Chapter 2 Alternatives

2.1 Introduction

This chapter provides a summary of the alternatives screening process; a description of the Proposed Action, two action alternatives, and the No Action Alternative; a comparative evaluation of the potential environmental effects of the alternatives; and identifies the environmentally preferable alternative. The four alternatives analyzed in detail in this EIS are:

- Alternative A—No Action;
- Alternative B (Proposed Action)—Banking CVP water Outside the MID Service Area Using Swales and Alteration of Reclamation-Owned Facilities;
- Alternative C—Banking CVP water Outside the MID Service Area Without Swales and Alteration of Reclamation-Owned Facilities; and
- Alternative D—Banking CVP water outside the MID Service Area with Banking and Recovery via Gravelly Ford Canal (no alteration of Reclamation-Owned Facilities).

Consistent with MID's 2005 EIR, Alternative B is Reclamation's preferred alternative, referred to in this Draft EIS as the Proposed Action. This alternative involves construction and operation of facilities to convey and bank surface water beneath Madera Ranch using natural swales and later to recover up to 90% of the banked water for beneficial use. The facility components of Alternatives B, C, and D are described below in detail and summarized in Table 2-1.

Table 2-1. Facility Components Associated with Project Alternatives

Component	Alternative B—Proposed Action	Alternative C—Without Swales	Alternative D—Use of Gravelly Ford Canal
24.2 Canal Improvements	X	X	
Section 8 Canal, Cottonwood Creek, and Main No. 1 Canal Connection Upgrade	X	X	
Section 8 Canal Upgrades/Extensions	X	X (Excluding northern lateral)	X (Excluding new 1.55 mile segment in Section 13 and 14)
Gravelly Ford Canal Upgrade			X
Gravelly Ford Canal Sedimentation Basin and Flow Regulation Area	X	X	X

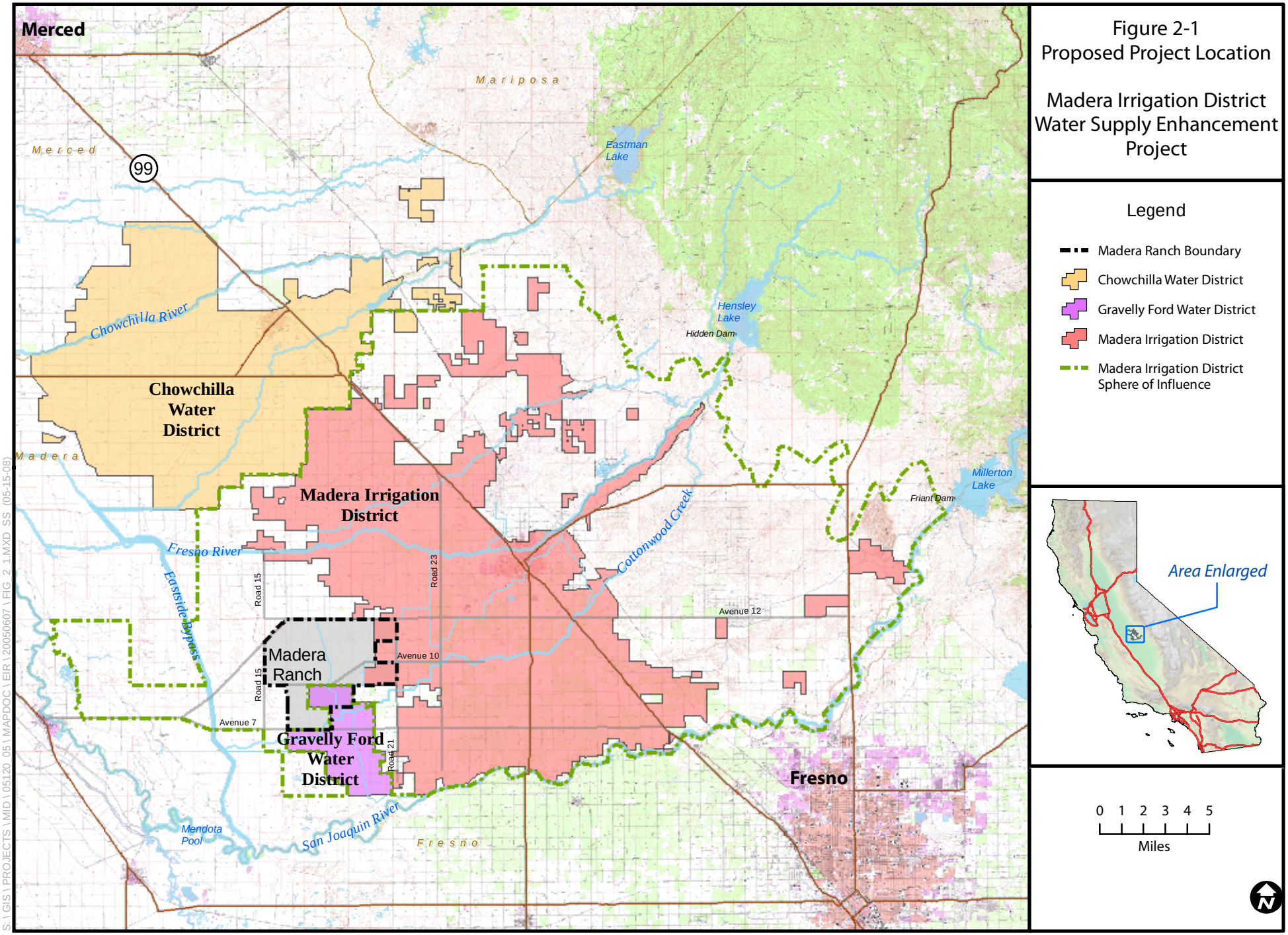
Component	Alternative B—Proposed Action	Alternative C—Without Swales	Alternative D—Use of Gravelly Ford Canal
Cottonwood Creek Overflow Improvements	X	X	X
Reconditioning of existing ditches	X	X	X
Swales	X		X
55 acres of Recharge Basins	X	X	
Section 8 Canal Southwestern Lateral Upgrade	X	X	X
Gravelly Ford Canal Section 21 Northern Lateral	X	X	X
1,000 acres of Recharge Basins	X*	X	X*
Recovery Wells	X	X	X
Recovery Pipelines and Electrical Facilities	X	X	X
Recovery Lift Stations	X	X	X

* These would be constructed only if the swales do not perform as expected.

2.2 Alternative A—No Action

Under the No Action Alternative, MID would not bank MID CVP water (MID Long-Term Water Service Contract supplies from both the Friant Division and Hidden Unit on Madera Ranch (Figure 2-1) and Reclamation's delivery canals would not be enlarged. The No Action Alternative also excludes any funding by Reclamation, as described below under Alternatives B,C, and D, under the Omnibus Public Land Management Act of 2009, the Policy and Program Services, Challenge Grant Program: Recovery Act of 2009 Water Marketing and Efficiency Grants, or any other funding source.

MID may bank non-CVP water via a Warren Act contract with Reclamation on the property, and other limited on-site water banking and recovery facilities may be constructed if MID is able to find participants and funding to support these efforts. MID estimates that under the No Action Alternative, MID could only apply less than 5,000 acre-feet per year (af/year) of their own non-CVP water, and recovery operations likewise would be limited if Reclamation-owned facilities were not altered. The number of other participants and amount of water they could bring to the project is uncertain. Many participants, even if they bring their own supplies, also would have to obtain Reclamation's approval because banking of CVP water outside CVP contractor's service areas, transfers or exchanges of CVP water would be needed to deliver the water to the property and to recover it. Therefore, without the ability to bank MID CVP water outside MID's service


Merced
Mariposa
Merced
99
Eastman Lake
Hensley Lake
Hidden Dam
Chowchilla River
Chowchilla Water District
Madera
Madera Irrigation District
Millerton Lake
Friant Dam
Cottonwood Creek
Fresno River
Eastside Bypass
Road 15
Road 23
Avenue 12
Madera Ranch
Avenue 10
Avenue 7
Gravelly Ford Water District
Road 21
Fresno
Mendota Pool
San Joaquin River
Fresno
Figure 2-1
Proposed Project Location
Madera Irrigation District
Water Supply Enhancement
Project
Legend
Madera Ranch Boundary
Chowchilla Water District
Gravelly Ford Water District
Madera Irrigation District
Madera Irrigation District
Sphere of Influence
Area Enlarged
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area, the project likely would be infeasible for MID. MID's customers would be subject to continued water supply uncertainty and higher water costs because of a reduced supply and ongoing groundwater overdraft conditions.

If the project does not proceed, MID likely would sell the property to other agricultural interests. MID has had numerous offers from prospective buyers, including dairy, orchard, and row crop farmers. The No Action conditions would continue to support agricultural activities. However, the type and extent of the activities are uncertain at this time. Future owners would be subject to compliance with the California Endangered Species Act (CESA), the federal Clean Water Act (CWA), and the federal Endangered Species Act (ESA), and the effects may be evaluated by Madera County (County) under CEQA if discretionary permits are needed.

2.3 Alternative B—Water Banking Outside the MID Service Area and Alteration of Reclamation-Owned Facilities

Alternative B is the Proposed Action and Reclamation's preferred alternative. The Proposed Action would be completed in two phases. Phase 1 would involve only recharge-related facilities. Phase 2 would involve supplemental recharge facilities and facilities for recovery of banked water. Reclamation would approve a total banking capacity of up to 250,000 acre-feet (af) of MID CVP water outside the MID service area and issuance of an MP-620 for the alteration of Reclamation-owned facilities (Lateral 24.2). After alteration of the Reclamation-owned facilities and certain MID facilities, MID would be able to recharge and recover a maximum of 55,000 af annually. Alternative B also includes funding by Reclamation. MID has been working toward securing federal funds to assist in the cost of purchasing Madera Ranch and construction cost. In January 2009, the U.S. Congress passed the "Omnibus Public Land Management Act of 2009" (Public Law 11-111; H.R. 146-308). Section 9102 of the Omnibus bill includes the "Madera Water Supply Enhancement Project, California." Thus, the WSEP has been authorized by the U.S. Congress and is eligible for federal funding in the next budget cycle, in 2010. MID is currently pursuing federal funding through the appropriations process. In addition, MID is pursuing a grant award through Reclamation's Policy and Program Services, Challenge Grant Program: Recovery Act of 2009 Water Marketing and Efficiency Grants. The application for this grant was due May 22, 2009. A determination relevant to grant approvals is expected to be made in July 2009. Regardless of whether this funding is acquired, the project components and associated effects would be the same.

2.3.1 Phase 1 Facilities

MID would implement Phase 1 to increase the capacity of existing MID conveyance facilities to deliver water to Madera Ranch facilities. Phase 1 would use primarily natural swales as recharge areas.

Phase 1 activities would involve:

- reconditioning and extension of canals to provide at least 200 cubic feet per second (cfs) of conveyance capacity into Madera Ranch;
- construction of approximately 55 acres of recharge basins on current agricultural land to regulate flow, remove sediment, and provide some recharge;
- application of recharge flows to approximately 700 acres of swales; and
- integration of approximately 2,600 acres of Madera Ranch row crops and vineyards into an in-lieu recharge program in which surface water periodically would be served in lieu of groundwater pumping subject to approval by the Madera Ranch Oversight Committee (MROC).

Diversion and Conveyance Facilities

Upgrades to Existing Canals

Figure 2-2 depicts the locations of existing canals in the vicinity of Madera Ranch. During Phase 1, MID would upgrade canals to enable gravity delivery of at least 200 cfs into Madera Ranch. Upstream portions of Cottonwood Creek, the 24.2 Canal and the Main No. 1 Canal collectively provide more than 200 cfs of gravity feed conveyance capacity above MID's normal service needs during nonpeak irrigation months, and lesser amounts of capacity during peak irrigation months. However, the portions of these conveyances and the Section 8 Canal within 2 miles of the ranch are undersized, causing a bottleneck such that the capacity to deliver water to the ranch is less than 100 cfs. Specifically, the confluence of Cottonwood Creek, the Main No. 1 Canal, and the Section 8 Canal, approximately 2 miles east of the ranch, has a capacity of less than 100 cfs. In addition, the Section 8 Canal running from this confluence into the ranch has a capacity of less than 50 cfs, and the 24.2 Canal, 1.5 miles from the ranch, also has a capacity of less than 50 cfs and does not tie into the Section 8 Canal.

The following sections summarize how these and other conveyances would be upgraded to provide up to 200 cfs delivery capacity to and from Madera Ranch.

