application and Wetland Delineation for submittal to USACE. In addition, the plan shall be tendered to Lahontan together with CEQA documentation, and a fee, for Section 401 Certification. The plan shall be written to conform to the recommendations set forth, for example, by the Sacramento District of USACE or Lahontan. The plan shall include a statement of the wetland functions and values to be replaced, a planting palette, a conceptual planting plan, a plan to preserve created wetlands through a conservation easement, performance criteria, and a five-year maintenance and monitoring plan. Replacement of wetlands shall be on site, if possible, or by off-site mitigation, possibly payments into a mitigation bank. If payment into a mitigation bank is chosen, the banking entity shall provide the Wetland Mitigation and Monitoring Plan as part of the fee.

Riparian Mitigation and Monitoring Plan. The District shall prepare a Riparian Mitigation and Monitoring Plan to accompany a CDFG 1601

Streambed Alteration Agreement Application and Wetland Delineation for submittal to CDFG.

The plan shall include a planting palette, a conceptual planting plan, and a plan to preserve created riparian habitat through a conservation easement, performance criteria, and five-year maintenance and monitoring plan. Replacement of riparian habitat shall be on site on the Heise Ranch along Indian Creek.

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: USACE

Implementing Agency: District

Timing: **Start:** During final design.

Complete: One (1) year prior to the beginning of construction.

Monitoring Agency: USACE, CDFG

Validation: The wetland and riparian mitigation and monitoring plans shall be submitted to USACE six (6) months prior to construction concurrently with an application for a Department of the Army Permit, request to Lahontan for Section 401 Certification, and 1601 Streambed Alteration Agreement application.

SP-25 Sensitive Resource Program

Description: Develop a Sensitive Resource Program for unavoidable impacts to <u>Winter Range for the Carson River Deer Heard</u>, Threatened and/or Endangered Species and their Critical Habitat to include compliance with FESA and CESA. Conduct a Biological Assessment; identify, select, and purchase mitigation sites; obtain an Incidental Take 2081 Agreement with CDFG; and prepare a mitigation and monitoring plan (see Measures SP-31, BIO-5A and BIO-5B). <u>If impacts are unavoidable, then mitigation shall be provided which reduces the impacts below a level that is significant.</u>

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: CDFG, NDOW, USFWS

Implementing Agency: District

Timing: **Start:** During preliminary planning.

Complete: Prior to application for permits.

Monitoring Agency: District

Validation: The Plan shall be developed prior to certification of the Final Engineering Drawings.

SP-26 Sensitive Plant Protection Program

Description: Develop a Sensitive Plant Protection Program for unavoidable impacts to Bureau of Land Management (BLM)-Sensitive, California Native Plant Society (CNPS) and Nevada Natural Heritage Program Special Status Plant Species. Conduct rare plant surveys to follow CNPS 2001 survey guidelines; avoid and fence rare plant populations identified from the surveys; identify, select, and purchase mitigation sites or negotiate conservation easements or restore off-site, degraded rare plant populations to compensate for unavoidable impacts; prepare a mitigation and monitoring plan (see Measures BIO-5A, SP-25, SP-31, and BIO-5B). <u>If impacts are unavoidable, then mitigation shall be provided which reduces the impacts below a level that is significant.</u>

Floristically-based Rare Plant Surveys. District shall contract with botanists to prepare a rare plant survey for each project that potentially impacts unplowed rangeland, scrubland, and woodlands. The format and scope for these rare plant surveys shall follow the CNPS 2001 guidelines.

Avoidance. Impacts to rare plant populations identified from the rare plant surveys shall be avoided by reconfiguring project design, fencing rare plant populations to prevent encroachment, and purchase of open space and conservation easements to protect the fenced rare plant populations.

Identify, Select, and Purchase Mitigation Sites. The District, together with input from the BLM, USFWS, CDFG, and NDF, shall identify opportunities for mitigation in the area. Mitigation may include a single, or combination of the following items: purchase of mitigation sites, negotiation of conservation easements, or habitat restoration in offsite, degraded rare plant populations to compensate for unavoidable impacts. If agreed on by the stakeholders, land and/or mitigation credits may be purchased in advance of construction.

Prepare a Special Status Plant Species Mitigation & Monitoring Plan. The District shall produce a mitigation and monitoring plan to follow the CNPS and CDFG guidelines to comply with Chapter 10 of CDFG Native Plant Protection Policy. This standard practice parallels measures BIO-, 5A, SP-31, and BIO-5B.

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: CDFG, NDF, USFWS

Implementing Agency: District

Timing: **Start:** During preliminary planning.

Complete: Prior to construction.

Monitoring Agency: District

Validation: The program shall be developed prior to certification of the Final Engineering Drawings.

SP-27 Avoid Impacts to Wetland and Riparian Areas

Description: The District shall avoid impacts to wetlands and riparian areas in the design, construction, operation and maintenance of Project Components. Final siting of components shall consider the locations of wetlands and riparian areas and shall avoid such features to the extent feasible. Avoidance shall occur through use of appropriate setbacks and buffers. Where wetlands or riparian areas cannot be avoided, construction shall take place in a manner to minimize impacts. This shall include the use of cutoff walls to ensure that wetlands would not be drained as a result of pipelines diverting groundwater. <u>If impacts are unavoidable, then mitigation shall be provided which reduces the impacts below a level that is significant.</u>

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: USACE

Implementing Agency: District

Timing: **Start:** Design measures shall be implemented during final design. Construction measures shall begin at the start of construction.

Complete: At the completion of construction.

Monitoring Agency: USACE, CDFG

Validation: The District shall review final engineering drawings to verify that appropriate setbacks and buffers have been established to protect wetlands and riparian areas.

D.5.2 Construction Measures

This section contains mitigation measures to be implemented prior to, during, and immediately following Project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the Project. Compliance with these mitigation measures will result in avoiding, minimizing, or reducing adverse environmental impacts.

SP-28 Remove Weak Surficial Deposits from Basin Footprints

Description: During construction, the construction manager shall ensure that weak surficial deposits, including landslide deposits, unconsolidated alluvium and colluvium and soil shall be excavated and removed from the borrow excavation area. Slope stabilization measures identified in standard practice SP-16 shall be incorporated into the borrow excavation plan for the basin sites to stabilize the basin to the extent feasible.

Component: Component 9, 10, 11

Lead Agency: District

Implementing Agency: District

Timing: **Start:** During construction of temporary containment sites.

Complete: Upon completion of construction.

Monitoring Agency: District

Validation: The District shall retain a Registered Geotechnical Engineer to verify compliance with this measure.

SP-29 Management of Hazardous Materials/Waste During Construction

Description: Prior to construction and during design, the District shall retain a Registered Geologist or Registered Environmental Assessor to survey each pipeline alignment for contaminated soil, recording the location, extent and type of contamination.

Construction activities related to the project that require excavation or exposure of soil in areas suspected of containing soil or groundwater contamination (i.e. areas in the vicinity of hazardous materials/waste release sites) shall include monitoring by the contractor for subsurface contamination in compliance with the appropriate state's (California or Nevada) occupational safety and health regulations. This monitoring would, at a minimum, include visual observation by personnel with appropriate hazardous materials training, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training as required for workers engaged in hazardous waste operations.

In areas where contamination of soil and groundwater is suspected or known, groundwater brought to the surface as a result of dewatering shall be contained in Baker tanks or similar containment devices. At a minimum, this would allow the suspended solids associated with dewatering to settle out before discharge, if discharge is allowable. Depending on the proximity to known contaminated plumes, and the probability of groundwater being contaminated based on visual or other evidence; samples would be collected and analyzed. A State of California (or State of Nevada) certified hazardous waste laboratory using EPA-approved analytical methods should perform the laboratory analyses. The types of analyses should be based on the likely contaminant(s) and on local permitting requirements. Discharges of dewatered groundwater would be subject to permitting by Lahontan or NDEP. The origin of the contaminated materials shall dictate the applicable State OSHA regulations and remediation process to follow.

District shall obtain required permits and incorporate permit requirements in the demolition/construction documents so that permit restrictions can be included in contractor's scope of work.

Potentially contaminated materials encountered during project demolition/construction activities shall be evaluated in the context of applicable local, state and federal regulations and/or guidelines governing hazardous waste. Materials deemed to be hazardous shall be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines. Evaluations, remediation, treatment and/or disposal of hazardous waste shall be supervised and documented by qualified hazardous waste personnel (having received a minimum of 40 hours HAZWOPER training).

Component: Component 16

Lead Agency: District

Implementing Agency: District

Timing: **Start:** The program shall be developed at the conclusion of the design phase of the proposed project. Monitoring to ensure implementation of the program shall begin during the construction mobilization phase.

Complete: Monitoring shall continue throughout construction and cease at the completion of the construction phase.

Monitoring Agency: District and California or Nevada OSHA

Validation: The program shall be developed prior to construction. State agencies do not provide regular monitoring services, but may conduct periodic inspections.

SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries

Description: Potential active nest sites and wildlife nurseries within 0.25 mile of the construction zone shall be identified during pre-construction surveys. Construction activities within 0.25 mile of active nests shall be scheduled to occur outside of the nesting season, or exclusion zones shall be established and monitored during construction.

District shall retain a wildlife biologist to conduct a pre-construction survey to determine if raptor nests, migratory bird nests, and pygmy rabbit nursery sites occur in or within 0.25 mile of the project site. If construction takes place outside the breeding season there shall be no need to conduct surveys for active nests and nurseries. If no active nests or nurseries are found in the study area, no mitigation shall be required.

If nests or nurseries are found in the project area, construction exclusion zones shall be established in consultation with the CDFG around each active nest or nursery. No disturbance shall occur within the exclusion zone around a nest site or nursery during the breeding season. A biological monitor shall be present during construction that takes place during the breeding season within 0.25 mile of a nest site or nursery.

During construction, a biological monitor shall evaluate potential nesting and nursery disturbances caused by the construction activities. The biological monitor shall have the authority to stop construction if it appears to be having a negative impact on the nesting raptors or breeding pygmy rabbits.

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 29, 30, 31, 32

Lead Agency: CDFG, NDOW, USFWS

Implementing Agency: District

Timing: **Start:** Two weeks prior to start of construction for final flagging/fencing.

Complete: Following completion of construction.

Monitoring Agency: District

Validation: State Game Wardens

SP-31 Pre-Construction Marking and Fencing of Sensitive Native Plant Communities

Description: Mark and fence sensitive native plant communities prior to construction. Pre-construction marking and fencing of sensitive native plant communities is required to protect these resources during construction, and to avoid additional costly mitigation.

This mitigation measure parallels standard practice SP-31, Pre-construction Marking and Fencing of Wetlands and Riparian Habitat, but differs from the latter in that marking and fencing focus on the protection of native rangeland from construction disturbance. A revegetation specialist shall mark the boundaries of native rangeland using temporary signs, protected from damage by the weather, to alert construction crews that they have reached the boundaries of their construction site, and may be encroaching on native rangeland.

Native rangeland shall be fenced from the permanent District easement and/or property with temporary rope and flagged fencing visible from the cab of heavy equipment, to keep operators from encroaching on native rangeland outside of the construction easement.

The revegetation contractor shall remove the markings and fencing during the habitat restoration and revegetation of disturbed sites. Through its land agents, the District shall work with private landowners and public agencies to replace or repair range fences disturbed by construction.

Component: Components 1, 3, 4, 5, 6, 9, 11, 14, 16, 17, 22

Lead Agency: CDFG, NDF

Implementing Agency: District

Timing: **Start:** Two weeks before construction for final flagging/fencing.

Complete: After construction.

Monitoring Agency: District

Validation: California State Game Warden, Nevada State Forester Fire Warden

SP-32 Pre-Construction Marking and Fencing of Wetlands and Riparian Habitat

Description: Mark and fence delineated wetlands and waters of the United States, and riparian habitat prior to construction. Pre-construction marking and fencing of sensitive wetlands and waters of the United States is required to protect these resources during construction, and to prevent illegal fills.

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: USACE

Implementing Agency: District

Timing: **Start:** Two weeks prior to construction for final flagging/fencing.

Complete: When construction is complete.

Monitoring Agency: District

Validation: USACE and CDFG

D.5.3 Operation and Maintenance Measures

This section contains standard practices to be implemented during operation of the Project. These measures generally require monitoring of system operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with these measures will result in the avoidance and/or reduction of adverse environmental impacts.

SP-33 Surface and Ground Water Protection Plan

Description: Install additional groundwater monitoring wells and monitor groundwater levels. Develop a Nutrient Management Plan (NMP) in accordance with the final draft of the State Board's Recycled Water Policy. Implement tailwater management and containment practices. Practice release prevention and public protection measures. Develop a monitoring response plan specifying appropriate actions to be taken at each site in the event of groundwater contamination or impending degradation of groundwater quality.

Alpine County Groundwater Monitoring Program

The District shall modify the Alpine County Groundwater Monitoring Program (ACGMP) to the satisfaction of Lahontan to offer concrete responses when baseline nitrate or other nutrient levels from groundwater monitoring wells show degradation of groundwater quality attributable to the recycled water reuse. The proposed modifications to the existing monitoring program are outlined in Appendix J of this EIR.

Nutrient Balance Comparison. Groundwater samples shall be collected from existing and new monitoring wells that shall be located at various distances down gradient from the portions of the project area that shall be irrigated with recycled water. The nitrate concentration in the groundwater shall be monitored quarterly, and compared to the previous year's data, and the threshold of 7 mg/l for nitrate. The drinking water standard (threshold) is 10 mg/l. The District shall commit to monitor for a "trigger threshold" of 7 mg/l allowing for alternative management opportunities prior to reaching the regulatory threshold. The plan shall include measures to curtail recycled water flows on to the project area either temporarily or permanently, should groundwater degradation result.

In order to determine the hydraulic loading based on nitrogen, Wood Rodgers consulted "WTS-1B: General Criteria for Preparing an Effluent Management Plan," prepared by the Nevada Department of Environmental Protection (NDEP). Wood Rodgers set a conservative "red-flag" threshold level of 7 mg/l for Cp, as is common practice in developing a Nevada Effluent Management Plan (EMP). This was done to insure that the receiving groundwater resource will not be excessively degraded to a point where it is no longer useable (please also refer to the Assimilation Capacity Technical Report, Appendix 4). The District understands that State Water Boards may impose a more stringent trigger value if an additional factor of safety is desired.

Tailwater Management and Containment Practices

Tracking. The District shall be required to track the quantity of recycled irrigation water applied to each irrigation area. The District shall be required to record total volume released for irrigation. The District shall create a log to track the irrigation within each irrigation area. The log shall indicate the date, area irrigated, irrigated acreage, start time, stop time, and comments.

Tailwater Management. The District shall apply recycled water for agricultural irrigation purposes inclusive of tailwater management. The following procedures shall be used to manage tailwater when irrigating with recycled water. Attend irrigation of fields and stop flow as water advances toward the end of the field to manage tailwater. In the event that tailwater is generated, containment can be accomplished by two methods, depending on the location of the field. Water can be conveyed by ditch and released for irrigation on a downstream field, or water can be contained by closing check gates and impounding the water in the containment area. A tailwater containment area shall be located on the property (size and location to be determined).

Tailwater Return. The District shall use the recycled water for agricultural purposes with tailwater management to ensure no discharge to surface water systems. The following procedures shall be used to contain tailwater, if generated from the project area when irrigating with recycled water: Irrigation shall be managed to optimize irrigation efficiency. Personnel shall attend irrigation of the fields to ensure that flows are stopped when irrigation demands have been met to avoid tailwater generation from the fields. Fields may be designed so that tailwater from upper fields flows onto lower fields as irrigation. All tailwater reaching the low end of the project area shall flow into a tailwater recovery area with a capacity to be determined to prevent surface discharge from the site when irrigating with recycled water.

Winter Operation. Recycled water shall be stored in Harvey Place Reservoir until it is needed at the beginning of the irrigation season. As such, winter irrigation shall not be authorized. Temporarycontainment of recycled water from HPR to the Diamond Valley Ranch may be authorized if approved by Lahontan.

Surface Water Quality Protection

To prevent contamination of freshwater sources from the aerial application of recycled water, the following buffers shall be applied when delineated irrigable acreage within the Project Area:

- A 25-foot setback from District property lines along Diamond Valley Road. Currently, irrigation occurs up to the property line along Diamond Valley Road. An overestimation of the buffer, which considers a 25-foot setback, allows the District discretion on irrigation methods.

- A 25-foot setback from the center line of irrigation ditches. In the areas currently under consideration for irrigation by the District, piping or rerouting of freshwater away from the recycled irrigation areas is proposed. A 25-foot setback from the center of primary ditches will protect freshwater supplies.

- A 25-foot buffer from the edge of streams. A 25-foot buffer from the edge of the IC Flood Control Channel and Indian Creek is necessary to protect beneficial uses and preserve water quality of freshwater sources.

Release Prevention and Public Protection Plan

These guidelines are applicable to an aerial irrigation system.

Release Prevention. Recycled water shall be applied in a manner to minimize potential impacts to groundwater quality incorporating the following specific measures to minimize the potential for surface release from the reuse site and preserve groundwater quality.

Standing Water. Unnecessary ponding of recycled water shall be avoided. In order to prevent unnecessary standing water, it is imperative that the irrigation system and tailwater recovery be operated properly. Standing water shall be minimized through the following means:

- Control of irrigation to prevent excessive tailwater;
- Use of laser leveled border strips irrigation;
- Manual control of pasture valves;
- Presence of an on-site irrigator monitoring surface irrigation progress; and
- Maintenance of perimeter ditches and tailwater containment area.

<u>Tailwater Recovery.</u> A tailwater recovery and return area may need to be constructed on the property. This area shall contain excess recycled water

<u>Unstable Ground Conditions.</u> The irrigation system shall be operated to minimize potential surface runoff by considering ground conditions before irrigating. Unsuitable conditions include frozen, saturated, or flooded soils. Fields shall not be irrigated during or immediately following significant precipitation events.

<u>Irrigation System Malfunction.</u> DVR personnel will inspect the irrigated areas to make sure the irrigation system is operational. Problems identified will be addressed and all necessary repairs will be completed promptly.

<u>Spill Response.</u> Spill response shall be required in the event of bypass or failure of check gate structures, breach of irrigation ditches, or breach of containment berms. Spill response shall entail the following:

- Shut down irrigation;
- Close check gates to retain irrigation on upstream or downstream fields; and
- Contain runoff and minimize off-site discharge by diverting water with temporary ditches, impounding water at topographic low spots, and/or constructing containment berms.

<u>Public Protection.</u> The following protection measures shall be implemented to assure public safety.

<u>Controlled Access.</u> The Diamond Valley Ranch has a perimeter fence defining the property boundary and locked gates shall restrict access to the reuse area.

<u>Public Notification.</u> The existing perimeter fence shall be posted with "No Trespassing" and "Warning Recycled water Do Not Drink" signs. Notification signs shall be placed at the access points and at minimum 500-foot intervals along the exterior fence line of application areas.

<u>Worker Notification.</u> Diamond Valley Ranch personnel directly involved with irrigating shall receive training and notification regarding possible

hazards and appropriate personal hygiene for working with recycled water.

Personal hygiene practices include:

- Do not drink the irrigation water;
- Do not use the irrigation water for washing;
- Always wash hands and face with clean water and soap before eating or drinking;
- Wear rubber gloves when working on the irrigation system;
- Minimize skin contact with recycled water;
- Treat cuts immediately before continuing to work on the irrigation system; and
- Report problems that might pose a risk.

Nutrient Management Plan

The District ~~shall~~ may require the development of ~~a~~ NMPs for the Carson Valley and Wade Valley portions of the project area to the satisfaction of the State Board's Recycled Water Policy. Nutrient management is the act of managing the amount, source, placement, form and timing of the application of plant nutrient and soil amendments. In the context of recycled water irrigation, the plan shall consider nutrient and salt concentrations present in recycled water when calculating fertilizer and irrigation application rates.

The plan must include a description of the best practicable treatment or control measures necessary to prevent nutrient or salt-related pollution or nuisance. The plan shall outline an approach towards education of contract irrigators regarding application of recycled water in an amount not exceeding the rate of uptake by planted crops. During the interim period prior to approval of NMPs, the District can reasonably control discharges of salts to groundwater by implementing nutrient management practices. Crop types and grazing management shall be determined according to site-specific conditions.

An NMP is primarily developed for use by the reuser as a current reporting mechanism and a future planning document. It is secondarily intended as a reporting mechanism for regulators. The purpose of the NMP is to provide guidance for irrigating with recycled water as follows:

- Provide a description of the recycled water delivery system and ancillary system components to inform responsible personnel of the system operation and capabilities;

- Identify responsibilities of the permittee/operator in the operation, maintenance and management of the recycled water reuse on the permitted site;

- Instruct system operators in the purpose and intended operation of components within the irrigation system under normal operating conditions and during emergency conditions. This report includes procedures for emergency response and notification; and

- Annual monitoring and reporting requirements.

Application rates shall be determined in accordance with site-specific hydraulic loading levels for the avoidance of degradation of groundwater quality and of groundwater mounding or increases in groundwater levels that cause surface water discharge in a non-stream environment.

To adequately convey, apply and manage average daily flows projected for 2028, the Carson and Wade Valley portions of the project area must be able to assimilate approximately 1.0 million gallons per day (MGD) of recycled waters exported from the District's WWTP. This is the difference between the 5.8 MGD projected for daily flows in 2028 and the 4.8 MGD total flow (71.89 in/yr or 5.99 acre-feet/acre) that can be applied effectively on the 904 irrigable acres in Diamond Valley Ranch with no calculated risk to groundwater quality. This application rate exceeds the current 2008 discharge from the District's WWTP, but does not adequately address projected discharge through 2028.

Effluent Management Plan

For Component 2 recycled water will be made available to irrigators in Nevada. The District ~~shall~~ may assist irrigators in Nevada with the preparation of Effluent Management Plans following guidance in WTS-1B: General Criteria for Preparing An Effluent Management Plan, the NDEP white paper.

Diamond Valley Ranch Nutrient Management Plan

The District shall implement the NMP for the Diamond Valley Ranch (Wood Rodgers 2009).

Application Rates. The initially calculated maximum recycled water application rate is 71.89 in/yr, which equates to 5.99 ac-ft/ac for 904 irrigable acres, or a total flow of 1,765 Mgal/yr (4.8 MGD). This is the maximum allowable application rate that will meet the crop requirements as well as meet the District's objective to use the maximum recycled water for irrigation purposes. This application rate exceeds the current average daily discharge from the District's WWTP.

Below is a summary of calculated application rates to meet the crop requirements for alfalfa and pasture grass, the recommended crops for the Diamond Valley Ranch portion of the project area.

Crop	Irrigation	Maximum Application Rate (ac-ft/ac)
Alfalfa	Surface	5.99
Alfalfa	Spray	5.57
Pasture grass	Surface	3.03
Pasture grass	Spray	3.18

Livestock Grazing. Currently the Diamond Valley Ranch is irrigated with freshwater and grazed in the late spring through early fall by approximately 1000 head of cattle under a grazing permit with the District. Although the District Pasture (see Figure 1 in NMP) has not been subject to consistent grazing over the last seven years, chemical properties are not significantly different as compared to the areas of the Ranch that have been consistently grazed. Wood Rodgers professional opinion is that the level of grazing that is occurring on the DVR is moderate, dispersed, and managed based on availability of feed. Thus, under this freshwater management regime no one area or field will be impacted by the production of manure and associated input of nutrients under a freshwater irrigation regime. Under a recycled water regime there will be a small excess of nitrogen available (NMP Table 5, Appendix 1, Grazing Options tech Memo).

~~If cattle grazing shall continue within the irrigation fields/temporary containment basins (Component 11), it is recommended that the carrying capacity of the crop be determined and livestock use be limited to a moderate level on a rotation system. Carrying capacity is defined as the maximum stocking rate possible that is consistent with maintaining or improving vegetation or related resources. It may vary from year to year on the same area due to fluctuating forage production.~~

In lieu of amending the grazing timeframes, crop type, and manure management necessary for a nutrient neutral grazing regime, the District shall commit to removing cattle from portions of the Diamond Valley Ranch when irrigating with recycled water. The removal of cattle during a recycled water irrigation regime is determined to result in deficiencies in the "whole ranch nutrient balance" for Phosphorus, Potassium, and Nitrogen, which assures the protection of groundwater resources.

Crop Management. Existing vegetation on the Diamond Valley Ranch consists of pasture grass species. The wetter portions of the ranch support grass-likes such as Baltic rush and sedges. When reviewing soil physical and chemical characteristics with the vegetation the Ranch is currently supporting, there are no unique vegetation species or communities. In other words, the species that occur are what is expected for mountain meadow community types, and are closely tied to soil moisture conditions rather than soil texture and soil chemical properties. An important consideration in developing an NMP is to maximize nutrient uptake by the vegetation. Alfalfa and pasture grass ~~shall be the~~ were the crop types studied for the Diamond Valley Ranch reuse area specifically for nutrient uptake calculations. Other crop types may be considered, but similar studies must first be completed.

Recommendations for alternative crops are as follows:

- The District shall consider a mix of crop uses (hay, crop, and wetlands mitigation plant materials). This will allow the DVR a variety of revenue opportunities as well as opportunity to maximize nutrient uptake and effluent disposal.

- Another viable option is to practice hay production for harvest or grazing, or both. One cutting shall be harvested due to short growing season from pasture hay fields, followed by grazing on irrigated stubble of that crop.

- The Diamond Valley Ranch NMP shall consider crop/plant alternative opportunities for nutrient uptake for the crops as determined by the District. Nutrient uptake is considered as a nutrient loss in the nutrient balance of the ranch under the effluent irrigation scenario. This analysis shall provide the District with information to be able to determine the crops they want to consider for production and maximize nutrient uptake and effluent disposal.

- Wetland sod shall be an alternative. Citations for the nutrient uptake of species that would grow in a non-open water situation are not available. If this shall be considered as an alternative, tissue samples will need to be collected on a current wastewater wetland site and compared to tissue samples of a natural site.

Nutrient Uptake. Final crop selection shall be dependent on growing season in the study area, availability of supplemental irrigation, the quality of the domestic wastewater with respect to the salinity tolerance of the crop, and market if the District determines that it is beneficial to produce a cash crop. In turn, the crop(s) selected shall be used to determine the hydraulic loading limit and water balance calculations. The hydraulic loading limit can be largely influenced by the potential of the crop to uptake nutrients, primarily nitrate. The water balance is primarily based on the need of the crop or the evapotranspiration rates and soil permeability rates. Nutrient uptake is considered as a nutrient loss in the nutrient balance of the ranch under the recycled water irrigation scenario.

A primary concern with recycled water application for agricultural irrigation purposes is maintaining ground water quality. In order to prevent nitrogen from leaching to groundwater, nitrogen uptake by plant species shall be used as a factor in computing hydraulic loading based on nitrogen as the limiting factor. Plants will uptake nitrate, the soluble form of nitrogen that is present in recycled water. Nitrogen uptake by alfalfa is well documented, and a value of 200 lb/ac/day is commonly used in hydraulic loading limit calculations (Metcalf and Eddy 1991). The value for nitrogen uptake by pasture grass, 80 lb/ac/day, is obtained from California Plant Health Association (2002).

Hydraulic Loading. The following is a summary of calculated hydraulic loading rates and irrigation application rate.

		Hydraulic Loading (in/yr)			**Irrigation Application Rate ac-ft/Ac**
Crop	**Irrigation**	**Consumptive Use**	**Nitrogen Loading**	**Soil Permeability**	
Alfalfa	Surface	***71.89***	86.05	274.72	5.99
Alfalfa	Spray	**66.75**	86.05	274.72	5.57

Pasture grass	Surface	70.49	**36.33**	274.72	3.03
Pasture grass	Spray	65.45	**38.20**	274.72	3.18

For the combination of alfalfa/ surface irrigation, the maximum annual nitrogen hydraulic loading rate will be:

71.89 in/yr
5,416 ac-ft/904 irrigable ac (5.99 ac-ft/ac)
1.95 Mgal/ac

The above calculations are based on the assumption that there are no additional inputs of nitrogen being added to the crop as fertilizer or as manure. The following are the necessary steps for calculation of the hydraulic loading for nitrogen.

1. Calculate "actual nitrogen loading" applied on a monthly basis from volume of recycled water applied, concentration of total nitrogen in recycled water used for irrigation, and factors accounting for nitrogen available for plant uptake. Nitrogen available from recycled water is based on a 20% loss to volatilization/denitrification and a 5% loss to leaching (ref hydraulic loading spreadsheets in the appendix) for a total loss of 25%.
2. Include any nitrogen added as commercial fertilizer to determine the "actual nitrogen loading." (Wood Rodgers recommends against application of nitrogen-containing commercial fertilizer since doing so would reduce the amount or recycled water that can be applied for irrigation).
3. Calculate "cumulative annual nitrogen loading" each month as the sum of the monthly "actual nitrogen loading" from the beginning of the year through each quarter.
4. The "allowable nitrogen loading" is the annual nitrogen uptake rate for the crop grown on the irrigated fields. Compare available nitrogen applied to the annual uptake rate by calculating the percentage on a monthly basis: monthly "cumulative annual nitrogen loading" divided by "allowable nitrogen loading."

Assimilative Capacity. Lahontan requested an Assimilative Capacity Model be completed as an element of the NMP. Wood Rodgers substantiates that nitrogen loading (as described above) accomplishes the same goal. No cumulative effect from nitrogen loading was observed (NDEP data for NMP) and conclusions are that the assimilative capacity of receiving waters will not be impacted when irrigating with recycled water from the WWTP.

Recycled Water Irrigation Planning. Wood Rodgers evaluated typical surface and aerial irrigation methods to determine hydraulic loading rates under a recycled water irrigation regime with the primary intent of maximization of nutrient uptake on the 904 irrigable acres on the Diamond Valley Ranch.

Irrigation shall typically occur between April 1 and October 15. Wood Rodgers' opinion is that the type of irrigation method chosen shall be dependent on the type of crop to be grown, capital budget for initial materials costs, operating budget for pumping if required, and labor if needed by the system. Surface irrigation and spray irrigation were examined as potential alternatives. Surface irrigation provides the highest benefit based upon maximizing recycled water use, and aerial irrigation provides similar benefits with less potential for tailwater.

Monitoring and Reporting Requirements

The District shall supply monitoring and reporting data to Lahontan in compliance with the Waste Discharge Permit.

Monitoring. Monitoring associated with the Diamond Valley Ranch and other reuse areas of the project area shall be performed as required by the Waste Discharge Permit (Revised Board Order R6T-2004-0010):

- Monitoring of irrigation volume and rate of application shall be performed through an automated metering devise. DVR personnel will collect readings in order to determine the 30-day average flow;
- Harvey Place Reservoir recycled water quality shall continue to be monitored;
- Groundwater quality shall continue to be monitored at the existing monitoring wells. New monitoring wells shall added in the vicinities of the reuse areas proposed for recycled water irrigation; and
- A nitrogen balance shall be calculated on an annual basis. The annual balance shall be compared to the initial calculation and the results of the previous year's balance, as well as the Diamond Valley Ranch receiving water thresholds of 7 mg/l.

In order to determine the hydraulic loading based on nitrogen, Wood Rodgers consulted "WTS-1B: General Criteria for Preparing an Effluent Management Plan," prepared by the Nevada Department of Environmental Protection (NDEP). Wood Rodgers set a conservative "red-flag" threshold level of 7 mg/l for Cp, as is common practice in developing a Nevada Effluent Management Plan (EMP). This was done to insure that the receiving groundwater resource will not be excessively degraded to a point where it is no longer useable (please also refer to the Assimilation Capacity Technical Report, Appendix 4). The District understands that State Water Boards may impose a more stringent trigger value if an additional factor of safety is desired.

Reporting. Monitoring data shall be provided monthly, quarterly, or annually as required by Lahontan and others. Should an unauthorized discharge of recycled water occur, Lahontan shall be notified as soon as the release is identified and controlled (within 2 hours). A written report on the release/discharge and the methods used for mitigation shall be submitted to Lahontan . The report shall list:

- Date and time of discharge;
- Exact location and estimated amount of discharge;
- Flow path and bodies of water which the discharge reached;
- Specific causes of the discharge; and

- Preventive and/or corrective actions taken.

Sampling Protocol. Sampling of the monitoring wells by the District shall follow the procedure outlined below:

- Document sampling on field data sheet;
- Measure depth to groundwater from the top of casing;
- Remove approximately three well volumes with bailer or pump (Do not contaminate the well or samples if using a bailer) and if a particular well is known to recharge slowly, pump well till casing is empty, allow well to refill then collect sample;
- Obtain sample bottles with preservatives from the laboratory; and
- Collect samples and immediately place them in a cooler with ice.

The following sampling for monitoring shall be completed:

Recycled Water Sampling. Samples shall be collected from Harvey Place Reservoir using containers, preservatives, and procedures recommended by the laboratory.

Flow Monitoring. Flow monitoring shall be done with a flow meter. Daily and monthly totalizer readings shall be recorded during irrigation. Readings shall be collected manually or electronically. Location of daily irrigation applications shall also be recorded to demonstrate appropriate distribution throughout the irrigation areas.

Soils. Soil samples in irrigated areas shall be collected and shall be analyzed as required by Lahontan. Given the high quality of recycled water discharged from theWWTP, it is recommended that soils be sampled every 3 to 5 years during recycled wastewater irrigation application.

Vegetation. If the District determines that it will be beneficial to produce a crop other than alfalfa or pasture grass, it is recommended that tissue samples be collected and analyzed annually to determine plant nutrient uptake specific to the reuse area. A plant sample protocol needs to be developed in coordination with Lahontan.

Component: Components 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 21, 22, 29, 30, 31, 32

Lead Agency: Lahontan

Implementing Agency: District

Timing: **Start:** During final design.

Complete: Prior to the beginning of construction.

Monitoring Agency: Alpine County

Validation: The Plans shall be developed prior to application of recycled water to new irrigation areas or operation of new temporary containment and water management components.

SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring

Description: The District shall prepare and implement a maintenance plan to monitor application and temporary containment infrastructure using water meters, coupled with quarterly visual inspection of pipelines and levees, and inspection during and immediately after high runoff events. Public works projects must be subject to periodic maintenance to prevent degradation of surface water quality from slope and levee failure, or impoundment spills.

Component: Components 1, 2, 4, 6, 7, 8, 11, 18, 21, 22, 23, 24

Lead Agency: Lahontan

Implementing Agency: District

Timing: **Start:** During final design.

Complete: Prior to the beginning of construction.