Reclamation Conveyance Facilities

24.2 Canal Improvements. MID would extend the earthen 24.2 Canal approximately 0.75 mile south to connect with the Section 8 Canal (see Figure 2-3). The connector would be a buried pipeline, not an open canal. In addition,

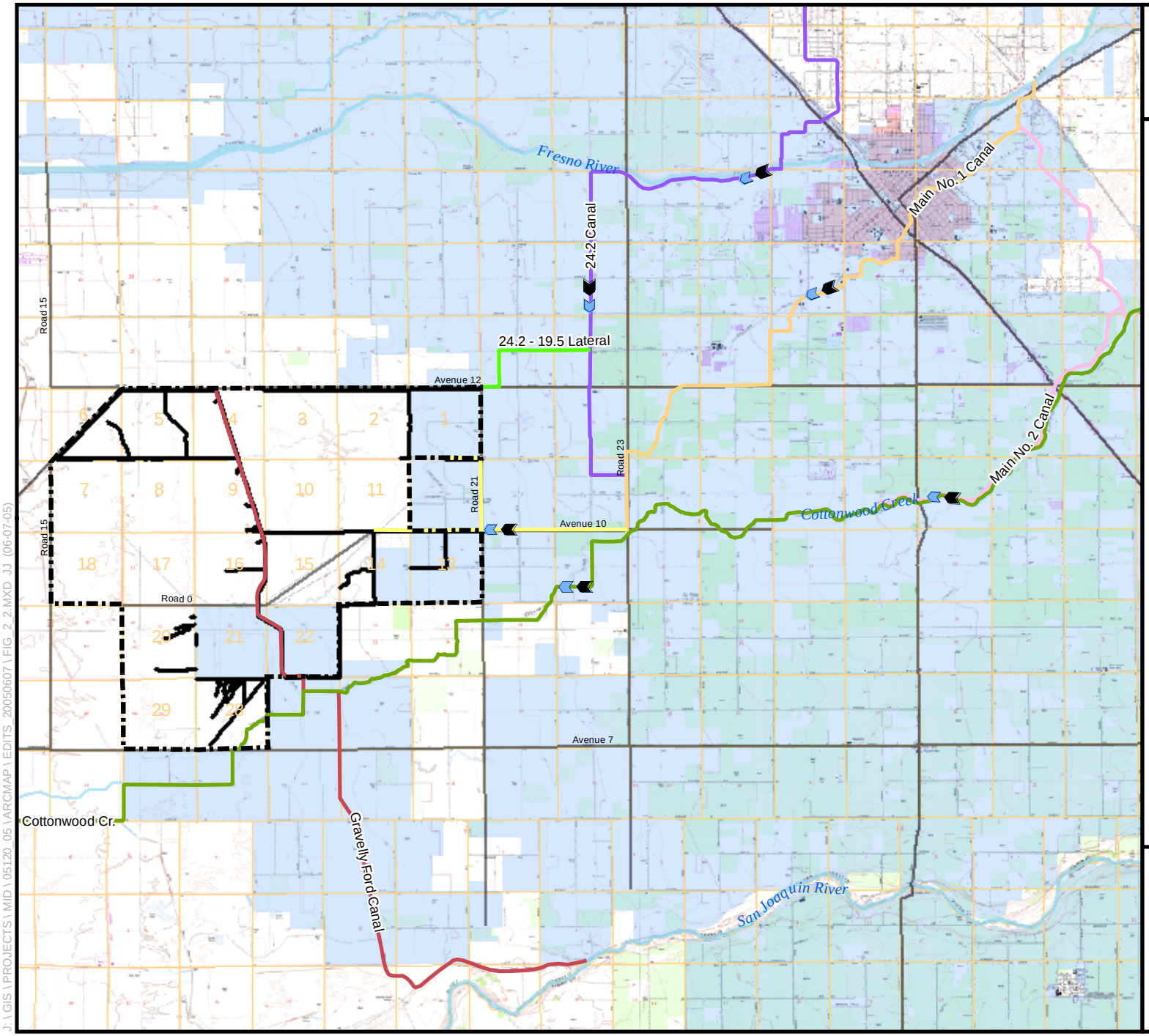

Figure 2-2
Existing Madera Ranch Water Sources and Conveyances

Legend

- Section Line
- Madera Ranch Boundary
- Madera Irrigation District

Existing Canals Serving Madera Ranch

- 24.2 Canal
- 24.2 - 19.5 Lateral
- Cottonwood Creek
- Gravelly Ford Canal
- Main No. 1 Canal
- Main No. 2 Canal
- Section 8 Canal and Lateral
- Existing On-Site Conveyances
- Surface Water Flow Direction

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Topographic Map Source:
National Geographic Society TOPO!

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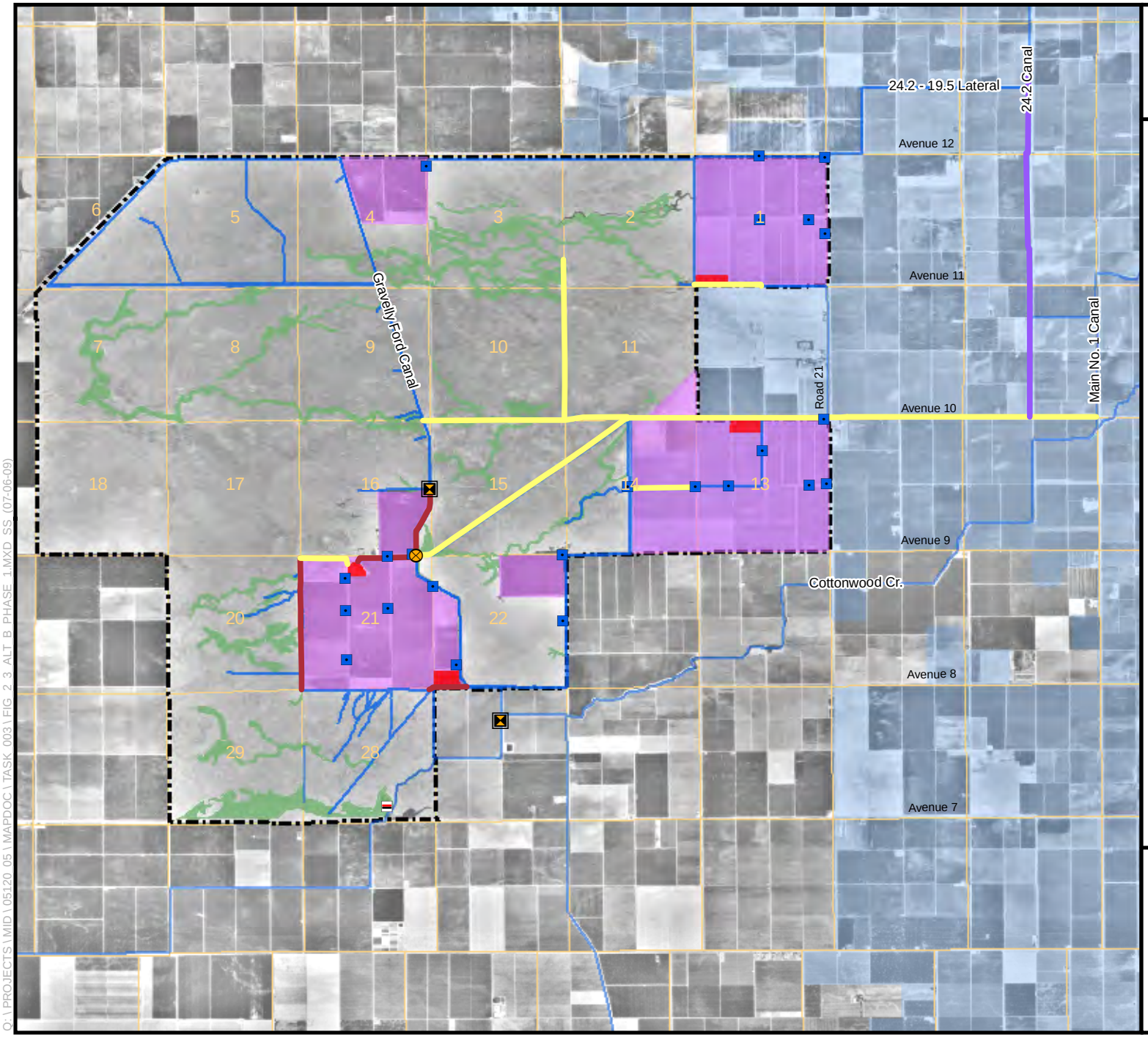

Figure 2-3
Alternative B
Phase 1
Conveyance Upgrades

Legend

- Existing Wells
- Section Line
- Madera Ranch Boundary
- Madera Irrigation District

Phase 1 Improvements

- Weir
- Hardened Sill
- Gate Valve
- Recharge Basins
- Swale Recharge Areas
- On-Ranch, In-Lieu Recharge Facilities (existing row crops and vineyards)
- 24.2 Canal Improvements
- Gravelly Ford Canal and Lateral Improvements
- Section 8 Canal and Lateral Improvements
- Existing Conveyances

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Aerial Photo Source: USGS Digital Orthophoto Quarter Quadrangle, 1993

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approximately 1.75 miles of the southern portion of the existing 24.2 Canal would be widened and deepened to accommodate 100 cfs of flow. In total, the extension pipeline and canal enlargement would involve moving approximately 76,000 cubic yards of soil.

MID Conveyance Facilities

Section 8 Canal, Cottonwood Creek, and Main No. 1 Canal Connection Upgrade. The existing connection between the Section 8 Canal (an earthen ditch built in the late 19th century), Cottonwood Creek, and Main No. 1 Canal would be widened and deepened to accommodate 100 cfs of flow (see Figure 2-2). Only the connection would be widened; Cottonwood Creek would not be widened as its capacity is sufficient to meet the needs of the alternative. Work would be performed in an approximately 500-foot-long and 100-foot-wide area, requiring a temporary construction easement of 1.2 acres from neighboring landowners. No new permanent easements would be required.

Section 8 Canal Upgrade. An approximately 1.75-mile segment of the earthen Section 8 Canal (from Road 23 to within approximately 0.25 mile of the Madera Ranch boundary at Road 21) would be reconstructed to expand from one-way, 50-cfs capacity to two-way (flat bottomed), 200-cfs capacity (see Figure 2-3). The 1.75-mile segment of the canal from 0.25 mile east of the ranch, along the north side of Section 13 and to the western edge of ranch row crop land on the north side of Section 14, would be replaced with an approximately 1.75-mile-long, 84-inch reinforced concrete pipe (RCP), 200-cfs (two-way) pipeline placed within the channel of the existing canal.

During construction, Avenue 10 temporarily would be closed (local traffic only) to allow work on the canal. To expand the canal, an additional 40-foot corridor would be required, for a total of 8.9 acres of easement or fee simple ownership. The last 0.25 mile of the west end of the canal off-ranch would be carried in concrete pipe buried in the existing canal such that additional right-of-way would not be needed. A 40-foot-wide temporary construction easement may be required for this last 0.25 mile off-ranch (resulting in an easement of 1.2 acres). In total, this reconstruction involves moving approximately 57,000 cubic yards of soil.

Section 8 Canal Western Extension. A new, approximately 1.55-mile-long, 20- to 50-cfs earthen ditch would be constructed within a paved road in Sections 14 and 15 from the new Section 8 Canal pipeline to the Gravelly Ford Canal (GF Canal). The ditch would be constructed within the existing leveled shoulder (see Figure 2-3).

Section 8 Canal Southwestern Extension. Sections 14 and 15 are bisected diagonally by a 30- to 40-foot-wide, dirt farm road that was previously a ditch. A new approximately 1.8-mile-long, 20-cfs earthen ditch would be constructed from the new Section 8 Canal pipeline, along the shoulder of this road and to the GF Canal (see Figure 2-3).

Section 8 Canal Northern Extension. Sections 10 and 11 are divided by a 20- to 40-foot-wide dirt farm road bordered by the remnants of a ditch. A new approximately 1.2-mile-long, 20- to 50-cfs earthen ditch would be constructed along the alignment of the old ditch (see Figure 2-3).

Section 8 Canal Section 14 Lateral Extension. An existing Section 8 Canal lateral (20 cfs) that flows across Section 13 would be extended approximately 0.5 mile across Section 14 (see Figure 2-3). All work would be performed along the edge of row crop land.

Section 8 Canal Section 1 Lateral Extension. An existing Section 8 Canal lateral (20 cfs) that flows east-west along the southern side of Section 1 would be extended approximately 0.5 mile to the southwestern corner of Section 1 (see Figure 2-3). All work would be performed along the edge of row crop land.

Gravelly Ford Canal Sedimentation Basin and Flow Regulation Area. With GFWD's permission, an approximately 3,000-foot-long segment of the GF Canal on the southeastern side of Section 16 would be equipped with a weir/control structure on the north side to allow use of the channel as a combined recharge area, sedimentation basin, and flow regulation area (see Figure 2-3).

Gravelly Ford Canal Flow Control Weir at Cottonwood Creek. With GFWD's permission, a new weir would be installed on the GF Canal approximately 1,000 feet south of Section 22 where the canal intersects and shares a channel with Cottonwood Creek (see Figure 2-3). All work would be performed in the existing artificial channel and on adjacent farm roads.

Gravelly Ford Canal Section 21 Northern Lateral. A new approximately 0.45-mile-long, 20- to 50-cfs earthen ditch would be constructed along the northern side of Section 21 from the GF Canal to a Phase 1 recharge basin located on farmland (see Figure 2-3).

Gravelly Ford Canal Section 21 Western Lateral. A new approximately 1-mile-long north/south canal would be constructed along the western side of Section 21 off of an existing 20- to 50-cfs earthen ditch bordering the southern side of the section. The new canal would be constructed on the shoulder of a dirt farm road bordering row crop land in Section 21 (see Figure 2-3).

Gravelly Ford Canal Section 22 Southern Lateral. A new approximately 0.28-mile-long, 20-to 50-cfs earthen ditch would be constructed along the southern side of Section 22 from the GF Canal to an existing ditch (see Figure 2-3).

Cottonwood Creek Overflow Improvements

A hardened sill (compacted or armored material with low potential for erosion) would be constructed on the existing Cottonwood Creek berm to protect the berm and to accommodate flow measurements. Sections 28 and 29 are inundated by Cottonwood Creek uncontrolled flows regularly during wet springs. These uncontrolled flows generally are prevented from flowing onto Avenue 7 by an earthen berm that runs along the southern boundary of Section 28 and north along the western boundary of Section 29 (see Figure 2-3).

Reconditioning of Existing Canals and Ditches

Reconditioning would involve reconditioning Gravelly Ford Canal, replacement of turnout gates, brush removal, repair of berms that have been worn down over time, reconstruction of segments that have been filled by recent farm operations, and installation of farm road crossings as required.

Recharge Facilities

Recharge Basins

Phase 1 would involve construction of approximately 55 acres of basins, approximately two basins that are 1,100 feet square, as shown in Figure 2-3 on agricultural land in order to:

- help regulate flows,
- allow settling of sediments before application of water to swales, and
- provide some recharge capacity.

The preliminary locations of four Phase 1 recharge basins are entirely on current agricultural land in Sections 1, 13, 21, and 22. The basins would be designed with 1.5:1 to 2:1 interior side slopes and average depths of 4 to 5 feet and surrounded by low earthen dikes created from the dirt excavated from the basin. Construction of the Phase 1 recharge basins could involve the movement of approximately 444,000 cubic yards of soil. Topsoil would be segregated during excavation and respread over the berm and construction disturbance areas to promote reestablishment of vegetation.

Swale Recharge Areas

The Proposed Action would entail diversion of water into approximately 700 acres of swales. The water would be conveyed to Madera Ranch through the existing and upgraded MID conveyances and to the swales through the existing, rehabilitated, and new ditches described above. At the head of each swale, a manually operated farm turnout (equipped with a gate valve and totalizing flow

meter) would be installed to regulate and measure the flow into each swale. Several turnouts currently exist on GF Canal and these would be replaced and several new ones will be added. Each turnout is approximately 3-feet wide by 6-feet long by 6-feet tall and is/will be buried in the existing banks of the canal. The turnouts are constructed off-site at MID headquarters. Flows at each turnout, based on pilot studies, would be no greater than 20 cfs and would average 5 cfs at the turnout. Maximum overall flows would be around 1 cfs per acre of application. Locations of the swales anticipated to be used during Phase 1 are depicted on Figure 2-3.

In-Lieu Recharge Facilities

Madera Ranch includes 2,666 acres of row crops and vineyards (see Figure 2-3) that are irrigated entirely by a system of 23 wells. MID would recondition existing turnouts and install new turnouts from the Proposed Action canals, pipelines, and ditches to enable delivery of surface water to these fields in lieu of groundwater pumping (Madera Irrigation District 2008).

These agricultural fields were purchased from MID in July 2008 by Grimmway Enterprises, Inc. Grimmway will continue to manage the property for agricultural uses. However, MID has retained rights to existing and future easements that would allow the Proposed Action to be implemented.

2.3.2 Phase 2 Facilities

Phase 2 would expand the areas used to recharge, develop wells and piping to recover the banked water, and install pumps to deliver the recovered water as shown in Figures 2-4 and 2-5.

Phase 2 activities for recharge and recovery facilities would involve:

- additional upgrades to existing canals,
- construction of up to 1,000 acres of new on-site recharge basins and canals as required to supplement Phase 1 facilities and achieve 200 cfs of recharge capacity (if required),
- use of up to 15 existing wells for recovery,
- installation of up to 49 new wells and recovery pipelines (in phases over several years) to provide 200 cfs of recovery capacity, and
- installation of up to 12 lift stations on MID canals and one lift station on GF Canal (in phases over several years) to provide 200 cfs of pump-back capacity into the MID service area.

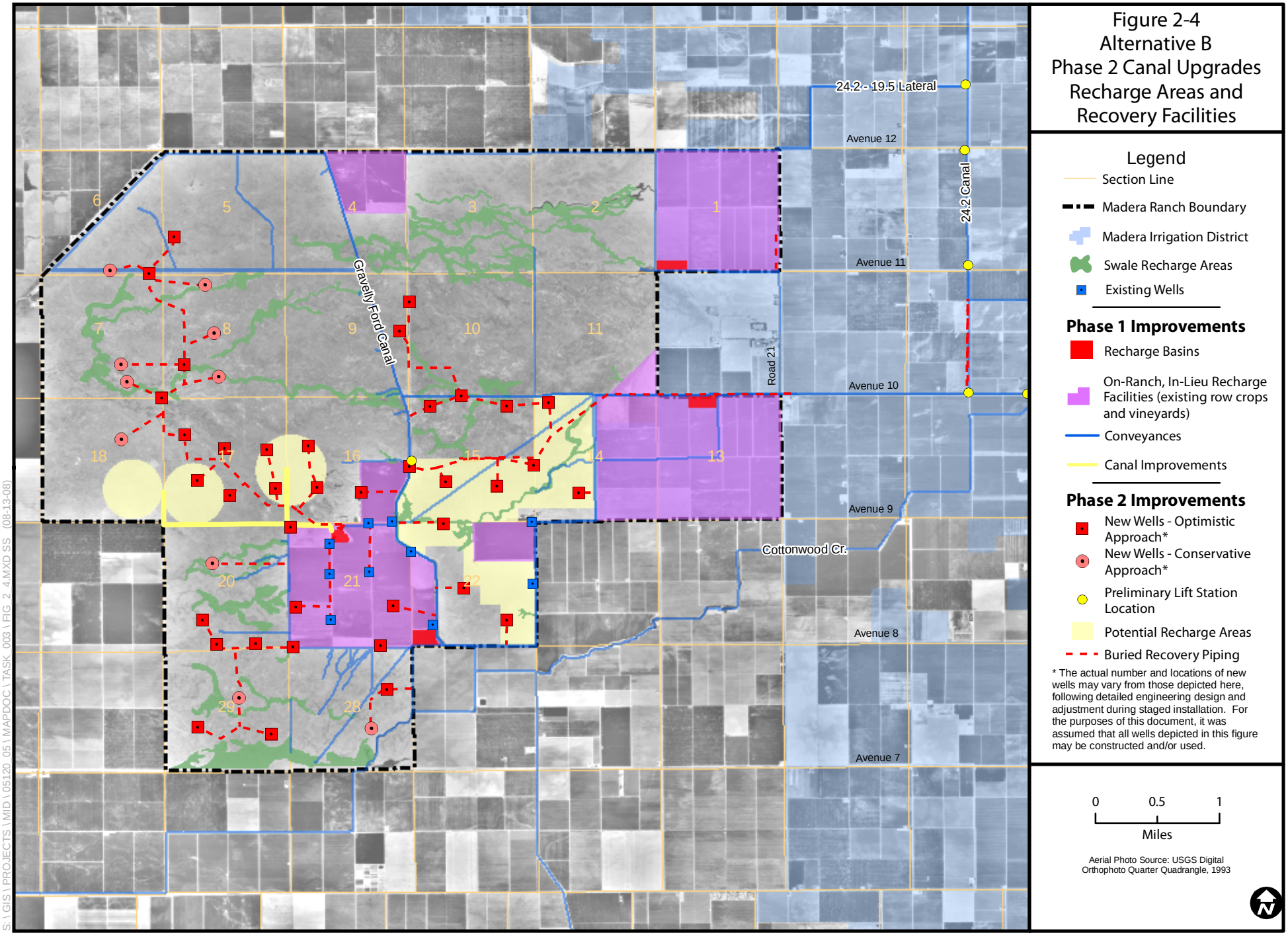

Figure 2-4
Alternative B
Phase 2 Canal Upgrades
Recharge Areas and
Recovery Facilities

Legend

- Section Line
- Madera Ranch Boundary
- Madera Irrigation District
- Swale Recharge Areas
- Existing Wells

Phase 1 Improvements

- Recharge Basins
- On-Ranch, In-Lieu Recharge Facilities (existing row crops and vineyards)
- Conveyances
- Canal Improvements

Phase 2 Improvements

- New Wells - Optimistic Approach*
- New Wells - Conservative Approach*
- Preliminary Lift Station Location
- Potential Recharge Areas
- Buried Recovery Piping

* The actual number and locations of new wells may vary from those depicted here, following detailed engineering design and adjustment during staged installation. For the purposes of this document, it was assumed that all wells depicted in this figure may be constructed and/or used.

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Aerial Photo Source: USGS Digital Orthophoto Quarter Quadrangle, 1993

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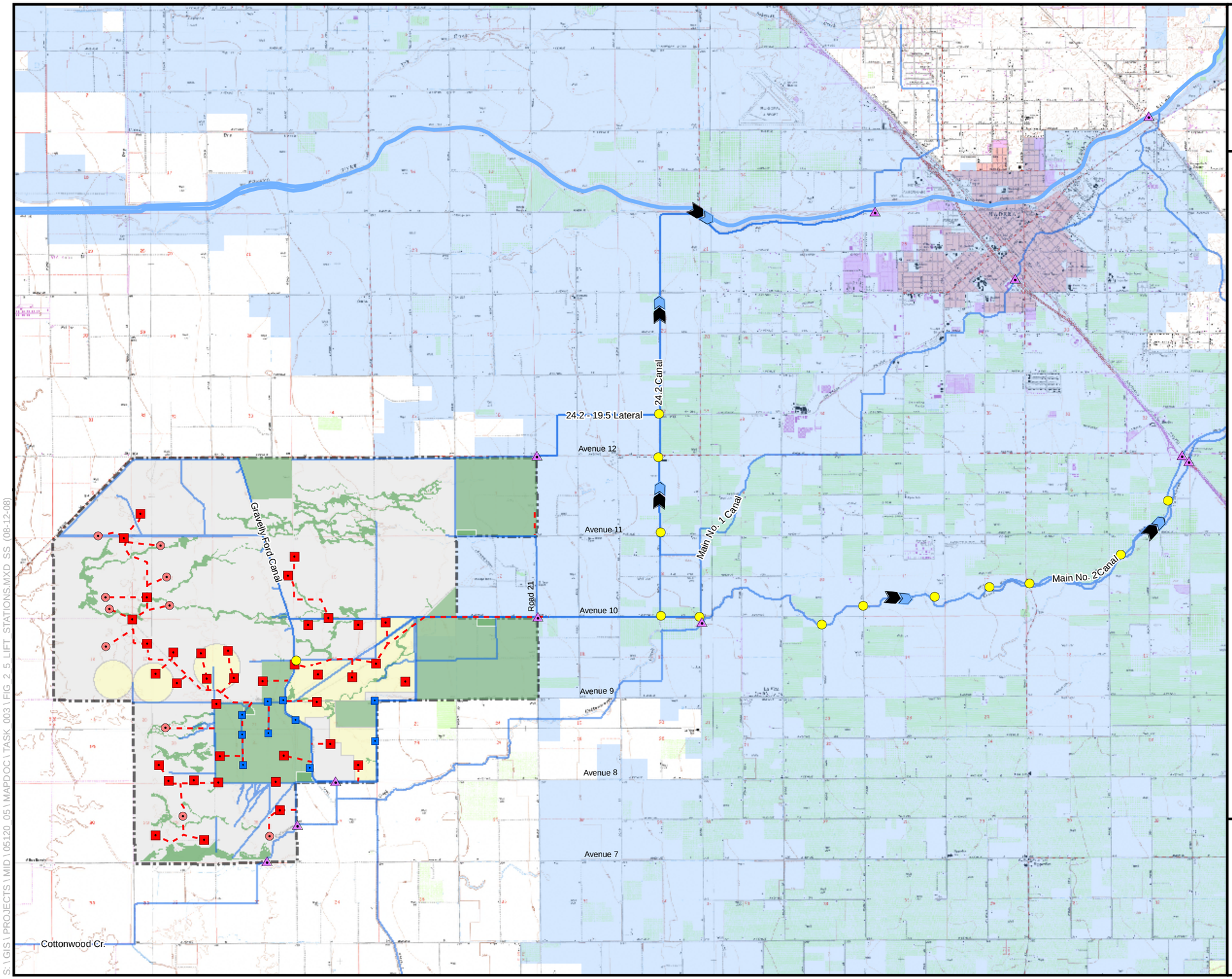
Figure 2-5

Lift Stations and Flow Monitoring Locations



Legend

- Madera Ranch Boundary
- Madera Irrigation District
- Phase 1 Recharge Areas
- Phase 2 Recharge Areas
- Phase 1, Phase 2, and Existing Conveyances; Recovery Piping
- Buried Recovery Piping
- New Wells - Optimistic Approach*
- New Wells - Conservative Approach*
- Existing Wells
- Preliminary Lift Station Location[1]
- Flow Monitoring Location
- Surface Water Flow Direction[2]

[1] The actual number and locations of wells and lift stations may decrease from those depicted here, following detailed engineering design and adjustment during staged installation. For the purposes of this document, it was assumed that all wells depicted in this figure may be constructed and/or used.

[2] All deliveries of recovered water off of 24.2 and Main No. 2 Canals will be via normal gravity procedures.

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Topographic Map Source:
National Geographic Society TOPO!