Monitoring Agency: District

Validation: The Plan shall be developed prior to certification of the Final Engineering Drawings.

SP-35 Conveyance Infrastructure Maintenance Plan

Description: The District shall prepare and implement a maintenance plan to monitor conveyance infrastructure using water meters, coupled with annual visual inspection of pipelines. Public works projects shall be subject to periodic maintenance to prevent degradation of surface water quality from pipeline failure.

Component: Components 2, 3, 4, 5, 6, 14, 17, 20, 22, 31, 32

Lead Agency: Lahontan

Implementing Agency: District

Timing: **Start:** After construction.

Complete: Ongoing.

Monitoring Agency: District

Validation: The Plan shall be developed during the final phases of construction of the conveyance infrastructure.

D.6 Recommended Mitigation Measures

This section outlines the mitigation measures recommended in response to potential significant impacts identified in impact analyses for environmental resources. These mitigations are additive to those standard practices the District is already implemented or has formally committed to implementing. Compliance with these mitigation measures will result in the avoidance and/or reduction of adverse environmental impacts.

LU-1 Land Use Map and Zoning Amendment

Description: In accordance with the Alpine County General Plan and specified in Section 18.84 of the Alpine County Code, an amendment to the Land Use Map and zoning will be obtained to designate lands on which the fields will be located as Open Space. Where the Residential Rural designation is now located in conjunction with the location of the irrigation fields, an amendment application shall be submitted to extend the boundary of the adjacent Open Space designation onto these areas. An application, with environmental documentation and associated fees shall be submitted to the County Planner for review and development of staff report for review by the Planning Commission. Public hearings will be held by the Planning Commission and a recommendation will be made to the Board of Supervisors for adoption or denial.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
LU-1. Will the Project Components be inconsistent with the land use plan map of an adopted General Plan or Master Plan?	Less than Significant 11 - Irrigation Fields A, B, and C
LU-2. Will the Project Components be inconsistent with zoning?	Less than Significant 11 - Irrigation Fields A, B, and C

Component: 11 (Irrigation Fields A, B, and C)

Lead Agency: Alpine County

Implementing Agency: District

Timing: **Start:** Design Phase

Complete: Prior to Construction

Monitoring Agency: Alpine County

Validation: The District shall not begin construction without approval of the General Plan Land Use Map and zoning boundary amendment.

GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch~~ Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water

Description: The District shall amend the grazing regime to reduce Nitrogen loading if recycled water is used for irrigation on the Diamond Valley Ranch.

~~Grazing timeframe, crop type, and manure management shall be determined.~~ To continue cattle grazing in the Diamond Valley Ranch in conjunction with application of recycled water, the carrying capacity of the crop ~~shall~~ must be determined and livestock use be limited to a moderate level on a rotation system. Carrying capacity is defined in the Diamond Valley Ranch NMP as the maximum stocking rate possible that is consistent with maintaining or improving vegetation or related resources. The assimilative capacity of pasture grass and/or alfalfa under a central pivot, recycled water regime with consideration to grazing impacts and manure inputs ~~shall~~ must be determined to assure that nutrient inputs are balanced with nutrient uptake and that ground water quality is protected. ~~The Grazing Options Technical Memo of the Diamond Valley Ranch NMP recommends that manure be analyzed at a statistically accurate level to provide more precise nutrient inputs.~~

In lieu of amending the grazing timeframes, crop type, and manure management necessary for a nutrient neutral grazing regime, the District shall commit to removing cattle from portions of the Diamond Valley Ranch when irrigating with recycled water. The removal of cattle during a recycled water irrigation regime is determined to result in deficiencies in the "whole ranch nutrient balance" for Phosphorus, Potassium, and Nitrogen which assures the protection of groundwater resources.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
GW-1. Will the Project degrade groundwater quality in the Carson, Wade and Diamond Valleys?	Less than Significant

Component: Components 9, 10, 11, 12, 13, 15, 16, 19, 29

Lead Agency: Lahontan

Implementing Agency: District

Timing: **Start:** Prior to construction.

Complete: Ongoing.

Monitoring Agency: District

Validation: Calculations shall be reviewed and approved by Lahontan prior to project-level permitting.

GW-1B ~~Determine Maximum Duration for Temporary Containment~~ Do Not Exceed a Maximum Duration of Temporary Containment (100 Days)

Description:

~~The District shall determine the maximum duration of containment of recycled waters that will meet the needs of temporary containment situations without causing impacts to groundwater quality. Wood Rodgers recommends additional investigations be undertaken in the areas of the proposed temporary containment fields to determine the depth to groundwater during the spring, as well as during drier months. An adequate depth to groundwater separating the unlined bottoms of the containment fields from the unsaturated zone will assures that groundwater quality is protected during times of temporary containment and that potential impacts are reduced to a level of less than significant.~~

The one-dimensional mass flux equation calculated by Farr West Engineering predicts that Nitrate-Nitrogen concentrations in water bearing zones will not be significantly impacted under a worst case scenario (100 days of containment during periods of saturated soil conditions, typically from late May to late July).

The District shall not temporarily contain recycled water on the Diamond Valley Ranch for more than 100 days. Findings from the project-level Nitrate-Nitrogen investigations (Appendix I-c) show that potential groundwater impacts resulting from the containment of recycled water for a period of 100 days could cause Nitrate-Nitrogen concentrations to increase by less than 2.0 mg/L in the underlying groundwater. The potential impact is dependent on the Nitrate-Nitrogen concentration in the temporarily contained recycled water and the permeability of the the soil materials underlying the containment field and is independent of the separation depth between the floor of the temporary containment fields and the groundwater table.

The District shall continue groundwater monitoring as outlined in SP-33. Should the temporary containment fields be put into use, the District shall complete project-level monitoring at the site to calibrate the one-dimensional mass flux equation.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
GW-1. Will the Project degrade groundwater quality in the Carson, Wade and Diamond Valleys?	Less than Significant

Component: Component 11

Lead Agency: Lahontan

Implementing Agency: District

Timing: **Start:** Prior to construction.

Complete: Ongoing.

Monitoring Agency: District

Validation: Calculations shall be reviewed and approved by Lahontan prior to project-level permitting.

SW-3 Develop Project-specific Nutrient Management Plan for the Jungle

Description: The District shall prepare and implement a nutrient management plan, as outlined in SP-33, for the portion of the project area referred to as the Jungle. Irrigation rates shall be balanced with the hydraulic loading levels determined for the site for the protection of surface water quality in the West Fork of the Carson River. The NMP shall include surface and groundwater protection and tailwater controls specific for the site conditions.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
SW-3. Will the Project cause numeric and narrative-based criteria to be exceeded at West Fork Carson River in California?	Significant

Component: Component 30

Lead Agency: Lahontan

Implementing Agency: District

Timing: **Start:** During or After construction, as appropriate.

Complete: Ongoing.

Monitoring Agency: District

Validation: The NMP shall be developed during the planning and design stages of the Project Component.

SW-4 Develop Erosion Control Methods for ICR

Description: The District shall develop erosion control methods for Component 31, which will divert stormwaters that typically flow into HPR to ICR. Implementation of erosion control methods in the drainage upslope of ICR shall stabilize slopes and capture sediment that may be mobilized, keeping sediment from entering ICR and potentially degrading water quality in the reservoir.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
SW-4. Will the Project cause TMDLs to be exceeded at ICR?	Less than Significant

Component: Component 31

Lead Agency: Lahontan

Implementing Agency: District

Timing: **Start:** During construction.

Complete: Ongoing.

Monitoring Agency: District

Validation: The erosion control methods for ICR shall be developed during the planning and design stages of the Project Component.

SW-5 Implement Component 15 Prior to Component 32

Description: Component 32 will construct a spillway channel for ICR that conveys reservoir spillage of freshwater around HPR to Indian Creek. These spills have the potential to cause bank erosion in Indian Creek and increase TSS. The District shall create and properly manage the riparian water treatment wetlands that shall be located downstream of ICR as part of Component 15. In order to reduce the impacts from phosphates and nitrates potentially flushed from ICR, Component 15 shall be constructed prior to component 32**.**

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
SW-5. Will the Project cause narrative-based criteria to be exceeded in Indian Creek below HPR?	Less than Significant

Component: Component 32

Lead Agency: Lahontan

Implementing Agency: District

Timing: **Start:** Prior to construction of Component 32.

Complete: Completion of Component 32.

Monitoring Agency: District

Validation: Component 15 shall be constructed prior to or concurrent to Component 32.

BIO-1 Conduct Biological Resource Assessments

Description: A qualified biologist and botanist shall conduct planning level surveys at the proper time of year to identify special-status species that might occur within the Project area. If sensitive fish or wildlife resources or habitat is found, project redesign shall avoid these resources whenever possible. If it is not possible to avoid impacting special status species then the impacts shall be mitigated to a level that is less than significant.

Biological Resource Assessments are to accompany tiered CEQA and NEPA documents for individual projects. They shall be conducted up to one full year before significant planning and design occurs on any given project. The assessments shall be conducted by qualified biologists who shall assist environmental planners in preparing the sections on Biology for CEQA and NEPA documents. Each assessment shall be written in a letter style report to District well in advance of the NOP.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
BIO-1. Will the Project cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species directly or indirectly?	Less than significant

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, ~~11,~~ 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: CDFG, NDOW, USFWS

Implementing Agency: District

Timing: **Start:** During Preliminary Planning.

Complete: Prior to Final Selection of Sites.

Monitoring Agency: District

Validation: The biological resource assessments are needed to supplement the results of the present programmatic EIR level surveys once sites have been selected for tiered projects. The assessments would be part of Initial Studies tiered from the present CEQA document and Environmental Assessments pursuant to NEPA.

BIO-4A Fish Passage Structures and Deer Migration Corridors

Description: Design in-stream structures to allow the passage of fish and provide unfenced corridors and bridges to facilitate deer migration.

Fish. Project engineers shall consult with a fisheries biologist to design non-pipeline conveyance infrastructure to facilitate the passage of fish and aquatic invertebrates. Pipelines shall be designed and maintained to meet requirements of the USFWS and CDFG.

Deer. Project engineers and ROW agents shall work with private landowners and public agencies to design conveyance and temporary containment infrastructure and fencing required around recycled water application areas to allow the passage of migrating deer. The precise determination of bona fide deer migration routes shall be made by a project wildlife biologist, federal and State wildlife biologists, and ~~State Game Wardens~~ CDFG North Central Habitat Conservation Branch.

Upon determination that a conveyance or temporary containment component shall impact a deer migration route, the Project Engineer shall design facilities to meet requirements of the USFWS and the CDFG to allow the passage of deer. These structures shall be maintained or redesigned at the discretion of federal and state agencies in consultation with the District.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
BIO-4. Will the Project substantially block or disrupt major fish or wildlife migration or travel corridors?	Less than significant

Component: Components 2, ~~3~~, 4, 5, 6, 11, 14, 17, ~~22~~

Lead Agency: CDFG, NDOW, USFWS

Implementing Agency: District

Timing: **Start:** During preliminary design.

Complete: Following completion of construction.

Monitoring Agency: CDFG, NDOW, USFWS

Validation: ~~State Game Wardens~~ CDFG North Central Habitat Conservation Branch

BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife

Description: Construction activities shall be limited to periods when fish are not spawning or migrating or when deer are not migrating if such activities would affect fish spawning or deer migration.

A District wildlife biologist in consultation with federal and state agencies shall determine the construction windows that shall minimize the disturbance to breeding and migrating wildlife including Lahontan cutthroat trout and birds. Construction windows shall be established and written into construction contracts.

Impacts Mitigated and Mitigation Level

	Impacts Mitigated	Level of Significance After Mitigation
	BIO-4. Will the Project substantially block or disrupt major fish or wildlife migration or travel corridors?	Less than significant

Component: Components 2, ~~3~~, 4, 5, 6, 11, 14, 17, ~~22~~

Lead Agency: CDFG, NDOW, USFWS

Implementing Agency: District

Timing: **Start:** Before construction.

Complete: After construction.

Monitoring Agency: District

Validation: ~~State Game Wardens~~ CDFG North Central Habitat Conservation Branch.

BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan

Description: A qualified botanist shall conduct surveys to identify and map sensitive native plant communities that might occur within the project area. If a sensitive plant resource or habitat is found, a Habitat Restoration Plan shall be put together and submitted to the responsible regulatory and planning agencies for approval.

Mapping of sensitive plant communities (native rangeland, including piñon pine woodland) shall be conducted by a botanist on color aerial photographs at a scale suitable for planning level purposes. Polygons mapped in this way shall be field checked. Aerial photo-based vegetation maps shall become part of the preliminary design package for each project.

The first step in project design shall be to redesign or relocate elements to avoid native rangeland and piñon pine woodland. If redesign or relocation is not possible, the project engineer shall minimize impacts to native rangeland and piñon pine woodland to the greatest extent possible. If impacts are unavoidable then mitigation shall be provided which reduces the impacts below a level that is significant.

Habitat Restoration Plan. A qualified habitat restoration or revegetation specialist shall prepare a Habitat Restoration Plan at a level of detail sufficient for interagency review and public input. The plan shall contain a description of the sensitive resources to be impacted, including discussion of what species were present before construction takes place, and the regulatory framework for protecting the sensitive resource.

The Habitat Restoration Plan shall contain a planting palette, soil analysis (including a laboratory assessment of soil nutrients, particle size, nutrient sufficiency, and recipes for amendments); a conceptual planting plan, statement of performance criteria, and maintenance and monitoring plan.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
BIO-5. Will the Project have a substantial adverse effect on or result in the permanent loss of any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	Less than significant

Component: Components 1, 3, 4, 5, 6, 9, 11, 14, 16, 17, 22

Lead Agency: CDFG, NDF

Implementing Agency: District

Timing: **Start:** Before construction.

Complete: After construction.

Monitoring Agency: District

Validation: California State Game Warden, Nevada State Forester Fire Warden

BIO-5B Monitor Habitat Restoration and Revegetation Sites

Description: Monitor habitat restoration sites for five (5) years to include annual reporting and remedial measures if the performance criteria outlined in BIO-5A are not met.

This mitigation measure parallels BIO-7 Monitor Wetland and Riparian Mitigation Sites, but differs from the latter by focusing on revegetation of native rangeland that may be disturbed by the project footprint. It differs from wetland and riparian mitigation in having less stringent performance criteria and 1:1 mitigation ratio (one [1] acre of native rangeland restored, replaced, or revegetated, for every acre disturbed or destroyed). Finally, this mitigation measure only restores or revegetates native rangeland but does not guarantee its preservation in perpetuity.

A revegetation specialist shall visit each construction site to photo-document the construction contractor's compliance with Best

Management Practices and Erosion Control Measures. In addition, the revegetation specialist shall document hydroseeding, and in the case of piñon pine replacement, the survival of container stock, each year for a total of five (5) years. The monitoring shall bring to the attention of the District project manager, any deviations from the performance criteria set forth in BIO-5A.

For each project, the revegetation specialist shall prepare a preliminary revegetation report to be submitted to the District project manager, one (1) year after completion of construction. A final revegetation report shall be submitted at the end of five (5) years in the case of piñon pine replacement.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
BIO-5. Will the Project have a substantial adverse effect on or result in the permanent loss of any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS?	Less than significant

Component: Components 1, 3, 4, 5, 6, 9, 11, 14, 16, 17, 22

Lead Agency: CDFG, NDF

Implementing Agency: District

Timing: **Start:** Two weeks before construction.

Complete: After construction.

Monitoring Agency: District

Validation: California State Game Warden, Nevada State Forester Fire Warden

BIO-7 Monitor Wetland and Riparian Mitigation Sites

Description: Monitor wetland and riparian mitigation sites for five (5) years to include annual reporting and remedial measures if the performance criteria outlined in SP-24 are not met.

Maintenance and Monitoring. Regulatory compliance would be achieved by execution of a mitigation monitoring and maintenance plan developed by a botanist or habitat restoration specialist. Monitoring of restoration success would employ techniques of vegetation and groundwater analysis using fixed photo-documentation points, semi-permanent vegetation monitoring transects using the line-intercept plant ecological method, and shallow groundwater monitoring wells.

Monitoring would take place for a period of five (5) years. The main elements of mitigation area monitoring and maintenance would be:

- Retain a qualified biologist to monitor restoration success;
- Install shallow groundwater monitoring wells and survey against horizontal and vertical control;
- Monitor groundwater levels three (3) times annually in the shallow groundwater monitoring wells;
- Survey restored landscape against horizontal control;
- Produce as-built drawings;
- Install semi-permanent vegetation monitoring transects and collect baseline data;
- Establish permanent photo-documentation points;
- Carry out repair of faulty drip irrigation lines and replacement of failed nursery stock;
- Prepare annual, written monitoring reports to be submitted to the permitting agencies;
- Delineate the newly created wetland after four (4) years; and
- Recommend remedial steps, if needed, to the responsible party.

Maintenance of the created habitat would entail semi-annual pick-up of refuse, mending of drip irrigation lines, control of unplanned erosion, repair of infrastructure (fencing and interpretive signs), and re-planting of failed landscape plantings. A qualified biologist would prepare annual monitoring reports. These reports would be reviewed by District and forwarded to the USACE, Lahontan, and CDFG.

Success Criteria. The success of mitigation shall be ascertained from review of monitoring data and comparison of the data against criteria to be agreed upon, in advance, by the regulatory agencies and District. The recommended criteria are:

- In the case of riparian woodland plantings, survival of three (3) out of every five (5) container tree and shrub stock planted at the beginning of the five-year period (= target survival criterion).
- In the case of wetlands to be created, documented presence of all three mandatory criteria (hydrophytic vegetation, wetland hydrology, and hydric soil characteristics) after five (5) years according to methodology in the 1987 Corps Manual.

Failure to meet the above criteria shall necessitate replacement plantings and could trigger another three (3) years of monitoring if required by the permitting agencies.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
BIO-7. Will the Project have an effect on wetlands or waters of the U.S. through direct removal, filling, hydrological interruption, or other means?	Less than significant

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 29, 30, 31, 32

Lead Agency: USACE

Implementing Agency: District

Timing: **Start:** First growing season after planting of mitigation sites.

Complete: Five (5) years after planting of mitigation sites.

Monitoring Agency: USACE, CDFG

Validation: USACE and CDFG shall sign-off on the mitigation following five (5) years of monitoring and submission of the Final Wetland and Riparian Mitigation and Monitoring Plan.

ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources

Description: (a) Upon selection of Project Components, the treatment of cultural resources to be affected by the Project shall continue to be addressed under the Section 106 process of the National Historic Preservation Act.

(b) As part of the Section 106 process, consultation to address potential adverse effects shall involve, at a minimum, District, Alpine and Douglas counties, the Washoe Tribe of Nevada and California and the Nevada and California SHPO. If necessary, the ACHP and other parties, if appropriate, may be a part of this consultation process.

(c) A PA between these parties, executed pursuant to 36 CFR 800.14 (b). The PA shall govern the implementation of a program to avoid adverse impacts to cultural resources formally determined eligible to the NHRP. The PA may provide for a phased resource identification, evaluation, and data recovery program.

(d) Phase I - Field surveys and cultural resource identifications must be directed by qualified archaeologists/historians/architectural historians who fulfill the Secretary of the Interior standards, as set forth in 36 CFR Part 1210, Appendix C. These identification studies must be conducted in a manner consistent with 36 CFR Part 1210, Appendix B, and with the recommendations of the SHPOs.

(e) Phase II - Prehistoric and historic resources that may be affected by implementation of the preferred alternative shall be evaluated for National Register significance. A phased resource identification, evaluation, and data recovery approach shall be implemented, allowing for construction to proceed at those locations where there are no cultural resources that may be affected by the project as allowed by the SHPOs. Evaluation for National Register significance shall be based on criteria A, B, C, and D, as presented in the Section 106 Guidelines, and the resources' overall integrity of location, setting, use, design, materials, workmanship, feeling, and association must be addressed.

(f) Subsurface testing of a resource is often needed in order to answer questions about an archaeological site's eligibility for the National Register or to obtain data needed to make decisions about how to mitigate Project impacts on a site already determined eligible or placed on the Register. Testing is directed toward determining the site's boundaries, the depth of its deposits, and/or its basic nature and condition. Testing is completed when sufficient information has been gathered to make a determination of eligibility or a management decision (ACHP 1980). The PA shall set forth guidelines for the testing and the subsequent development of a detailed data recovery work plan (research design).

(g) Phase III - The PA shall call for the development of a treatment plan (considerations for assessment of significance of cultural resources and impacts to NRHP eligible properties). This plan shall be developed according to the ACHP's "Recommended Approach for Consultation on Recovery of Significant Information from Archaeological Sites" (ACHP, 1999). This plan shall include the following (ACHP 1980):

(1) Specification of cultural resources to be studied within the impact area of the preferred alternative;

(2) Development of pertinent research questions;

(3) Establishment of study topics, springing from the research questions;

(4) Establishment of study priorities;

(5) Definition of data needs for each topic for study;

(6) Description of methods to be employed in fieldwork and analysis for determination of historic significance. Architectural characteristics should be recorded consistent with the standards of the Historic American Buildings Survey (HABS) or the Historic American Engineering Record (HAER), as appropriate; and

(7) Development of a policy for the treatment of NRHP eligible properties.

The PA shall provide for archaeological monitoring to guard against the discovery of unknown and/or buried resources. A qualified archaeologist, who meets standards of the Secretary of the Interior, shall conduct in-field monitoring during construction activities in areas of high archaeological sensitivity. Native American monitors may be present as determined by the Washoe Tribe of California and Nevada. In-field monitoring of unknown archaeological resources is discussed under Construction Mitigation Measure 2.4.7, Protect Undiscovered Cultural Resource Sites.

(h) The PA shall provide an opportunity for appropriate technical review of the data recovery work plan, usually by the SHPOs, and, where needed, by the ACHP and peer review by outside parties.

(i) Phase IV – Cultural resources and historic properties studies shall be carried out by or under the direct supervision of a person or persons meeting at a minimum the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-39) in the appropriate disciplines. Cultural resources and historic properties studies shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-44740). Reports prepared shall meet the published standards of the Office of Historic Preservation specifically, Preservation Planning Bulletin Number 4(a), "Archaeological Resources Management Reports (ARMR): Recommended Contents and Format" (December 1989).

(j) The District shall ensure that curation of archaeological materials and data attempts to conform to the Secretary's Standards and Guidelines, and the requirements of the Archaeological Resources Protection Act (PL 96-95), if applicable.

If mitigation is the responsibility of an out of state agency, a reciprocal agency agreement shall be made between California and Nevada SHPOs to assure monitoring and reporting responsibilities are agreed upon.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation
ARCH-1. Will the Project disturb known, potentially eligible National, Nevada or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources?	Less than Significant 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
ARCH-1. Will the Project disturb known, potentially eligible National, Nevada or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources?	Significant - ~~Components~~ 29, 30, 31, 32

ARCH-2. Will the Project disturb unknown archaeological resources or human remains?	Less than Significant 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
ARCH-2. Will the Project disturb unknown archaeological resources or human remains?	Significant - ~~Components~~ 29, 30, 31, 32

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** Prior to Project Design.

Complete: Before commencement of Project construction.

Monitoring Agency: Alpine County, Douglas County, California SHPO, and Nevada SHPO.

Validation: District shall not begin construction without concluding Section 106 Consultation with the California and Nevada SHPOs.

ARCH-2 Protect Undiscovered Cultural Resource Sites

Description: The District shall retain an archaeological monitor to be present during certain phases of Project construction. The monitor shall be a qualified archaeologist who meets Secretary of the Interior standards and who shall conduct in-field monitoring during construction activities in areas of known resources and areas of high archaeological sensitivity. When the in-field monitor is not present, construction personnel shall be made aware of indicators of cultural resources and shall report encounters to the in-field monitor. In the event of late discoveries, work at the location should cease until the in-field monitor has evaluated the finds and situation and provided recommendations for further procedures.

If human remains are discovered, the county coroner must be notified as soon as is reasonably possible (CEQA Section 15064.5). There shall be no further disturbance to the site where the remains were found. If the remains are Native American, the coroner is responsible for contacting the Native American Heritage Commission within 24 hours. The commission, pursuant to Section 5097.98 of the Public Resource Code (PRC), shall immediately notify those persons it believes to be the most likely descendants of the deceased Native American. Treatment of the remains shall be dependent on the views of the most likely descendent.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation

ARCH-1. Will the Project disturb known, potentially eligible National, Nevada or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources?	Less than Significant 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
ARCH-1. Will the Project disturb known, potentially eligible National, Nevada or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources?	Significant - 29, 30, 31, 32
ARCH-2. Will the Project disturb unknown archaeological resources or human remains?	Less than Significant 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
ARCH-2. Will the Project disturb unknown archaeological resources or human remains?	Significant - 29, 30, 31, 32

Component: Components 1, 2, 3, 4, 5, 6, 7, 9, 10, 11,12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32

Lead Agency: District

Implementing Agency: District

Timing: **Start:** Upon selection of a preferred alternative.

Complete: Before commencement of Project construction.

Monitoring Agency: Alpine County, Douglas County, California SHPO, and Nevada SHPO.

Validation: The District shall not begin construction without concluding Section 106 Consultation with the California and Nevada SHPOs.

VOS-1 Pump Station Design

Description: Earth tones that mimic surrounding landscape colors shall be used on the exterior of the pump station structure and the surface of the structure shall not be reflective. Structural design shall utilize the presence of the ranch house to obscure views and the structure shall not be sized greater than necessary.

Impacts Mitigated and Mitigation Level

Impacts Mitigated	Level of Significance After Mitigation

	VISUAL-2. Will structures constructed as part of the No Project Components be inconsistent with the protection of views of open areas, ridges, and peaks from any designated scenic route, scenic corridor, open space, residential or recreation area?	Less than Significant 11 - Pump Station

Component: **11 (Pump Station)**

Lead Agency: **District**

Implementing Agency: **District**

Timing: **Start: Design Phase.**

Complete: 100% Design.

Monitoring Agency: **District**

D.7 Program Implementation and Monitoring

D.7.1 Implementation

The District shall be responsible for the implementation and administration of the MMP for the Project. Where necessary to ensure compliance with mitigation measures, the District shall include the performance of mitigation in its contracts with irrigators, recycled water wholesalers and contractors. The District shall designate a staff person to serve as coordinator of mitigation monitoring among the various government agencies, construction contractors, and other parties. This person (Coordinator) shall oversee implementation and monitoring of compliance measures, standard practices, and mitigation measures to ensure that they are completed to the standards specified in the EIR.

Duties of the Coordinator include the following:

- Coordinate with applicable agencies that have mitigation monitoring and reporting responsibility;
- Coordinate activities with the construction manager;
- Coordinate activities of in-field monitors;
- Develop work plan and schedule for monitoring activities;
- Coordinate activities of consultants hired by the District when such expertise and qualifications are necessary;
- Routine inspections and reporting activities;
- Plan checks;
- Assure follow-up and response to citizen inquiries and complaints;
- Develop, maintain, and compile Verification Report form(s);
- Maintain the Mitigation Monitoring Checklist or other suitable mitigation compliance summary; and

- Coordinate and assure implementation of corrective actions or enforcement measures, as needed.

D.7.2 Mitigations Outlined By Project Component and Master Plan Project Number

Table D-2 below outlines the mitigations that are required to be implemented for each component when constructed.

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
1	8 – West Fork Pipeline 9 – On-Farm Pipeline	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring SP-35 Conveyance Infrastructure Maintenance Plan BIO-1 Conduct Biological Resource Assessments BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2		
Mitigation Required for Projects and Components		
Component Number	**Project Number(s) and Name (s)**	**Mitigation Required**
2	13 – make Recycled Water Available to Irrigators in Nevada	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring BIO-1 Conduct Biological Resource Assessments BIO-4A Fish Passage Structures and Deer Migration Corridors BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
3	5 – Diamond Ditch Conveyance Improvements 6 – Waterfall Pipeline Forebay and Pipeline	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-35 Conveyance Infrastructure Maintenance Plan BIO-1 Conduct Biological Resource Assessments ~~BIO-4A Fish Passage Structures and Deer Migration Corridors~~ ~~BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife~~ BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2		
Mitigation Required for Projects and Components		
Component Number	**Project Number(s) and Name (s)**	**Mitigation Required**
4	6 – Waterfall Pipeline Forebay and Pipeline 8 – West Fork Pipeline	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-5 Avoid Traffic Disruption on Major Highways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-17 Pipeline Design Features in Active Fault Zones SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring SP-35 Conveyance Infrastructure Maintenance Plan BIO-1 Conduct Biological Resource Assessments BIO-4A Fish Passage Structures and Deer Migration Corridors BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
5	10 – Wade Valley Pipeline	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-17 Pipeline Design Features in Active Fault Zones SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-35 Conveyance Infrastructure Maintenance Plan BIO-1 Conduct Biological Resource Assessments BIO-4A Fish Passage Structures and Deer Migration Corridors BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
6	6 – Waterfall Pipeline Forebay and Pipeline 9 – On-Farm Pipeline	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-5 Avoid Traffic Disruption on Major Highways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring SP-35 Conveyance Infrastructure Maintenance Plan BIO-1 Conduct Biological Resource Assessments BIO-4A Fish Passage Structures and Deer Migration Corridors BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
7	7 – District Pasture Subsurface Irrigation Pilot Project 8 – West Fork Pipeline 9 – On-Farm Pipeline	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

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Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
8	26 – Injection Well Program	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2		
Mitigation Required for Projects and Components		
Component Number	**Project Number(s) and Name (s)**	**Mitigation Required**
9		SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-22 Mosquito Prevention SP-23 Delineate Wetlands, Waters of the United States and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-28 Remove Weak Surficial Deposits from Basin Footprints SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch~~ Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water BIO-1 Conduct Biological Resource Assessments BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2		
Mitigation Required for Projects and Components		
Component Number	**Project Number(s) and Name (s)**	**Mitigation Required**
10	1 – Recycled Water Irrigation Fields on Diamond Valley Ranch	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-22 Mosquito Prevention SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-28 Remove Weak Surficial Deposits from Basin Footprints SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch –~~ Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2		
Mitigation Required for Projects and Components		
Component Number	**Project Number(s) and Name (s)**	**Mitigation Required**
11	1 – Recycled Water Irrigation Fields on Diamond Valley Ranch 2 – Harvey Place Reservoir Bypass System Pipelines and Ditches 3 – Diamond Valley Ranch Irrigation Fields Pump Back System	SP-1 Dam Safety SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-21 Temporary Containment and Impoundment Siting and Design SP-22 Mosquito Prevention SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-28 Remove Weak Surficial Deposits from Basin Footprints SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch~~ – Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water GW-1B ~~Determine Maximum Duration for Temporary Containment~~ Do Not Exceed a Maximum Duration of Temporary Containment (100 Days) ~~BIO-1 Conduct Biological Resource Assessments~~ BIO-4A Fish Passage Structures and Deer Migration Corridors BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites VOS-1 Pump Station Design

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Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
12	1 – Recycled Water Irrigation Fields on Diamond Valley Ranch	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch~~ – Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

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Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
13	1 – Recycled Water Irrigation Fields on Diamond Valley Ranch	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-22 Mosquito Prevention SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitats SP-33 Surface and Ground Water Protection Plan GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch –~~ Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2		
Mitigation Required for Projects and Components		
Component Number	**Project Number(s) and Name (s)**	**Mitigation Required**
14	7 – District Pasture Subsurface Irrigation Pilot Project 8 – West Fork Pipeline 9 – On-Farm Pipeline 10 – Wade Valley Pipeline	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-35 Conveyance Infrastructure Maintenance Plan GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch –~~ Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water BIO-1 Conduct Biological Resource Assessments BIO-4A Fish Passage Structures and Deer Migration Corridors BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2		
Mitigation Required for Projects and Components		
Component Number	**Project Number(s) and Name (s)**	**Mitigation Required**
15	Future Projects	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-22 Mosquito Prevention SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch –~~ Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
16	7 – District Pasture Subsurface Irrigation Pilot Project	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-29 Management of Hazardous Materials/Wastes During Construction SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan BIO-7 Monitor Wetland and Riparian Mitigation Sites GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch~~ Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water BIO-1 Conduct Biological Resource Assessments BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
17	14 – Snowshoe Thompson No. 1 Conveyance Capacity Improvements	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-35 Conveyance Infrastructure Maintenance Plan BIO-1 Conduct Biological Resource Assessments BIO-4A Fish Passage Structures and Deer Migration Corridors BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

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Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
18	11 – Prepare Nutrient Management Plan	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-17 Pipeline Design Features in Active Fault Zones SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites
19	12 – Permitting for Recycled Water Use in Diamond Valley	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-17 Pipeline Design Features in Active Fault Zones SP-23 Delineate Wetlands, Waters of the United States and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for <u>Migratory Birds,</u> Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch –~~ <u>Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water</u> BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

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Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
20	13 – Make Recycled Water Available to irrigators in Nevada	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-27 Avoid Impacts to Wetland and Riparian Areas SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-35 Conveyance Infrastructure Maintenance Plan BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

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Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
21	Future Projects	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2		
Mitigation Required for Projects and Components		
Component Number	**Project Number(s) and Name (s)**	**Mitigation Required**
22	6 – Waterfall Pipeline Forebay and Pipeline 10 – Wade Valley Pipeline	SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-31 Pre-construction Marking and Fencing of Sensitive Native Plant Communities SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring SP-35 Conveyance Infrastructure Maintenance Plan BIO-1 Conduct Biological Resource Assessments ~~BIO-4A Fish Passage Structures and Deer Migration Corridors~~ ~~BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife~~ BIO-5A Map Sensitive Native Plant Communities and Prepare Habitat Restoration Plan BIO-5B Monitor Habitat Restoration and Revegetation Sites BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
23	14 – Snowshoe Thompson No. 1 Conveyance Capacity Improvements 15 – Upper Dressler Ditch Conveyance Improvements 16 – Indian Creek Treatment Wetlands 19 – use Mud Lake Winter Flows for Indian Creek Reservoir Flushing	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites
24	14 – Snowshoe Thompson No. 1 Conveyance Capacity Improvements 15 – Upper Dressler Ditch Conveyance Improvements 16 – Indian Creek Treatment Wetlands 20 – Storage of Water for Downstream Users	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
25	21- Develop Recycled Water Wholesale Program	Future Project/Components
26	22 – Biosolids Composting	Future Project/Components
27	23 – Become a Water Rights Buyer/Broker to Maintain the Value of Recycled Water	Future Project/Components
28	24 – Power Generation	Future Project/Components
29	4 – Diamond Valley Freshwater/Recycled Water Irrigation System	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan GW-1A ~~Determine a Nutrient Neutral Grazing Regime for Diamond Valley Ranch~~ – Remove Cattle Grazing from Portions of Diamond Valley Ranch Irrigated with Recycled Water BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
30	4 – Diamond Valley Freshwater/Recycled Water Irrigation System	SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SW-3 Develop Project Specific Nutrient Management Plan for the Jungle BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
31	17 – Diversion Ditch for Stormwater Flow Away from Harvey Place Reservoir and to Indian Creek Reservoir	SP-1 Dam Safety SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-35 Conveyance Infrastructure Maintenance Plan SW-4 Develop Erosion Control Methods for ICR SW-5 Implement Component 15 Prior to Component 32 BIO-1 Conduct Biological Resource Assessment BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites

Table D-2

Mitigation Required for Projects and Components

Component Number	Project Number(s) and Name (s)	Mitigation Required
32	18 – Indian Creek Reservoir Spillway Channel	SP-1 Dam Safety SP-2 Standard Traffic Control Procedures SP-3 Emergency Response Vehicles Shall Not be Impeded SP-4 Maintain Maximum Number of Open Lanes on Roadways SP-6 Fence or Cover Trenches SP-7 Access to Businesses and Residences SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites SP-9 Park within Construction Easements SP-10 Limit Ingress/Egress of Construction Equipment SP-11 Erosion Control/Storm Water Pollution Prevention Plan SP-12 Standard Noise Control Practices - Construction Phase SP-13 Standard Noise Control Practices - Operation Phase SP-14 Standard Air Quality Control Practices - Construction Phase SP-15 Standard Air Quality Control Practices - Operation Phase SP-16 Slope Stabilization Design SP-17 Pipeline Design Features in Active Fault Zones SP-18 Liquefaction Stabilization Design SP-19 Standard Engineering Methods for Expansive Soils SP-20 Standard Engineering Methods for Corrosive Soils SP-23 Delineate Wetlands, Waters of the United States, and Riparian SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan SP-25 Sensitive Resource Program SP-26 Sensitive Plant Protection Program SP-27 Avoid Impacts to Wetland and Riparian Areas SP-30 Pre-construction Surveys for Migratory Birds, Nesting Raptors and Wildlife Nurseries SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian Habitat SP-33 Surface and Ground Water Protection Plan SP-35 Conveyance Infrastructure Maintenance Plan SW-5 Implement Component 15 Prior to Component 32 BIO-1 Conduct Biological Resource Assessments BIO-7 Monitor Wetland and Riparian Mitigation Sites ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources ARCH-2 Protect Undiscovered Cultural Resource Sites
33	25 – Extend the C-Line to the State Line	Future Project/Components
34	26 – Injection Well Program	Future Project/Components

D.7.3 Mitigation Monitoring

The implementation of compliance measures, standard practices and recommended mitigation measures shall be monitored at two levels. The first level of monitoring is done through the use of a Verification Report. A sample Verification Report is shown as Table 2-4. This report is to be completed by the District for each mitigation measure. Frequency of report completion shall vary based on the type of mitigation measure. For example, measures that require modification of final design drawings shall require that the Verification Report be completed at the time the final drawings are completed and again when they are approved. In-field monitoring for activities such as pipeline construction through a stream may require that a Verification Report be completed daily.