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Diversion and Conveyance Facilities

Upgrades of Existing Canals

Section 8 Canal Southwestern Lateral Upgrade. The 20- to 50-cfs, Phase 1 earthen canal running diagonally across Sections 14 and 15 would be partially replaced with an approximately 1.75-mile-long, 72-inch to 84-inch RCP, 135- to 200-cfs (two-way) buried pipeline. The pipeline would extend from the Phase 1 Section 8 Canal upgrade (200-cfs pipeline) to the GF Canal beneath an existing 30- to 40-foot-wide dirt farm road (Figure 2-4).

Gravelly Ford Canal Section 21 Northern Lateral. The 0.45-mile-long Phase 1 ditch along the northern side of Section 21 would be replaced with an approximately 2.1-mile-long, 135-cfs, east-west earthen lateral canal along the north side of Sections 21 and 20 with two north-south sub-lateral canals running northward along the east and the west sides of Section 17.

Depending on the recharge basin acreage and construction methods (see Recharge Basins below), up to 3.2 miles of 20- to 100-cfs earthen ditches would be constructed within the Phase 2 recharge basin area to distribute water into recharge areas.

Recharge Facilities

Recharge Basins

Depending on the performance of Phase 1 recharge facilities, up to approximately 1,000 acres of recharge basins may be constructed within a 1,300-acre area (Figure 2-4). The recharge basin construction would proceed as follows.

- **Stage 1:** Berming of recharge area boundaries along topographic contours using farm roads wherever possible and farm grading techniques, but no excavation (similar to unleveled rice fields).
- **Stage 2:** Deep ripping of corridors within the bermed areas, interspersed with corridors of undisturbed land.
- **Stage 3:** Excavation of basins varying from 4 to 5 feet deep.

The final number of recharge basins constructed and techniques summarized above is uncertain, and the highest estimated acreage is highly unlikely to be required. This EIS evaluates the potential effects associated with 1,000 acres of excavated basins. Recharge basins would be clustered in sets of three or four varying in size from 5 to 80 acres, with the first basin constructed in each set serving as both a settling and a recharge basin.

Construction of the recharge basins and internal routing ditches could involve the moving of up to approximately 7.7 million cubic yards of soil. Basins would be

designed with 1.5:1 to 2:1 interior side slopes and average depths of 4 to 5 feet. Low earthen dikes would be constructed around the recharge basins using excavated materials. Topsoil would be segregated during excavation and respread over the berm and construction disturbance areas to promote reestablishment of vegetation.

Recovery Facilities

Recovery Wells

Banked water would be recovered using up to 15 existing wells and approximately 49 new wells, as shown in Figure 2-4. Wells would be placed, whenever possible, at locations that could be accessed by existing farm roads and at least 0.25 mile within the interior of the Madera Ranch boundary. The wells would be connected via a manifold to a buried pipeline, and a canal and lift station system would deliver the water back to MID.

Recovery Pipelines and Electrical Facilities

Up to 11.6 miles of 8-inch- to 60-inch-diameter polyvinyl chloride (PVC) to RCP buried recovery pipelines, as shown in Figure 2-4, would run from recovery wells to the GF Canal and the Section 8 Canal for delivery back to farmers. The recovery pipelines would be buried 2–3 feet beneath the ground surface. Electrical lines servicing the electrical well pumps would be placed in the same trenches as the recovery pipelines to minimize disturbance and to ensure that all electrical lines are placed below grade. The recovery pipelines would be constructed during the same stage of project development as the well construction.

Recovery Lift Stations

The MID delivery system is currently all gravity feed from east to west. In order to deliver up to 200 cfs from the recovery wells to MID's customers, up to 13 lift stations would be required on the same conveyances used to deliver water into the water bank, as depicted in Figure 2-5.

- **Stage 1:** One lift station would be constructed along the GF Canal to pump water recovered from wells on the west side of Madera Ranch. Four lift stations with capacity stepping downward from approximately 100 cfs to 80 cfs would be constructed on the 24.2 Canal.
- **Stage 2:** Six lift stations with capacity stepping downward from approximately 100 cfs to 80 cfs would be constructed on Cottonwood Creek and Main No. 2 Canal.

- **Stage 3:** After several years of operation, up to two additional lift stations may be added to the upper reaches of the Main No. 2 Canal as dictated by the required additional level of delivery.

2.3.3 Construction

Conveyance Facilities

Upgrade of Section 8 Canal, Cottonwood Creek, and Main No. 1 Canal Connection

The connection between the Section 8 Canal, Cottonwood Creek, and Main No. 1 Canal would be widened and deepened to accommodate 100 cfs of flow. Upgrading the connection would involve the following steps:

1. Draining the canals.
2. Excavating mud or silt from the bottom of the canals, and storing the wet material on site or transporting it to a storage site.
3. Excavating the canals to a sufficient width and depth to provide adequate capacity.
4. Transporting the excavated material to Madera Ranch for use as fill required by other proposed construction.
5. Installing piping for road crossings.

Water to control fugitive dust emissions would be supplied by a water truck. An excavator and dump truck would be required. Approximately 12 persons would be employed during the upgrade of the connection.

Section 8 Canal Upgrade. Phase 1 construction would involve installation of approximately 1.5 miles of 84-inch diameter RCP on Madera Ranch and an additional 0.25 mile of 84-inch RCP immediately east of Madera Ranch, all in the channel of the existing Section 8 Canal. Installation of the pipeline would involve the following steps.

1. Draining the canal.
2. Excavating mud or silt from the bottom of the canal, and storing the wet material on site, or transporting it to a storage site. The material would be used to backfill the excavation, if suitable. The stored mud or silt would not be placed on wetlands.
3. Excavating the canal to a sufficient depth to provide adequate cover over the RCP, and preparing the pipe bed.
4. Transporting the pipe to the site on low-bed trucks. Unloading and stringing the pipe together using a large crane or large forklift.
5. Setting the pipe into the trench with the crane.

6. Placing backfill around the pipe using front loaders and a bulldozer.
7. Compacting the material around the pipe with an excavator-mounted compacting wheel. Compacting material above the pipe with a vibrating sheepsfoot roller.
8. Finishing the grade over the pipe with a motor grader.

Water to control fugitive dust emissions would be supplied by a water truck. A gang truck and two or more pickup trucks would be required during pipe laying. Approximately 12 persons would be employed during the installation of the pipeline. Installation of the 84-inch RCP temporarily would affect an area of approximately 32 acres adjacent to farmland.

Off-Ranch Canal Expansion and Extension. Several reaches of the Section 8 Canal (1.75 miles), the 24.2 Canal (1.75 miles), and the Main No. 1 Canal (500 feet) would need to be expanded to increase their capacities to 200 cfs, 100 cfs, and 100 cfs, respectively.

Canal expansion would employ methods, equipment, and labor similar to the conveyance upgrades discussed above (see Upgrade of Section 8 Canal, Cottonwood Creek, and Main No. 1 Canal Connection). Temporary construction activities would affect about 53 acres. Additionally, MID would extend the 24.2 Canal approximately 0.75 mile to the south through a new pipeline to connect with the Section 8 Canal. Canal extension would employ methods, equipment, and labor similar to canal construction and pipeline installation. Temporary construction effects associated with extension of the 24.2 Canal would affect about 9 acres.

On-Ranch Canal Extensions. Existing on-ranch canals would be extended to deliver water to the recharge areas. Approximately 7.5 miles of canals would be extended on Madera Ranch. Extending the canals would involve the following steps.

1. Excavating the canal using an excavator or a Briscoe ditching machine pulled by a tractor.
2. Placing fill material for the canal embankments. Every effort would be made to balance cut and fill so that no import of material is necessary. Spoil material can be placed in the embankments.
3. Compacting the embankments using a vibrating sheepsfoot roller.
4. Finishing canal and embankment shaping with a diesel-powered, rubber-tired Gradall and motor grader.

Moisture for compaction of embankments would be applied from a water truck. The water truck also would provide dust control. A gang truck and two or more pickup trucks would be required to support canal construction. Approximately

10 persons would be employed during canal construction. The area temporarily affected by canal extension would be approximately 81 acres on Madera Ranch.

On-Ranch Canal Reconditioning. A diesel-powered, rubber-tired Gradall excavator; a Briscoe ditching machine pulled by tractor; and a diesel-powered, rubber-tired backhoe/front end loader would be used for reconditioning ditches and cutting farm road crossings within Madera Ranch.

Weir Installation

Two weirs would be installed on GF Canal. Construction of the weirs would involve the following steps.

1. Clearing and grubbing the site with a motor grader and backhoe.
2. Excavating for the structure with an excavator.
3. Constructing wooden forms for the structure. Installing reinforcing steel bars within the forms.
4. Placing concrete from ready-mix trucks. A concrete pump may be used if necessary. Finishing the concrete surfaces and applying curing compound. Allowing the concrete to cure. Removing the forms and repairing the surface as necessary.
5. Placing backfill around the structure with a front end loader. Compacting the backfill with hand whackers.
6. Finishing the grade with a motor grader.

A pickup truck and a flatbed truck would be required to haul materials during construction. Approximately five persons would be employed during construction. The areas temporarily affected by construction would be about 1 acre.

Recharge Facilities

Recharge Swales

Phase 1 recharge swales would remain unaltered and would not be subject to any construction activities.

Construction of Recharge Basins (Phase 2)

The staging of recharge basin construction proposed would proceed as follows.

- **Stage 1:** Berming of recharge area boundaries along topographic contours and using farm roads wherever possible. These recharge areas would be constructed using graders that follow prestaked topographic contours to

raise 1- to 3-foot-high berms around the downslope portions of areas ranging from 5 acres to 80 acres. Berm material would be obtained from an approximate 50-foot-wide corridor parallel to the interior toe of the berm. Topsoil would be segregated during excavation and respread over the berm and construction disturbance areas to promote reestablishment of vegetation.

- **Stage 2:** Deep ripping of corridors within the bermed areas, interspersed with corridors of undisturbed land. This will be done to ensure deeper percolation is maximized during project operation.
- **Stage 3:** Excavation of basins varying from 4 to 5 feet deep. Because of the demonstrated permeability of soils at Madera Ranch, Stage 3 recharge basins are unlikely to be required. However, in the event these basins were used, they would be clustered in sets of three or four varying in size from 5 acres to 80 acres, with the first basin in each set serving as both a settling and a recharge basin. Basins would be designed with 1.5:1 to 2:1 interior side slopes and average depths of 4 to 5 feet. After excavation, each basin would be shallow-ripped or disked by construction equipment in order to break up compaction of the bottom soils in the recharge basin. Low earthen dikes would be constructed around the recharge basins using excavated materials. Topsoil would be segregated during excavation and respread over the berm and construction disturbance areas to promote reestablishment of vegetation. Excess soil removed during excavation would be managed to ensure that top layers are stockpiled, excavated soils would be mounded between basins, and stockpiled topsoil would be placed on top of the soil pile.

It is estimated that Stage 3 recharge basins would be constructed using:

- three to 20 heavy diesel-powered scrapers (40- to 60-yard capacity);
- three to five 500-horsepower (hp) diesel-powered skip loaders;
- 15 to 30 heavy-duty, off-road-type trucks (60-yard capacity);
- three to five large, diesel-powered, crawler-type tractors; and
- three to five diesel-powered motor graders.

The final combination of the acreages and techniques summarized above is uncertain. However, as previously discussed, this EIS evaluates the potential effects associated with 1,000 acres of Stage 3 excavated basins.

Recovery Facilities

Recovery facilities include recovery wells, pipelines, and lift stations.

Construction of Recovery Wells

The recovery wells would be constructed by drilling to a depth of approximately 300–320 feet below ground surface. The wells would be gravel-packed between the casings and bore holes to maximize efficiency. Construction techniques would involve drilling, flushing, development, and testing to maximize well efficiency and longevity. The screen opening size, screen length, and screen depth of each well would be determined in the field by a registered geologist.

Drill rigs would use portable steel mud pits rather than excavated pits to reduce effects on surrounding habitat. Drilling water would be trucked in to most drill sites and stored in portable tanks. Two small berms would be used to control accidental spills during drilling operations, as required by Occupational Safety and Health Administration (OSHA). A small berm would be constructed with a small front loader around the perimeter of the 100-foot-by-100-foot temporary construction area. Another berm would be constructed around all drilling equipment, and the area inside the berms would be lined with tarps to contain accidental spills of fuels, lubricants, and drilling effluent. These berms would be constructed of local materials. After drilling is completed, all equipment and fluids would be disposed of in a lawful manner; the berms would be leveled, and the sites would be restored to near preconstruction condition.

Each new well would be equipped with a line-shaft-driven, deep-well turbine pump typical of agricultural pumps. Each wellhead would be fitted with an electric motor, controls, valves, and individual water meters and would be mounted on a concrete slab, approximately 5 feet by 5 feet, to stabilize and seal the well and provide a stable foundation for the motor, controls, and piping. The new pumps could be driven by 25- to 200-hp electric motors. Electricity would be supplied to the wells through underground electrical cable adjacent to the collection pipeline. A transformer, switchgear, and control cabinet would be constructed adjacent to each well on a concrete slab, approximately 6 feet by 14 feet. Each well would be fenced within an enclosure of approximately 600 square feet to allow most areas of Madera Ranch to continue to be grazed by cattle. Well maintenance is described in the Maintenance section.

Five of the existing wells to be used for recovery currently are powered by diesel engines, and nine of these wells are powered by electric motors. These operations could be changed so that all recovery wells could be powered by electric motors, but the assumption is that existing propane powered pumps could remain and that new pumps could be propane gas–powered. Installation of each well temporarily would affect an area of approximately 1 acre, and each facility would permanently affect about 0.1 acre.