Once a mitigation measure is completed and the measure needs no further monitoring or follow-up, the District shall complete a final Verification Report that includes evidence of completion, such as a final engineering drawing or a photograph of field activities. The District shall be responsible for maintaining completed Verification Reports. Copies of these reports shall be maintained at the District Offices.

If the Coordinator determines that non-compliance has occurred, the Coordinator shall deliver a written notice describing the non-compliance and requiring compliance within a specified period of time. If non-compliance still exists at the expiration of the specified period of time, construction may be halted and fines may be imposed upon the party responsible for implementation, at the discretion of the District.

The second level of monitoring shall be done through the completion of the Mitigation Monitoring Checklist, Table 2-5. The purpose of the checklist is to provide a summary for the District, other public officials, and concerned citizens of the status of the adopted mitigation measures. The Coordinator shall update the checklist quarterly (four times a year) by reviewing the Verification Reports and status of the mitigation measures. A copy of the most current Mitigation Monitoring Checklist shall be maintained at the District Offices.

Table D-3

Verification Report

Date:	Compliance: ☒ Acceptable ☒ Unacceptable	
Location:	Mitigation Measure:	
	Discipline:	
	☒ Land Use/ Agriculture	☒ Public Health/ Services
	☒ Geology	☒ Noise/Air
	☒ Water	☒ Transportation
Construction Sheet No:	☒ Biology	☒ Cultural/Arch.
Activity:		
Observations:		
Recommendations:		
By:	Approved By:	
Copies to:		
Anticipated Completion Date:		
Method of Compliance:		
Date Closed:	Authorized By:	

Table D-4

Mitigation Monitoring Checklist

Mitigation Measure	Lead Agency	Implementing Agency	Monitoring Agency	Validation/ Status	Comments
2.2 Measures Included in the Project					
SP-1 Dam Safety	District	District	OES		
SP-2 Standard Traffic Control Procedures	District	District	Caltrans/Alpine County		
SP-3 Emergency Response Vehicles Will Not be Impeded	District	District	District		
SP-4 Maintain Maximum Number of Open Lanes on Roadways	District	District	Caltrans/Alpine County		
SP-5 Avoid Traffic Disruption on Major Highways	District	District	Caltrans		
SP-6 Fence or Cover Trenches	District	District	District		
SP-7 Access to Businesses and Residences	District	District	District		
SP-8 Repair Road Damage and Revegetate Temporarily Disturbed Sites	District	District	Caltrans/Alpine County		
SP-9 Park Within Construction Easements	District	District	District		
SP-10 Limit Ingress/Egress of Construction Equipment	District	District	District		
SP-11 Erosion Control/Storm Water Pollution Prevention Plan	District	District	District		
2.3 Planning Measures Included in the Project					
SP-16 Slope Stabilization Design	District	District	District		
SP-17 Pipeline Design Features in Active Fault Zones	District	District	District		
SP-18 Liquefaction Stabilization Design	District	District	District		
SP-19 Standard Engineering Methods for Expansive Soils	District	District	District		
SP-20 Standard Engineering Methods for Corrosive Soils	District	District	District		
SP-21 Temporary Containment and Impoundment Siting and Design	District	District	District		
~~ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources~~	~~District~~	~~District~~	~~Alpine County, Douglas County, California SHPO, and Nevada SHPO~~		
SP-22 Mosquito Prevention	District	District	Alpine County Health Department		

Table D-4					
~~BIO-1 Conduct Biological Resource Assessments~~	~~CDFG, NDOW, USFWS~~	~~District~~	~~District~~		
~~BIO-4A Fish Passage Structures and Deer Migration Corridors~~	~~CDFG, NDOW, USFWS~~	~~District~~	~~CDFG, NDOW, USFWS~~		
~~BIO-5A Map Sensitive Native Plant Communities and Habitat Restoration Plan~~	~~CDFG, NDF~~	~~District~~	~~District~~		
SP-23 Delineate Wetlands, Waters of the United States and Riparian	USACE	District	USACE, CDFG		
SP-24 Prepare Wetland and Riparian Mitigation and Monitoring Plan	USACE	District	USACE, CDFG		
SP-25 Sensitive Resource Program	CDFG, NDOW, USFWS	District	District		
SP-26 Sensitive Plant Protection Program	CDFG, NDF, USFWS	District	District		
SP-27 Avoid Impacts to Wetland and Riparian Areas	USACE	District	USACE		
2.4 Construction Measures <u>Included in the Project</u>					
<u>SP-12 Standard Noise Control Practices - Construction Phase</u>	<u>District</u>	<u>District</u>	<u>District</u>		
<u>SP-14 Standard Air Quality Control Practices - Construction Phase</u>	<u>District</u>	<u>District</u>	<u>District</u>		
SP-28 Remove Weak Surficial Deposits from Basin Footprints	District	District	District		
SP-29 Management of Hazardous Materials/Wastes During Construction	District	District	District and California or Nevada OSHA		
SP-30 Pre-construction Surveys for <u>Migratory Birds</u>, Nesting Raptors and Wildlife Nurseries	CDFG, NDOW, USFWS	District	District		
~~BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife~~	~~CDFG, NDOW, USFWS~~	~~District~~	~~District~~		
SP-31 Pre-construction Marking and Fencing Native Plant Communities	CDFG, NDF	District	District		
SP-32 Pre-construction Marking and Fencing of Wetlands and Riparian	USACE	District	District		
~~ARCH-2 Protect Undiscovered Cultural Resource Sites~~	~~District~~	~~District~~	~~Alpine County, Douglas County, California SHPO, and Nevada SHPO~~		
2.5 Operation and Maintenance Measures					

Table D-4					
SP-13 Standard Noise Control Practices - Operations Phase	District	District	District		
SP-15 Standard Air Quality Control Practices - Operations Phase	District	District	District		
SP-33 Surface and Ground Water Protection Plan	Lahontan and NDEP	District	Alpine County		
SP-34 Application and Temporary Containment Infrastructure Maintenance and Monitoring	Lahontan and NDEP	District	District		
SP-35 Conveyance Infrastructure Maintenance Plan	Lahontan and NDEP	District	District		
2.6 Recommended Mitigation Measures					
GW-1A Remove Cattle Grazing from Portions of the Diamond Valley Ranch Irrigated with Recycled Water	Lahontan	District	District		
GW-1B Do Not Exceed a Maximum Duration of Temporary Containment (100 Days)	Lahontan	District	District		
SW-3 Develop Project-Specific Nutrient Management Plan for Jungle	Lahontan	District	District		
SW-4 Develop Erosion Control Methods for ICR	Lahontan	District	District		
SW-5 Implement Component 15 Prior to Component 32	Lahontan	District	District		
BIO-1 Conduct Biological Resource Assessments	CDFG, NDOW, USFWS	District	District		
BIO-4A Fish Passage Structures and Deer Migration Corridors	CDFG, NDOW, USFWS	District	CDFG, NDOW, USFWS		
BIO-4B Schedule Construction to Avoid Breeding and Migrating Wildlife	CDFG, NDOW, USFWS	District	District		
BIO-5A Map Sensitive Native Plant Communities and Habitat Restoration Plan	CDFG, NDF	District	District		
BIO-5B Monitor Habitat Restoration and Revegetation Sites	CDFG, NDF	District	District		
BIO-7 Monitor Wetland and Riparian Mitigation Sites	USACE	District	USACE, CDFG		
ARCH-1 Identification, Evaluation and Avoidance of Cultural Resources	District	District	Alpine County, Douglas County, California SHPO, and Nevada SHPO		

Table D-4					
ARCH-2 Protect Undiscovered Cultural Resource Sites	District	District	Alpine County, Douglas County, California SHPO, and Nevada SHPO		
VOS-1 Pump Station Design	District	District	Alpine County		

Source: Hauge Brueck Assoc. 2009

D.7.4 Mitigation Monitoring Status Reporting

The District shall compile a Mitigation Monitoring Status Report on an annual basis. The report shall be prepared by the Coordinator and contain the following:

- Mitigation Monitoring Checklist to provide the status of every mitigation measure;
- List of completed mitigation measures;
- List of non-compliance incidences, with action taken or required;
- Evaluation of the effectiveness of the mitigation measures;
- Recommendations for modifications to the MMP to improve effectiveness; and
- Required modifications to the MMP to comply with legislation and policies adopted in the previous year (e.g. newly listed threatened species).

The report shall be presented and reviewed at a meeting of the District's Board of Directors. The meeting shall be noticed in local newspapers and shall be open for the public to speak and present written evidence as to the effectiveness of mitigation measures.

Appendix S
Diamond Valley Ranch Irrigation Improvement Project
50% Pre-Design Engineering Report

Diamond Valley Ranch Irrigation Improvements Project

50% PRE-DESIGN ENGINEERING REPORT

South Tahoe Public Utilities District (STPUD)

Prepared By:

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Table of Contents

Background

The purpose of the Diamond Valley Ranch Irrigation Improvements Project is to design an irrigation system to dispose of recycled water for the South Tahoe Public Utility District (STPUD). The following Technical Memorandum (TM) describes the 50% design of the system and criteria to be used in the final design of the system.

Initially the system will be irrigated using fresh water and supplemented with recycled water. During the preliminary design of the project alternatives were analyzed for the conveyance of the fresh water and recycled water systems. This analysis is summarized below.

Fresh Water Analysis

The fresh water system starts at the West Fork of the Carson River diversion near Woodfords. At this location fresh water is diverted from the West Fork of the Carson River and is conveyed to Indian Creek Reservoir via the Snowshoe Thompson #1 and Upper Dressler Ditches. Fresh water is also diverted from Indian Creek into Upper Dressler Ditch and conveyed to Indian Creek Reservoir. Further downstream, water is diverted from the West Fork of the Carson River and is conveyed to Snowshoe Thompson #2 Ditch.

The main irrigation ditches on Diamond Valley Ranch are Millich and Snowshoe Thompson #2 Ditches. Both ditches take their water from the West Fork of the Carson River. Millich Ditch takes its water via Snowshoe Thompson #1 and Thompson #2 takes it directly from the river. The flows within these ditches are currently used by the Ranch to flood irrigate grazing lands.

The Ranch has both riparian and appropriative rights out of Indian Creek and appropriative rights out of the West Fork.

Water right information is provided in Attachment A, including the final estimates of flow rates provided by STPUD. The estimates of flow rates show that Millich Ditch can supply as much as 4,000gpm and Snowshoe Thompson #2 can supply as much as 3,000gpm. The data also indicates that during some months the supply is limited making it difficult to supply the total irrigation water required for a built out system.

D&A analyzed two main options for the fresh water supply. The first option uses the current water rights from Millich Ditch and Snowshoe Thompson #2 Ditch to irrigate on an every other week rotation. The second option also uses current water rights from Millich and Snowshoe #2 Ditches to irrigate on an every other week rotation. However during this rotation some of the Millich Ditch water rights would be diverted to Indian Creek Reservoir for temporary storage that could be used during the off week rotation.

Based on STPUD review of the options presented Option 2 was selected to proceed to 50% design. This option will include a future supply pipeline from Indian Creek Reservoir in addition to the supply pipelines from Millich Ditch and Snowshoe Thompson #2 Ditch.

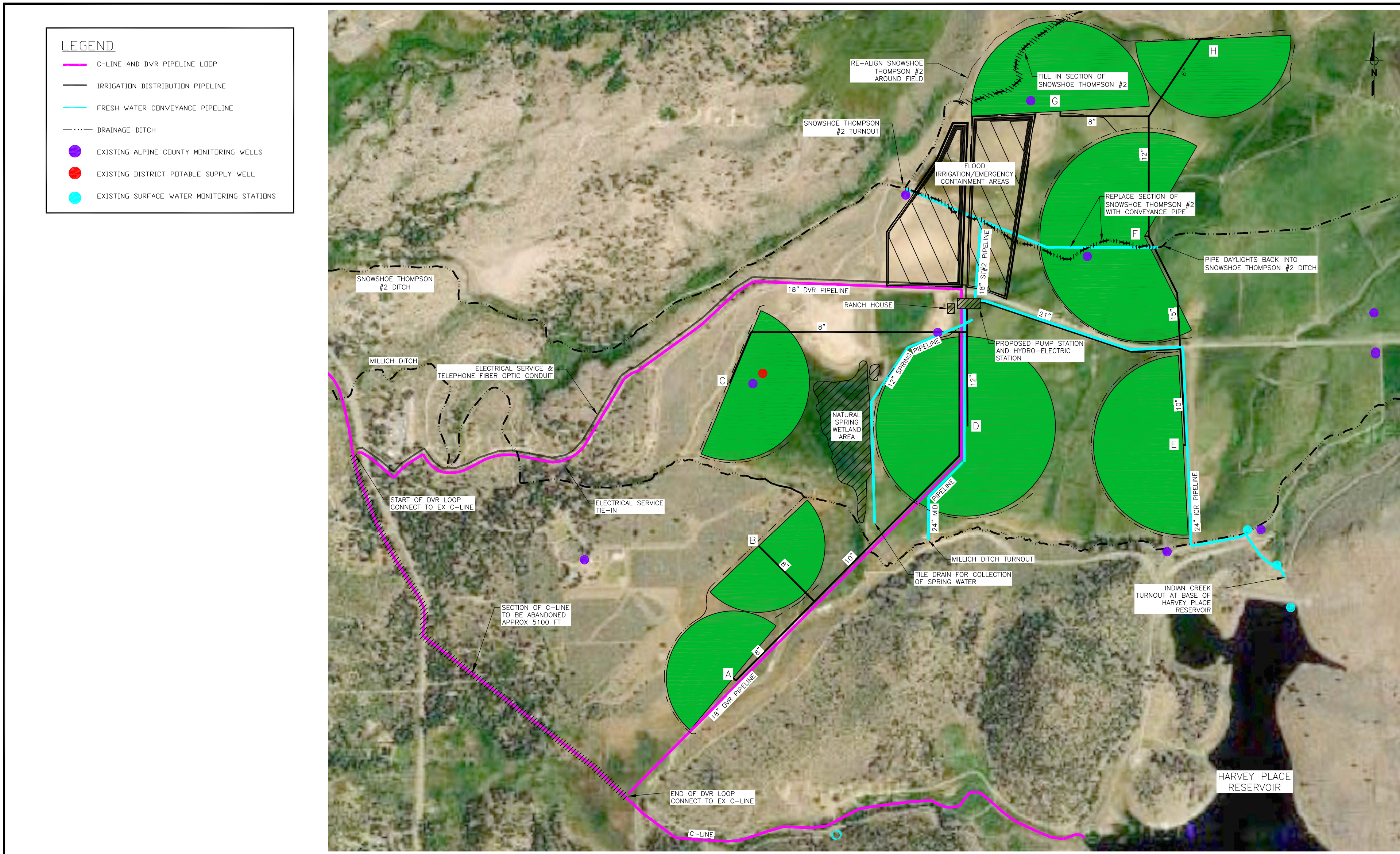
Reclaimed Water Analysis

D&A looked at five options for the location of the project facilities (pump and hydro-electric station) and the pipe alignments for the reclaimed water system. The five options included 1) a service line that dead-ends at the Ranch House with the project pumping and hydro facilities centralized at the Ranch House 2) a looped system with the project facilities centralized at the Ranch House, 3) continue to utilize the entire C-Line with non-centralized project facilities 4) a main transmission line that runs through the project to Harvey Place Reservoir and 5) and a main transmission line that runs through the project similar to option 4 but with a different start location.

Based on review by STPUD, Option 2 was selected for 50% design of facilities.

50% Design Parameters

Figures 1 and 2 on the following pages shows the overall system components proposed for 50% design. This system is considered the ultimate buildout of the Diamond Valley Ranch. Construction of the facilities will be phased dependent on available budget. Development of Phase 1 of the project will follow STPUD review of the 50% design and cost estimates and relative to the available funding for the project. Final plans and specifications will then be developed for Phase 1 of the project. The following sections describe the basis of design for the various components of the system.



REV	DATE	BY	DESCRIPTION

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WARNING
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IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

DESIGNED S.M. ROGERS
DRAWN K. COOPER
CHECKED J. DOMENICHELLI

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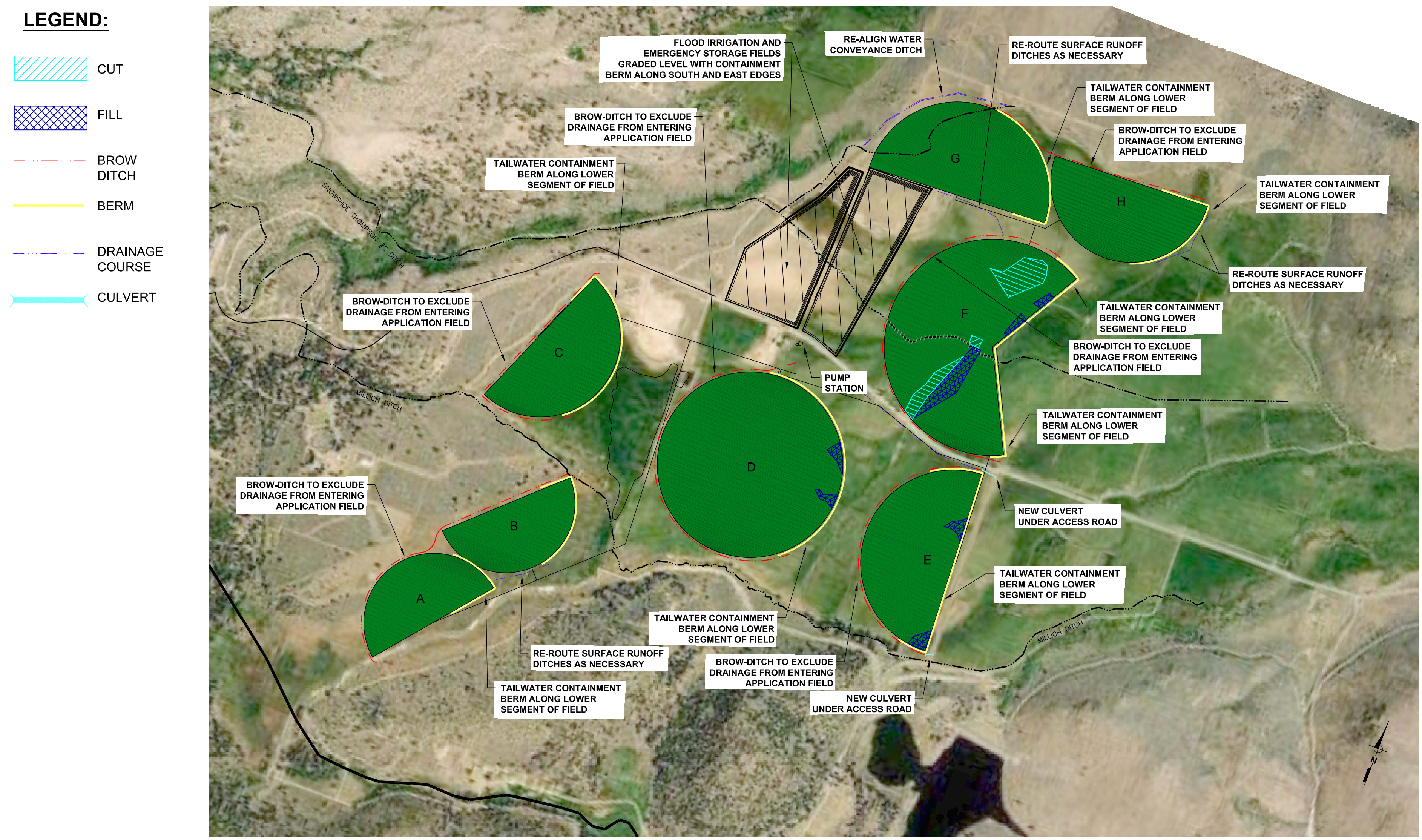
REGISTERED PROFESSIONAL ENGINEER SARA MILLER ROGERS NO. C64226 Exp. 6/30/11 CIVIL STATE OF CALIFORNIA

DIAMOND VALLEY RANCH IRRIGATION IMPROVEMENTS

FIGURE 1

SHEET 01 OF 2



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DIAMOND VALLEY RANCH IRRIGATION IMPROVEMENTS

FIGURE 2

SHEET 2 OF 2

Irrigation System Components

The proposed Diamond Valley recycled water irrigation system will irrigate approximately 372 acres, composed of:

- 322 acres of center pivots
- 50 acres of level basin (flood)

The system will be designed to apply either fresh or effluent water, depending upon permits and availability. Fresh water will be available every other week from surface water rights, and continuously (approximately 0.5 – 2.0 CFS) from seepage recovery.

The irrigation systems will be designed to apply water with a high uniformity and degree of control.

The primary method of irrigation will be through center pivots. Pivots have been selected because they are capable of achieving high uniformities, are commonly used on alfalfa, and are relatively simple to maintain and operate.

A total of eight pivots are currently proposed in the 50% design drawings. Additional information on the center pivot design including crop plan, nutrition plan and irrigation scheduling can be found in Attachment B – Technical Memorandum dated November 19, 2010 “Diamond Valley Irrigation System Design and Management”.

Water Balance/Application Rates

The annual irrigation requirements are based on an irrigated acreage of 372 acres and an estimated Evapotranspiration (ET) rate of 36-inches per growing season (See Attachment B for details on ET estimates). Using the estimated irrigation season ET of 36”, and an Irrigation Efficiency of 85%, and ignoring precipitation during the growing season, the gross application volume per season will be approximately:

Gross application = 36”/.85 = 42” (1.14 MG/acre) per growing season for the pivots

For the flood irrigation, the value is 33”/.75 = 44”(1.19 MG/acre)

The MG of irrigation water is estimated to be:

Pivots: 1.14 MG/acre × 322 acres = 367 MG

Flood: 1.19 MG/ac × 50 acres = 60 MG

Total: = 427 MG

A pivot on an alfalfa field must be designed to apply the monthly ET in about 22 days during the middle of the summer, because there may be 8 to 9 days of down time due to cutting the hay and harvesting it. Assuming an average peak monthly ET of 9”, the gross to apply is 10.6” per month for the pivots.

If all the pivots were operated 24/7 during the 22 days, this would require a flow rate of 9.1 GPM/acre. For example, for 322 irrigated acres of pivots, the continuous flow rate requirement would be 2930 GPM. Adding in the flood irrigated fields (50 acres) requires about **3480 GPM**.

However, if the system is designed to irrigate **2 weeks out of 4 weeks** (which means two weeks per cutting during peak ET), the flow rate requirement would be based on irrigating for 14 days per month. This would require a flow rate of **14.3 GPM/acre**. For 372 irrigated acres, the flow rate requirement would be about **5460 GPM**.

The minimum available effluent flow rate is about 5.5 CFS, or **2470 GPM**, which will likely be sufficient most of the summer if not all pivots are operated simultaneously. However, during hot periods, these flows will need to be supplemented with fresh water to meet the ET requirement.

The following provides a comparison of these numbers:

Gross requirement during peak ET, running 24/7, 22 days/mo =	3480 GPM
Gross requirement during peak ET, irrigating 14 days/mo =	5460 GPM
Minimum available effluent flow rate =	2470 GPM

The ultimate system will be designed for a capacity of 5460gpm. More detail on the water and nitrogen balance can be found in Attachment B.

Irrigation Distribution System Pipelines

The irrigation system distribution pipelines (from the pump station to supply the pivots) were sized for a maximum velocity of 3fps. Final pipe sizes can be found on the overview provided in Exhibit 1. The pipelines will be PVC Class 125 pipe. Costs provided in the estimate reflect trenching to a minimum depth of 4-ft and using sand bedding per STPUD standard drawings. Costs for the piping could be reduced if a different trench section is approved.

Recycled Water System Improvements

The main components of the recycled water irrigation system improvements include:

- DVR Pipeline Loop
- Center Pivot Irrigation System (as described above)
- Flood Irrigation/Emergency Containment Areas (FI/EC)

DVR Pipeline Loop

The DVR pipeline loop is the proposed mainline to reroute the existing 21 inch C-Line to the DVR. The proposed pipeline branches off the C-Line at the intersection of CA-89S and Diamond Valley Road. It continues east towards the DVR headquarters where it then changes alignment and starts to run south and west to loop and tie back into the C-Line for discharge into Harvey Place Reservoir.

During the irrigation season, the pipeline loop will be used as the mainline for distributing recycled water under pressure to all proposed irrigation areas of the DVR. During the non-irrigation season, the irrigation system will be bypassed and the loop will be used as the mainline for conveying recycled water to Harvey Place Reservoir. A hydro-electric station at the DVR is proposed in the future. When construction is finished, the DVR loop will be used as the mainline for both reclaimed water for irrigation and hydro-electricity generation.

In the case of an emergency, the DVR pipeline loop and feeder line will also be used to convey recycled water to the emergency containment areas for temporary storage. A feeder line directly connecting the emergency containment areas and the DVR pipeline loop is also proposed. Following a flood event, the DVR pipeline loop will be used for distributing impounded water from emergency containment areas to all irrigation areas or to Harvey Place Reservoir.

Phase 1 of the pipeline has been designed by C2ME Engineering. The final plans for Phase 1 are included in the 50% plan submittal as a separate document. During the final design these plans will be modified to extend the pipeline to the pump station/hydro-electric facility location and incorporated into the overall plan set.

Flood Irrigation/Emergency Containment Areas (FI/EC)

The Flood Irrigation/Emergency Containment Areas will consist of two level field areas bounded by earthen embankments (or cut slopes) along the perimeter. During the irrigation season, the containment areas will be flood irrigated for alfalfa. The containment areas may be used as a temporary impoundment for recycled water in the case of an additional storage need or other emergency condition. The containment areas will receive recycled water from a branch line off of the irrigation distribution system, but may also be filled directly from the DVR pipeline loop via a valved connection. Freshwater may also be supplied to the FI/EC areas through the irrigation distribution system via the pump station if desired. A field drainage pipeline will be constructed from each impoundment back to the pump station sump for drawdown of stored water in the containment areas. The impoundment volume of the containment areas will be around 300 acre-feet which is approximately equivalent to 100 days of outflow from the District's recycled water operations.

Field grading will consist of substantial cut and fill to achieve the target storage volumes, while providing sufficient field dimensions for growing and harvesting alfalfa. Individual flood irrigation fields will nominally be 100-feet wide by 500-feet long, and will be sloped between 1.0% and 2.0% in the longitudinal direction.

Fresh Water System Improvements

The main components of the fresh water irrigation system improvements include:

- Fresh Water Conveyance Pipelines
- Fresh Water Irrigation Pump Station

Fresh Water Conveyance Pipelines

The main fresh water sources located on Diamond Valley Ranch are Millich and Snowshoe Thompson #2 Ditches and a natural spring. A series of conveyance pipelines are proposed to divert water from these sources to a new pump station to supply enough fresh water for the irrigation distribution system.

The start of the conveyance pipeline from Millich Ditch is approximately 2900 feet south of the existing Ranch House. It is proposed to connect the Millich Ditch conveyance pipeline to an existing turnout structure that is currently used for flood irrigation. The turnout shall be modified to include a grate to prevent any trash from entering the conveyance pipeline. The pipeline is sized to convey the maximum amount of appropriate and riparian water rights allotted to Diamond Valley Ranch from Millich Ditch (approximately 5,000gpm).

A portion of Snowshoe Thompson #2 Ditch runs through the layout of center pivot F. In order to ensure that irrigation water from the center pivot does not mix with fresh water from Snowshoe Thompson #2, a conveyance pipeline is proposed to replace that portion of Snowshoe Thompson #2 Ditch. It is proposed to connect this conveyance pipeline to an existing turnout structure. The conveyance pipeline is proposed to daylight back into Snowshoe Thompson #2 Ditch east/downstream from Pivot F. This pipeline shall be sized to convey the maximum flow in the ditch. Another pipeline is proposed to tee off the main conveyance pipeline approximately 900 feet downstream from the turnout and run to the pump station sump. This pipeline shall be used to supplement the irrigation distribution system with fresh water. This pipeline is sized to convey the maximum amount of appropriate and riparian water rights allotted to Diamond Valley Ranch from Snowshoe Thompson #2 Ditch (approximately 3,000gpm).

The fresh water spring is located southwest of the Ranch House. A tile drain is proposed to collect the spring water and a conveyance pipeline is proposed to divert the collected spring water from the tile drain to the sump. The tile drain and conveyance pipeline are sized based on an approximate flow estimates taken in the field at the spring location of 2cfs and a minimum velocity of 3fps to prevent deposition of material in the pipeline.

Junction Box

At the outfall of each of the freshwater pipelines a junction box will combine the flows before sending water to the pump station. This box will help to regulate the flows from the various sources and provided a smoother flow transition to the pump station. The flow from the pipelines will be regulated using float control valves. The valves will close as the water in the box rises, regulating the flow from each source.

Irrigation Pump Station

Based on the water balance and application rates proposed the ultimate fresh water pump station will be designed for a flow rate of 5,000 gpm. The sump and irrigation pump station are proposed to be located east of the existing Ranch House. The sump is proposed to be a concrete vault. The vault will be designed to contain enough water to minimize pump cycling. Two vertical turbine pumps (approximately 2,600gpm each) with VFDs are proposed for ultimate build out of the project. Each pump will have a flow meter, air release, butterfly and check valve.

A control building is designed to house all control features proposed at final buildout, including the proposed hydro facilities. Since the District has not yet developed a phasing plan for this project, all features shall be included in the design and phased as necessary.

Two vertical turbine pumps are anticipated for this project. Vertical turbine pumps have the benefit of having the motor above grade for east access if maintenance is required. The pump and associated valving are located for easy access and removal. The pumps are operated based on system pressures. A pressure transducer will be located on the pump discharge. The PID controller on the VFD panel will automatically maintain the target pressure for the system.

A check valve will be included for each pump. The check valve is located on the discharge line and shall prevent backflow from entering the pump during shutdown or power failure.

Other appurtenances included in the system will be an electromagnetic flow meter, an air release/vacuum (ARV) valve and isolation valves. Since the electromagnetic flow meters require less space than propeller type meters, have no moving parts and are more accrurate, an electromagnetic flow meter is preferred for this project. The meter will be wired back to the SCADA system for easy monitoring of the station. A flow meter is also proposed at the outlet of each pump. This will allow the District to monitor each pump separately and the system as a whole. The ARV valve will release and introduce air during startup and shutdown of the system. The spill from the ARV will be designed to discharge back to the sump. Isolation valves will be used to isolate the system during maintenance activities.

Irrigation Field Surface Improvements

The irrigation/disposal fields will not be mass-graded to produce level or constant-sloped areas. Rather, the sharp surface features such as swales, rock outcroppings, and steeper sloped areas will be smoothed out for improved irrigation application and harvesting of the crops. Each area will be improved with containment berms at the low-end of the fields to impede tailwater runoff from entering site stormwater drainage facilities. The fields will also have cut-off ditches (head-ditches) constructed uphill of the application areas to keep non-irrigation surface flows from entering the application areas. Stormwater runoff from outside the application areas will be directed around the fields into historical runoff points. As much as practical, the existing network of surface water runoff collection ditches will remain in use. However, where necessary, new drainage courses and culverts for road crossings will be installed where an application area interferes with the historical drainage course.

Mass grading in the application areas, proposed access roads, and new stormwater runoff conveyance will be minimized to retain as much of the current topography as practical for the intended future use.

The 50% design plans provide an overview of the grading and drainage system proposed. Additional detail will be provided for the fields selected during the final design of Phase 1 of the system.

Tailwater (Surface Runoff) Control

The every-other-week availability of surface water requires that the pivots be designed with high application rates. The pivots must be able to apply the required water volume in half the time seen with standard designs. The high application rates have the potential to cause runoff, so the design and land preparation have been adjusted to avoid or minimize such problems.

To reduce the volume of land grading that is required within fields, at least 2 of the fields (F and D) are anticipated to have pivots equipped with Variable Rate Irrigation (VRI). This feature will allow the pivots to not irrigate selective sections of ground that may be too steep or low. The figure below illustrates the concept of VRI as sold by Valmont.

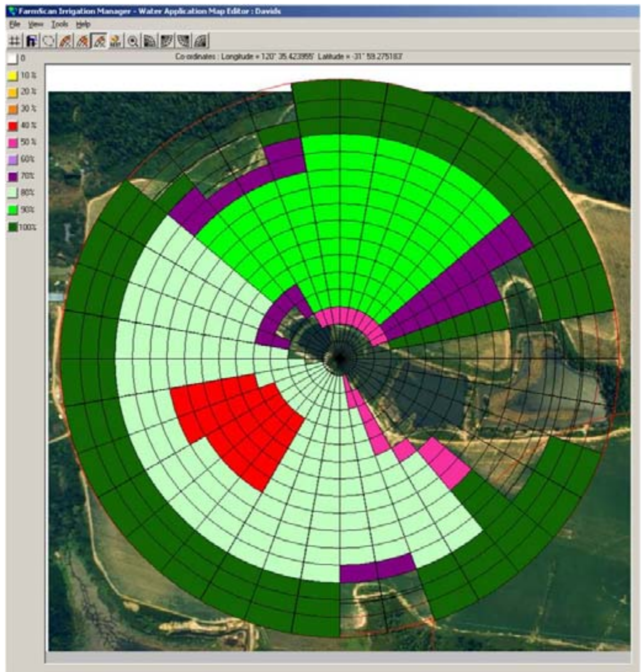


Figure 3. Variable Rate Irrigation (VRI) concept.

Each field will have a low ditch/;berm located on the upslope side to channel on-coming surface water away from the field. There will also be a berm located on the downslope side to capture and temporarily store any surface runoff, preventing it from reaching natural channels. The combination of correct sprinkler selection, high speed gearboxes, row hay, land grading, and treatment of the soil with gypsum prior to planting will minimize or completely eliminate surface runoff problems. Surface runoff can be difficult to predict, but the District's plan is to begin irrigation on each field with surface water and resolve any such problems before effluent is used. Because of the fresh water purity, any runoff problems that might eventually occur would be expected to show up with the fresh water.

The berms will be located at least 30'away from the irrigated circles, to provide turn-around room for harvesting equipment, and to provide a road for access around the pivots. At natural drainage points (low points) of each berm, a culvert with an upstream gate (such as a Waterman C-10 Canal Gate) will be provided to allow standing water to drain, if necessary.

There may eventually be limitations to draining any standing water (whether it be fresh water, precipitation-caused, or effluent) into natural or new drainageways. If standing water near the berms does become a problem, an engine-powered pump on a trailer can be used to drain the water. The pump will discharge into a traveling large sprinkler (such as the Boss Little Dude® hard hose reel traveler). The traveling sprinkler would re-distribute the water into the irrigated area, or outside the area in a non-wetland area.

Hydro-electric Opportunities Analysis

The opportunity for hydroelectric power generation has been explored in a separate TM provided to the District. A copy of this TM has been provided in Attachment C. The ultimate potential for hydro-electric generation will depend on the the level of increased pressure in the C-Line allowed by the District.

Electrical, Instrumentation and Security

Pump station design addressed in this section include electrical power, motor controls, control systems, instrumentation, and site security systems. These design parameters are discussed below.

Electrical Power

The project will require 277/480 volt, three phase power supply and will be sized for all present connected loads new loads to run the irrigation system and one additional future pump. Power will be served from the local power utility via underground power lines to the site. The site will have a dedicated and unshared feed to the transformer and main breaker. The transformer will be a pad mounted style with pad dimensions measuring approximately 90 inches x 106 inches. The pump building transformer will be located in an accessible location such that it will not inhibit operations and maintenance. The Utility dictates that 3 feet side clearance and 8 feet front clearance is required for access, maintenance and shutdown.

A meter/main switchboard will be located inside the control building and will include the main disconnect, and feeder breakers. The utility meter will be located on the face of the meter/main switchboard. The meter/main switchboard will be rated for 800 amps at 480 VAC, 3 phase, 4 wire. The switchboard will have a PFR relay to notify the control system of power problem and shutdown the pump motors if a phase failure or voltage imbalance is detected.

The following lists all devices connected to 480-volt power from the MCC and switchboard.

- Motor Control Center
- Hydrogeneration System
- Lighting Panel “LP” Transformer
- Electrical Room HVAC unit

Motor Controls

The motor controls will be located in separate sections of the motor control center (MCC). The pump motor controls will be designed with solid state starters. Other 3 phase motor loads will be designed with plug-in cubicles, motor starters, motor circuit protectors, control switches, and indicators as required.

The pump motors will be approximately 100 hp for the booster pumps. This will allow for the pumps to be started across-the-line in the event that the VFD drive fails.

The motor controls will include a hand-off-auto (HOA) switch to allow for PLC control and hand control. With the Hand-Off-Automatic switch is in auto, the PLC will control the motor start and speed. In automatic mode, fault conditions such as motor over-temperature, motor overload, and VFD fault will lockout the pump from operating. In hand operation, the PLC and non-essential interlocks will be bypassed and allow the pump to start.

Front panel indicators will include a red run light, green run light. The amber fail light and amber overload light. Hand and auto switch positions, motor running, motor overload, motor overtemp, will be monitored by SCADA.

Lighting Panel Board

A 120/240 VAC, 1 phase, 3 wire panelboard and transformer will provide lighting, receptacle and other miscellaneous power. The panelboard and transformer will be located within a switchboard section and fed from the main switchboard distribution section.

Exterior Lighting

The perimeter of the site will include pole mounted lights, and the building will have wall mounted lighting. Perimeter lights will be cut-off style that directs 100% of the downwards in effort to comply with dark sky requirements. The quantity of light will be such that a minimum of 0.25 foot candles is available at all points on the ground. This quantity will enable the video monitoring equipment to perform satisfactorily at night.

A lighting control system will utilize a photocell, time clock and lighting contactor to turn on outdoor area lighting. A switch for photocell over-ride will be provided in the lighting controls.

Interior Lighting

Interior lights will be 32-watt fluorescent vapor tight, non-metallic, dual tube fixtures with electronic ballasts. Indoor lighting will be controlled with motion detector style light switches. If motion is detected, the half of the lights in the control room will illuminate. The other half of the lights will be connected to a timer switch. The motion detector and timer switches will have on-off-auto switches built in.

Receptacles

Interior receptacles will consist of multiple 120 volt NEMA 5-20 receptacles the pump room. The receptacles will be located at 48” AFF unless needed for a specific purpose such as under a desk or defined equipment. A spacing of 10 to 15 feet between receptacles is usually sufficient for pump rooms.

Exterior receptacles will be located next to doors, outdoor equipment and generator connections. Outdoor receptacles will be on dedicated circuits such that they may be turned off at the panelboard when not in use.

Conduit and Wire Installation

Conduit for lighting and receptacles will be surface mounted in the building. Conduits stubbed up through floor will be PVC coated galvanized rigid steel through the transition and GRS where exposed. Outdoor exposed conduit will be PVC coated GRS and black liquid-tight metal reinforced flexible conduit (Anaconda).

Exterior receptacles will be located next to doors, outdoor equipment and generator connections. Outdoor receptacles will be on dedicated circuits such that they may be turned off at the panelboard when not in use.

Instrumentation

The table below summarizes the type of analog instrumentation proposed for this project. Smart (programmable) devices will be used where possible.

Table 1. Instrumentation Summary.

Description	Type	Manufacturer
Discharge Flowmeter(s)	Magnetic, inline, remote transmitter	Endress and Hauser 53W
Discharge Pressure Indicator	Gauge, process mount	US Gauge 656 liquid filled

Discharge High Pressure Switch	Switch, process mount with calibration valve	Static O Ring or Ashcroft
Discharge Pressure Transmitter	Gauge, process mount with calibration valve	Endress and Hauser Cerabar M PMC 41
Suction Pressure Transmitter	Gauge, process mount with calibration valve	Endress and Hauser Cerabar M PMC 41

Fire Alarm

The fire alarm system will consist of keypad and smoke detectors with alarm status of the system reporting to the alarm monitoring company and SCADA system. The control panel for the fire alarm will be located in the electrical room.

Intrusion Alarm

The control panels for the systems will be located within the electrical room.

Description of Diamond Valley Ranch SCADA System

The STPUD Diamond Valley Ranch SCADA[1] Irrigation Control and Monitoring System will consist of an integrated network of measurement and automatic control equipment for operating center pivots and pumping facilities, a high-speed data communications network, and new office computer workstations that permit 24/7 real-time access to the entire operation. Implementation of the Diamond Valley Ranch SCADA system will involve many steps including the design, deployment, calibration, documentation, and verification of various pieces of hardware and software. The purpose of this section is to present an overview of the main components, functions, and planning-level cost estimates of the recommended SCADA system.

The proposed Diamond Valley Ranch SCADA system will enhance the reliability and performance of the STPUD center pivot irrigation systems. Other benefits of SCADA, besides real-time water accounting for decision-making about the operation of the pivots and pump stations, will be comprehensive record keeping capabilities for historical analysis and forecasting, and fast response times to user inputs and alarms. Features such automatic back-up of data and compatibility with standard database programs will be part of the system.

The Diamond Valley Ranch SCADA sites are listed in **Table 2** with a summary of their functional purpose. The project encompasses automated VFD-equipped pumps controls, electronic flow measurement devices and sensors, field controllers on each center pivot, mobile interface terminals, and computer and communications support systems at the office with alarming, report generation, and data management capabilities.

[1] Supervisory Control and Data Acquisition

Table 2. STPUD Diamond Valley Ranch SCADA sites and functions

No.	Location (Name)	Automatic Control	Remote Manual Control	Remote Monitoring	Base Station	Radio System
1	Fresh Water Pump Station	√	√	√		
2	Hydroelectric Power Plant	√	√	√		
3	Booster Pump Station	√	√	√		
4	Junction Box			√		
5	Remote Ditch Inlets (4)			√		
6	Weather Station			√		
7	Ranch House Office				√	
8	Hal's Shop				√	
9	Radio Repeater Stations					√

SCADA Control Strategies for Diamond Valley Ranch

The basic SCADA strategies proposed for STPUD Diamond Valley Ranch center pivot irrigation system are this (refer to the diagram in **Figure 4**):

1. Major upgrades to the existing office equipment: the development of an advanced SCADA system for the operation of the center pivots, pump stations and other facilities will require the installation of new computers and communications equipment. For example, it is expected that once a radio signal path survey has been conducted the recommendation will be to install a master radio antenna tower at the office with a height of approximately 60-80 ft that can hold antennas for communications with both field radio units on the center pivots and also the pumps stations and ditches that are located through the service area. In addition to the new master radio and tower, the IT network at the Ranch House will be upgraded to include redundant computer servers, distributed firewalls and other security tools, an autodialer system for alarms, and laptops/smart phones.
2. An additional component to the STPUD **SCADA System** based on unlicensed radios and commercial RTUs: infrastructure that is part of the conveyance and water distribution system(s) will be monitored and controlled by a SCADA system that includes commercially-available, open-standard, industrially-hardened, proven equipment that will link directly to the STPUD office in South Tahoe. STPUD personnel may elect to do much of the installation work themselves and utilize their existing integrator (Ausenco) as a sub-contractor to develop the HMI (Human Machine Interface) software screens for operator interfaces in the office.
3. A new wireless web-based **Irrigation Control System** for the center pivots and pumps: the motors and valves that operate on each center pivot will be controlled using a wireless web-based network that will allow operators of the irrigation system to perform routine tasks from internet-equipped work stations such as starting/stopping pivots, adjusting set points, monitoring water usage, etc. Employees with the proper network authorization will be able to remotely access the system via a series of web pages that interact in real-time with the individual pivot field controllers. The Fresh Water pumping plant (2× VFD-equipped pumps), possible eventual booster pump, and filter stations will also be monitored and controlled by a software package provided by the center pivot manufacturer.
4. On-site touchscreen interface for the center pivots and pumps: in addition to the remote access capabilities that will be available through the web-based SCADA interfaces, operators will also be able to operate the center pivots and pumps via full color LCD touchscreen interface panels at each site. Where critical values are used on any automatic control system it is recommended that redundant sensors are employed. The field controllers (with integrated LCD displays) will be supplied by the same manufacturer that provides the center pivots. Modern commercial packages are tightly integrated with specially-designed interfaces for center pivot irrigation.
5. New weather station: a new commercial weather station will be installed in the ranch in order to provide accurate and localized estimates of irrigation water requirements and other weather-related parameters.

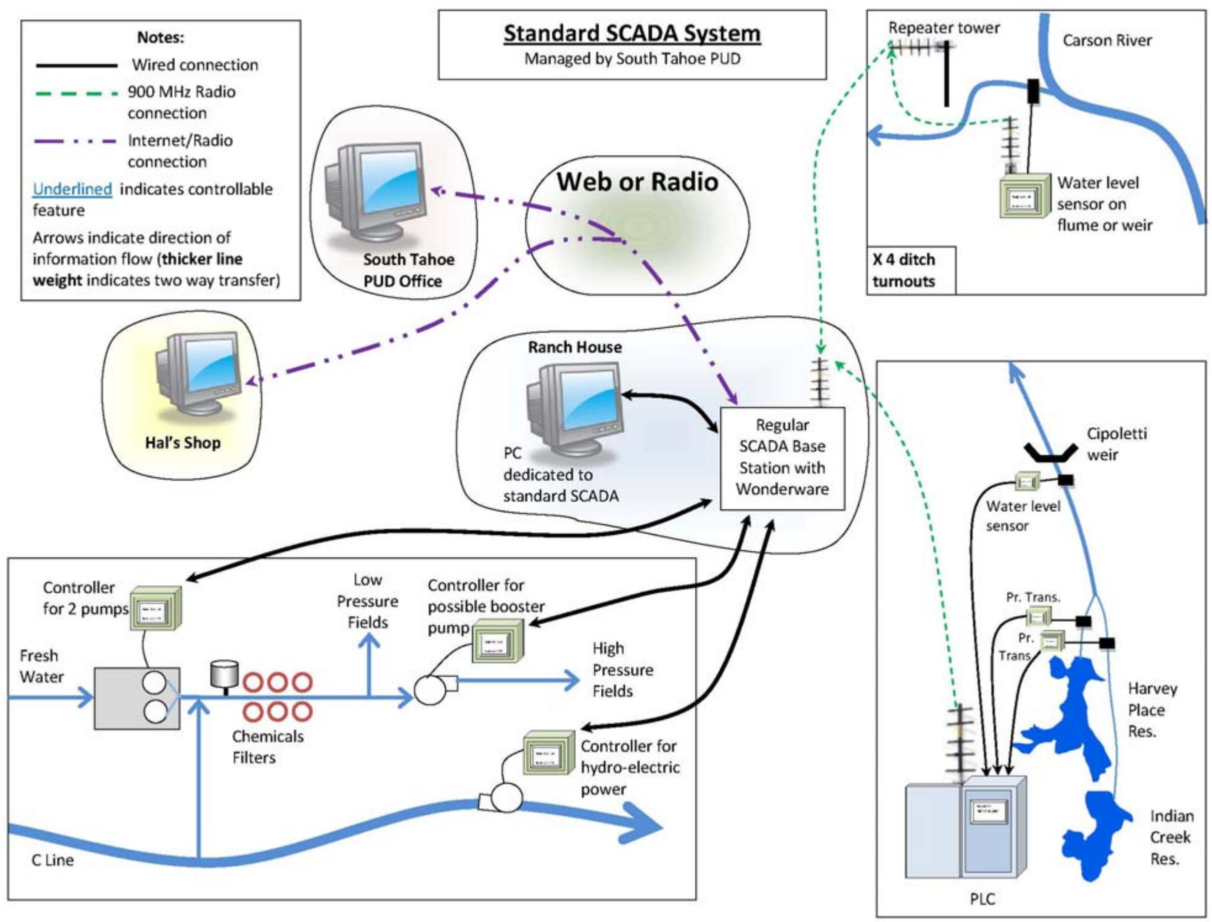


Figure 4.Key components of the Diamond Valley Ranch SCADA System. Directly linked to the STPUD distribution system SCADA

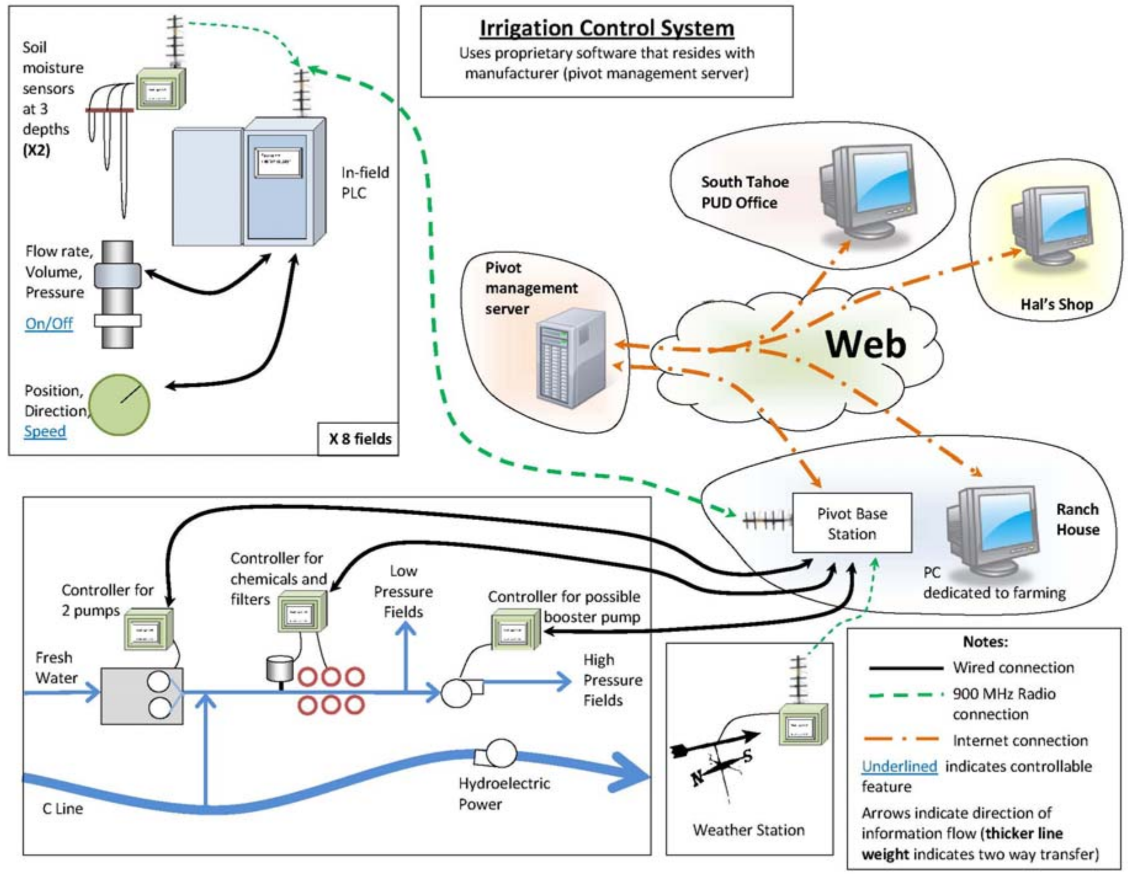


Figure 5. Key components of the Diamond Valley Ranch Irrigation SCADA System Stand-alone.

Base Station and Office Software Specifications

There will be two different and separate SCADA software programs that operate in the STPUD Diamond Valley Ranch system for different but overlapping purposes:

1. Wonderware (existing SCADA software to be upgraded/expanded) – this is the existing HMI software that currently manages SCADA sites in the STPUD system (approx. 80 existing RTUs). This server-based software will be installed on a new server computer at Diamond Valley Ranch House headquarters office. Since the office will have a fiber optic connection it will be possible to automatically sync with other databases on STPUD central servers in order to provide a redundant back-up for the historian database. Once the final specifications are written for the project, it may be necessary to obtain a license upgrade or other third-party software licenses (e.g., new reporting writing software or web drivers) as well as licenses for laptops or other off-site computers that have to access the system.
2. Irrigation Control – this new software will be installed with the center pivots and will be part of the package provided with the field controllers. This software and the existing Wonderware software will have some overlapping features and components; however, this software is primarily for the on-farm operation of the pivots and will not be used for controlling the operation of facilities in the canal system or reservoirs.

The backbone computer and communications networks used for both office software packages may also have some overlapping components, with one major exception- the radio systems for each system will be separate. This will increase the robustness of the system as well as provide a separation between the proprietary software supplied by the center pivot manufacturer and the commercial SCADA integrator. For example, it is expected the radio system used for the "regular" SCADA system, which is really just an expansion of the existing Wonderware-based system, will be high-speed Ethernet 900 MHz unlicensed with at least a few stand-alone repeater stations for access to sites further up in higher terrain than the ranch. On the other hand, the field controllers for the pivot and the base unit for the office will likely be proprietary equipment that is specially designed for pivot operations, with a lower range.

Remote monitoring of the field sites in the Diamond Valley Ranch system shall be done from the base station located at the Ranch House (located adjacent to the Fresh Water pump station). The base station shall be equipped with the tools required to communicate with the SCADA sites, display information on a computer screen, make changes to devices at the RTUs, and store historical data accumulated from the RTUs.

In addition, a second base station work station computer will be installed at Hal's Shop to provide remote access to the system from that location. Hal's Shop will be able to access the SCADA system via a licensed client software platform running on a new dedicated work station. In addition, Hal's Shop may be equipped with a sub-master radio station, depending on the final results from the radio testing.

The SCADA base station will include separate computer servers for the different office software, and in addition, ideally there will be two separate computer monitors so that the operator(s) can conveniently interact with each system side-by-side. In addition, is predicted that the network configuration required for each half of the SCADA system (i.e., Wonderware and Irrigation Control) will be somewhat different and specialized.

The SCADA base station at the Ranch House office will operate as a stand-alone, autonomous system, monitoring sensors, displaying data, outputting controls, activating alarms and logging information to facilitate on-going operations. Wonderware SCADA management software, or an approved equivalent, will be installed and configured with user-customizable screens as the HMI platform for the primary access point for operations. The base station shall be capable of polling, transmitting and receiving data (both analog and digital), via secure high-speed digital radios (unlicensed 900 MHz), with multi-level password security.

SCADA Equipment Requirements at the Ranch House Base Station

The following items will be provided and installed at the Diamond Valley Ranch Base Station:

- 2× office computer server systems (high-performance dual hard-drive servers with work stations)
- 2× 30-inch widescreen monitors
- 2× mobile SCADA laptops (hardened)
- Wonderware HMI software program (license, upgrades, etc.)
- Master office Irrigation Control software
- Color laser printer (network enabled)
- 900 MHz master data transceiver radio
- Alarm autodialer system
- UPS
- 2× Omni antennas
- 2× Antenna cables
- Antenna mast or tower

SCADA Equipment Requirements at the Hal's Shop Base Station

The following items will be provided and installed at the Hal's Shop Base Station:

- Office computer system (high-performance PC work station)
- 30-inch widescreen monitor
- Wonderware HMI software program (license, upgrades, etc.)
- Color laser printer (network enabled)
- 900 MHz master data transceiver radio
- Alarm autodialer system
- UPS
- Omni antenna
- Yagi antenna
- Antenna cable
- Antenna mast or tower

Radio Testing

Radio frequency engineering analysis with signal path testing will be required to determine if communications with an unlicensed (900 MHz spread spectrum) would be reliable and reach all sites in Diamond Valley Ranch service area. 900 MHz spread spectrum radios have several advantages over other types of radios including high speed, security, cost, and the fact that no FCC license is required. The radio test results will indicate if the signal strengths and signal-to-noise ratios are in acceptable ranges. No locations have been identified for repeater stations at this date, but to be conservative it is expected that up to four (4) repeaters will be required to provide adequate coverage for places such as Snowshoe Thompson No. 1 Ditch and Upper Dressler Ditch System.

SCADA Equipment Requirements for Pump Stations

A SCADA-based control system will be installed at the new Fresh Water Pump Station that is designed primarily for the operation of the center pivots. Major center pivot manufacturers provide turn-key, integrated pump station control packages that include controls for common components such as flow meters, filter stations, and VFDs. The pump control system will be integrated into the same web-based software that is used to operate the center pivots. Thus, the operator of the center pivots will use the same control package to also monitor and control the pump station.

In addition to the commercial irrigation control package, STPUD will also install a separate RTU for incorporating control and monitoring features of the pump station into the service-area level SCADA system that is used for the water conveyance and distribution system. For example, key sensor components such as pressure transducers and flow meters on the pipelines at the center pivots will be measured by both the Irrigation Control system and the SCADA system.

Fresh Water Pump Station

The following SCADA items will be provided and installed at the Fresh Water Pump Station:

- SCADA RTU (district standard – automatic)
- Irrigation Control RTU (district standard – automatic)
- 2× VFD controllers (supplied with pump station MCCs)
- 3× electromagnetic flow meters
- 8× pressure sensors (est.)
- 900 MHz master data transceiver radio or hardwire connection to the Farm House
- Control panels, misc. electrical hardware
- HOA switches
- Control building
- Yagi antenna, unless hard wired
- Antenna mast or tower, unless hard wired
- Antenna cable, unless hardwired

Booster Pump Station

The following SCADA items will be provided and installed at the Booster Pump Station:

- SCADA RTU (district standard – automatic)
- 1× electromagnetic flow meter
- 4× pressure sensors (est.)
- 900 MHz master data transceiver radio, unless hardwired
- Control panels, misc. electrical hardware
- HOA switches
- Yagi antenna, unless hardwired
- Antenna mast or tower, unless hardwired
- Antenna cable, unless hardwired

Hydroelectric Plant

The following SCADA items will be provided and installed at the Hydroelectric Plant:

- SCADA RTU (district standard – automatic)

- 2× electromagnetic flow meters (est.)
- 8× pressure sensors (est.)
- 900 MHz master data transceiver radio, unless hardwired
- Control panels, misc. electrical hardware
- HOA switches
- Control building
- Yagi antenna, unless hardwired
- Antenna mast or tower, unless hardwired
- Antenna cable, unless hardwired

SCADA Equipment Requirements for Center Pivots

Field Irrigation Control

The following SCADA items will be provided and installed at the center pivots:

- Field Controller Unit
- Pressure sensor
- Flow meter
- Temperature sensor
- Power sensor
- 900 MHz master data transceiver radio with antenna (field unit)

SCADA Equipment Requirements for Remote Ditch Inlets

Remote Ditch Inlets

The following SCADA items will be provided and installed at each of the Remote Ditch Inlets:

- RTU (district standard - monitoring)
- LCD display
- Water level sensor (ultrasonic or pressure transducer)
- Solar power charging system (12/24 VDC)
- 900 MHz master data transceiver radio
- Staff gauge
- Vandalism enclosure
- Yagi antenna
- Antenna mast or tower
- Antenna cable

SCADA Equipment Requirements for Junction Box

A new RTU will be installed at the Junction Box site in order to monitor the flow rate in one canal, as well as estimating the water elevation in Harvey Place Reservoir and Indian Creek Reservoir. The pressure measured by a transducer attached to each pipeline upstream of the discharge valve at the Junction Box will be correlated with the corresponding elevation head in each of the reservoirs. This method will be fairly accurate and consolidate several measurement points into one SCADA RTU. At a future date STPUD may decide to install additional SCADA sites at the reservoirs themselves depending on access to suitable sites for radio communications towers or other means.

The following SCADA items will be provided and installed at the Junction Box site for monitoring-only purposes:

- RTU (district standard - monitoring)
- LCD display
- 2× pressure sensors (pipelines)
- Water level sensor (ultrasonic or pressure transducer)
- Solar power charging system (12/24 VDC)
- 900 MHz master data transceiver radio
- Staff gauge
- Vandalism enclosure
- Yagi antenna
- Antenna mast or tower
- Antenna cable

Cost Estimate for the Diamond Valley Ranch SCADA System

The proposed STPUD SCADA System to be installed as part of the Diamond Valley Ranch Irrigation Improvements are summarized in the cost estimate section of this report. Based on planning-level cost estimates developed for this report, the implementation of the SCADA system will cost approximately $300,000 to $800,000 depending on many factors including how much of the engineering and electrical work is done by the district, the degree of complexity, et.

The project budgets include estimates for the final design and engineering expenses, civil works and construction, plus contingencies. Reported estimates are based on a preliminary analysis of the required components, without having completed further studies such as radio testing or a topographic survey database of the proposed civil works features.

Preparing Final SCADA Designs and Specifications

The final details of the STPUD SCADA system will be defined in the *Final Automation Plan and SCADA Specifications* technical report (part of the RFP to be prepared at a future date). There must be discussions with STPUD staff to delineate tasks that STPUD can do versus what will be done by others. The specific products they use vary depending on the job, but the design and implementation of the STPUD SCADA system will conform to performance-based specifications developed in coordination with the final design of the pump stations and center pivots.

Engineer's Opinion of Probable Costs

The following table provides the 50% engineer's estimate of probable costs for the complete project. Additional information on cost assumptions can be found in Attachment D.

South Lake Tahoe Public Utility District
Diamond Valley Ranch Project Irrigation Improvements Project
Engineer's Opinion of Probable Costs (50%)

Element Description	Estimated Quantity	Units	Unit Price	Estimated Amount
Mobilization, Bonds, Insurance	1	LS	$ 300,000	**$ 300,000**
Irrigation System				
Pivots & Accessories				
Field A	1	EA	$ 78,700	$ 78,700
Field B	1	EA	$ 78,700	$ 78,700
Field C	1	EA	$ 86,630	$ 86,630
Field D	1	EA	$ 88,930	$ 88,930
Field E	1	EA	$ 97,315	$ 97,315
Field F	1	EA	$ 100,200	$ 100,200
Field G	1	EA	$ 97,440	$ 97,440
Field H	1	EA	$ 106,390	$ 106,390
Pivot SCADA	1	LS	$ 10,000	$ 10,000
Field Preparation				
Land smoothing	1	LS	$ 70,500	$ 70,500
Field preparation	1	LS	$ 190,500	$ 190,500
Soil Monitoring				
moisture sensors (3 per site)	48	EA	$ 450	$ 21,600
Data Loggers (1 per site)	18	EA	$ 650	$ 11,700
Data station	1	EA	$ 1,500	$ 1,500
Installation per site	18	EA	$ 3,000	$ 54,000
Filtration & Injection				
Filters, fitting and media	1	LS	$ 150,000	$ 150,000
Fertilizer Injector, tank & hoses	1	LS	$ 80,000	$ 80,000
Misc fittings, valves, concrete pad	1	LS	$ 25,000	$ 25,000
Electrical panel & wiring	1	LS	$ 7,000	$ 7,000
Subtotal =				**$ 1,356,105**
Irrigation Distribution System (water pipe & electrical)				
Pivots A&B				
10" PVC water pipe to A & B (Class 125 , typical all distr pipe)	3700	LF	$ 40	$ 148,000
8" PVC water pipe to A & B	1300	LF	$ 36	$ 46,800
Electrical cable in conduit to A & B	5000	LF	$ 24	$ 120,000
Pivots C, D & E				
8" PVC water pipe to C	3000	LF	$ 36	$ 108,000
Electrical cable in conduit to C	3000	LF	$ 24	$ 72,000
12" PVC water pipe to D	1100	LF	$ 48	$ 52,800
Electrical cable in conduit to D	1100	LF	$ 24	$ 26,400
21" PVC water pipe to E (also serves F thru H)	2500	LF	$ 90	$ 225,000
10" PVC water pipe to E	1050	LF	$ 40	$ 42,000
Electrical cable in conduit to E	3550	LF	$ 24	$ 85,200
Pivots F, G & H				
15" PVC water pipe to F	1350	LF	$ 55	$ 74,250
Electrical cable in conduit to F	1350	LF	$ 24	$ 32,400
12" PVC water pipe to G & H	1450	LF	$ 48	$ 69,600
8" PVC water pipe to G & H	2100	LF	$ 36	$ 75,600
Electrical cable in conduit to G & H	3550	LF	$ 24	$ 85,200
Subtotal =				**$ 1,263,250**

South Lake Tahoe Public Utility District
Diamond Valley Ranch Project Irrigation Improvements Project
Engineer's Opinion of Probable Costs (50%)

Element Description	Estimated Quantity	Units	Unit Price	Estimated Amount
Fresh Water System				
5000 GPM Pump Station (Sump, Pumps, Valves & Pipe)	1	LS	$ 170,000	$ 170,000
Gravity Pipe from Indian Creek Reservoir Turnouts (24" ICR)	5900	LF	$ 60	$ 354,000
Gravity Pipe Pipe from Millich Ditch to Sump (24" MD)	2900	LF	$ 60	$ 174,000
Gravity Pipe Pipe from Snowshoe #2 to Sump (18" ST#2)	1900	LF	$ 40	$ 76,000
Gravity Pipe Pipe from Snowshoe #2 to daylight downstream	2600	LF	$ 40	$ 104,000
Junction Box with control valves	1	LS	$ 68,000	$ 68,000
Spring Supply Tile Drains and 12" Gravity Pipeline	3500	LF	$ 25	$ 87,500
Subtotal =				**$ 1,033,500**
Recycled Water System				
C-Line Loop Mainline (DIP) Phase I (C-Line to Ranchhouse)	8360	LF	$ 135	$ 1,128,600
C-Line Loop Mainline (DIP) Phase II (back to C-Line)	8340	LF	$ 135	$ 1,125,900
12" Pressure regulating valve & vault	1	LS	$ 18,000	$ 18,000
Misc Piping & Valves to filters	1	LS	$ 20,000	$ 20,000
Subtotal =				**$ 2,292,500**
Control Building and Misc Structural				
Metal Building	500	SF	$ 100	$ 50,000
Foundation Structure (concrete)	10	CY	$ 750	$ 7,500
HVAC	1	LS	$ 4,500	$ 4,500
Roofing, Doors, & Misc. Supports	1	LS	$ 12,000	$ 12,000
Subtotal =				**$ 74,000**
Pump Station Electrical System (excluding SCADA & Controls)				
Main Switchboard	1	LS	$ 33,500	$ 33,500
MCC	1	LS	$ 124,000	$ 124,000
Instrumentation	1	LS	$ 25,000	$ 25,000
Building & Site Electrical	1	LS	$ 75,000	$ 75,000
Subtotal =				**$ 257,500**
Hydro Electric Station (excluding building, scada, tie to grid)				
Hydroelectric turbine/generator & drive Installed	1	LS	$ 360,000	$ 360,000
Misc supports, piping & Valves	1	LS	$ 18,000	$ 18,000
Subtotal =				**$ 378,000**
SCADA System				
Fresh Water Pump Station SCADA System	1	LS	$ 52,500	$ 52,500
Hydroelectric SCADA Controls	1	LS	$ 75,000	$ 75,000
Booster Pump Station Controls	1	LS	$ 41,250	$ 41,250
Junction Box Remote Monitoring	1	LS	$ 56,563	$ 56,563
Remote Ditch Inlets Remote Monitoring	1	LS	$ 39,063	$ 39,063
Radio Repeaters	1	LS	$ 75,000	$ 75,000
Base Station at the Ranch House	1	LS	$ 67,500	$ 67,500
Base Station at Hal's Shop	1	LS	$ 30,625	$ 30,625
Communications System	1	LS	$ 91,875	$ 91,875
Irrigation Control - Field Controllers and Software	1	LS	$ 56,000	$ 56,000
Irrigation Control - Pump Station Control System	1	LS	$ 25,000	$ 25,000
Weather Station	1	LS	$ 30,000	$ 30,000
Engineering and Project Management	1	LS	$ 64,038	$ 64,038
Mobilization	1	LS	$ 35,221	$ 35,221
Contingency	1	LS	$ 74,000	$ 74,000
Subtotal =				**$ 813,635**

NOTE: SCADA costs will vary based on selection of options by STPUD. The range of costs for SCADA are from $300,000 to $800,000

South Lake Tahoe Public Utility District
Diamond Valley Ranch Project Irrigation Improvements Project
Engineer's Opinion of Probable Costs (50%)

Element Description	Estimated Quantity	Units	Unit Price	Estimated Amount
Electrical Utility Extension				
Utility Extension Construction	6200	LF	$ 50	$ 310,000
Misc Tie-in Facilities (transformers, pull boxes, etc)	1	LS	$ 65,000	$ 65,000
Utility Extension Administration	1	LS	$ 25,000	$ 25,000
Subtotal =				**$ 400,000**
Grading and Drainage				
Containment Areas Berms	59,300	CY	$ 3.0	$ 177,900
Containment Areas Mass Grading	196,000	CY	$ 1.5	$ 294,000
Fields A & B Berms	5600	CY	$ 3.0	$ 16,800
Fields A & B Mass Grading	3300	CY	$ 1.5	$ 4,950
Fields C, D & E Berms	16000	CY	$ 3.0	$ 48,000
Fields C, D & E Mass Grading	9800	CY	$ 1.5	$ 14,700
Fields F, G & H Berms	12900	CY	$ 3.0	$ 38,700
Fields F, G & H Mass Grading	45400	CY	$ 1.5	$ 68,100
Subtotal =				**$ 663,150**
Sub Total Construction Costs =				**$ 8,931,840**
Construction Contingency (10%)				$ 893,184
*****TOTAL PROJECT COST =**			Subtotal =	**$ 9,825,024**

Attachment A – Water Rights Back-up Information

Diamond Valley Ranch
Water Rights

Surface water bodies on the ranch consist of Indian Creek and numerous irrigation ditches. The primary irrigation ditches are known as Snowshoe Thompson #2 and Millich Ditches, which take water from Indian Creek and the West Fork of the Carson River. Water within the ditches are used to flood irrigate grazing lands.