Installation of Recovery Pipelines

The recovery pipelines would be constructed by trenching rectangular ditches wide enough to lay the pipe. Trenching would be performed by backhoes, track hoes, or trenching machines. Soil would be temporarily sidecast within the construction corridor and pushed back into the trench once the pipeline is in place. Backfill would be compacted using a vibrating sheepsfoot roller. Piping would be of manufactured materials, such as PVC or polyethylene, with the exception of steel pipe at the wellheads and RCP for larger diameters approaching 60 inches. Pipeline installation temporarily would disturb about 140 acres.

Construction of Recovery Lift Stations

Lift stations would consist of reinforced concrete check structures with pumping equipment to reverse flow. The gates would allow control of flows of surface water to Madera Ranch and would be closed to accommodate reverse flows when recovered water is being pumped back to MID's customers.

Construction of the structures would require excavation of the site, erection of forms, installation of steel reinforcement and embeds, placement of concrete, stripping of forms, concrete patching, placement of backfill around the structure, and compaction of the backfill. Material from the structural excavation would be used for backfill after being conditioned to attain the proper moisture content.

Discharge piping would be installed for connection to the pumps. The pump connection would be aboveground, and the discharge to the canal would be underground for discharge below the water level. A trench would be excavated for the buried portion of the piping. The pumps would require installation of structural steel beams and grating, mounting of the pumps and drivers, and installation of electrical wiring and controls.

Required equipment would include an excavator, a backhoe, a water truck, a pickup truck, vibrating plate compactors, concrete ready-mix trucks, a compressor, a generator, a boom truck or crane, and an electrician's truck. Labor would require, at various times, a superintendent, carpenters, steel workers, laborers, operators, and electricians. The maximum crew probably would not exceed 12 persons.

Lift stations would be constructed in three phases, requiring about 90 to 120 days for each phase. Each lift station would require a work area of about 0.25 acre that would be disturbed during construction. The final area occupied by the structure would be about 2,500 square feet. The total area permanently affected by the lift stations would be less than 1.2 acres.

Staging Areas

MID would use its existing off-ranch facilities for the long-term storage and maintenance of materials and equipment. However, Madera Ranch has a central headquarters area with equipment laydown areas and storage buildings. MID would use these facilities as needed to store equipment and materials that would be used to construct, maintain, and operate the Proposed Action.

Construction Traffic

The primary transportation corridors to Madera Ranch would be State Route (SR) 99, Avenue 7, and Avenue 12 (Figure 2-1). The majority of the vehicle trips generated by the Proposed Action most likely would originate in Madera and Fresno, proceeding up SR 99 to either the Avenue 7 or the Avenue 12 exit, then to Road 23, Road 21, and Avenue 10, where traffic would enter Madera Ranch.

2.3.4 Maintenance

Maintenance Corridors

The maintenance corridors would include new roads in the recharge pond area and areas with heavy disturbance, and unimproved routes in grassland areas. The maintenance corridors would be configured to take advantage of existing farm roads, fence lines, farmed areas, and recharge basin areas. Maintenance corridors through undisturbed grassland areas would not be graded or gravel-packed.

Diversion and Conveyance Facilities

Maintenance of the Section 8 Canal, Cottonwood Creek, the 24.2 Canal and Main No. 1 Canal would be consistent with maintenance of most water infrastructure in the San Joaquin Valley. Channels would require cleaning every several years. Each channel would be cleaned using mechanized dredging. The dredged material would be disposed of in a lawful manner. Cleaning would be scheduled during periods when the canal is not in operation. Banks of channels would be kept clear of brush and trees, and rodent or small mammal burrows would be filled to minimize erosion of the channel banks.

Maintenance of the on-ranch conveyance ditches and canals also would be consistent with that of most water infrastructure in the San Joaquin Valley. Pumps, gates, and appurtenances would be serviced when they are not operating to keep the system in top condition. The exterior canal slopes would be kept clear of large brush and trees, but grass and small shrubs would be acceptable as long as the root systems do not compromise the interior canal lining. Noxious weeds and brush would be removed to prevent them from becoming established on nearby cropland. Canals and ditches on MID property would be unlined but would be kept clear of vegetation. Mechanical removal and permitted herbicides

would be used to control unwanted vegetation. Any evidence of rodent or small mammal burrows would be monitored and burrows filled in to reduce the possibility of damage, leakage, and potential collapse of canal banks. Maintenance roads parallel to the canals and ditches would have all-weather surfaces; vegetation would be controlled.

Access to canal bottoms would be by intermittent ramps that would allow mechanical equipment access into the canals for cleaning. Deeper sections of canals would be cleaned using small mechanical equipment such as rubber-tired front-end loaders or "bobcats." Materials removed from the canal bottoms would be disposed of by legal means, including spreading on farmland as allowed or on the maintenance areas of the groundwater bank property. Shallow sections of canals or ditches may be cleaned out using Gradall excavators that would work from access roads. The frequency of cleaning operations would be determined by what is necessary to maintain reasonable flow regimes in the canals.

Recharge Facilities

Recharge swales and basins would stand idle during dry years, when water is not available for banking. No maintenance would be performed in swales during these times, but recharge basins may be scarified as described below. During operation of recharge basins, it may be necessary to apply algicide or other chemicals to keep vegetation in check and to minimize algae growth. Algicides would not be used within natural swales used for recharge. Basin operation would require infrequent delivery of miscellaneous repair equipment, usually in smaller trucks such as non-semi, three-axle rigs. On average, after 5 years of actual use, basin bottoms would be scarified to remove the thin layer of low impermeable material that would develop over time. Other maintenance activities would be conducted as necessary.

Recovery Facilities

Recovery Wells. Wells, meters, pumps, and appurtenances would be maintained during periods when recovery is not in progress to allow ready startup when a bank participant requests water. The wells are expected to run for up to 5 operating years before needing maintenance or repair. The well pumps are expected to operate for at least 10 years before requiring maintenance or repair. When a pump needs to be removed, a "pump rig," consisting of a truck-mounted boom designed to easily remove deep well pumps, would be brought in and backed up to the wellhead. The well discharge head and pump column, normally in 20-foot lengths, would be removed and "laid by" the well on wood planking to keep them reasonably clean. The pump would be replaced with a new or refurbished pump by reversing the removal operation. The pump then would be taken to the shop for repair or overhaul. During operation, some fuels and

lubricants may be transported to the site. Wells would be reworked on an average 20-year cycle.

Recovery Pipelines. Nominal maintenance of recovery pipelines would be required. The anticipated life of recovery pipelines is approximately 50 years; however, in the event of a break in a pipeline or excessive leakage, segments of a pipeline would need to be replaced. Depending on the size and length of the segment to be replaced, the pipeline would be either mechanically or hand-excavated.

Maintenance Roads and Corridors. Nominal maintenance on the maintenance roads and corridors would be required. The maintenance roads may require maintenance during wet winters if portions of the roads wash out or become impassable. To minimize effects on grassland habitat, no maintenance of the corridors in grassland areas is proposed.

2.3.5 Operations

Madera Ranch operations, including banking, water recovery, and maintenance to support banking and recovery, are described below, including measures to monitor potential effects on neighboring farmers and districts (adjacent stakeholders).

Water Banking

MID would bank a portion of its long-term water supply made available by contracts with Reclamation (Friant Division and Hidden Unit supplies), CVP uncontrolled flows provided under temporary contract and MID's pre-1914 non-CVP water rights supply. It is expected that average annual water available for banking would be approximately 20,000 af (15,000 af with river restoration) with wet years providing up to 55,000 af (see Section 4.1, Water Supply, for additional information). Water typically would be banked from mid-October through mid-April, depending on water-year type and availability. Figure 2-6 illustrates the typical recharge season and historic deliveries. The upper part of the figure shows maximum Hidden Unit releases in relation to average Friant Division deliveries to MID, and indicates that off-season deliveries could occur and be used for recharge when water is available. Large amounts of water are unlikely to be banked during the summer because MID's system is being used to convey water to farmers. The lower part of the figure shows that based on historic deliveries, more than 45,000 af was available less than 5% of the time; in May, for example, approximately 45,000 af was available 5% of the time, 25,000 af was available 70% of the time, and 18,000 af was available 100% of the time. Water supply estimates based on the record from 1985 through 2007 indicate great variability in banking opportunities, ranging from less than 20,000 af in 61% of years to more than 20,000 af in 39% of years.

Water would be delivered into distribution ditches, swales, and recharge basins through the enlarged Section 8 Canal (converting to a pipeline within Madera Ranch), the 24.2-19.5 lateral, the GF Canal, and Cottonwood Creek. Parshall flumes and weirs would be installed in these conveyances to regulate and measure flows in the same fashion as has already performed throughout the MID and Friant systems for decades.

Upstream recharge basins would be used for sedimentation. Flows through ditches, swales, and basins would be regulated in accordance with monitoring and operating criteria designed to prevent overflows and unacceptably high water table elevations beneath adjoining properties. MID would control upstream, off-site flows to avoid spillage in the same manner that current water operations are conducted. Ditch riders would monitor the flow in each canal, ditch, swale, and recharge basin to ensure proper control of flows and to ensure that programmed water levels in the recharge areas are maintained. Spillage would be minimized through diligent observation of conditions in accordance with MID's standard operating schedule.

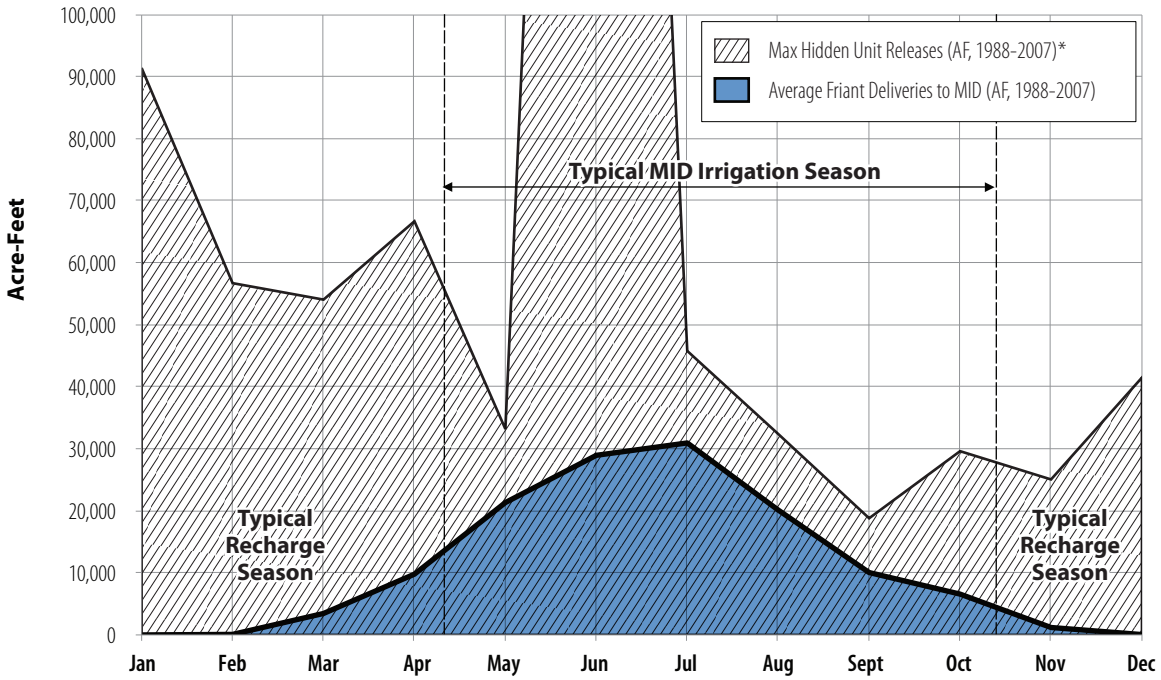
Flows in the swales would be constrained by acreage (approximately 700 acres) and the canal's capacity to deliver water to the swales. Water depths could range from several inches to several feet depending on the topography of the swales, percolation rates, and the amount of water being applied. Flows in the canals would be constrained by capacity, and recharge for banking in the canals, including GF Canal, would depend on the percolation rates. During water years with limited water available for banking, MID would use canals and selected swales to bank available supplies. The swales would be selected based on readily available canal delivery locations and other management needs. Flows to the recharge ponds, should they be needed, would be similarly constrained by seasonal water availability and delivery capacity.

Monitoring and Operational Constraints Plan

The Proposed Action would recover no more than 90% of banked water, ensuring that there is a net gain by the aquifer. Recovered water would be delivered to farmers within MID, and potentially for M&I and environmental uses, ensuring that any deep percolation is recharged into the local aquifer system.

Madera Ranch Oversight Committee

Adjacent property owners have expressed concern that water levels could rise and flood root zones during recharge events and that pumping costs might increase as the water table declines during recovery events. MID determined that modeled predictions would not provide sufficient security for adjacent stakeholders. Therefore, on April 17, 2006, the MID Board approved formation of the 10-member MROC composed of:



* Hidden Unit releases are illustrated because they best represent the timing and magnitude of when water would be available for banking.

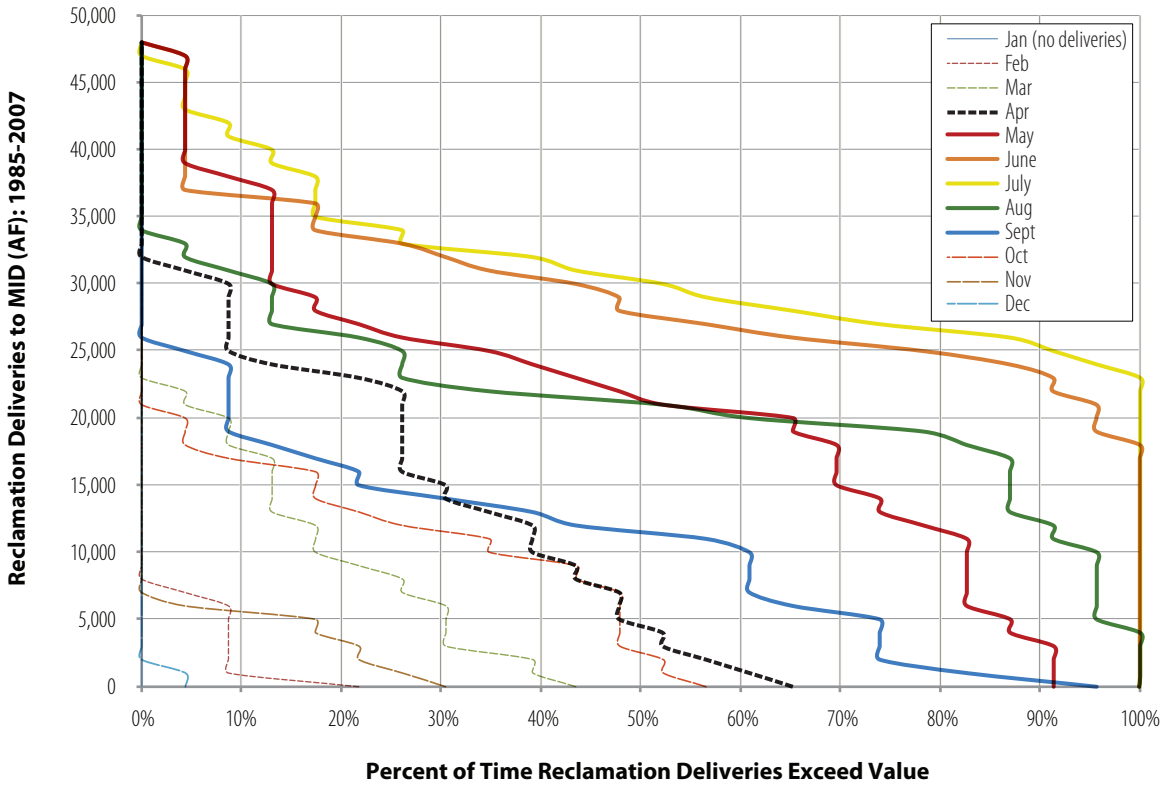


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Figure 2-6
Typical Recharge Season and Historic Deliveries

- the five MID board members;
- one elected board member from GFWD, as selected by the GFWD board;
- three independent members, representing the interests of surrounding landowners not within the service areas of MID or GFWD; and
- one County Supervisor.

The MROC would:

- ensure implementation of the Monitoring and Operational Constraints Program (MOCP) for the Proposed Action,
- protect adjacent landowners from unacceptable impacts by reviewing monitoring results and making recommendations for adjustments to operations if data suggest unacceptable impacts may occur,
- make recommendations for adjustment to the monitoring program as appropriate, and
- prepare annual monitoring reports.

The MROC would meet monthly during recharge/recovery periods (usually winter/spring and summer, respectively) and quarterly during other periods when the facility is not in operation.

Monitoring and Operational Constraints Plan

The MROC would implement the MOCP (Madera Irrigation District 2007) to ensure there are no unacceptable impacts on groundwater levels or quality. The draft MOCP includes the following components.

Water Level Monitoring. MID would monitor water levels in on-site and off-site wells and adjust recharge operations to prevent off-site water levels from rising to within 30 feet of the ground surface. In the event that off-site water levels rise to within 30 feet of the ground surface, recharge operations would be halted and not be restarted until approved by the MROC. During recovery operations, MID would monitor water levels with operational adjustment, compensation, or provision of alternate sources of water in the event that water levels drop to unacceptable levels in off-site wells as a consequence of operations.

Water levels would be monitored in a network of wells that would include:

- recovery wells,
- wells near the Madera Ranch boundary, and
- select irrigation wells located at varying distances from Proposed Action facilities.

The MROC would determine the numbers and locations of wells to be monitored. All wells installed only for monitoring purposes would be constructed within existing roads or lands already disturbed by other components of the Proposed Action (e.g., recharge basins).

The MROC would establish protocols to adjust operations and to avoid, minimize, or recommend compensation for adverse effects. Monitoring data collected during recharge and recovery would be interpreted using methods preapproved by the MROC to provide two levels of protection. First, data would be used in real time to adjust operations. Second, if, after adjusting operations, data indicate that off-site water levels would decline or rise (or have declined or risen) an unacceptable amount as a consequence of operations, the MROC would be immediately notified.

Water Quality Monitoring. The Proposed Action primarily would convey and recharge water originating from Millerton Lake (Friant Division water) with lesser potential contributions of Fresno River water originating from Hensley Lake. These waters have been conveyed through the MID system and used for irrigation throughout the district for over 50 years. Friant water is recognized as high quality and generally of higher quality than the underlying groundwater.

MID's daily, ongoing operations currently include surveillance of conveyance facilities to ensure that accidental spills of hazardous materials that may occur near its facilities are discovered and addressed to prevent contamination of MID's water. This surveillance would continue and extend to the facilities constructed as part of the Proposed Action.

In addition to these precautions, MID believes it is important to monitor water quality. Water banked at Madera Ranch must not impair any designated beneficial uses of water or violate the water quality standards and objectives as defined in the Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) (Central Valley Regional Water Quality Control Board 2007). Therefore, in addition to its ongoing surveillance program, the MOCP water quality monitoring includes:

- sampling and analysis of recovered water leaving Madera Ranch and groundwater flowing away from Madera Ranch for total dissolved solids (TDS) to ensure that levels remain appropriate for irrigation purposes; and
- sampling and analysis of samples from drinking water wells within 1 mile of the Proposed Action for fecal coliform, TDS, and select components of TDS as specified by the MROC.

Water Accounting. MID already extensively monitors flow throughout its system and those data would be used by the Proposed Action. Flows would be monitored where water enters Madera Ranch and where water leaves Madera Ranch. In addition, MID would monitor flows to specific recharge areas and from

individual recovery wells for operational purposes. Recharge areas include swales, recharge basins, and in-lieu recharge areas.

Precipitation, wind, evaporation, and temperature would be monitored to calculate net precipitation and evaporation effects. Taken together, the data and estimates from all of these systems would be used to estimate evapotranspiration losses (from vegetation, crops, and recharge areas), recharge during conveyance, recharge into the facility, and recovery.

Recoverable Recharge. Recharge that occurs during conveyance through the off-ranch MID system is part of normal MID operations and thus would not be considered banked because it is an existing condition that would not be changed by the Proposed Action. Flow into Madera Ranch and recharge areas would be monitored. Flow into recharge areas, minus estimated evaporation and evapotranspiration, would be considered banked. However, only 90% of the banked water would be considered recoverable, because 10% of the water applied would be retained in the bank to reduce overdraft rates.

Recovery. Flow from recovery wells, minus recharge during conveyance to the perimeter of Madera Ranch, would be considered recovered water. Recharge of recovered water during conveyance would be considered returned to the water bank.

Almost all aquifer banking projects experience migration of recharged water away from recovery systems over time. In addition, a portion of early-season recharge water typically becomes inaccessible to recovery systems either through perching above silts/clays or through banking in sediments that drain too slowly to be of practical use to recovery systems. MID has concluded that actual aquifer losses cannot be reasonably predicted in a way that would adequately protect surrounding landowners from "overextraction." Therefore MID has committed to operational constraints to leave 10% of the recharged water behind to ensure that the Proposed Action results in a net reduction in the rate of overdraft and to prevent "over-recovery."

Subsidence Monitoring. Historically, subsidence has occurred to the west of Madera Ranch. However, ground elevation monitoring conducted by the U.S. Geological Survey (USGS) has indicated that no more than 1 foot of subsidence has occurred on Madera Ranch even though the area of Madera Ranch has been subjected to more than 100 years of intense groundwater pumping from above and below the Corcoran Clay. Therefore, it is unlikely that subsidence would be a factor in operations. Nonetheless, MID envisions that operations would include high accuracy Global Positioning System (GPS) monitoring of multiple locations on Madera Ranch before and during operation of the Proposed Action. The elevations of on-site markers would be measured annually by MID and compared to distant USGS benchmarks to allow detection of any change in ground elevations. The MROC would monitor subsidence and has the authority to impose

operational constraints or mitigation on the WSEP, depending on the level of impact, if any.

Water Recovery Operations

Water would be recovered using existing wells and new wells installed in the vicinity and downgradient of the recharge areas. As noted above, the MOCP would constrain recovery operations to prevent unacceptable impact on surrounding landowners. Recovered water would be pumped into collection piping, through the main pipeline, and into the enlarged Section 8 Canal.

Water would be conveyed via the Section 8 Canal into the MID distribution system through a series of lift stations. All of these deliveries would be made in lieu of normal surface water deliveries from Millerton Lake or Hensley Lake. Therefore, an equal volume of water would be made available in these respective reservoirs for delivery to other parts of the MID service areas, increasing the net supply of available water.

The recovery operations described above depend on farmer irrigation demand. As a consequence, recovery would be constrained to the irrigation season, typically running from mid-March through mid-October. Peak irrigation demand, when 200 cfs of recovery capacity would be needed, typically occurs from May through August.

Use of the Water Bank Facilities by Other Entities

Under the Proposed Action, MID could use the entire annual recovery capacity (55,000 af) of the facilities for its agricultural customers in some years. Based on MID's business plan, MID's capacity would be allocated as follows:

- 20,000 af/year for MID overall in-district agricultural use;
- 5,000 af/year for individual MID agricultural users;
- 10,000 af/year for other Madera County agricultural users;
- 10,000 af/year for all other Madera County users including industrial, commercial, and residential development; and
- 10,000 af/year for environmental water obligations.

MID's Friant Division Long-Term, contract with Reclamation does not provide for delivery of Millerton water to municipal or industrial users. However, there is a need for water storage by other Madera County water users. Other potential users would require separate environmental analysis and approvals, and would rely on their own water entitlements in using the proposed groundwater banking and recovery facilities.

If capacity is available after Madera County needs have been met, MID's banking facilities could be used by regional customers. Potential participants would be required to provide their own water for banking and would take delivery of banked water through exchange. Participant water would be gravity delivered through MID conveyances for recharge through the proposed facilities.

Potential non-MID participation could result in a wide array of agreements, water rights amendments, transfers, or changes to the operation of existing non-MID facilities. However, the specific tenants, potential agreements, and other related actions are not reasonably foreseeable. Therefore, analysis of these potential elements would be remote and speculative. As a result, the environmental analysis presented in this document has been conducted without regard to the specific entities or organizations that may desire to bank water in the proposed facility. Specifically, this environmental document does not evaluate:

- potential amendments to existing water rights, contracts, permits, or licenses that would allow prospective participants to use the facility;
- changes to operations of existing non-MID local, state, or federal facilities that could result from prospective participants seeking to use the facility; or
- individual water transfers or exchanges that could occur as a result of prospective participant use of the facility.

The types of actions listed above would be subject to environmental analyses as separate projects. If any water rights amendments, water transfers, or changes in operation to federal, state, or non-MID local facilities would be required for use of the facility, the potential participant(s) would be the party(ies) responsible for complying with applicable environmental analyses requirements.

2.4 Alternative C—Water Banking outside the MID Service Area without Swales, and Alteration of Reclamation-Owned Facilities

Alternative C is a variation of the Proposed Action that would complete the water bank in two phases and replace natural swale recharge solely with recharge basins. Phase 1 would involve recharge-related facilities only. Phase 2 would involve facilities for recovery of banked water. Reclamation would approve banking of CVP water outside the MID service area and alteration of Reclamation-owned facilities. Similar to Alternative B, Alternative C includes funding by Reclamation, under the Omnibus Public Land Management Act of 2009, the Policy and Program Services, Challenge Grant Program: Recovery Act of 2009 Water Marketing and Efficiency Grants, or any other funding source. Regardless of whether this funding is acquired, the project components and associated effects would be the same. A description of Alternative C follows.

2.4.1 Phase 1 Facilities

MID would implement Phase 1 to increase the capacity of existing MID conveyances to deliver water to Madera Ranch facilities. Phase 1 would use engineered basins as recharge areas.

Phase 1 activities would involve:

- reconditioning and extension of existing canals to provide at least 200 cfs of conveyance capacity into Madera Ranch;
- construction of up to 1,000 acres of new on-site recharge basins and canals as required to achieve 200 cfs of recharge capacity; and
- integration of approximately 2,600 acres of Madera Ranch row crops and vineyards into an in-lieu recharge program in which surface water periodically would be served in lieu of groundwater pumping subject to approval by the MROC.