The Diamond Valley Ranch (Old Heise Property) has both riparian and appropriative rights out of Indian Creek, Most of which are supplemental. It also has West Fork rights. According to the records of the Federal Water Masters Office, Diamond Valley Ranch has Alpine Decree rights from the following claims:

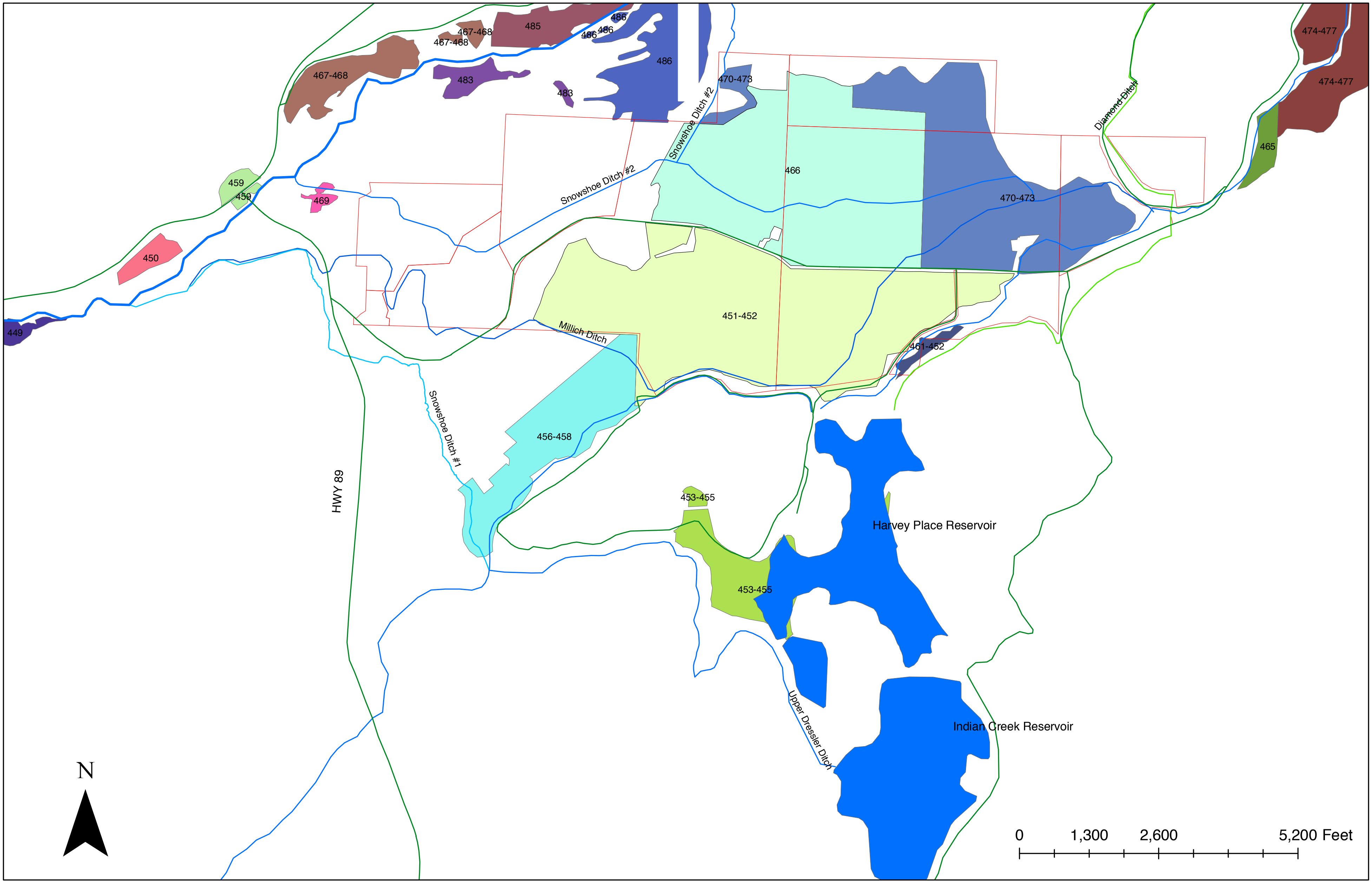
Claim	Source	Priority	Acres	Supp.
49	Indian Creek	Riparian	25.0	All
50	Indian Creek	1881	57.8	All but 11.6 acres
51	Indian Creek	Riparian		All
52	Indian Creek	1881	84.0	All
	Total		**166.8**	
451	West Fork – Snowshoe Thompson #1	4/1/1869	359.9	See Claim 50
452	West Fork – Snowshoe Thompson #1	4/1/1891	11.5	See Claim 50
466	West Fork – Ellis of Ellis-Dudley	11/6/1876	309.5	
470	West Fork – Snowshoe Thompson #2	8/15/1864	161.6	See Claim 51-52
471	West Fork – Snowshoe Thompson #2	4/1/1878	20.2	See Claim 51-52
472	West Fork – Snowshoe Thompson #2	4/1/1881	32.8	See Claim 51-52
473	West Fork – Snowshoe Thompson #2	4/1/1885	10.1	See Claim 51-52
	Total		**905.6**	

As noted, all but 11.6 acres of the Indian Creek rights are supplemental. Therefore, the total water righted acreage would be 917.2 acres.

DIAMOND VALLEY
SURFACE WATER DIVERSION ESTIMATES

64% diverted from Snowshoe Thompson #1

MONTH	ST #1 HISTORICAL AVERAGE DIVERSION RATES				ST#1 Average Minimum Flow to ICR		ST#1 Maximum Available Flow to Millich Ditch		MILLICH-AVAIL. SUPPLY W/DITCH LOSS @ 3 CFS (1347 gpm)	INFERRED ST#2 DIVERSION (= 0.6389 * ST1 Rate)			ST#2 - AVAIL. SUPPLY W/DITCH LOSS @ 3 CFS (1347 gpm)	
	AF/DAY	AF/YR	CFS	GPM	CFS	GPM	CFS	GPM	GPM	AF/YR	CFS	GPM	GPM	CFS
April	24	720	12.10	5,432	2.50	1,122	9.60	4,310	2,963	460	7.73	3,470	2,123	4.73
May	32	992	16.14	7,242	3.40	1,526	12.74	5,716	4,369	634	10.31	4,627	3,280	7.31
June	28	840	14.12	6,337	2.90	1,302	11.22	5,035	3,688	537	9.02	4,049	2,702	6.02
July	21	651	10.59	4,753	2.20	987	8.39	3,765	2,418	416	6.77	3,036	1,689	3.76
August	14	434	7.06	3,168	1.50	673	5.56	2,495	1,148	277	4.51	2,024	677	1.51
September	11	330	5.55	2,490	1.10	494	4.45	1,996	649	211	3.54	1,591	244	0.54
October	3	93	1.51	679	0.30	135	1.21	544	-803	59	0.97	434	-913	-2.03
ANNUAL		4060								2594				
Median				4,753				3,765	2,418				1,689	3.76
Mean				4,300				3,409	2,062				1,400	3.12
Maximum				7,242				5,716	4,369				3,280	7.31
Jun - Sept Median				3,961				3,130	1,783	347		2,530	1,183	
Jun - Sept Mean				4,187				3,323	1,976	360		2,675	1,328	
Jun - Sept Maximum				6,337				5,035	3,688			4,049	2,702	



485
486
486
486
467-468
467-468
467-468
486
483
483
470-473
474-477
474-477
Diamond Ditch
465
Snowshoe Ditch #2
466
459
459
469
Snowshoe Ditch #2
470-473
450
451-452
449
Millich Ditch
461-452
456-458
Snowshoe Ditch #1
HWY 89
453-455
Harvey Place Reservoir
453-455
Upper Dresser Ditch
Indian Creek Reservoir
N
0
1,300
2,600
5,200 Feet

Attachment B – Diamond Valley Ranch Irrigation System Design and Management TM (Prepared by the ITRC)

moving water in new directions
IRRIGATION TRAINING AND RESEARCH CENTER
California Polytechnic State University
San Luis Obispo, California 93407
Tel: (805) 756-2434
Fax: (805) 756-2433
www.itrc.org

TECHNICAL MEMORANDUM

Date: November 19, 2010

To: South Tahoe Public Utility District

From: Charles M. Burt, ITRC Chairman
Office: 805.756.2379
Cell: 805.748.3863
Email: cburt@calpoly.edu

Subject: Diamond Valley Irrigation System Design and Management

Overview

The proposed Diamond Valley recycled water irrigation system will irrigate approximately 372 acres, composed of:

- 322 acres of center pivots
- 50 acres of level basin (flood)

The system will be designed to apply either fresh or effluent water, depending upon permits and availability. Fresh water will be available every other week from surface water rights, and continuously (approximately 0.5 – 1.0 CFS) from seepage recovery.

The irrigation systems will be designed to apply water with a high uniformity and degree of control.

Crop Plan

The first years of operation will only use fresh water. In the Fall of the first year small grain will be planted. It will be harvested during the next summer. The purpose of planting the small grain is to locate problem spots in the field and correct those problems with spot treatment. Problems can involve nutrient deficiencies, hardpan, sand streaks, and infiltration difficulties. There may also be localized subsidence on fill locations that need to be smoothed out. These problems should be remedied before the more permanent crop of alfalfa is planted.

The small grain will be planted on wide (approx. 60") beds with shallow furrows that have been "dammer-diked" to create small basins (about 3'long, each) within each furrow. Those shallow basins will help avoid surface runoff problems.

During August-September of the second year, alfalfa will be planted after the problems of the first year have been resolved. The alfalfa variety that has been tentatively been selected in the Dyna-Gro DG4210 (formerly Western Farm Service's Grandstand), which is intended for exceptional forage yield potential, fast recovery after cutting, and excellent winterhardiness. It is a Fall Dormancy-4 (1 = very early dormancy; 9 += non-dormant), with a 1.2 Winterhardiness rating (1=most hardy; 6= non-hardy). Generally to obtain the same winterhardiness, other varieties have a Fall Dormancy of 3 (meaning a shorter season). This variety is also designed to be highly resistant to most forms of wilt and root rot, and resistant to pea aphid and stem nematode.

It is anticipated that the hay will be cut, dried, and baled in the field. However, depending on the market the hay may be green-chopped and sold for silage. Exactly how the hay is processed in the field will determine how many days per cutting period the pivots will not be able to irrigate a field.

The alfalfa stand will likely last 5-7 years before needing to be replanted.

Irrigation System

The Irrigation System – Center Pivots

The primary method of irrigation will be through center pivots. Pivots have been selected because they are capable of achieving high uniformities, are commonly used on alfalfa, and are relatively simple to maintain and operate.

Most of the pivots will be equipped with Nelson N3000 Nutator spinner sprinklers hanging down from drop tubes. These sprinklers are designed for low trajectories and water droplet sizes that are particularly resistant to wind distortion. The sprinklers will operate at relatively low pressures to minimize misting and spray. In the two small pivots that will be installed near the school, a different drop nozzle may be used to simulate a moving flood irrigation system.

Excellent uniformity will be achieved by incorporating several features into the center pivot irrigation system:

1. Each sprinkler will be equipped with an individual pressure regulator. This will ensure the correct application rate for every sprinkler, regardless of changes in supply pressure and differences in elevation as the pivot moves across a field.
2. The fresh water will be filtered through sand media tanks (approximately 40 mesh filtration) that will have automatic backflush. The filtration will ensure that the sprinkler nozzles and pressure regulators will not be plugged. The lack of proper filtration often causes major headaches with plugging of filters and pressure regulators on pivots. In addition, pre-filtration will be accomplished for the fresh water by using flat plate perforated screens with velocities (into the ½"holes) of less than 1 foot/second. This will ensure that the media filters are not overloaded with dirt, which would cause them to backflush frequently.

3. The first span on each pivot will have sprinklers that will only operate half the time (every other pass). This will allow larger nozzles to be used in this area of the pivot, which typically has very small nozzles that can be susceptible to wind distortion.
4. The field will be prepared to grow the alfalfa as "row hay", which is common in the Imperial Valley of California but is not usually seen in other areas. The alfalfa will be grown on slightly raised beds, and the furrow depressions between the beds will be able to contain any temporary runoff if it should occur. A device called a "dammer-diker" will be used to put small dams in the furrows at a spacing of about 30", to help avoid runoff down the furrows. All of these measures will help ensure that water that hits the ground at a point stays there instead of re-distributing across the field.

Each pivot will have an individual flow meter and on/off valve, as well as a control panel – all located in the field. The pivots have been designed as part-circles where possible to facilitate easy alfalfa harvesting that can be accomplished without having the harvesting equipment turn around in the field itself. This will help create more uniform growth throughout the field, which is important for monitoring and nutrient uptake.

Pivots will be equipped with a special 3-tire system on the outside towers to minimize track rutting. The gear boxes of the towers on the outside will be high-speed to help minimize any potential runoff problems.

The pivots have been designed to operate on fresh water alone during the first years. Because water is only available every-other-week, the pivot application rates will be almost double those found with typical center pivots.

The Irrigation System – Level Basins

The emergency overflow area will be equipped with many relatively small level basins. Level basins are widely accepted as the most simple-to-manage form of surface irrigation. They are designed with a very slight slope (0.1% in the direction of flow; 0% cross slope) to facilitate rapid water advance and uniform infiltration. A substantial benefit comes from management by time – all of the water that is applied will infiltrate. That is, there is no tailwater runoff. Therefore, if an irrigator knows the flow rate and the depth to apply, the proper duration of water application is known in advance.

The water will be supplied to individual basins via a buried pipe that has an alfalfa valve riser for each basin. The alfalfa valves will be located slightly below the ground surface grade so that they will not be damaged by harvesting equipment. Alfalfa valves are widely used for surface irrigation of alfalfa. The valves will be sized large enough to provide sufficient flows for rapid water advance across the fields and good uniformity. The ground within each level basin will be laser leveled for good grade control.

Land Preparation

It will be important to have uniform growth within each field so that irrigation water (and nitrogen) uptake is uniform. Multiple means will be used to accomplish this:

1. As mentioned above, the irrigation systems must be manageable and must be capable of applying water very uniformly.

2. The land surface must be graded to eliminate surface depressions that might accumulate winter precipitation and cause variations in crop growth.
3. High water tables must be eliminated so that the entire water uptake is either precipitation or applied irrigation water. Three areas have been targeted for limited tile drainage: Subsurface water that moves to the surface (e.g., from a natural wetlands) or from the limited tile drainage lines will be routed away from the irrigated areas; canal seepage from the Snowshoe Thompson #2 ditch and from the Millich Ditch will also be minimized by piping some section of those ditches, thereby minimizing artificial wetland areas within the irrigated zones.
4. The soil fertility must be brought up to a sufficiently high level to support good alfalfa growth. The soil has very little natural fertility, and a complete package of potassium, phosphorous, boron, calcium, and other nutrients will be added after the land grading. Regular and dolomitic lime will be added to improve the soil pH. Gypsum will be added to improve water penetration; the very low-salinity fresh water will cause infiltration problems unless the soil has adequate calcium available on the soil cation exchange sites.
5. It is anticipated that gypsum will be land-applied annually to help minimize or eliminate surface runoff problems.

Irrigation Scheduling and Monitoring

The irrigation scheduling (when and how much to irrigate) will be determined with weather-based evapotranspiration (ET) estimates, plus soil moisture monitoring. Features that will be incorporated into the program include:

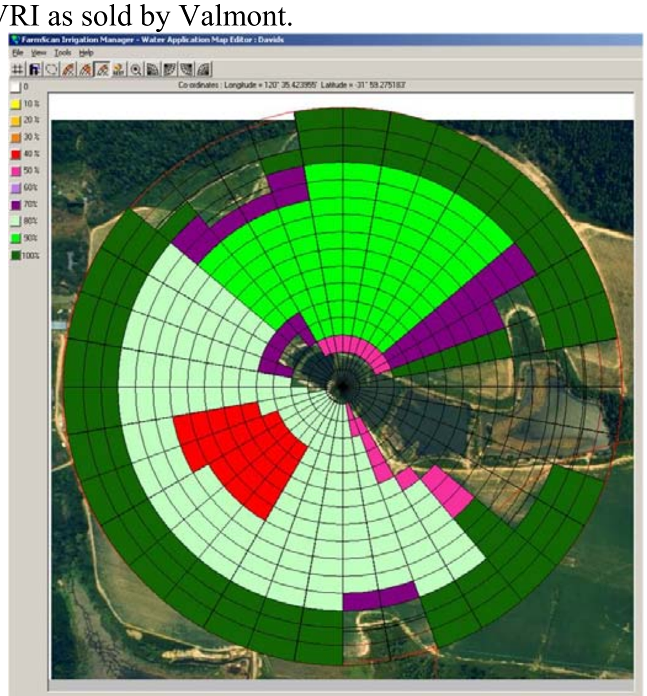
1. A new, high-quality weather station will be installed. The data will allow the computation of hourly ETo (reference ET) values using the Penman-Monteith method – the standard procedure used by CIMIS (California Irrigation Management Information System). At this time, it is not known if the weather station can be incorporated into the CIMIS network of stations; at a minimum, it will be properly sited and equipped with the same equipment as the CIMIS stations. The new weather station will be located near the Ranch house, with an irrigated area around it (regular impact sprinklers). The weather station will have a Campbell Scientific datalogger that is capable of computing ETo with the hourly weather data.
2. Alfalfa ET will be computed by combining ETo and appropriate crop coefficients, on a daily basis. The crop coefficients will be adjusted, using standard procedures from ITRC, to account for stress, wet soil/plant surfaces, and the status of the alfalfa crop (recently cut, full bloom, etc.).
3. The monthly ET must be applied within about 22 days out of the month, due to the cutting cycle of alfalfa. Knowledge of the soil water holding capacity and root zone depth and anticipated cutting dates will be combined with the estimated alfalfa ET to schedule irrigations so that the root zone is at field capacity immediately before cutting.
4. All the pivots are to be designed to have the same application rate for ease of management. Regardless of the size of the field, 24 hours of irrigation on any field will apply the same average depth (averaged over the whole acreage) as 24 hours of irrigation on any other field.
5. Each pivot, and the emergency containment flood irrigated area, will have individual flow meters that read out both the instantaneous flow rate and totalized volume applied. This is important for verification of applied amounts of water.

6. A pivot control software package will be installed on-site. This will provide remote monitoring of each pivot's status and of the flow meter into the flood irrigated area. The software will enable South Tahoe Public Utility District ("District") management to have current information on the status of each irrigated parcel, plus records of historical applied volumes of water.
7. A program of soil moisture monitoring will be incorporated just to examine trends. Soil moisture monitoring equipment is just one of many tools that can be used for scheduling. It is clear that if a sensor is moved a few inches to the side or up or down, a different result will be read. However, if sensors are placed near the top, middle, and bottom of the root zone in several fields, management can obtain an indication of soil moisture trends. That equipment can be monitored in the field office. It is anticipated that occasionally the District will dig backhoe pits to the bottom of the root zone in a few fields to directly see what the roots and soil moisture conditions are.
8. The District will use software to keep track of irrigation scheduling computations.
9. Flow meters to the fresh water and effluent water supply will enable the District to know gross volumes of water supplied from each source. These will also be remotely monitored.

<u>Tailwater (Surface Runoff) Control</u>

The every-other-week availability of surface water requires that the pivots be designed with high application rates. The pivots must be able to apply the required water volume in half the time seen with standard designs. The high application rates have the potential to cause runoff, so the design and land preparation have been adjusted to avoid or minimize such problems.

To reduce the volume of land grading that is required within fields, at least 2 of the fields (F and D) are anticipated to have pivots equipped with Variable Rate Irrigation (VRI). This feature will allow the pivots to not irrigate selective sections of ground that may be too steep or low. The figure below illustrates the concept of VRI as sold by Valmont.



Each field will have a low ditch/;berm located on the upslope side to channel on-coming surface water away from the field. There will also be a berm located on the downslope side to capture and temporarily store any surface runoff, preventing it from reaching natural channels. The combination of correct sprinkler selection, high speed gearboxes, row hay, land grading, and treatment of the soil with gypsum prior to planting will minimize or completely eliminate surface runoff problems. Surface runoff can be difficult to predict, but the District's plan is to begin irrigation on each field with surface water and resolve any such problems before effluent is used. Because of the fresh water purity, any runoff problems that might eventually occur would be expected to show up with the fresh water.

The berms will be located at least 30'away from the irrigated circles, to provide turn-around room for harvesting equipment, and to provide a road for access around the pivots. At natural drainage points (low points) of each berm, a culvert with an upstream gate (such as a Waterman C-10 Canal Gate) will be provided to allow standing water to drain, if necessary.

There may eventually be limitations to draining any standing water (whether it be fresh water, precipitation-caused, or effluent) into natural or new drainageways. If standing water near the berms does become a problem, an engine-powered pump on a trailer can be used to drain the water. The pump will discharge into a traveling large sprinkler (such as the Boss Little Dude® hard hose reel traveler). The traveling sprinkler would re-distribute the water into the irrigated area, or outside the area in a non-wetland area.

Nutrition Plan

Details of the nitrogen balance are found in Appendix A. The discussion in the Appendix shows that the nitrogen in the effluent water is not sufficient to meet the overall needs of the alfalfa. Therefore, the alfalfa will fix N_2 from the atmosphere to supply the deficit.

During the first year of operation, small grain will be grown. It will require nitrogen applications on the ground and through the center pivot irrigation system (via fertigation) to have good growth. Once alfalfa is planted, no additional nitrogen applications are envisioned.

The land preparation plan includes the addition of various nutrients and soil amendments to prepare a fertile and permeable soil.

After the soil is land graded, the amendments listed in Table 1 should be spread uniformly across the to-be-planted areas and then evenly mixed into the top 6"of soil by multiple disking.

Table 1. Amendments to planting areas

	Recommended Applications - lb/acre								
Field Location	Dolomite	Gypsum	Lime	Nitrogen N	Phosphate P_2O5	Potash K_2O	Zn	B	Cu
South of Road		2000	4000	100	150	400	10	3	10
North of Road	2000	2000	2000	100	150	300	10	3	10

These recommendations are based on composite soil samples taken by ITRC on September 9, 2010, plus examination of the Wood Rogers soils reports. The ITRC samples were analyzed by A&L Western Agricultural Labs of Modesto. More detailed sampling will be done in the next project phase. The focus of the recommendations (with the exception of the N application) is on eventual alfalfa nutrition.

Notes regarding the pre-plant amendments include:

1. The average pH of the soil (0 – 18" depth) was 6.0. Plant nutrition will be improved if the pH is raised to 6.5 or 7.0. Both Dolomite and Lime will raise the soil pH. When treated effluent is eventually applied to the ground, conversion of ammonium to nitrate will reduce the pH. It is best to raise the pH before planting.
2. Dolomite has magnesium rather than calcium. South of the road, there is no need to add magnesium.
3. The salinity (ECe) of the soil is extremely low: about 0.2 dS/m. This will contribute to water infiltration problems, in spite of the sandy nature of the soils. In addition, the treated effluent chemistry is over 50% sodium, which will compound the infiltration problem. Prior to planting alfalfa, gypsum will be well mixed into the top 6"of soil:
4. Both Phosphate and Potassium levels are low in the soil. These are relatively immobile, meaning that a strong application prior to planting will not leach out over time. The recommendations above are higher than provided by Wood Rogers. But the lack of mobility of these nutrients, plus the ease of ground applying during land preparation, justify the higher rates. In addition, the Wood Rogers recommendations were for pasture rather than for alfalfa. Both are major nutrients, and the plants will remove as much potassium as nitrogen. Therefore, frequent fertigation (application of fertilizer through the irrigation system) will eventually be necessary to replenish the potassium.
5. Micronutrients (Zn, B, and Cu) are all in the range of medium-low. They should be applied as chelates, rather than as salts. Boron in particular is so low that alfalfa plant growth will be seriously stunted unless it is applied.
6. Excess nitrogen applications can be harmful during establishment of alfalfa, but the current levels of nitrogen are almost at zero. The 40 lb/acre, provided as a mix of nitrate and ammonium, will be essential for establishment.
7. The lb/acre of the various nutrients (N, Zn, etc.) are not lb/acre of fertilizer. A nitrogen fertilizer, for example, may only be 20% N – requiring five times as many pounds of fertilizer as pounds of N.

It is possible that eventually a finely ground, pure mixture of gypsum will be injected into the irrigation water to enhance infiltration. The design of the filtration station accounts for that eventuality.

Appendix A

Nitrogen balance

Background Information

Annual effluent values are found in **Table 1** below, including variable annual concentrations (mg/L) of various chemical and organic constituents. Total annual effluent flows also vary by year. **Figure 1** illustrates the variability of daily summer flows from the treatment plant.

Table 1. Final effluent annual trends – chemical and flow

FINAL EFFLUENT
ANNUAL TRENDS

	<---FLOW--->											Total			
	Total	Daily	COD	BOD	SS	NH3-N	NO3-N	Total-P	Cl	TDS	Turbidity	Cl_2	Coliforms		TKN
Year	MG	MGD	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	Total	Fecal	mg/L
80	1,418.20	4.32	22.0	3.0	2.0	5.5	5.75	0.40	148.0	551	0.70	2.84			
81	1,354.60	3.90	20.0	2.0	2.0	3.3	13.47	0.83	80.0	455	0.92	0.68			
82	1,807.90	5.10	23.0	4.0	4.0	3.1	7.87	0.81	88.0	410	1.84	2.62			
83	1,737.60	4.85	18.0	2.0	2.0	1.0	8.50	0.72	94.0	426	0.95	1.77			
84	1,566.70	4.33	16.0	2.0	1.0	1.6	8.24	0.39	103.0	436	0.73	1.84			
85	1,532.40	4.24	20.0	2.0	3.0	4.5	5.15	0.17	92.0	395	1.14	4.92			
86	1,660.50	4.59	17.0	2.0	2.0	5.3	4.95	0.20	82.0	341	1.02	4.91			
87	1,657.20	4.81	19.0	2.0	4.0	7.7	4.83	0.23	117.0	452	1.43	3.89			
88	1,619.90	4.42	14.0	2.0	3.0	6.6	9.29	0.12	136.0	480	1.01	2.78			
89	1,769.70	4.89	40.0	6.0	5.0	13.9	4.93	3.80	76.0	326	2.47	13.56	2.9	2.0	15.64
90	1,697.30	4.76	37.0	6.0	4.0	8.4	8.39	3.80	83.0	387	2.32	14.63	2.0	2.0	10.13
91	1,610.80	4.46	37.0	6.0	4.0	5.9	9.71	3.55	92.0	367	2.58	10.34	2.0	2.0	7.81
92	1,608.40	4.39	41.0	7.0	4.0	9.6	6.46	5.05	64.0	289	3.07	4.40	3.7	2.1	11.21
93	1,795.00	4.94	51.0	8.0	4.0	13.8	7.03	3.79	60.0	266	3.08	5.32	2.1	2.0	15.60
94	1,638.20	4.50	43.1	7.6	3.8	20.6	1.30	3.21	59.3	253	2.94	4.11	3.3	2.0	22.09
95	1,925.70	5.27	39.4	7.4	5.0	20.5	0.03	2.69	51.0	236	2.60	4.40	2.2	2.0	21.12
96	1,965.80	5.37	37.3	7.0	4.4	18.6	0.13	2.50	44.2	221	2.51	4.02	2.1	2.0	20.56
97	1,872.30	5.12	37.0	6.9	3.7	19.3	0.25	2.59	50.0	226	2.80	6.12	2.1	2.0	20.73
98	1,693.40	4.64	35.6	6.9	4.0	18.6	0.28	2.56	47.6	227	2.55	4.57	2.1	2.0	21.05
99	1,742.20	4.78	34.8	6.5	3.1	19.3	0.16	2.65	48.8	220	2.42	4.19	2.8	2.0	19.77
00	1,685.90	4.74	42.4	7.9	3.9	20.7	0.04	2.55	53.1	226	2.83	4.53	2.1	2.0	20.89
01	1,565.40	4.29	46.9	8.7	5.1	19.1	0.54	2.87	58.3	241	4.49	5.20	2.0	2.0	21.60
02	1,581.80	4.33	41.2	6.8	3.0	19.8	0.64	2.79	54.8	231	3.70	5.49	2.0	2.0	21.57
03	1,537.50	4.21	45.9	7.8	3.3	22.2	0.10	2.83	57.2	240	4.08	5.69	2.1	2.0	24.20
04	1,483.30	4.05	47.4	7.9	3.8	23.1	0.04	3.19	55.7	242	4.79	6.00	2.1	2.0	26.33
05	1,496.68	4.21	44.9	7.4	3.5	21.1	0.74	3.06	50.6	250	4.30	6.19	2.0	2.0	21.67
06	1,588.08	4.35	47.8	6.6	2.7	21.2	0.07	3.09	48.1	242	4.35	5.95	2.0	2.0	21.66
07	1,380.03	3.78	47.5	7.5	3.3	22.2	0.44	3.38	50.0	255	4.37	6.47	2.0	2.0	24.53
08	1,343.14	3.67	40.5	6.0	2.9	20.2	1.60	3.61	53.9	255	4.05	5.32	2.0	2.0	21.53
09	1,455.20	3.98	45.7	8.6	3.1	21.9	1.02	3.66	50.0	250	4.45	6.08	2.2	1.9	22.75

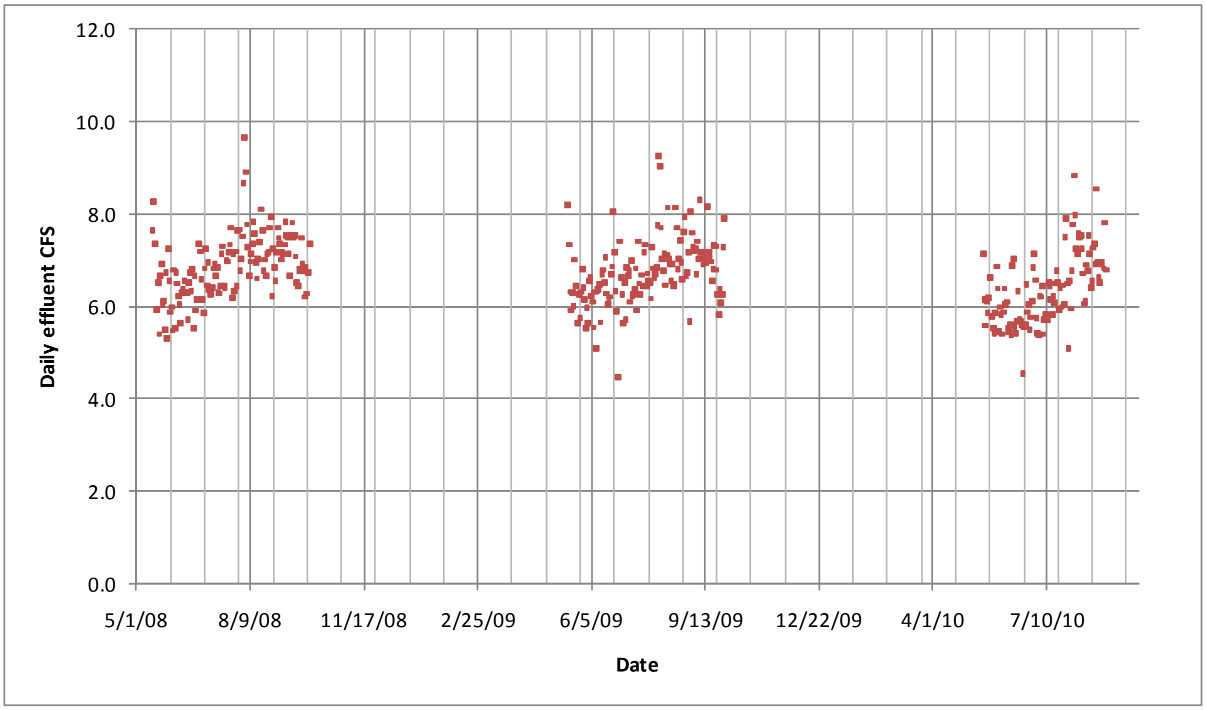


Figure 1. Daily effluent flows

Evapotranspiration rates and effluent components will change somewhat over time. For this technical memo, the following will be assumed:

- Total nitrogen (TKN + NO_3-N) in the water = 24 ppm (mg/L) average
- The dominant form of nitrogen will change depending upon the operation of the treatment plant.
  - From May to June, there can be a high concentration of NO_3 relative to ammonium, caused by activation of aeration units at the treatment plant.
  - From July to August, the nitrogen is primarily the ammonium form.
- Annual average daily flows = 4 MGD
= 6.2 CFS (1.55 CFS/MGD × 4 MGD)
- Typical minimum flow rate available during the summer = 5.5 CFS

Alfalfa Yield and ET

It is generally understood that there is a linear relationship (with origin at 0,0) between alfalfa yield and ET. However, it is also understood that there can be variations in the individual data due to differences in variety, weather conditions, and other unknowns. **Figure 2** provides a summary of reported yields in various literature sources.

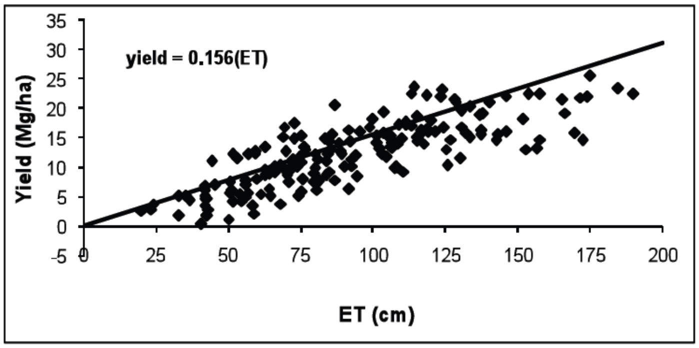


Figure 2. Alfalfa yields reported by various researchers. (Compiled by Lindenmayer, Hansen, Crookston, Brummer, and Ja. . 2008. Strategies for reducing alfalfa consumptive use. Hydrology Days. http://hydrologydays.colostate.edu/Papers_2008/Lindenmayer_paper.pdf)
Note: 1 Mg = 1.1 ton; 1 ha = 2.47 acres; 1 Mg/ha = .446 tons/ac; 1 ton/ac = 2.24 Mg/ha

Figure 2 indicates that a typical alfalfa yield (at 12% moisture) is about one ton per 5.7 ac-in. It is clear that there is not an excellent correlation coefficient; at 15 Mg/ha, there is a very wide spread of recorded ET values. ITRC has documented an average of about one ton (at 12% moisture) per 7.1 ac-in from the Palmdale effluent disposal site for LA County Sanitation Districts.

Crop ET is commonly estimated using the following formula:

$$\text{Crop ET} = \text{ETo} \times \text{Kc}$$

Where
Crop ET = crop evapotranspiration, in/day
ETo = "reference ET" such as provided by the CIMIS network, in/day. This is computed based on daily weather data.
Kc = Crop coefficient, the ratio of (Crop ET/ETo) as established by many research sources.

ETo provides a baseline indication of the evapotranspiration demand, based on extensive research of grass water usage. Because ETo is based on daily weather, it will vary by day and by year. The key weather components that influence the ETo computation are net solar radiation, relative humidity, air temperature, and wind.

The primary conclusion from the discussions above is that the nitrogen uptake is on a percentage basis of alfalfa weight, and the yield is directly proportional to the crop evapotranspiration. Therefore, regardless of whether the ET estimates are too high or too low, the conclusions below regarding the nitrogen balance remain the same.

Alfalfa ET Requirements at Diamond Valley

The Diamond Valley Ranch does have a weather station, but it only has limited types of data as well as limited historical data. Therefore, ETo was estimated by ITRC using a combination of Woodfords temperatures, Minden relative humidity, and daily satellite images from DWR that provide incoming short wave solar radiation maps for California. The estimate is therefore not precise, but we commonly understand that even with very good data the daily ETo estimates are only accurate within about +/- 5-10%.

Once the project is begun, an excellent weather station should be installed. It should have the same equipment as the California DWR CIMIS stations.

Figure 3 below provides an estimate of daily ETo values for Diamond Valley.

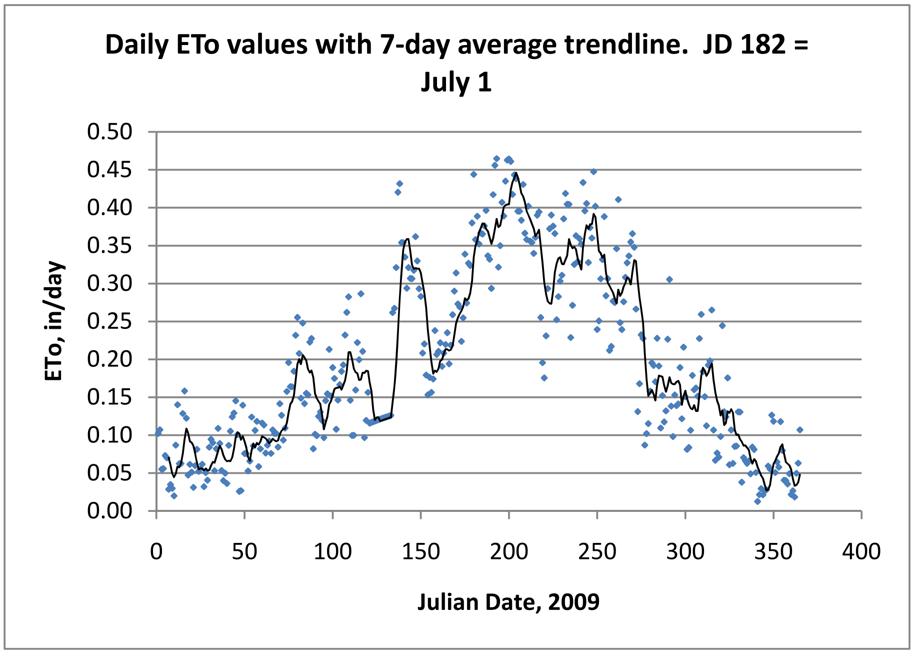


Figure 3. Daily ETo estimates for Diamond Valley. These provide approximate values for engineering planning.

For calculation of alfalfa ET from ETo, an average Kc value of 0.95 was used for the growing season. This accounts for cutting the hay, some stress, evaporation, etc. Immediately before harvest without stress, the Kc would be closer to 1.25. But after harvest the Kc drops because there are almost no leaves for transpiration, and the field may not be irrigated for a week. **Figure 4** shows the estimated 7-day running average of daily alfalfa ET estimates.

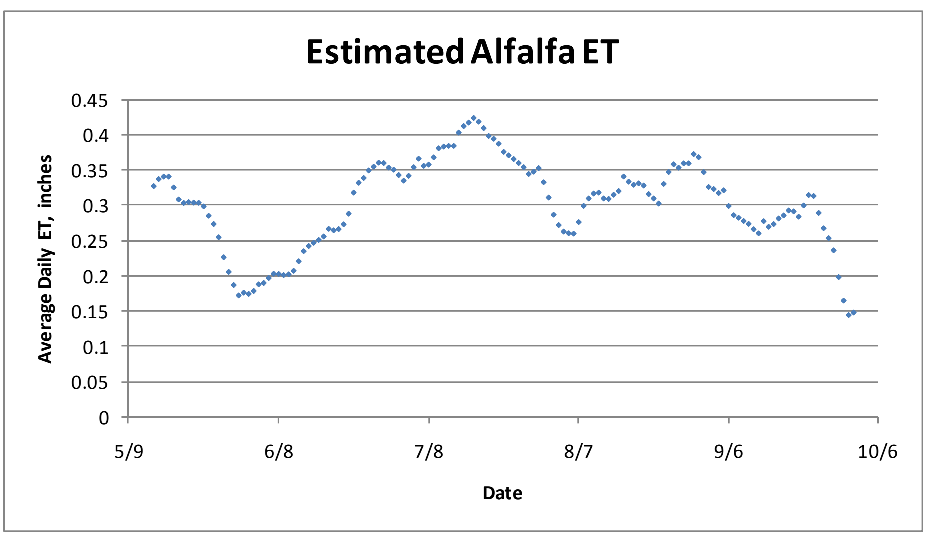


Figure 4. Approximate alfalfa ET, 7-day running averages. Constructed from a mix of 2009/2010 data. For engineering estimates only. Values appear to be high. A peak of 0.30"/day is used for estimates.

The sum of the daily ET values during the irrigation season is approximately 42". This number appears to be about 25% high, based on "experience" with this type of elevation and climate. However, the high winds and dry air may create an "oasis" effect in the valley that creates higher-than-typical ET rates. The ET estimate's uncertainty underlines the importance of having good local weather data and soil moisture monitoring once the irrigation systems are installed and running, so that the applications can match the required amounts of water.

For discussion purposes, the remainder of the computations in this technical memo will use an irrigation season ET of 36" for the center pivots, 33"/season for the flood irrigation (which will have more stress and less soil surface evaporation), and a peak weekly ET of 0.30"/day for the center pivots and 0.28"/day for the flood irrigated acreage.

Water Application – MG/Growing Season

To meet the ET rates, and to compensate for various inefficiencies such as non-uniformity of water application, the application amounts are generally estimated as:

$$Gross\ Application = \frac{ET - Effective\ Rainfall}{\left(\frac{Irrigation\ Efficiency}{100}\right)}$$

For center pivots with effluent application, ITRC uses an Irrigation Efficiency of 85%. The consequences of using this value are:

- There is almost no under-irrigation due to non-uniformity.
- About 15% of the applied water (and nitrogen) deep percolate below the root zone.
- The Distribution Uniformity of water applied by the center pivots must be about 0.85, which requires special attention to design and filtration.

Using the estimated irrigation season ET of 36", and an Irrigation Efficiency of 85%, and ignoring precipitation during the growing season, the gross application per season will be approximately:

Gross application = 36"/.85 = 42" (1.14 MG/acre) per growing season for the pivots

For the flood irrigation, the value is 33"/.75 = 44"(1.19 MG/acre)

The MG of irrigation water is estimated to be:

Pivots: 1.14 MG/acre × 322 acres = 367 MG

Flood: 1.19 MG/ac × 50 acres = <u>60 MG</u>

Total: = 427 MG

Application Rates

Instantaneous application rates (a.k.a., pump flow rates) will depend upon the design hours/day of irrigation, the number of days/week the alfalfa is irrigated, the design application rate of the pivots, and how many pivots will be operated simultaneously. Because of the uncertainties of all of these design criteria – especially knowledge of actual ET and actual management procedures – the application rates will be designed conservatively (i.e., high). Management will therefore have the capability of applying the required volume of water in a relatively short time.

This design decision has several positive aspects:

1. If there are problems with the water supply or pivots, there will be adequate time to "catch up" with the irrigation.
2. If there are unusual hot spells, the pivots will have the capacity to meet the ET requirement.
3. Most of the pivots have relatively small acreages, which means that a high percentage of the sprinklers have low flow rates. By designing the pivots for higher-than-typical flow rates, the small sprinklers will not have as many wind drift problems. Nevertheless, it is planned that the first span will have ball valves at each sprinkler, and these sprinklers will only irrigate every fourth pass by the machine. This will provide sufficient sprinkler flow rate on the first span to obtain adequate uniformity of application.
4. It will be possible to irrigate only with fresh water when it is available every other week.

The design decision has two negative aspects:

1. The high application rates may present infiltration problems with this effluent water, which has a high percentage of sodium. To address this potential problem, three design features will be incorporated:
    a. Gypsum will be applied to the soil annually.
    b. The machines will rotate quickly, thereby applying a relatively small application/pass.
    c. Special tire options will be used to minimize wheel rut problems.
2. If all the pivots are irrigated simultaneously, the pump and filter station and mainline pipes must be larger than if the individual pivot flow rates were smaller.

A pivot on an alfalfa field must be designed to apply the monthly ET in about 22 days during the middle of the summer, because there may be 8-9 days of down time due to cutting the hay and harvesting it. Assuming an average peak monthly ET of 9", the gross to apply is 10.6" per month for the pivots.

If all the pivots were operated 24/7 during the 22 days, this would require a flow rate of 9.1 GPM/acre. For example, for 322 irrigated acres of pivots, the continuous flow rate requirement would be 2930 GPM. Adding in the flood irrigated fields (50 acres) requires about **3480 GPM**.

However, if the system is designed to irrigate **2 weeks out of 4 weeks** (which means two weeks per cutting during peak ET), the flow rate requirement would be based on irrigating for 14 days per month. This would require a flow rate of **14.3 GPM/acre**. For 372 irrigated acres, the flow rate requirement would be about **5460 GPM**.

The minimum available effluent flow rate is about 5.5 CFS, or **2470 GPM**, which will likely be sufficient most of the summer if not all pivots are operated simultaneously. However, during hot periods, these flows will need to be supplemented with fresh water to meet the ET requirement.

A comparison of numbers is given:

Gross requirement during peak ET, running 24/7, 22 days/mo =	3480 GPM
Gross requirement during peak ET, irrigating 14 days/mo =	5460 GPM
Minimum available effluent flow rate =	2470 GPM

In summary, the design recommendation is:

- The initial design will be for 3 center pivot fields (D, E, and F). The flow rate requirement, based on water available only 14 days/month, for this acreage is about 3000 GPM, including 200 GPM for filter backflushing.
- During peak ET, utilize the full flow available (2470 GPM) from the effluent plant and supplement it with fresh water if needed during the hottest time of the year.

The key assumptions for design are that the system must:

- be able to irrigate the full requirement in 14 days out of approximately 22 days available for irrigation.
- incorporate special design features in the pivots to minimize runoff problems.

Conclusions

Uptake of Effluent Nitrogen. There is no anticipated problem with uptake of the N from the effluent water. The key points that create that opinion are:

1. The LA County Sanitation Districts (LACSDs) effluent at Palmdale has about 34 ppm N.
2. The STPUD effluent has about 24 ppm average N concentration.
3. At LACSDs, it is estimated that about 25% of the ammonium volatilizes. This depends upon the water and soil pH, as well as the temperature. It is expected that volatilization at Diamond Valley will be about 20%.
4. At LACSDs, the 34 ppm N (minus volatilization) is insufficient to meet the N uptake demands of the alfalfa. It is estimated that 20% of the total N uptake is from rhizobium bacteria fixation of atmospheric N_2 by the alfalfa plant.
5. During the hottest time of the summer, the effluent flow rate will likely not be great enough to supply the full irrigation demands of 370 +/- irrigated acres.

In summary, because:

1. The LACSDs N ppm is higher than at Diamond Valley, and
2. This high LACDSs N concentration is not sufficient to meet the alfalfa N requirement, and
3. The effluent water from STPUD will be supplemented with fresh water to meet peak crop evapotranspiration demand,

it is not anticipated that the effluent water will need to be mixed with fresh water for the purposes of nitrogen management.

Seasonal Application of Irrigation Water. The estimate of annual irrigation water application is about 1.15 Million Gallons per acre, on about 370 acres. It will be essential to install an excellent, well-maintained weather station on site, plus to monitor soil moisture to verify that this is the correct value. This irrigation water will be a mix of effluent water and fresh water, depending upon available flows and maintenance of water rights. The minimum fresh water that could be used would be about 15% of the seasonal applied, and will only be used during the hottest time of the year. Because of the difficulties of irrigating 24/7, and the flow limitations from the effluent plant, it is assumed for planning purposes that the seasonal irrigation water will be comprised of:

75% from effluent (320 MG)
25% from fresh water (107 MG)

Attachment C – Hydro-Electric Opportunities TM (prepared by D&A)

South Lake Tahoe Public Utility District

Diamond Valley Irrigation Improvements Project

Hydro Generation Options Technical Memorandum – November 5, 2010

Purpose

The purpose of this technical memorandum is to present the options analyzed for the proposed hydro-electric operation along the C-Line. The current operation of the C-Line is gravity flow with portions of the pipeline flowing partially full. The pipeline was designed with pressure ratings between 125psi and 175psi, however the current pressure capacity is unknown. In order to generate enough power to offset the electrical use by the irrigation system the pressure in the C-Line must be increased beyond the current maximum hydraulic grade line. The following scenarios detail alternatives for increasing pressure in the pipeline and the impacts to hydro-generation potential.

Scenario 1- No Hydro Generation

This scenario is presented as the "no project" option for comparison purposes. This scenario does not increase the existing pressure of the C-Line. In this scenario, the existing pressure meets the pressure requirement to run pivots C – J, but would not meet the pressure requirements for pivots A and B. Therefore, without increasing the pressure of the C-Line all pivots with the exception of A and B could operate. This scenario would allow operation of a majority of the pivots without the concern of increasing pressure in the C-Line, however hydro generation would not be possible. The costs for running the pivots during the irrigation season each year would be approximately $5,325 (not including any fresh water pumping costs), with no offset of cost with a hydro component. Each pivot is estimated to use 6HP for a total of 1,328hours per irrigation season (see attached calculations).

Scenario 2 – Hydro Generation with All Irrigation Lines Downstream of Hydro-Station

This scenario increases the pressure in the C-Line in order to provide enough pressure to operate all pivots (including high pressure pivots A and B) and offset the power requirement to drive the units. This scenario assumes all irrigation distribution tie-ins are located downstream of the hydro station meaning that all flow will pass through the hydro station. The power requirement to drive all eight pivot units at approximately 6 HP/unit is 48 HP or 36 KW. In order to meet the pressure requirement of pivot A and offset the power requirements, the pressure at the low point (at the river crossing) in the C-Line would be increased from 63 PSI to 132 PSI. This increases the pressure in existing C-Line 69 PSI at the low point (see attached hydraulic profiles with the Hydro-station).

A cost estimate for the hydro-electric station is included at the end of this TM. The capital cost of the station would be approximately $390,000. These costs are the incremental increase of adding a hydro station and do not include costs for bringing power to the site, site grading or building costs. Assuming the construction is funded through a 30-year loan at 6% interest the annual payment is estimated to be $28,758.

The hydro-station is sized to offset costs of power consumption on site which are estimated to be $7,100 per irrigation season. Additionally, during the non-irrigation season the hydro-station could generate an additional 509,000 kW-hrs of power for a yearly estimated revenue of $50,900. Using the revenue from hydro-generation and considering the offset costs of electrical use the payback for this scenario is 9-years.

Scenario 3 – Hydro Generation with High Pressure Line Upstream of Hydro-Station

As with Scenario 2, this scenario increases the pressure in the C-Line in order to provide enough pressure to irrigate all pivots and offset the power requirements to drive the units. However, under this scenario the high pressure line, which feeds pivots A and B, tees off before the hydro station. With this assumption, the pressure in the C-Line is only increased enough to meet the pressure requirements of pivots C (not high pressure pivots A and B) and offset the power requirements to drive all the units. As with Scenario 2, the power requirement is 48 HP or 36 KW to run the pivots. The total head requirement at the hydro station (required head for pivot C plus required head for power offset) results in an HGL elevation of 5788 FT and the requirement for pivot A is 5779 FT. This means the pressure and power requirement combination for Pivots C-J creates enough head to operate pivots A and B. With this requirement, the pressure at the low point in the C-Line is approximately 94 PSI. This increases the pressure in existing C-Line by 32 PSI at the low point.

The cost for the hydro-electric station would be the same as for Scenario 2, however the revenue generated during the off-irrigation season would be decreased. The hydro-station would still offset costs of power consumption on site which are estimated to be $7,100 per irrigation season. Additionally, during the non-irrigation season the hydro-station could generate an additional 268,000 kW-hrs of power for a yearly estimated revenue of $26,800. Using the revenue from hydro-generation and considering the offset costs of electrical use the payback for this scenario is estimated to be 24-years.

Assumptions/Observations

The following assumptions are made in the above scenarios:

- Effluent from the C-Line supplies the irrigation distribution system for the majority of the irrigation season.
- Fresh water supplemental pumping is anticipated to be necessary for the project, however it is not included in this analysis as the costs would be incurred whether or not a hydro-electric station is included in the project.
- Power offset for pumping fresh water is not included because it requires unreasonable pressures in the existing C-Line.
- For the economic analysis a loan rate of 6% was assumed with costs for electricity assumed to be $0.15/kW-hr for purchase and $0.10/kW-hr to sell back to the grid
- Payback periods could be reduced significantly if the interest rate assumed could be lowered or if portions of the project were grant funded.

Hydro -Generation Revenue during the Non-Irrigation Season

turbine efficiency	65%	
plant factor	97%	
hydro gen rate	$ 0.10	per kwh

Scenario	Flow Rate (gpm)	Head (ft)	Power (KW)	Hrs/Yr	Total KW-HR/Yr	Annual Revenue ($0.10/KW-HR)
Scenario 2	3143	183	69	7,432	509,000	$ 50,900
Scenario 3	3143	97	36	7,432	268,000	$ 26,800

Fresh Water Pumping Costs during Peak ET

Scenario	Pump HP	Pumping (KW)	Hours Pumped	Pumping KW-HR	Pump Cost per Year ($0.15/KW-
Scenario (All Pivots)	252	188	336	63,243	$ 9,500
Scenario (Lower Pivots)	150	112	336	37,616	$ 5,600

Scenarion 2 Assumptions:

Pumping Flow =	2600	GPM
Pumping Head =	269	FT
Efficiency =	70	%
Elev of Pump =	5510	FT
Elev of Pivot A =	5779	FT
Hrs Pumping =	336	(assuming 14 days, 24 hours a day)
Pumping Rate =	0.15	$/KW-HR

Scenarion 3 Assumptions:

Pumping Flow =	2600	GPM
Pumping Head =	160	FT
Efficiency =	70	%
Elev of Pump =	5510	FT
Elev of Pivot D =	5670	FT
Hrs Pumping =	336	(assuming 14 days, 24 hours a day)
Pumping Rate =	0.15	$/KW-HR

Pivot Unit Costs

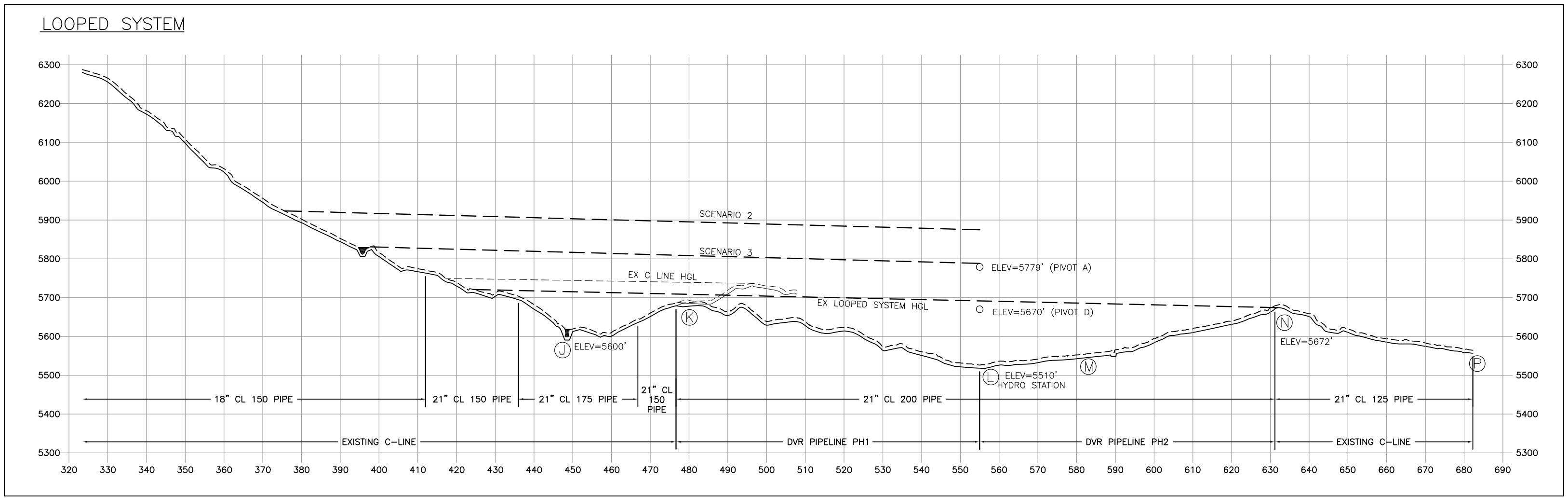
Both Scenarios	Motor HP	Motor (KW)	Hours Running	KW-HR	Pump Cost per Year ($0.15/KW-
Pivot Motors	48	36	1,328	47,553	$ 7,100

Assumptions:

Motor HP =	6	HP/Motor
# of Motors =	8	
Hrs Irrigating =	1328	
Power Rate =	0.15	$/KW-HR

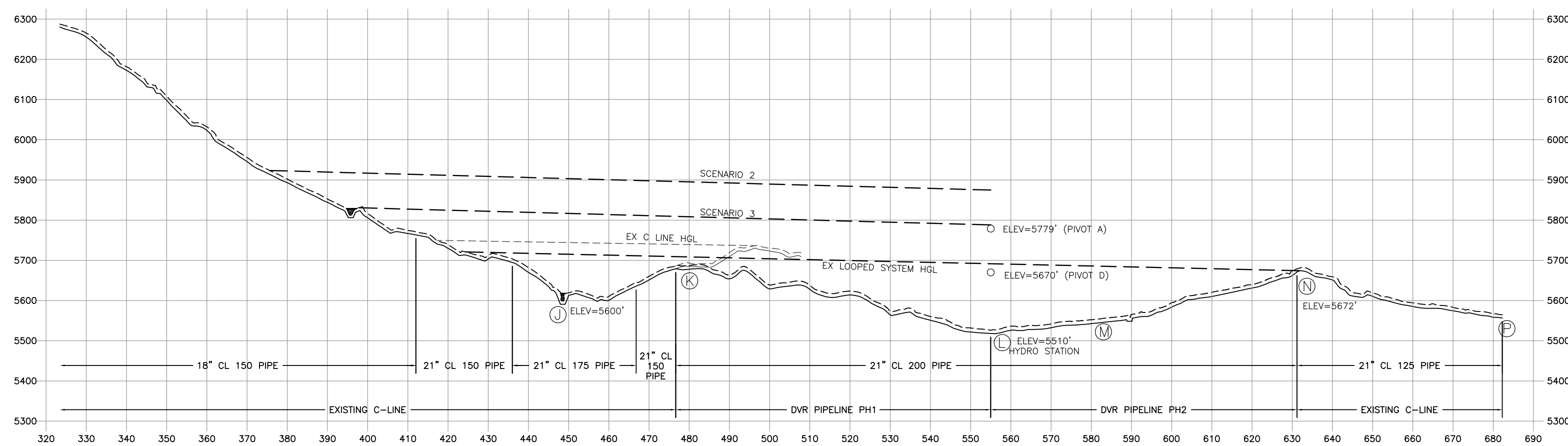
STPUD Diamond Valley Irrigation Improvements
Hydroelectric Project
Engineer's Preliminary Estimate of Probable Costs

Element Description	Estimated Quantity	Units	Unit Price (installed)	Estimated Amount
Mobilization & Site work				
Mobilization, Bonds, Insurance	1	LS	$ 20,000	$ 20,000
			Subtotal =	**$ 20,000**
Pipe, Valves and Fittings				
16" DIP	60	LF	$ 50	$ 3,000
16" Fittings	6	EA	$ 1,000	$ 6,000
16" Intake and Discharge Manifolds	1	LS	$ 15,000	$ 15,000
12" motorized control valve	1	EA	$ 6,800	$ 6,800
16" isolation valve	2	EA	$ 4,000	$ 8,000
12" isolation valve	2	EA	$ 2,500	$ 5,000
16" flow meter w/ vault	1	EA	$ 12,000	$ 12,000
Misc adaptors, gauges, minor piping	1	LS	$ 8,500	$ 8,500
			Subtotal =	**$ 64,300**
Turbine/Generators/ Swithcgear/ controls				
1 units as a package/ with variable speed capability Installed and controls	1	LS	$ 280,000	$ 280,000
			Subtotal =	**$ 280,000**
Electrical Tie-in to Grid				
Included with Frisch Pump Station Estimate- SCADA & Tie In	1	LS	$ -	$ 15,000
Site electrical & Security	1	LS	$ 10,000	$ 10,000
			Subtotal =	**$ 25,000**
	TOTAL CONSTRUCTION COSTS =			**$ 389,300**



PIPELINE PROFILE
HORZ: 1"=1500'
VERT: 1"=150'

LOOPED SYSTEM



PIPELINE PROFILE
HORZ: 1"=1500'
VERT: 1"=150'

Attachment D – Cost Back-up

Diamond Valley 50% cost estimate Nov 19, 2010	C. Burt	
Description of Task	**Cost**	
Rock/shrub removal	$ 140	/acre
Disking	$ 27	/acre
Ripping	$ 45	/acre
Land planing	$ 18	/acre
Bed/row preparation	$ 23	/acre
Planting (incl. Seed)	$ 130	/acre
Land smoothing	$ 188	/hr
Transport equipment	$ 150	/hr
Assumptions:		
Description	**Quantity**	
Farmed Land	370	acres
Number of diskings required	2	times
Number of land planings required	2	times
Number of bed/row preparations required	2	times
Land smooothing (6 wks x 40 hr/wk)*1.5	360	hrs
Round trips for equipment	8	trips
Distance (Time, round trip)	20	hrs
Estimated Costs (assuming 1 crop of wheat and another of alfalfa):		
Land smoothing & equipment transportation	$ 70,500	
Field preparation & equipment transportation	$ 190,500	
Total cost for land preparation	**$ 261,000**	
Filtration, Injection		
Fertilizer injector, controller, tanks, hoses	80,000	
Media filters, fittings, media	150,000	
Misc. Fittings, valves on concrete pad	25,000	
Electric panel, wiring on pad	7,000	
Material on the concrete pad	**$ 262,000**	

Fertilizer	Material Cost		Trucking Cost	
Dolomite	$ 19	/ ton	$ 24	/ton
Gypsum	$ 23	/ ton	$ 10	/ton
Lime	$ 23	/ ton	$ 10	/ton
Fertilizer blend	$ 690	/ ton	$ 40	/ton
Organic matter	$ 40	/ ton	$ 10	/ton

Assumptions:

Location	(tons/acre)	(tons/acre)	(tons/acre)
Required South of DV Rd	0	1	2
Required North of DV Rd	1	1	1

Material	Application Rate		
Fertilizer blend required	0.4105	tons/acre	
Organic matter required	0	tons/acre	(preliminary

Estimated Cost for Fertilizer and Organic Matter by Field:

Pivot	Location	Acres	Cost
A	South	21	$ 8,332
B	South	21	$ 8,212
C	South	29	$ 11,362
D	South	75	$ 29,900
E	South	38	$ 14,950
F	North	67	$ 27,421
G	North	38	$ 15,325
Surface irrig area	North	50	$ 20,433
H	North	29	$ 11,647
		Application costs (based on $15/acre)	$ 5,550
		Total cost for fertilizer and organic matter	**$ 153,133**

Appendix T - Response to Comments

Appendix T Response to Comments

A total of three comment letters were received by the District on the Draft Supplemental Environmental Impact Report. The following represents the response to comments received. The three letters received are included at the end of this appendix for reference.

Comment Letter 1, William Rose and Karen Brickey Rose, 11 May 2011

Letter 1 Comment 1:

A) ROAD IMPACTS- All project Components

No discussion of road impacts from repeated use of heavy construction trucks and equipment for 20 years and the resulting deferred maintenance it will cause over the long term. STPUD should provide funding and/or maintenance for the additional impacts resulting from repeated use, that is not historically present on Diamond Valley Road. This definitely affects county budgets and ultimately the local economy.

Response: Potential traffic and circulation impacts resulting from construction of the Project are discussed in Section 12 – Traffic and Circulation. Findings from this evaluation indicate that construction of the irrigation fields, pump station, hydroelectric generation facility and associated pipelines will result in temporary increases in traffic due to construction activity. Temporary construction activity will not result in significant daily traffic or circulation impacts. The increase in traffic will be less than ten percent (10%) of the existing traffic volume. New access points to State Routes will not be constructed as part of the Project.

Letter 1 Comment 2:

B) WATER RIGHT TRANSFERS and the effects on DITCH OPERATIONS - Projects 4,14,19-Components 24,23,17 and General Ranch Operation (Millich Ditch)

Much discussion is devoted to refilling ICR, ditch improvements and modifications (mainly Snowshoe #1), Mud Lake winter diversions and the transfer of water rights to accomplish such objectives. Only a few places the "Millich Ditch" is mentioned in the Master Plan or EIR. More detail is needed as to the role of the Millich Ditch and the impacts those manipulations of fresh water delivery will cause on the local residents and properties that the Millich Ditch crosses via easement.

Response: Potential impacts resulting from construction of the Project on the hydrology of the Carson Valley, Diamond Valley and Indian Creek watersheds are discussed in Section 19 – Hydrology. Findings from this evaluation indicate that there will be no effect on water availability to downstream users or erode water rights.

Letter 1 Comment 3:

We personally request that the following conditions are respected and allowed to remain in perpetuity in regulation, maintenance and operation of the Millich Ditch. Water releases and conveyance amounts, and water rights to remain in the current state as directed by the Alpine Decree with the Segment 4-5 alternate week schedule to remain in place as it exists.