Diversion and Conveyance Facilities

Under Alternative C, conveyance facilities would be identical to those proposed under Alternative B, with the exception that neither the Section 8 Canal Northern Extension nor the Section 8 Canal Section 1 Lateral Extension would be required and Phase 2 conveyance upgrades under Alternative B would be constructed during Phase 1 of Alternative C to convey water to the engineered recharge basins. Figure 2-2 depicts the locations of existing canals in the vicinity of Madera Ranch. Figure 2-7 depicts the additional conveyance upgrades that would be required under Alternative C.

Recharge Facilities

Recharge Basins

Approximately 1,000 acres of recharge basins would be constructed within a 1,300-acre area.

Recharge basins would be clustered in sets of three or four, varying in size from 5 to 80 acres, with the first basin constructed in each set serving as both a settling and a recharge basin.

Construction of the recharge basins and internal routing ditches could involve the movement of up to approximately 7.7 million cubic yards of soil. Basins would be designed with 1.5:1 to 2:1 interior side slopes and average depths of 4 to 5 feet. Low earthen dikes would be constructed around the recharge basins using excavated materials. Topsoil would be segregated during excavation and respread

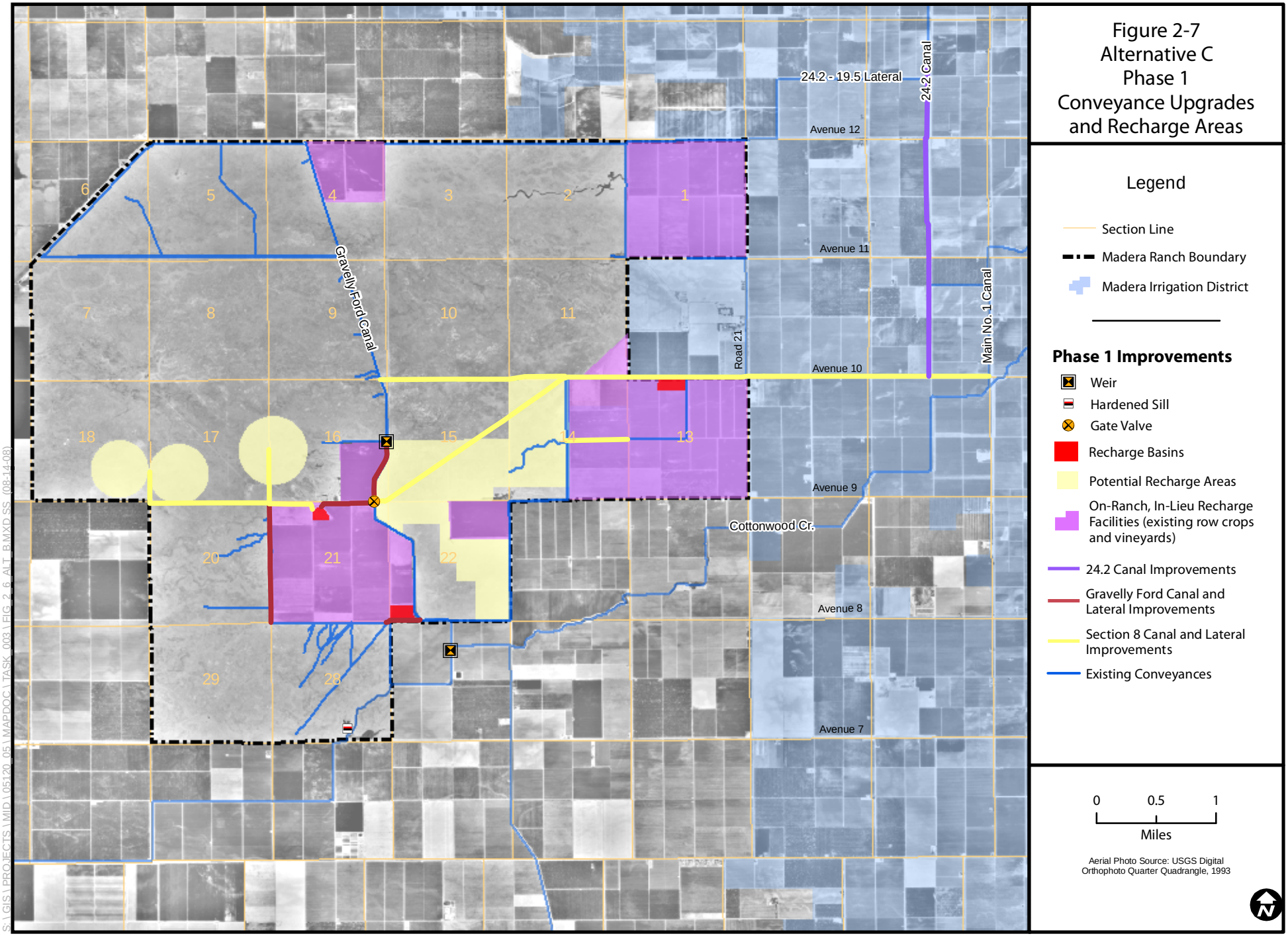

Figure 2-7
Alternative C
Phase 1
Conveyance Upgrades and Recharge Areas

Legend

- Section Line
- Madera Ranch Boundary
- Madera Irrigation District

Phase 1 Improvements

- Weir
- Hardened Sill
- Gate Valve
- Recharge Basins
- Potential Recharge Areas
- On-Ranch, In-Lieu Recharge Facilities (existing row crops and vineyards)
- 24.2 Canal Improvements
- Gravelly Ford Canal and Lateral Improvements
- Section 8 Canal and Lateral Improvements
- Existing Conveyances

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Miles

Aerial Photo Source: USGS Digital Orthophoto Quarter Quadrangle, 1993

S:\GIS\PROJECTS\MID\05120_05\MAPDOC\TASK_003\FIG_2-6_ALT_B.MXD SS (08-14-08)

over the berm and construction disturbance areas to promote reestablishment of vegetation.

In-Lieu Recharge Facilities

As under Alternative B, MID would recondition existing turnouts and install new turnouts from the Proposed Action canals, pipelines, and ditches to enable delivery of surface water to these fields in lieu of groundwater pumping.

2.4.2 Phase 2 Facilities

Phase 2 would develop wells and piping to recover the banked water, and install pumps to deliver the recovered water as shown in Figure 2-8.

Phase 2 recharge and recovery facilities would involve:

- up to 15 existing wells for recovery;
- up to 49 new wells and recovery pipelines (in phases over several years) to provide 200 cfs of recovery capacity; and
- up to 12 lift stations on MID canals and one lift station on GF Canal (in phases over several years, total of 13 lift stations) to provide 200 cfs of pump-back capacity into the MID service area.

Recovery Facilities

Recovery Wells

As under Alternative B, banked water would be recovered using up to 15 existing wells and approximately 49 new wells (see Figure 2-8).

Recovery Pipelines and Electrical Facilities

As under Alternative B, up to 11.6 miles of 8-inch- to 60-inch-diameter PVC to RCP buried recovery pipelines would run from recovery wells to the GF Canal and the Section 8 Canal for delivery back to farmers (see Figure 2-8).

2.4.3 Construction

All construction methodologies necessary to construct Alternative C are described in detail under Alternative B—Water Banking outside the MID Service Area Using Swales and Alteration of Reclamation-Owned Facilities. See Section 2.3.3 on pages 2-10 through 2-16.

Recovery Lift Stations

As under Alternative B, up to 13 lift stations would be required on the same conveyances used to deliver water into the water bank (see Figure 2-8).

2.4.4 Maintenance

All maintenance methodologies necessary to operate Alternative C are described in detail under Alternative B—Water Banking outside the MID Service Area Using Swales and Alteration of Reclamation-Owned Facilities. See Section 2.3.4 on pages 2-17 through 2-18.

Maintenance Corridors

As under Alternative B, the maintenance corridors would include new roads in the recharge pond area and areas with heavy disturbance, and unimproved routes in grassland areas.

2.4.5 Operations

Please refer to the Operations subsection of Alternative B—Water Banking outside the MID Service Area Using Swales and Alteration of Reclamation-Owned Facilities. Discussion related to swales would not apply to Alternative C, but all other aspects of recharge operations would be identical. See Section 2.3.5 on pages 2-19 through 2-24.

2.5 Alternative D—Water Banking outside the MID Service Area with Banking and Recovery via Gravelly Ford Canal

Under Alternative D, MID would enter into an agreement with GFWD to improve the GF Canal to allow water to be conveyed from the San Joaquin River through the GF Canal to Madera Ranch for banking of water and recovery of water from the ranch back through the canal to the river. The existing GFWD river pumping plant would be upsized; the existing, associated pipeline replaced with a larger-diameter line; the GF Canal regraded to a flat-bottom (zero slope) configuration to allow two-way flow; a new connection to the river constructed to allow recovery water to reach the river without flowing through the pumps; and appropriate gate structures constructed. On-site improvements allowing water banking and extraction, including a pumping plant and pipeline to allow distribution of water uphill from the GF Canal, would be constructed (Figures 2-9 and 2-10).

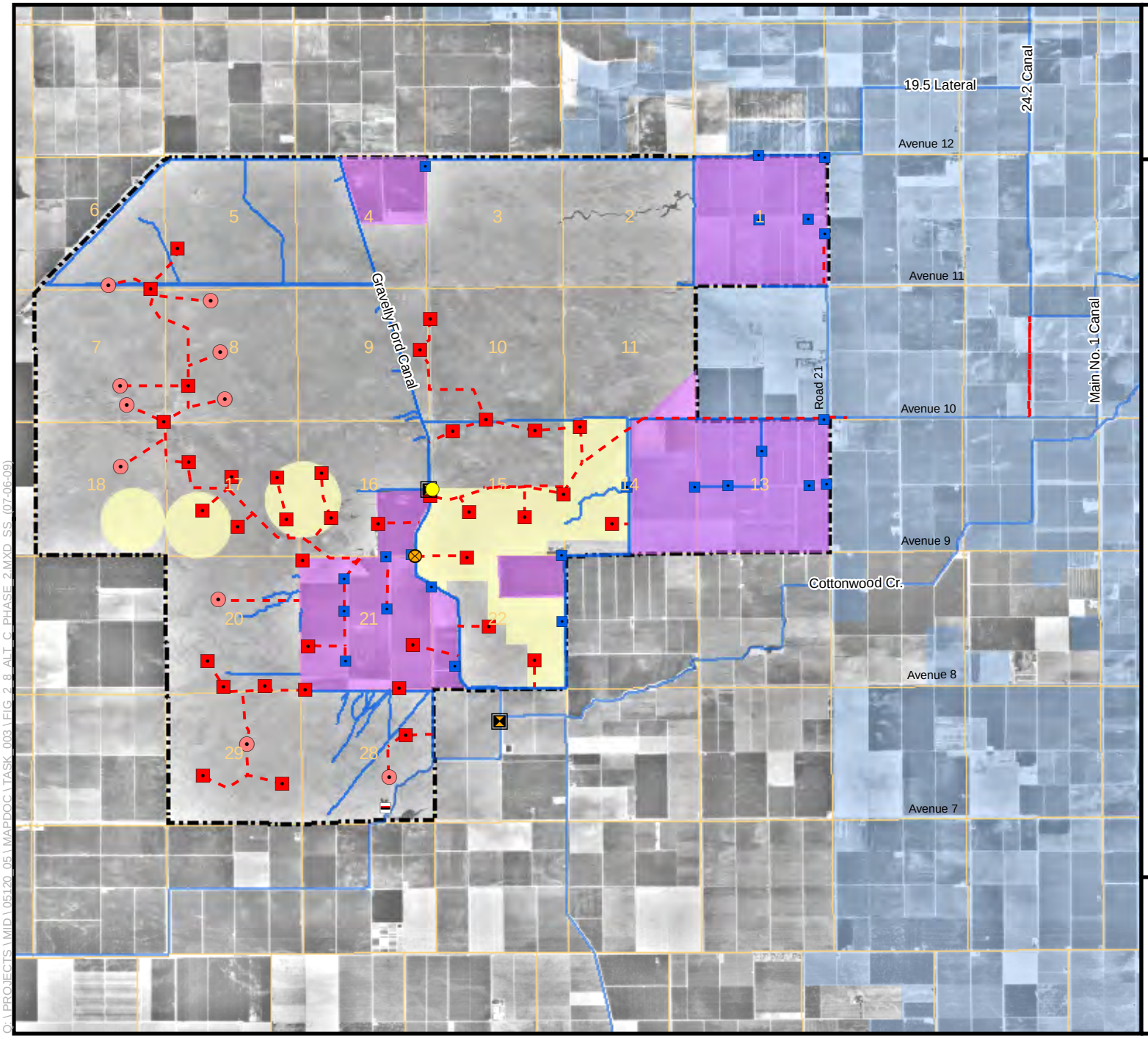

Figure 2-8
Alternative C
Phase 2
Conveyance Upgrades and Recharge Areas

Legend

- Existing Wells
- Section Line
- Madera Ranch Boundary
- Madera Irrigation District

Phase 1 Improvements

- Weir
- Hardened Sill
- Gate Valve
- Potential Recharge Areas
- On-Ranch, In-Lieu Recharge Facilities (existing row crops and vineyards)
- Existing Conveyances

Phase 2 Recovery Facilities

- Preliminary Lift Station Location
- New Wells - Optimistic Approach*
- New Wells - Conservative Approach*
- Buried Recovery Piping

* The actual number and locations of new wells may vary from those depicted here, following detailed engineering design and adjustment during staged installation. For the purposes of this document, it was assumed that all wells depicted in this figure may be constructed and/or used.