Response: This is not a comment on the content or adequacy of the Draft SEIR. This information is passed on to the Project proponent and decision makers for consideration. No further response to this comment in relation to the Draft SEIR is warranted. Potential impacts resulting from construction of the Project on the hydrology of the Carson Valley, Diamond Valley and Indian Creek watersheds are discussed in Section 19 – Hydrology. Findings from this evaluation indicate that there will be no effect on water availability to downstream users or erode water rights.

Letter 1 Comment 4:

Under no circumstances should the Millich Ditch be allowed to be converted to a pipe or tube in the residential area adjacent to the Diamond Valley School along the Diamond Valley Road, where it crosses to easement on private residential properties.

Response: This is not a comment on the content or adequacy of the Draft SEIR. This information is passed on to the Project proponent and decision makers for consideration. No further response to this comment in relation to the Draft SEIR is warranted.

Letter 1 Comment 5:

Maintenance by heavy equipment of the Millich Ditch in residential areas should be limited. Excavating permits and BMP's should allows be required.

Response: This is not a comment on the content or adequacy of the Draft SEIR. This information is passed on to the Project proponent and decision makers for consideration. No further response to this comment in relation to the Draft SEIR is warranted.

Letter 1 Comment 6:

Prior notice should be given to residents before the commencement of work on the Millich Ditch.

Response: This is not a comment on the content or adequacy of the Draft SEIR. This information is passed on to the Project proponent and decision makers for consideration. No further response to this comment in relation to the Draft SEIR is warranted.

Letter 1 Comment 7:

If a historical precedent for the Millich Ditch is not maintained, the potential environmental impacts are as follows:

1. *Property values along the Millich Ditch will be potentially degraded.*
2. *Recharge rates to local domestic wells will be impacted.*
3. *The intrinsic value of the adjacent riparian area, (historically established in 1860), is in jeopardy of complete loss.*
4. *Wildlife watering habitat altered and or threatened.*

Response: This is not a comment on the content or adequacy of the Draft SEIR. This information is passed on to the Project proponent and decision makers for consideration. No further response to this comment in relation to the Draft SEIR is warranted.

Letter 1 Comment 8:

C) *ARCHEOLOGY - Project 16, Component 15, 30*

Tables for Archeology sites could be clearer. Although many sites are denoted and most seem to be outside of the project areas, mitigation measures to protect any random site is weak due to poor base line thresholds for protection, i.e. because few sites qualify for the Register of Historic Places.

Response: The District is aware that extensive cultural resources may be present through the Project area. Prehistoric and historic archeological sites have been located during cultural resource surveys through Diamond Valley. The Project is designed to avoid any construction activities through these areas. For potential sites that are not known, but may occur, ground disturbance will be performed in a manner to identify and protect any undiscovered cultural resource sites potentially encountered during construction. The Snowshoe Thompson site is located more than 1,500 feet from the proposed project area and will not be subject to any construction activities.

Letter 1 Comment 9:

The Snowshoe Thompson site needs to be specifically noted and protected as it does seem to appear in the project area of Component 15, 30 (area, and creek below HPR intended for "potentially jurisdictional wetland".

Response: See response to comment Letter 1 Comment 8.

Letter 1 Comment 10:

The Snowshoe Thompson site is a very important to our local history; it also has a significant, mammoth place in the history of North American ski history. This needs to be addressed in the Master Plan and the EIR. Protect for future generations, and not be made into a swamp, i.e. "potentially jurisdictional wetland".

Response: See response to comment Letter 1 Comment 8. Additionally, while the location of the Snowshoe Thompson site may be located within a jurisdictional wetland, no impact to the site will occur as a result of project implementation.

Letter 1 Comment 11:

D) "C" LINE - Master Plan General

Throughout the Master Plan and EIR the "C" Line is described briefly. As a mainstay component and delivery system to the whole of the Alpine County operations it is hard to believe more attention has not been devoted to this major appliance. Assuming that the "A" and "B" lines are the same vintage as the "C" line, mandatory testing and replacement for the "C" Line should be a major component of the Master Plan and EIR.

Considering the amount of leaks and replacement to pipelines in the Tahoe Basin, Alpine County deserves the same due diligence for repairs and replacement of the "C" Line, (regardless if it is pressurized or not).

The issue of the antiquated "C" line could potentially have a negative, long reaching impacts on local ground water, the West Fork of the Carson River and local domestic well supplies.

Response: The purpose of the Recycled Water Facilities Master Plan is to identify facilities, improvements and operations necessary to provide for the reliable reuse and disposal of recycled water in Alpine County. The District appreciates your comment and concern regarding the age and condition of the export system in Alpine County (C-Line). The District is performing evaluation and considering potential improvements to the C-line, outside the scope of the Master Plan.

Letter 1 Comment 12:

E) *TITLE 22 – Project 7 - Component 16*

Although Title 22 is a comprehensive base line as set forth by the state of California, a 100 ft. setback for the purposes of dispersing sewer effluent, is a weak regulation.

Larger setbacks should be mandated by the Master Plan (even though the current locations accomplish a working setback, the public wants "written assurance" of good intent).

This issue has the potential to effect public health, wells and ground water to property values. Neither school kids nor bicyclists want to feel "mist" regardless if the source is some ½ mile away.

Response: The Project is being designed with appropriate setbacks in accordance with Title 22 requirements, the California Department of Public Health (CDPH) and Lahontan Regional Water Quality Control Board (LRWQCB). In addition, recycled water is proposed to be applied in Diamond Valley using center pivot spray irrigation systems (CPS). Potential wind drift will be mitigated through use of low pressure nozzles designed to consistently deliver large droplets of recycled water uniformly over the irrigation fields. Through the CPS, recycled water will be applied at agronomic rates to prevent run-off and potential impacts to groundwater quality.

Letter 1 Comment 13:

F) MAINTENANCE & CONSTRUCTION OF DITCHES – Generally affecting Master Plan and all irrigation ditches

Regardless of what "Standard Construction and Engineering Practices" are set forth, the STPUD should be required to provide BMPs on all maintenance and construction projects, regardless if the project is a dirt enhancement of an existing irrigation ditch. Historically, the District has a poor environmental record for over bearing maintenance with heavy equipment and no BMPs or excavating permit along the Millich Ditch.

STPUD may be well within the guise of the various regulations and agencies. However, under all circumstances, BMP placements for ditch construction and maintenance need to be implemented and then maintained throughout the years. More over, excavating permits are required if more than so many cubic yards of material are moved.

The public would like written assurance in the Master Plan from STPUD that the policy of moving material without an excavating permit or the lack of BMPs will not be continued, particularly on private lands where ditch easements exists.

Response: Practices employed by the District during the maintenance of irrigation ditches is not part of the EIR.

Letter 1 Comment 14:

G) CONSTRUCTION OF WASTEWATER DELIVERY LINE – Components 11, 14

The proposed pipeline crosses a major wildlife migratory path as it parallels the Millich Ditch on the south side of Diamond Valley Road. This is not specifically addressed in the EIR.

In regards to the actual construction of the pipeline. Since this project is within 200 yds [sic] of our residence, it would be nice to have some advanced notice of commencement, construction scheduling and anticipation of completion. This is nowhere to be found in the Master Plan or EIR. It is assumed "Standard Noise Reduction Measures" will be observed.

Response: Potential impacts resulting from construction of the Project on blockage of major migration corridors is considered in Section 11 – Biological Resources. Proposed mitigation measures include scheduling construction to avoid breeding and migrating wildlife. Construction activities on District projects are normally performed between 8:00 am to 6:00 pm, Monday through Friday. Work outside of these hours may be allowed on a task specific basis.

Comment Letter 2, Robert Tucker, California Regional Quality Control Board, Lahontan Region, 11 May 2011

Letter 2 Comment 1:

1. Page 2-1 states the following:

"A draft wetland delineation has been submitted (August 2010) to the United States Army Corps of Engineers (Corps) for approval and is currently under review. This draft wetland delineation was utilized for the redesign of Project Component 11 in order to avoid potential wetlands that may be determined jurisdictional by the Corps. The Master Plan projects 1 and 2 strive to avoid and minimize jurisdictional wetland and waters of the US as regulated by the Corps."

The District should consider adding the following language as underlined,

". . . in order to avoid disturbance or waste discharges, including recycled water, to all potential wetlands that may be determined jurisdictional by the Corps or to waters of the state as regulated by the State Water Resources Control Board and Lahontan Water Board. . ."

Additionally, we will require a copy of the final wetland delineation and the jurisdictional determination by the Army Corps.

Response: The language changes to paragraph 2, Page 2-1, shall be added as suggested. However, it should be noted that the District's WWTP is currently permitted for disinfected secondary-23 recycled water. This recycled water is not a waste, as it is currently used for surface irrigation in Alpine County for pasture and fodder crops, as allowed under Title 22 Water Recycling Criteria (Title 22, Article 3, Section 60304 (c)).

The District has submitted a wetlands delineation to the United States Army Corps of Engineers (Corps) as the basis for a preliminary jurisdictional determination map. A copy of the Corps-approved preliminary JD map will be provided to the Lahontan Water Board.

Letter 2 Comment 2:

Page 2-3, DVR pipeline loop section and figure 2.6, discuss and show the new pipeline loop. The new DVR loop will drop in elevation and go through a pump house that at a later date may house a hydroelectric unit to produce electric power. Will the recycled water that flows through the pump house, need to be pumped from the pump house to Harvey Place Reservoir? Please discuss backup systems needed to pump recycled water back to Harvey Place Reservoir and means to avoid a discharge due to a pumping or power failure.

Response: The District is interested in using a single pump as turbine (PAT) hydro-electric system to generate power for the proposed irrigation improvements in Diamond Valley. The hydro-electric facility will be housed at the proposed fresh water pump station site. The power requirement to drive eight pivot units is estimated at approximately 48 hp or 36 KW.

Assuming a turbine efficiency of 65% and a plant factor of 97%, the required head to generate 36 KW is 96 ft or 42 psi. The C-line requires a pressure of 78 psi, downstream of the hydro-electric facility to overcome friction losses and elevation to Harvey Place Reservoir. Therefore, the pressure required upstream of the hydro-electric facility is 120 psi. A pressure sustaining valve will be used to maintain the required pressure upstream of the hydroelectric facility. A pumping station will not be required to pump recycled water back to Harvey Place Reservoir (HPR). Enough pressure will remain in the line to provide gravity flow to HPR, whether the irrigation system operates or not.

Letter 2 Comment 3:

Irrigation Field G shown on figure 2.6 shows a portion of Snowshoe Thompson Ditch Number 2 going through the irrigated field. What has been proposed for altering the flow alignment and its possible impacts? Please include information on the evaluation of the ditch and whether the adjacent area around/along the ditch is a wetland.

Response: The District is planning to reroute Snowshoe Thompson Irrigation Ditch #2 (STID2) outside the west and north boundary of irrigation Field G. After the required segment of STID2 is moved outside the irrigation field, the existing segment will be filled and abandoned during land preparation for Field G. Figure 2.6 has been revised to show this change and is included in the final SEIR document. No lands have been mapped as wetlands through any area around/along this segment of STID2. The preliminary jurisdictional wetland boundaries that are identified on Figure 2.6 do not show any wetland areas surrounding the Snowshoe Thompson Ditch Number 2 in the vicinity of Field G, however the Ditch itself has been designated as an Other Waters of the US. Prior to implementation of this project in Phase II, sufficient mitigation will be required in order to offset impacts that may result from relocation and piping of this ditch.

Letter 2 Comment 4:

Figure 2.6 shows a portion of Snowshoe Thompson Ditch being replaced with an underground pipe, to allow the flow to go under Field 1, Field 2 and Field F. Please include information on the evaluation of the ditch and whether the adjacent area around/along the ditch is a wetland, including the area at the end of the pipe.

Response: The District is planning to construct the Snowshoe Thompson #2 (ST2) Pipeline across upland area west of the Potentially Jurisdictional Wetlands, mapped north of Diamond Valley Road. The east end of this pipeline terminates at the western margin of the delineated wetlands. Supporting evidence for an upland setting along the pipeline route is provided in the wetland determination data forms completed at sample points 6-3, 6-4, 6-5, 6-6, 7-8 and 7-9 (Wood Rodgers, June 2010). Review of these data forms and the wetlands delineation map shows no identified wetland areas crossing the proposed ST2 pipeline route. The preliminary jurisdictional wetland boundaries that are identified on Figure 2.6 do not show any wetland areas surrounding the Snowshoe Thompson Ditch in the vicinity of Fields 1, 2, and F, however the Ditch itself has been designated as an Other Waters of the US. Prior to implementation of this project in Phase II, sufficient mitigation will be required in order to offset impacts that may result from relocation and piping of this ditch.

Letter 2 Comment 5:

The pipeline described in comment three, above, appears to enter some 200 feet (east of Field F) into the potentially delineated wetlands. That additional pipeline into the wetland may indirectly impact a portion of the wetland and could desiccate the wetlands. Has the impact to that portion of the wetland been *evaluated? Please evaluate the impact and how to minimize the impact or provide mitigation requirements to maintain the existing wetlands function and values.*

Response: Figure 2.6 has been updated to reflect the ditch only being piped outside the wetland area. The District is generally planning to construct the buried portion of the ST2 Pipeline along the existing bed and grade of the Snowshoe Thompson 2 Diversion Ditch, to daylight at the western margin of the wetlands, east of the proposed irrigation improvements. The diversion ditch conveys surface water and is not believed to intersect the water table. Groundwater elevation monitoring indicates that shallow groundwater is typically greater than 10 feet below ground surface (ft bgs), across the upland portion of Diamond Valley and below the bed of the diversion ditch (west of ACMW-11). Therefore, the proposed pipeline trench is not expected to intersect shallow groundwater and should not change groundwater flow patterns beneath the adjoining wetlands.

Letter 2 Comment 6:

On Figure 2.6, between Field C and Field D there is a potential delineated wetlands shown. Adjacent to the wetland is a blue line for fresh water conveyance system. In other documents it has been proposed to place a tile pipe adjacent to that wetland. A tile pipe adjacent to that wetland could impact the wetland by desiccating the wetland, please provide information on what that blue line is indicating, its purpose, and evaluate the effects that it could have on the adjacent wetland.

Response: Appendix U of the document is a memorandum prepared by Dr. Charles Burt (Irrigation Training and Research Center) provide a preliminary evaluation of the potential impact of the proposed interceptor drain on the wetland area immediately west of Field D.

The purpose of the interceptor drain is to capture lateral groundwater flow in order to establish a uniform, lowered water table, east of the interceptor drain. This is a prerequisite in order that crop consumptive use across Field D will be satisfied by recycled water and not shallow groundwater. Baseflow measurement from the existing irrigation ditch, between the neighboring wetland and the interceptor drain, are substantially greater than the anticipated seepage rate along the eastern margin of the wetland using available saturated hydraulic conductivity values for local soils and Darcy's equation. The baseflow is also substantially greater than the anticipated flow that would be captured by the interceptor drain. Therefore, the interceptor drain is not anticipated to have any hydraulic influence west of the irrigation ditch and therefore, would not impact the adjoining wetland. To insure that that there is not any impact to this wetland, in-line valves could be added as a potential mitigation measure to reduce flow through the interceptor drain, thereby raising the neighboring water table, if needed.

Letter 2 Comment 7:

Figure 2.6 shows a number of different red, black and blue lines, which reportedly identify Diamond Valley Recycled (DVR) pipelines, irrigation pipelines for recycled water, and fresh water pipelines, respectively, and it appears that some of those lines will connect. Fresh water pipelines designed to allow fresh water to flow into surface waters must not be capable of conveying recycled water. Please include this as a mitigation requirement.

Response: The project is planned to have separate fresh water and recycled water pipeline systems. The fresh water system is used to convey irrigation water to the pump station from Snowshoe Thompson Irrigation Ditch #2, Millich Ditch and the Interceptor Drain Pipeline. The irrigation water carried in the freshwater system is not of acceptable water quality for potable uses and will not be used for drinking water. At the pump station, the fresh water pipelines are connected at a concrete junction box which is equipped with float controlled shutoff valves to prevent back-flow into the freshwater gravity pipelines. The junction box is then connected to a vertical turbine pump sump. Freshwater from the pump sump is discharged to the filtration system prior to pumping to the irrigation system. The freshwater pump discharge includes a check valve as an added measure to prevent back-flow to the freshwater supply. The DVR Loop Pipeline is the mainline of the recycled water system and is used to convey recycled water from the C-line to the pump station location. Recycled water from the C-line is connected to the irrigation system, upstream of the filtration system and downstream of the freshwater pump station. Given this conditions and the backflow prevention measures described above, reclaimed water cannot back-up into the freshwater supply sources. In addition to the backflow prevention designs, since the fresh water system is used to convey irrigation water, not drinking water, this is not believed to constitute a connection between recycled and potable waters.

Letter 2 Comment 8:

Page 7-20, fourth paragraph, states that Field 1 and Field 2 will have a seven foot berm. Page 9-13, fourth paragraph, states containment fields will be surrounded with a six foot berm. Please clarify the projected height of the berms for Field 1 and Field 2 consistently throughout the document.

Response: Page 9-13 was updated to state the berms will be at a height of seven feet. Engineering plans for Temporary Containment Fields 1 and 2 have been developed up to the 50% design stage. Fields S1 and S2 are currently designed with the following characteristics, which are subject to change:

Design Parameter	S1	S2
Nominal Elevation (ft msl)	*5514’*	*5506’*
Maximum Storage Elevation (ft msl)	*5520’*	*5512’*
Nominal Berm Elevation (ft msl)	*5521’*	*5513’*
Dam Height (feet)	*7*	*7*
Area (acres)	*31.2*	*16.1*
Nominal Storage Volume - with 1-foot freeboard (ac-ft)	*195*	*100*

Letter 2 Comment 9:

Fields 1 and 2 will have the ability to be flooded on emergency basis and may have berms higher than six feet and hold water in excess of 50 acre-feet. If those parameters are correct the District should consult with the California Division of Dam Safety on the construction and siting of those fields/berms.

Response: The District will consult with the Division of Safety of Dams (DOSD) as the engineering plans for the Temporary Containment Fields are further developed. Provisions of Division 3 of the California Water Code include specific exemptions from DOSD jurisdiction applicable to waste water control facilities which are 15 feet or less in dam height, have a maximum storage capacity of 1,500 acre-feet or less and are off-stream.

These exemptions may be applicable pending the final engineering design parameters used for the Temporary Containment Fields.

Letter 2 Comment 10:

This supplement to the EIR also added three additional irrigation fields, Fields A, B, and C as shown on figure 2.6 from the previous final EIR. If the ground water gradient in the area is known, then it should be disclosed in the final EIR.

Response: Groundwater flow directions across Diamond Valley have been inferred using groundwater level data collected from District monitoring wells; neighboring spring and stream bed elevations from USGS 7.5-minute topographic mapping; and estimated groundwater elevations along the basin fill-bedrock contacts surrounding Diamond Valley (Figure Q.1 below). Using these data, the groundwater gradient across the area of irrigation Fields A and B is directed to the north- northeast at an estimated rate of 0.03 ft/ft. North of Millich Ditch, groundwater flow direction appears to rotate toward the east and groundwater gradients appear to flatten. The groundwater gradient across the area of Field C is directed to the east- northeast at an estimated rate of 0.01 ft/ft.

The nearest drinking water well to irrigation Fields A and B is the Diamond Valley School Well (GW-11), located approximately 1,400 feet northwest and cross gradient of Field A. The Diamond Valley School Well is constructed to a total depth of 490 feet, with screen interval depths between 260 feet to 300 feet; and from 430 feet to 490 feet below ground surface. This well is completed with a 200 foot sanitary seal. The District has routinely collected groundwater quality samples from the Diamond Valley School Well since 1981.

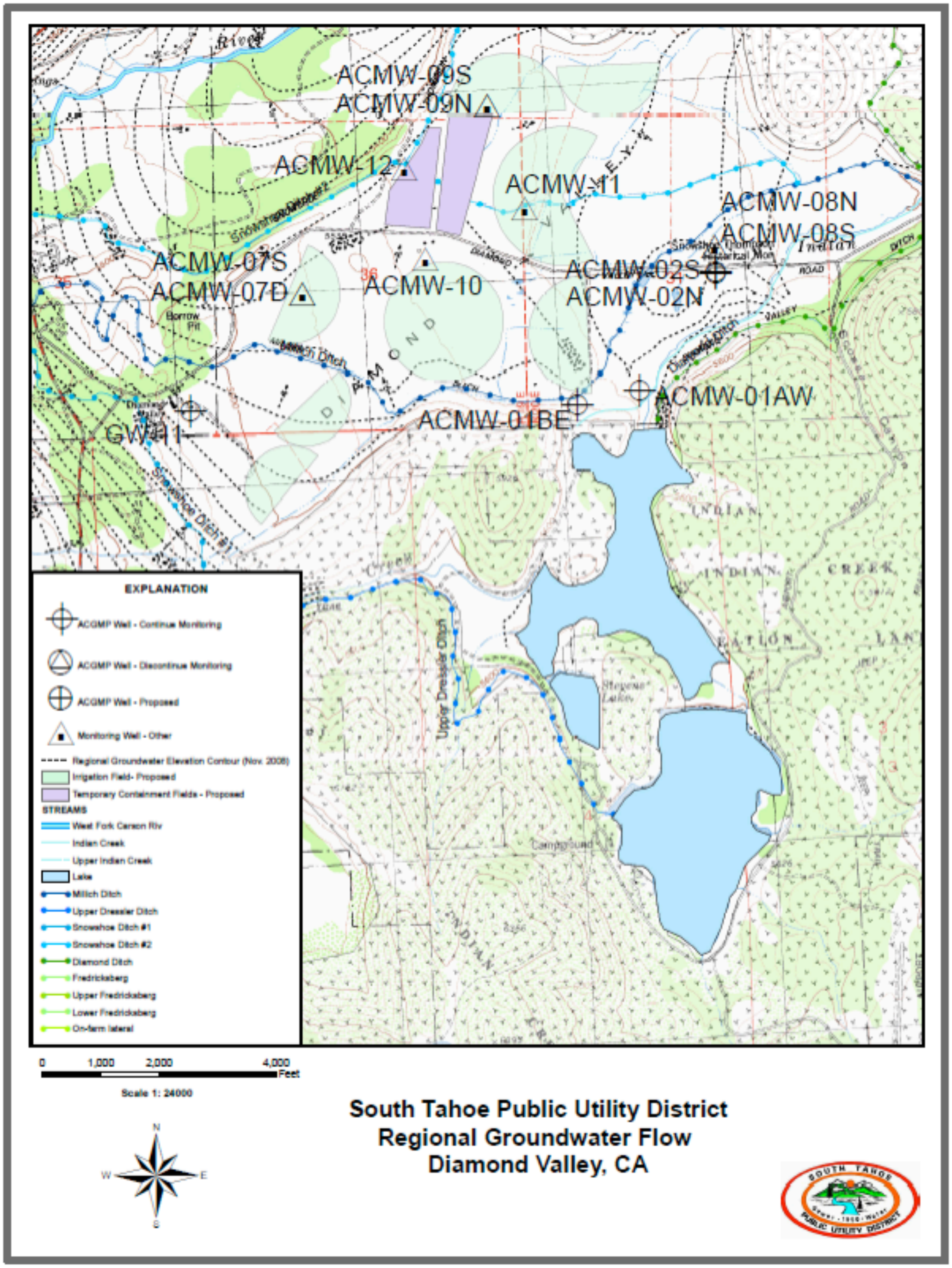


Figure T.1 Inferred regional patterns of groundwater flow, Diamond Valley, CA.

Letter 2 Comment 11:

Many of the specific comments above are concerned with the possible disturbance of wetlands. If Army Corps does not take jurisdiction on any wetland under Clean Water Act section 404, the delineated wetland is wetland as defined by the State and disturbance should still be avoided, minimized, and mitigated where avoidance is infeasible.

Response: Comment noted. Phase I projects do not include any disturbance to potential jurisdictional wetlands or Waters of the US. The overall project may result in the overall disturbance of wetlands. Exact degree of impacts has not been determined as the remainder of the project has been developed up to the 50% design stage and will require additional environmental documentation prior to implementation and approval. As required in Mitigation Measure XX all impacts to section 404 wetlands will require sufficient mitigation and a wetland mitigation plan.

Letter 2 Comment 12:

For temporary impacts to wetland we will require the District to demonstrate the areas disturbed have recovered to pre-disturbed conditions. If areas must be impacted and will not or should not recover we will require mitigation for the loss of wetland with a minimum of 1½ times the functional area, volume, and value of the lost wetland. We request the District provide the Water Board a copy of the Army Corps verification or jurisdiction determination and a description of all disturbances on all waters of the State including waters of the U.S.

Response: See response to letter 2 Comment 11 above.

Letter 2 Comment 13:

Once impacts to waters of the U.S. or waters of the State have been avoided and minimized to the maximum extent practicable, the District must submit a complete mitigation proposal. A wetland mitigation plan must include, but not limited to, the following information incorporated into a Mitigation and Monitoring Plan:

1) *The location where creation, restoration, and enhancement will be located*
2) *Complete description of the habitat disturbed by the project;*
3) *Site plan showing the current and proposed conditions of the mitigation site;*
4) *Time schedule for implementation;*
5) *Site preparation activities for the mitigation site;*
6) *Vegetative preservation techniques;*
7) *Planting plan that includes plant species, quantities, container sizes and spacing;*
8) *Seeding plan that includes plant species and seeding rates;*
9) *Interim and final success criteria for the mitigation project(s);*
10) *Entity responsible for success and long-term viability of mitigation proposal;*
11) *Contingency plan for poor or unsuccessful mitigation;*
12) *Monitoring plan and schedule; and*
13) *Description of what measures will be implemented if either the interim or final success criteria are not satisfied*

Response: See response to letter 2 Comment 11 above.

Letter 2 Comment 14:

The proposed project may involve over an acre of ground disturbance not including activities that are agricultural such as leveling and planting crop fields. If so, the District must apply for the State Water

Resources Control Board, National Pollutant Discharger Elimination System Permit (NPDES) General permit for storm water discharges associated with construction and land disturbance activities, Board Order 2009-0009-DWQ. (Available at www.waterboards.ca.gov.) Agricultural activities are exempt from NPDES requirements.

Response: Comment noted. The District will apply for a NPDES permit through the Lahontan Region.

Comment Letter 3, Lisa Lee, California Regional Quality Control Board, Division of Financial Assistance, 11 May 2011

Letter 3 Comment 1:

We understand the District is seeking financing through the CWSRF Program for a subset of the Project (under Master Plan Projects 1 and 2). State Water Board staff reviewed the SEIR and determined that the document, as it is currently written, is inadequate for its use. In accordance with the current CWSRF Program Policy (refer to Section IX, subsection B, Policy for Implementing the Clean Water State Revolving Fund for Construction of Wastewater Treatment Facilities, Amended March 2009), applicants must submit project specific environmental documents (with project specific environmental analysis) so that the State Water Board can make an informed decision on a project and ensure that there is adequate information to document environmental compliance. Please revise the SEIR to include the project specific environmental analysis for Master Plan Projects 1 and 2, particularly for those components to be funded through the CWSRF Program. The project specific environmental analysis should be clear, with sufficient supporting evidence to support the environmental determinations for each impact. This should include specific unavoidable environmental impacts applicable to Master Plan Projects 1 and 2 (components 11, 18 and 19).

Response: Paragraphs 5 and 6 of page 1-1 is as follows:

"This FSEIR includes updated project descriptions for Master Plan Projects 1 and 2 in Chapter 2. Chapter 3 describes how the Environmental Analysis is updated due to the modifications of the projects. Chapters 4 through 18 provide updated environmental analysis for each of the resource areas analyzed for the FEIR. Chapters 19 and 20 discuss Alternatives and Mandatory Environmental Analysis respectively.

The entirety of the South Tahoe Public Utility District Recycled Water Facility Master Plan FEIR (December 2009) is incorporated herein by reference. Select pages that have been updated or modified based on the revised project descriptions for Master Plan Projects 1 and 2 are included in the FSEIR. Those sections or portions of the FEIR that have no changes are not duplicated or identified in this FSEIR and are referenced back to the FEIR. Changes to Chapters 3 through 20 are presented in legislative format to display the changes made based on the revised project as described in Chapter 2. Only the pages where analysis was modified is included in the Final Supplemental EIR for Chapters 3 through 20 and Appendix D. The new text has been underlined and deleted text has been struck out."

Projects 1 and 2 were already analyzed in the original EIR that was certified in 2009. The basis for issuing the SEIR was to update the project descriptions for Master Plan Projects 1 and 2. The majority of the project specific analysis was performed for Master Plan Projects 1 and 2 in the 2009 EIR. Significant and unavoidable impacts were disclosed in the 2009 EIR as well as in Table 1-1 of the SEIR on Page 1-4.

Letter 3 Comment 2:

Provide further discussion on the proposed mitigation measures and substantiate how those measures will reduce environmental impacts. For example, mitigation measure SP-30 is proposed to reduce bird impacts by conducting a pre-construction survey for nesting migrating birds and raptors. Discuss who will be conducting the survey and when the survey will take place (ie. How many days, weeks or months before construction). Also, please include a Mitigation Monitoring Program with those identified mitigation measures in the SEIR.

Response: SP-30 states a wildlife biologist will perform the surveys two weeks prior to the start of construction (Page D-37). The entirety of Appendix D (Mitigation and Monitoring Plan) is included in the Final SEIR to provide clarification as requested.

Letter 3 Comment 3:

Page 11-40 was missing in the SEIR received by the State Water Board. Please include this page in the DSEIR and/or forward a copy of this page to the State Water Board for review.

Response: No changes were made to page 11-40 in the SEIR and therefore it was not included. In order to provide clarification, page 11-40 has been added to the Final SEIR.

Letter 3 Comment 4:

Page 11-41 under BIO-2 analyzes impacts to California Native Plant Society (CNPS) List 2, 3 and 4 plant species. Please also include a discussion on impacts to CNPS List 1A and 1B plants for the Project area, if applicable.

Response: The database search (CNPS and CNDDB) was performed to include List 1A and 1B plants. Page 11-41 has been updated to include 1A and 1B plants. No 1A or 1B plants were located during floristic surveys, however the area must be surveyed again in 2012 prior to construction activities to ensure no sensitive plant species are present. The text has been updated on page 11-41 accordingly.

Letter 3 Comment 5:

Page 11-43 states that "suitable habitat for pygmy rabbits exists in the area." Please discuss impacts to the pygmy rabbit and its habitat, should preconstruction surveys identify this species in the Project area. Include any feasible mitigation or conservation measure to reduce potential impacts.

Response: Paragraph 7 on page 11-43 states that preconstruction surveys were performed in the project area in 2009 and no evidence was found for pygmy rabbits. Phase I of the proposed project does not result in any impacts to pygmy rabbit habitat.

Letter 3 Comment 6:

Page 11-46 indicates that the construction of conveyance infrastructure across native rangeland has been changed from "will" to "may." Please further discuss the likelihood of this construction and the potential to impact the federally listed threatened cutthroat trout. Include any feasible mitigation or conservation measures.

Response: The change in paragraph 3 on page 11-46 from "will" to "may" was made as a corrective measure to ensure consistency in other determinations throughout the document. Component 4 is not proposed for implementation at this time and will be subject to subsequent environmental analysis as it has only been analyzed at the programmatic level in this document. Prior to analysis for this component, surveys will be performed for Lahontan cutthroat trout to determine presence. Subsequent environmental documentation will determine adequate mitigation based on suitable habitat and species present.

COMMENT LETTER 1

5-11-11

To: South Tahoe Public Utility District

Re: Public Comment on the
Draft Supplemental Environmental Impact Report for
STPUD Recycled Water Facilities Master Plan

To whom it may concern,

As residents of Woodfords, and property owners directly adjacent to the Diamond Valley Ranch, please find our comments to the Draft EIR Supplemental on the following pages.

In regards to public notifications of such Master Plans, EIRs, and other legal matters. STPUD generally follows public notification requirements set forth by California Code. Although, simple publication of such notices in the South Tahoe Tribune is not an adequate way to notify the general public in Alpine County, particularly one's direct neighbor.

We consider ourselves valid stake holders in any matters regarding the Diamond Valley Ranch, Millich Ditch and Snowshoe Thompson #1 Ditch, We would appreciate a more direct form of notification regarding all matters. Please add us to any direct mailings, e-mails lists, etc.

Respectfully Submitted

William Rose
Karen Brickey Rose

9 Hawkside Ct.
Markleeville, CA 96120

Public Comment on
STPUD Recycled Water Facilities Master Plan –
Draft Supplemental EIR

A)-ROAD IMPACTS- All project Components

1 No discussion of road impacts from repeated use of heavy construction trucks and equipment for 20 years and the resulting deferred maintenance it will cause over the long term. STPUD should provide funding and/or maintenance for the additional impacts resulting from repeated use, that is not historically present on Diamond Valley Road. This definitely affects county budgets and ultimately the local economy.

B)-WATER RIGHT TRANSFERS and the effects on DITCH OPERATIONS - Projects 4,14,19-Components 24,23,17 and General Ranch Operation (Millich Ditch)

2 Much discussion is devoted to refilling ICR, ditch improvements and modifications (mainly Snowshoe #1), Mud Lake winter diversions and the transfer of water rights to accomplish such objectives. Only a few places the “Millich Ditch” is mentioned in the Master Plan or EIR. More detail is needed as to the role of the Millich Ditch and the impacts those manipulations of fresh water delivery will cause on the local residents and properties that the Millich Ditch crosses via easement.

We personally request that the following conditions are respected and allowed to remain in perpetuity in regulation, maintenance and operation of the Millich Ditch.

3
1. Water releases and conveyance amounts, and water rights to remain in the current state as directed by the Alpine Decree with the Segment 4-5 alternate week schedule to remain in place as it exists.

4
2. Under no circumstances should the Millich Ditch be allowed to be converted to a pipe or tube in the residential area adjacent to the Diamond Valley School along the Diamond Valley Road, where it crosses to easement on private residential properties.

5
3. Maintenance by heavy equipment of the Millich Ditch in residential areas should be limited. Excavating permits and BMP’s should allows be required.

6
4. Prior notice should be given to residents before the commencement of work on the Millich Ditch.

If a historical precedent for the Millich Ditch is not maintained, the potential environmental impacts are as follows:

7
1. Property values along the Millich Ditch will be potentially degraded.
2. Recharge rates to local domestic wells will be impacted.
3. The intrinsic value of the adjacent riparian area, (historically established in 1860), is in jeopardy of complete loss.
4. Wildlife watering habitat altered and or threatened.

C)-ARCHEOLOGY - Project 16, Component 15, 30

8 Tables for Archeology sites could be clearer. Although many sites are denoted and most seem to be outside of the project areas, mitigation measures to protect any random site is weak due to poor base line thresholds for protection, i.e. because few sites qualify for the Register of Historic Places.

9 The Snowshoe Thompson site needs to be specifically noted and protected as it does seem to appear in the project area of Component 15, 30 (area, and creek below HPR intended for "potentially jurisdictional wetland".

10 The Snowshoe Thompson site is a very important to our local history; it also has a significant, mammoth place in the history of North American ski history. This needs to be addressed in the Master Plan and the EIR. Protect for future generations, and not be made into a swamp, i.e. "potentially jurisdictional wetland".

D) "C" LINE - Master Plan General

11 Throughout the Master Plan and EIR the "C" Line is described briefly. As a mainstay component and delivery system to the whole of the Alpine County operations it is hard to believe more attention has not been devoted to this major appliance. Assuming that the "A" and "B" lines are the same vintage as the "C" line, mandatory testing and replacement for the "C" Line should be a major component of the Master Plan and EIR.

Considering the amount of leaks and replacement to pipelines in the Tahoe Basin, Alpine County deserves the same due diligence for repairs and replacement of the "C" Line, (regardless if it is pressurized or not).

The issue of the antiquated "C" line could potentially have a negative, long reaching impacts on local ground water, the West Fork of the Carson River and local domestic well supplies.

E) TITLE 22 – Project 7 - Component 16

12 Although Title 22 is a comprehensive base line as set forth by the state of California, a 100 ft. setback for the purposes of dispersing sewer effluent, is a weak regulation. Larger setbacks should be mandated by the Master Plan (even though the current locations accomplish a working setback, the public wants "written assurance" of good intent).

This issue has the potential to effect public health, wells and ground water to property values. Neither school kids nor bicyclists want to feel "mist" regardless if the source is some ½ mile away.

F) MAINTENANCE & CONSTRUCTION OF DITCHES – Generally affecting Master Plan and all irrigation ditches

Regardless of what "Standard Construction and Engineering Practices" are set forth, the STPUD should be required to provide BMPs on all maintenance and construction projects, regardless if the project is a dirt enhancement of an existing irrigation ditch. Historically, the District has a poor environmental record for over bearing maintenance with heavy equipment and no BMPs or excavating permit along the Millich Ditch.

STPUD may be well within the guise of the various regulations and agencies. However,
13 under all circumstances, BMP placements for ditch construction and maintenance need to be implemented and then maintained throughout the years. More over, excavating permits are required if more than so many cubic yards of material are moved.

The public would like written assurance in the Master Plan from STPUD that the policy of moving material without an excavating permit or the lack of BMPs will not be continued, particularly on private lands where ditch easements exists.

G) CONSTRUCTION OF WASTEWATER DELIVERY LINE – Components 11, 14

The proposed pipeline crosses a major wildlife migratory path as it parallels the Millich Ditch on the south side of Diamond Valley Road. This is not specifically addressed in the EIR.

14 In regards to the actual construction of the pipeline. Since this project is within 200 yds of our residence, it would be nice to have some advanced notice of commencement, construction scheduling and anticipation of completion. This is nowhere to be found in the Master Plan or EIR. It is assumed "Standard Noise Reduction Measures" will be observed.

COMMENT LETTER (2)

RH

California Regional Water Quality Control Board
Lahontan Region

Linda S. Adams
Acting Secretary for Environmental Protection

2501 Lake Tahoe Boulevard, South Lake Tahoe, California 96150
(530) 542-5400 • Fax (530) 544-2271
www.waterboards.ca.gov/lahontan

Edmund G. Brown Jr.
Governor

RECEIVED
MAY 12 2011
By

May 12, 2011

Ivo Bergsohn
South Tahoe Public Utility District
1275 Meadow Crest Drive
South Lake Tahoe, CA 96150

COMMENTS ON ENVIRONMENTAL IMPACT REPORT DRAFT SUPPLEMENTAL DATED MARCH 2011, FOR THE SOUTH TAHOE PUBLIC UTILITY DISTRICT RECYCLED WASTE FACILITIES MASTER PLAN, ALPINE COUNTY (WDID 6A021008003 & WDID 6A095900700, SCH # 2007042116)

The California Regional Water Quality Control Board, Lahontan Region (Lahontan Water Board) staff reviewed the above-mentioned document. The supplemental material was produced and provided by the South Tahoe Public Utility District (District) and the following are Water Board staff's comments on the draft.

(1)

1. Page 2-1 states the following:

   "A draft wetland delineation has been submitted (August 2010) to the United States Army Corps of Engineers (Corps) for approval and is currently under review. This draft wetland delineation was utilized for the redesign of Project Component 11 in order to avoid potential wetlands that may be determined jurisdictional by the Corps. The Master Plan projects 1 and 2 strive to avoid and minimize jurisdictional wetland and waters of the US as regulated by the Corps."

   The District should consider adding the following language as underlined,

   ". . . in order to avoid <u>disturbance or waste discharges, including recycled water, to all</u> potential wetlands that may be determined jurisdictional by the Corps <u>or to waters of the state as regulated by the State Water Resources Control Board and Lahontan Water Board. . .</u>".

   Additionally, we will require a copy of the final wetland delineation and the jurisdictional determination by the Army Corps.

(2)

2. Page 2-3, DVR pipeline loop section and figure 2.6, discuss and show the new pipeline loop. The new DVR loop will drop in elevation and go through a pump house that at a later date may house a hydroelectric unit to produce electric power. Will the recycled water that flows through the pump house, need to be pumped from the pump house to Harvey Place Reservoir?

sufficient head

Please discuss backup systems needed to pump recycled water back to Harvey Place Reservoir and means to avoid a discharge due to a pumping or power failure.

3

3. Irrigation Field G shown on figure 2.6 shows a portion of Snowshoe Thompson Ditch Number 2 going through the irrigated field. What has been proposed for altering the flow alignment and its possible impacts? Please include information on the evaluation of the ditch and whether the adjacent area around/along the ditch is a wetland.

4

4. Figure 2.6 shows a portion of Snowshoe Thompson Ditch being replaced with an underground pipe, to allow the flow to go under Field 1, Field 2 and Field F. Please include information on the evaluation of the ditch and whether the adjacent area around/along the ditch is a wetland, including the area at the end of the pipe.

5

5. The pipeline described in comment three, above, appears to enter some 200 feet (east of Field F) into the potentially delineated wetlands. That additional pipeline into the wetland may indirectly impact a portion of the wetland and could desiccate the wetlands. Has the impact to that portion of the wetland been evaluated? Please evaluate the impact and how to minimize the impact or provide mitigation requirements to maintain the existing wetlands function and values.

6

6. On Figure 2.6, between Field C and Field D there is a potential delineated wetlands shown. Adjacent to the wetland is a blue line for fresh water conveyance system. In other documents it has been proposed to place a tile pipe adjacent to that wetland. A tile pipe adjacent to that wetland could impact the wetland by desiccating the wetland, please provide information on what that blue line is indicating, its purpose, and evaluate the effects that it could have on the adjacent wetland.

x mitigation

7

7. Figure 2.6 shows a number of different red, black and blue lines, which reportedly identify Diamond Valley Recycled (DVR) pipelines, irrigation pipelines for recycled water, and fresh water pipelines, respectively, and it appears that some of those lines will connect. Fresh water pipelines designed to allow fresh water to flow into surface waters must not be capable of conveying recycled water. Please include this as a mitigation requirement.

8

8. Page 7-20, fourth paragraph, states that Field 1 and Field 2 will have a seven foot berm. Page 9-13, fourth paragraph, states containment fields will be surrounded with a six foot berm. Please clarify the projected height of the berms for Field 1 and Field 2 consistently throughout the document. 7' vs 6' ?

9

9. Fields 1 and 2 will have the ability to be flooded on emergency basis and may have berms higher than six feet and hold water in excess of 50 acre-feet. If those parameters are correct the District should consult with the California Division of Dam Safety on the construction and siting of those fields/berms.

10 10. This supplement to the EIR also added three additional irrigation fields, Fields A, B, and C as shown on figure 2.6 from the previous final EIR. If the ground water gradient in the area is known, then it should be disclosed in the final EIR. DATA?

GENERAL COMMENTS
Possible Wetland Disturbance

11 Many of the specific comments above are concerned with the possible disturbance of wetlands. If Army Corps does not take jurisdiction on any wetland under Clean Water Act section 404, the delineated wetland is wetland as defined by the State and disturbance should still be avoided, minimized, and mitigated where avoidance is infeasible.

12 For temporary impacts to wetland we will require the District to demonstrate the areas disturbed have recovered to pre-disturbed conditions. If areas must be impacted and will not or should not recover we will require mitigation for the loss of wetland with a minimum of 1½ times the functional area, volume, and value of the lost wetland. We request the District provide the Water Board a copy of the Army Corps verification or jurisdiction determination and a description of all disturbances on all waters of the State including waters of the U.S. 1:1.5

13 Once impacts to waters of the U.S. or waters of the State have been avoided and minimized to the maximum extent practicable, the District must submit a complete mitigation proposal. A wetland mitigation plan must include, but not limited to, the following information incorporated into a Mitigation and Monitoring Plan:

1) The location where creation, restoration, and enhancement will be located
2) Complete description of the habitat disturbed by the project;
3) Site plan showing the current and proposed conditions of the mitigation site;
4) Time schedule for implementation;
5) Site preparation activities for the mitigation site;
6) Vegetative preservation techniques;
7) Planting plan that includes plant species, quantities, container sizes and spacing;
8) Seeding plan that includes plant species and seeding rates;
9) Interim and final success criteria for the mitigation project(s);
10) Entity responsible for success and long-term viability of mitigation proposal;
11) Contingency plan for poor or unsuccessful mitigation;
12) Monitoring plan and schedule; and
13) Description of what measures will be implemented if either the interim or final success criteria are not satisfied

Storm Water Construction General Permit

14 The proposed project may involve over an acre of ground disturbance not including activities that are agricultural such as leveling and planting crop fields. If so, the

14 District must apply for the State Water Resources Control Board, National Pollutant Discharger Elimination System Permit (NPDES) General permit for storm water discharges associated with construction and land disturbance activities, Board Order 2009-0009-DWQ. (Available at www.waterboards.ca.gov.) Agricultural activities are exempt from NPDES requirements.

Thank you for the opportunity to comment. If you have any questions regarding this matter please contact me at 530-542-5467 or Alan Miller, Chief, North Basin Regulatory Unit, at 530 542-5430.

Robert Tucker

Robert Tucker
Water Resource Control Engineer

CC: RANDY FESSLER/DIVISION OF SAFETY OF DAMS
DEPARTMENT OF WATER RESOURCES

RTT/clhT: STPUD supplemental.doc

COMMENT LETTER (3)

State Water Resources Control Board

Division of Financial Assistance
1001 I Street, Sacramento, California 95814 • (916) 341-5700
Mailing Address: P.O. Box 944212 • Sacramento, California 94244-2120
FAX (916) 341-5707 • http://www.waterboards.ca.gov

Linda S. Adams
Acting Secretary for Environmental Protection

Edmund G. Brown Jr.
Governor

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STATE CLEARING HOUSE

MAY 11 2011

Mr. Ivo Bergsohn
South Tahoe Public Utility District
1275 Meadow Crest Drive
South Lake Tahoe, CA 96150

Dear Mr. Bergsohn:

DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT (SEIR) FOR THE SOUTH TAHOE PUBLIC UTILITY DISTRICT (DISTRICT); SOUTH TAHOE PUBLIC UTILITY DISTRICT RECYCLED WATER FACILITIES MASTER PLAN (PROJECT); EL DORADO COUNTY; STATE CLEARINGHOUSE NO. 2001082130

Thank you for the opportunity to review the above document. We understand the District is pursuing Clean Water State Revolving Fund (CWSRF) financing for this Project (CWSRF Nos. C-06-5608-110 and C-06-5611-110). As a funding agency and a State agency with jurisdiction by law to preserve, enhance, and restore the quality of California's water resources, the State Water Resources Control Board (State Water Board) is providing the following information for the California Environmental Quality Act (CEQA) document prepared for the Project.

The CWSRF Program is partially funded by the United States Environmental Protection Agency (USEPA) and requires additional "CEQA-Plus" environmental documentation and review. Three enclosures are included that further explain the environmental review process and some additional federal requirements in the CWSRF Program. In addition an environmental evaluation form is included for the District to complete and submit to the State Water Board Project Manager. The State Water Board is required to consult directly with agencies responsible for implementing federal environmental laws and regulations. Any environmental issues raised by federal agencies or their representatives will need to be resolved prior to State Water Board approval of a CWSRF financing commitment for the Project. For further information on the CWSRF Program, please contact Ms. Michelle L. Lobo at (916) 341-6983.

It is important to note that prior to a CWSRF financing commitment, projects are subject to provisions of the Federal Endangered Species Act, and must obtain Section 7 clearance from the United States Fish and Wildlife Service (USFWS), and/or the National Marine Fisheries Service (NMFS) for any potential effects to special status species. Please be advised that the State Water Board will consult with the USFWS, and/or the NMFS regarding all federal special status species the Project has the potential to impact if the Project is to be funded under the CWSRF Program.

The District will need to identify whether the Project will involve any direct effects from construction activities or indirect effects, such as growth inducement, that may affect federally listed threatened, endangered, or candidate species that are known, or have a potential to occur on-site, in the surrounding areas, or in the service area, and to identify applicable conservation measures to reduce such effects.

CWSRF projects must also comply with Section 106 of the National Historic Preservation Act (NHPA). The State Water Board has been delegated responsibility for carrying out the requirements of Section 106 under a Nationwide Programmatic Agreement executed for the CWSRF Program by the USEPA, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.

As stated above, the State Water Board has responsibility for ensuring compliance with Section 106 and the State Water Board's Cultural Resources Officer (CRO) consults directly with the California State Historic Preservation Officer (SHPO). SHPO consultation is initiated when sufficient information is provided by the CWSRF applicant for projects having potential to impact cultural resources. Please contact the State Water Board's CRO, Ms. Cookie Hirn, at 916-341-5690 with any questions on how to begin the Section 106 compliance process. Note that the District will need to identify the Area of Potential Effects (APE) including construction, staging areas, and depth of any excavation.

Please provide the CRO with a copy of a current records search for the Project area including maps that show all recorded sites and surveys in relation to the APE for the Project. The APE is three-dimensional and includes all areas that may be affected by the Project. The APE includes the surface area and extends below ground to the depth of any Project excavations. The records search request should be made for an area larger than the APE. The appropriate area varies for different projects but should be drawn large enough to provide information on what types of sites may exist in the vicinity of the Project.

Native American and Interested Party Consultation is required for Section 106 compliance:

- A Project description and map should be sent to the Native American Heritage Commission (NAHC). The NAHC will provide a list of Native American tribes and individuals that are culturally affiliated with your Project area and recommend that they all be contacted.
- A Project description and map should be sent to everyone on the list provided by the NAHC, asking for information on the Project area.
- Similar letters should be sent to local historical organizations.
- Follow-up contact should be made by phone if possible and a phone log should be included.
- Comments from the NAHC, local tribes and historical organizations affiliated with the Project area, as well as the City's response to these comments should be included in the submittal to the CRO.

The NAHC can be contacted at:

915 Capitol Mall, Room 364
Sacramento, CA 95814
(916) 653-4082

Other federal requirements pertinent to the Project under the CWSRF Program include the following:

A. Compliance with the federal Clean Air Act: (a) Provide air quality studies that may have been done for the Project; and (b) if the Project is in a nonattainment area or attainment area subject to a maintenance plan; (i) provide a summary of the estimated emissions (in tons per year) that are expected from both the construction and operation of the Project for each federal criteria pollutant in a nonattainment or maintenance area, and indicate if the nonattainment designation is moderate, serious, or severe (if applicable); (ii) if emissions are above the federal de minimis levels, but the Project is sized to meet only the needs of current population projections that are used in the approved State Implementation Plan for air quality, quantitatively indicate how the proposed capacity increase was calculated using population projections.

B. Compliance with the Coastal Zone Management Act: Identify whether the Project is within a coastal zone and the status of any coordination with the California Coastal Commission.

C. Protection of Wetlands: Identify any portion of the proposed Project area that may contain areas that should be evaluated for wetlands or United States waters delineation by the United States Army Corps of Engineers (USACE), or require a permit from the USACE, and identify the status of coordination with the USACE.

D. Compliance with the Farmland Protection Policy Act: Identify whether the Project will result in the conversion of farmland. State the status of farmland (Prime, Unique, or Local and Statewide Importance) in the Project area and determine if this area is under a Williamson Act Contract.

E. Compliance with the Migratory Bird Treaty Act: List any birds protected under this act that may be impacted by the Project and identify conservation measures to minimize impacts.

F. Compliance with the Flood Plain Management Act: Identify whether or not the Project is in a Flood Management Zone and a copy of the Federal Emergency Management Agency flood zone maps for the area.

G. Compliance with the Wild and Scenic Rivers Act: Identify whether or not any Wild and Scenic Rivers will be potentially impacted by the Project and include conservation measures to minimize such impacts.

Following are specific comments on the District's EIR:

1 1. We understand the District is seeking financing through the CWSRF Program for a subset of the Project (under Master Plan Projects 1 and 2). State Water Board staff reviewed the SEIR and determined that the document, as it is currently written, is inadequate for its use. In accordance with the current CWSRF Program Policy (refer to Section IX, subsection B, *Policy for Implementing the Clean Water State Revolving Fund for Construction of Wastewater Treatment Facilities, Amended March 2009*), applicants must submit project specific environmental documents (with project specific environmental analyses) so that the State Water Board can make an informed decision on a project and ensure that there is

1 adequate environmental information to document environmental compliance. Please revise the SEIR to include the project specific environmental analysis for Master Plan Projects 1 and 2, particularly for those components to be funded through the CWSRF Program. The project specific environmental analysis should be clear, with sufficient supporting evidence to support the environmental determinations for each environmental impact. This should include specific unavoidable environmental impacts applicable to Master Plan Projects 1 and 2 (components 11, 18 and 19).

2 2. Provide further discussion on the proposed mitigation measures and substantiate how those measures will reduce environmental impacts. For example, mitigation measure Sp-30 is proposed to reduce bird impacts by conducting a preconstruction survey for nesting migrating birds and raptors. Discuss who will be conducting the survey and when the survey will take place (ie. How many days, weeks or months before construction). Also, please include a Mitigation Monitoring and Reporting Program with those identified mitigation measures in the SEIR.

3 3. Page 11-40 was missing in the SEIR received by the State Water Board. Please include this page in the SEIR and/or forward a copy of this page to the State Water Board for review.

4 4. Page 11-41 under BIO-2 analyzes impacts to California Native Plant Society (CNPS) List 2, 3, and 4 plant species. Please also include a discussion on impacts to CNPS List 1A and 1B plants for the Project area, if applicable.

5 5. Page 11-43 states that "suitable habitat for pygmy rabbits exists in the area." Please discuss impacts to the pygmy rabbit and its habitat, should preconstruction surveys identify this species in the Project area. Include any feasible mitigation or conservation measures to reduce potential impacts.

6 6. Page 11-46 indicates that the construction of conveyance infrastructure across native rangeland has been changed from "will" to "may." Please further discuss the likelihood of this construction and the potential to impact the federally threatened cutthroat trout. Include any feasible mitigation or conservation measures.

Thank you again for the opportunity to review the District's SEIR. We have no further comments at this time. If you have any questions or concerns, please feel free to contact me at (916)327-9401 or by email at LDLEE@waterboards.ca.gov, or contact Ms. Jessica Henderson-McBean at (916) 327-9117 or by email at JHenderson-McBean@waterboards.ca.gov.

Sincerely,

Lisa Lee
Environmental Scientist

Enclosures (4)

cc: State Clearinghouse
(Re: SCH# 2001082130)
P.O. Box 3044
Sacramento, CA 95812-3044

Appendix U - Interceptor Drain Discussion

ITRC
moving water in new directions
IRRIGATION TRAINING AND RESEARCH CENTER
BioResource and Agricultural Engr. Dept.
California Polytechnic State University
San Luis Obispo, CA 93407-0730
Phone: (805) 756-2434 FAX: (805) 756-2433 www.itrc.org

Date: May 31, 2011

To: Ivo Bergsohn, PG, CHG
Hydrogeologist
South Tahoe Public Utility District
1275 Meadow Crest Drive
South Lake Tahoe, CA 96150
Phone: 530-543-6204
Fax: 530-541-4319
Ibergsohn@stpud.dst.ca.us

cc: Joe Dominichelli, Sara Rogers

From: Charles M. Burt, Ph.D., P.E., D.WRE
Chairman, ITRC
Professor, BRAE Dept.
Office phone: 805-756-2379
Cell phone: 805-748-3863
cburt@calpoly.edu

Re: Interceptor to the east of wetlands area for Field D
Diamond Valley Effluent Project

An interceptor drain to be buried approximately 80-100' east of the open ditch along Field D in the Diamond Valley Effluent Project has been proposed. The purpose of the drain is to intercept subsurface water that flows past the open ditch, to a depth of 8 feet. This will help minimize sub-irrigation of the crop within the future pivot area.

The discussion below addresses these questions:

- Why is an interceptor drain necessary when an open ditch already exists?
- Will the interceptor drain impact the moisture content of the wetlands, which will be *upstream* of the interceptor?

Background

The wetlands area of interest has a seismic scarp on its eastern side. There is a ground surface elevation drop of approximately 10 feet on the most easterly 250 feet of the wetlands. Free water can be seen flowing from the face of the scarp, and into a shallow open ditch. A rough estimate of the flow rate exiting the open ditch, made on one date in the early fall of 2010, was 220 GPM. The open ditch is about 1000' long, and presently discharges into a pond. **Figure 1** illustrates the location.

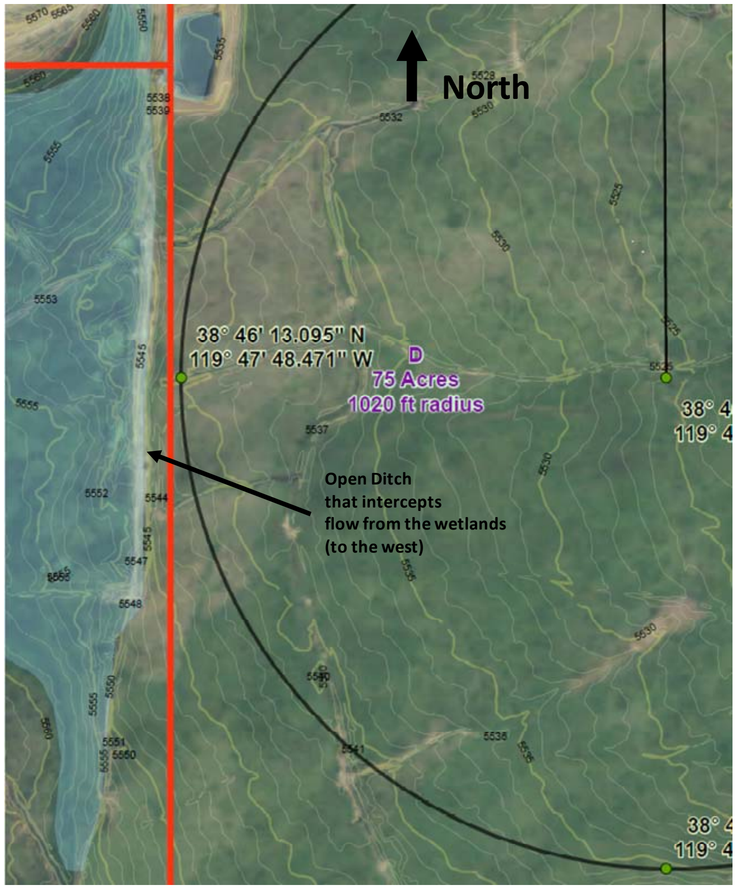

Figure 1. Location of open ditch, wetlands, and Field D

It is important to intercept drainage that flows into Field D because the center pivot will be designed to apply a uniform water depth across the field, and incoming drainage would disrupt the uniformity. Proper effluent irrigation management requires that:

1. Plant consumptive use (evapotranspiration) must be uniform across the field. For this reason, an excellent soil/plant fertility management program is proposed.
2. The consumptive use across the field must be supplied by precipitation or the irrigation system – not by subirrigation.

It is this second point that requires the maintenance of a low water table within the field. Soil corings within the field, taken in January, indicate the presence of a water table in Field D at a depth of 2½ –4 feet below the ground surface. This high water table will contribute to the evapotranspiration of the crop, and must be lowered.

When lateral inflow to the field causes a high water table in the downhill field (as it does here), the solution is to install a single buried interceptor drain perpendicular to the flow of water as it enters the field. This type of drain is called an "interceptor" drain. It is intended to impact the water table *downstream* of itself. A question was posed as to what the possible implications are to the area *upstream* of the drain.

Before continuing the discussion, it is important to note the following:

1. As described above, it will be necessary to lower the water table in Field D.
2. ITRC has not performed soil tests to determine the existing slopes of the water table, or the hydraulic conductivities in the area of influence of the tile line. However, some soil hydraulic conductivity values from other areas in Diamond Valley have been provided by STPUD.
3. Hydraulic conductivity values that are measured in the laboratory or field often have an inherent variability of 100 times or more. Localized soil variability can cause even larger differences. Therefore, while drainage theory is fairly exact, drainage engineering suffers from the lack of exact input values, and therefore is highly dependent upon experience and judgment.
4. A "no impact on the wetlands" from the interceptor drain can be guaranteed by placing an in-line valve at the downstream end of the interceptor line. This can be used to restrict the intercepted flow and raise the water table at the interceptor line if it is seen that the open ditch dries up. Such valves are common in areas where drainage systems are sometimes used to remove excess water, while at other times the same system is used to raise the water table for subirrigation.

Interceptor Drainage Theory and Practice

Figure 2 illustrates the basic concept of an interceptor drain, and symbols used for a mathematical analysis. There are a variety of simplifying assumptions, none of which are ever completely true. These include:

1. The ground surface, initial water table, and impermeable barrier all have the same uniform slope.
2. The soil is homogeneous and isotropic (same saturated hydraulic conductivity in both horizontal and vertical directions).

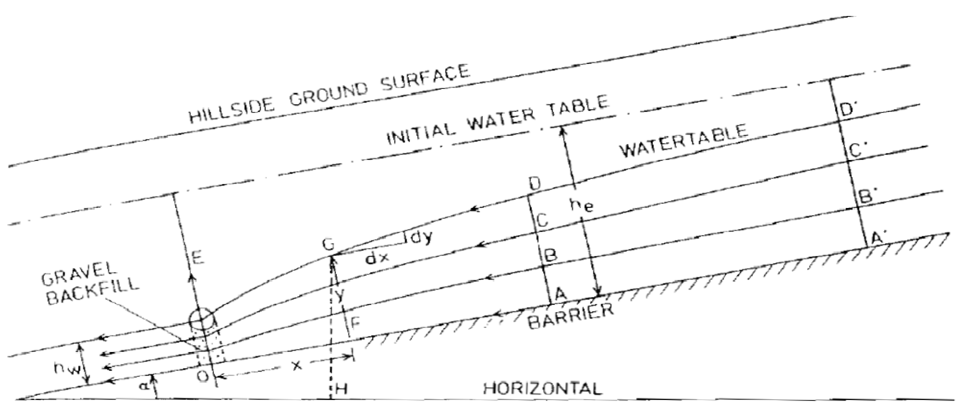

Figure 2. Tile drain as an interceptor of lateral inflowing water on a hillside. Figure 6-26 from the ASA Monogram No 38, Agricultural Drainage. R. W. Skaggs and Jan Van Schilfgaarde, ed. 1999.

In practice, interceptors are usually buried as deep as possible to intercept the maximum possible inflow. As can be seen in **Figure 2**, the intercepted percentage of the flow is:

$$Percent\ Intercepted = \frac{he - hw}{he} \times 100 \quad (1)$$

All of the original flow that would have passed over the center of the new interceptor drain would be removed by the interceptor tile drainage line. It works this way as long as the new water table and initial water table intercept each other a long distance upstream.

It can be seen in **Figure 2** that the new water table surface approaches the initial water table surface very gradually on the upstream side (right hand side of the sketch). Mathematically, we generally estimate the distance to 95% convergence to determine where the two curves intersect.

The formula for **Figure 2** that is commonly used to estimate the shape of the new water table (x = 0 at the drain) is given below. While the shape of the surface is independent of the soil's hydraulic conductivity, the flow *is* dependent upon that hydraulic conductivity (this will enter into a later discussion).

$$x = \frac{\left[2.3h_e \log_{10}\frac{h_e - h_w}{h_e - y}\right] - (y - h_w)}{\tan\propto} \qquad (2)$$

Drainage Hydraulics – Wetlands Flow into the Open Ditch

The soil surface on the eastern 250' or so of the wetlands appears close to saturation. Free water can be seen at the soil surface, and water clearly drains from the scarp face into the open ditch. One might look at this condition and conclude that the scarp and open ditch already act as an interceptor drain. This is not the case, however, when one considers that:

- Saturated hydraulic conductivity values for nearby soils were provided by STPUD. These ranged from .02 – 8.40 feet/day (about 400 times difference between the range of values).
- The slope of the water table surface, before rising to the ground surface, was uniform and was approximately the same as the ground surface slope in the field to the west of the wetlands. This slope is about 2% (.02 ft/ft).
- The scarp intercepts the flow from a 10 ft thick saturated layer.

One can estimate the anticipated flow rate using Darcy's equation:

$$Q = KiA \qquad (3)$$

Where

Q = flow rate, cubic feet/day
K = saturated hydraulic conductivity, ft/day
i = slope of the original water table upstream of the interceptor
A = area, sq. ft., of intercepted flow

In this case, A = (10' thick) × (1000' long) = 10,000 sq. ft.
K_{max} = 8.4 ft/day (approximate for a sand)
i = .02 ft/ft

The estimated flow rate = 1680 cubic feet/day
= .02 cubic feet/sec
= 9 GPM

The measured ditch outflow, while crude, was in the ballpark of 200 GPM. Using the highest hydraulic conductivity value provided by STPUD, the estimated flow (9 GPM) is considerably lower than this.

One can therefore postulate that:

1. Either the saturated hydraulic conductivity value is considerably higher (20 times higher than the greatest value provided), or
2. What is seen at the face of the scarp is different than what is encountered with a classical interceptor drain.

It appears that the scarp and possibly the subsurface of the eastern edge of the wetlands is acting somewhat as a dam or aquiclude, and is therefore causing water to rise to the surface from considerably lower than 10'. The open drain appears to be operating partly like a channel on/near the top of a dam spillway. While no soil coring data along the scarp was examined that supports this, the computations do not support a strong conclusion that the open drain and hill are functioning as a classic surface interceptor downstream. This is important when considering the impact of a downstream interceptor drain.

If this was open channel flow, a dam would be overtopped in a critical flow regime, which would mean that downstream changes in water level would have no changes on the upstream water level. Certainly the flow regime here is not even close to critical, but it can serve as a possible analogy for illustration.

Upstream Influence of an Interceptor Drain

Using equation (2), **Table 1** was developed for various interceptor drain positions and depths to an impermeable layer.

Table 1. Distances (feet) uphill at which the new water table has 95% convergence with the original water table. Assumed original slope = 1.5%. Single interceptor tile drain.

	8 foot tile depth		6 foot tile depth	
	Depth of imperm layer, ft		Depth of imp. Layer, ft.	
Thickness intercepted, ft.	18	8	18	6
2			2666	272
3	2403	408	2802	408
4	2540	545	2939	545
5	2676	681	3075	681
6	2812	817		

Table 1 assumes that there are uniform conditions with a uniform original water table slope for a long distance upstream of the interceptor drain. The proposed distance from the open ditch to the interceptor drain in Field D is approximately 80 feet, which does not match such a condition. Therefore, the flow net into the Field D interceptor drain will be different than what is assumed in the development of **Table 1**.

Therefore, one can make an estimate of the impact of the interceptor drain as follows:

Assumptions:

- Saturated hydraulic conductivity = 8.4 ft/day
- Average thickness of flow path = 10 ft.
- Elevation drop of water surface = 8 feet (from ditch to drain)
- Distance between water surfaces = 100 ft
- Resultant slope = .08

Using Darcy's law, Q = KiA

$$
\begin{aligned}
Q &= 8.4\ \text{ft/day} \times .08 \times (10\ \text{ft} \times 1000\ \text{ft}) \\
&= 6720\ \text{cubic feet/day} \\
&= .08\ \text{CFS} \\
&= 35\ \text{GPM}
\end{aligned}
$$

A flow rate of 35 GPM through the interceptor drain will be considerably less than what is flowing out of the open ditch. Therefore, **there would be no influence upstream of the open ditch**.

However, given all of the uncertainties, it would be prudent to install an in-line valve at the downstream end of the interceptor drain to reduce the flow and raise the water table, in what appears to be the unlikely event that the interceptor would dry out the ditch and influence the wetlands. The concept of such valves is shown below, in a figure taken from an Advanced Drainage Systems (ADS) brochure.

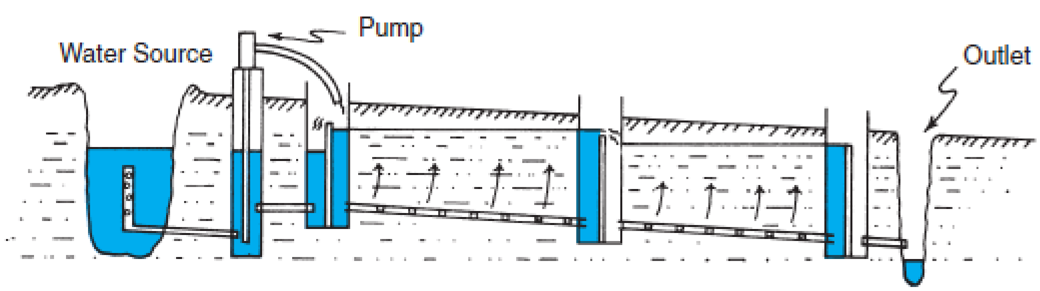

Figure 3. Concept of IrriDrain valves (by ADS) for subsurface irrigation. The same concept can be used to guarantee no negative impact on the wetlands in Diamond Valley.