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Aerial Photo Source: USGS Digital Orthophoto Quarter Quadrangle, 1993

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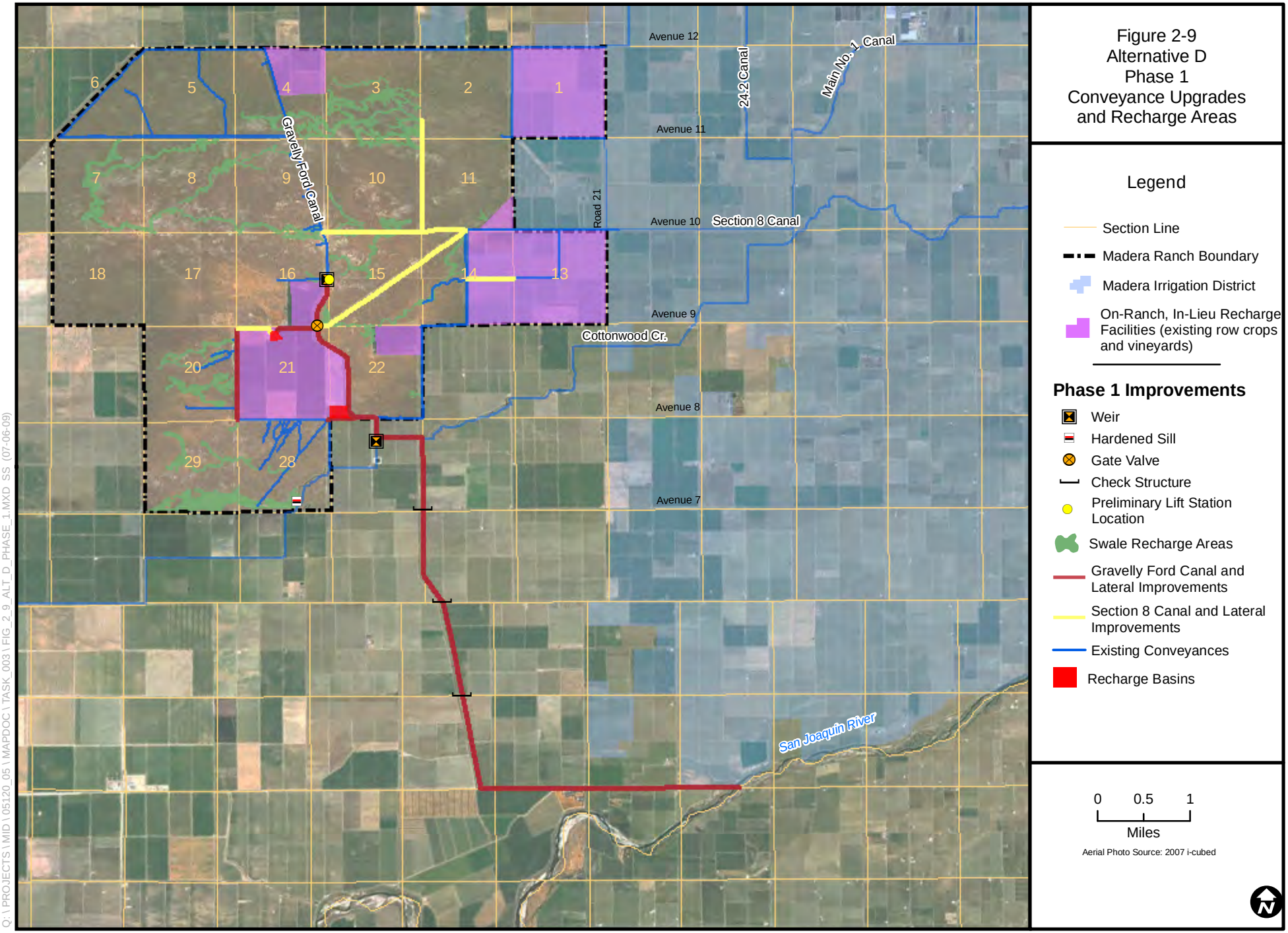

Figure 2-9
Alternative D
Phase 1
Conveyance Upgrades
and Recharge Areas

Legend

- Section Line
- Madera Ranch Boundary
- Madera Irrigation District
- On-Ranch, In-Lieu Recharge Facilities (existing row crops and vineyards)

Phase 1 Improvements

- Weir
- Hardened Sill
- Gate Valve
- Check Structure
- Preliminary Lift Station Location
- Swale Recharge Areas
- Gravelly Ford Canal and Lateral Improvements
- Section 8 Canal and Lateral Improvements
- Existing Conveyances
- Recharge Basins

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Aerial Photo Source: 2007 i-cubed

Q:\PROJECTS\MID\05120_05\MAPDOC\TASK_003\FIG_2_9_ALT_D_PHASE_1.MXD SS (07-06-09)

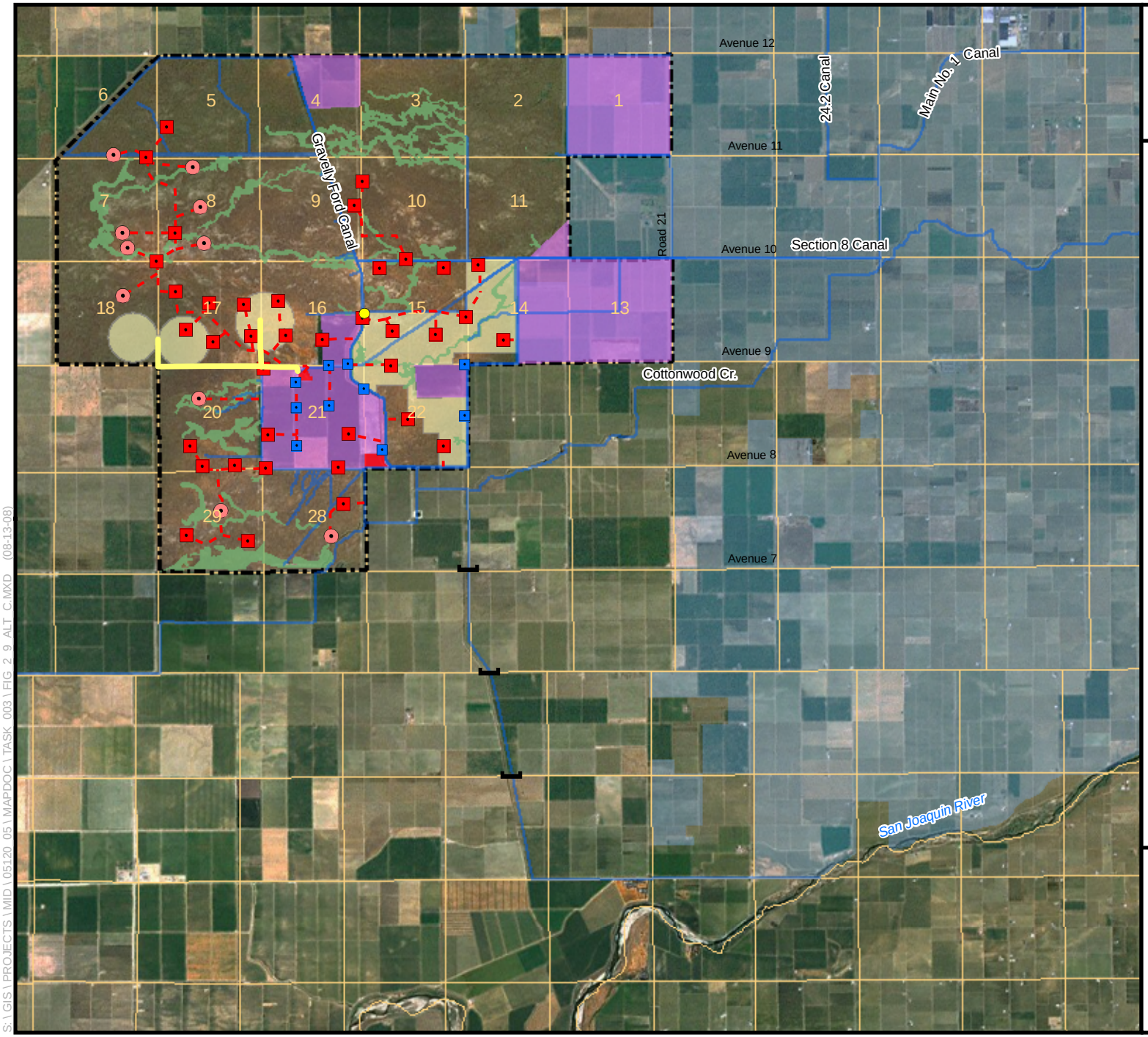

Figure 2-10
Alternative D
Phase 2
Recharge Areas
and Recovery Facilities

Legend

- Section Line
- Madera Ranch Boundary
- Madera Irrigation District
- Swale Recharge Areas
- On-Ranch, In-Lieu Recharge Facilities (existing row crops and vineyards)
- Phase 2 Recharge Areas
- Recharge Basins
- Phase 1, Phase 2, and Existing Conveyances
- Section 8 Canal and Lateral Improvements
- Check Structure

Phase 2 Recovery Facilities

- Preliminary Lift Station Location
- Existing Wells
- New Wells - Optimistic Approach*
- New Wells - Conservative Approach*
- Buried Recovery Piping

* The actual number and locations of new wells may vary from those depicted here, following detailed engineering design and adjustment during staged installation. For the purposes of this document, it was assumed that all wells depicted in this figure may be constructed and/or used.

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Aerial Photo Source: USGS Digital Orthophoto Quarter Quadrangle, 1993

S:\GIS\PROJECTS\MID\05120_05\MAPDOC\TASK_003\FIG_2_9_ALT_C.MXD (08-13-08)

MID would complete Alternative D in two phases. Phase 1 would involve recharge-related facilities only. Phase 2 would involve supplemental recharge facilities and facilities for recovery of banked water. Reclamation would approve the banking of CVP water outside the MID service area as described under Alternative B. No alteration of Reclamation-owned facilities would occur under Alternative D. However, similar to Alternative B, Alternative D includes funding by Reclamation, under the Omnibus Public Land Management Act of 2009, the Policy and Program Services, Challenge Grant Program: Recovery Act of 2009 Water Marketing and Efficiency Grants, or any other funding source. Regardless of whether this funding is acquired, the project components and associated effects would be the same.

2.5.1 Phase 1 Facilities

MID would implement Phase 1 to increase the capacity of existing conveyances to deliver water to Madera Ranch. Phase 1 would use primarily natural swales as recharge areas.

Phase 1 activities would involve:

- reconditioning of existing canals to provide at least 200 cfs of conveyance capacity into Madera Ranch;
- construction of approximately 26 acres of recharge basins on current agricultural land to regulate flow, remove sediment, and provide some recharge;
- application by MID of recharge flows to approximately 700 acres of swales; and
- integration of approximately 2,600 acres of Madera Ranch row crops and vineyards into an in-lieu recharge program in which surface water would be periodically served in lieu of groundwater pumping subject to approval by the MROC.

Diversion and Conveyance Facilities

Upgrades to Existing Canals

Figure 2-2 depicts the locations of existing canals in the vicinity of Madera Ranch. During Phase 1, MID would upgrade existing canals to enable delivery of at least 200 cfs into Madera Ranch (see Figure 2-3). The following sections summarize how these and other conveyances would be upgraded to provide 200 cfs of delivery capacity to and from Madera Ranch.

Gravelly Ford Canal. The configuration of the GF Canal, as shown on record drawings from 1966, indicates that the canal cannot convey 200 cfs, in part because of its highly irregular bottom. To allow a two-way flow of up to 200 cfs,

the canal would have to be regraded, and the intake pipeline on the San Joaquin River connecting the pump plant to the open canal segments enlarged to a 72-inch-diameter concrete pipe. A flow meter would be installed in the pipeline. In addition to the canal improvements, a new pumping plant and pipeline improvements would be completed. Additional improvements would involve (see Figure 2-9):

- installation of three checkdams,
- reconstruction of culvert crossings and farm road bridges, and
- installation of a Parshall flume at the edge of Madera Ranch to measure recovery volumes.

Additionally, a 400-hp pumping plant, consisting of two 200-hp pumps, would be required on-ranch to move water from the GF Canal uphill to the east as far as Section 13 so that water could be delivered to swales for recharge and in-lieu fields east of the canal.

Gravelly Ford Canal Sedimentation Basin and Flow Regulation Area. With GFWD's permission, an approximately 0.6 mile segment of the GF Canal on the southeastern side of Section 16 would be equipped with a weir/control structure on the north side to allow use of the channel as a combined recharge area, sedimentation basin, and flow regulation area.

Gravelly Ford Canal Flow Control Weir at Cottonwood Creek. As under Alternative B, with GFWD's permission, a new weir would be installed on the GF Canal approximately 1,000 feet south of Section 22 where the canal intersects and shares a channel with Cottonwood Creek (see Figure 2-9).

Section 8 Canal/Gravelly Ford Canal Connection. As under Alternative B, a new, approximately 1.55-mile-long, 20- to 50-cfs, earthen ditch would be constructed adjacent to a paved road in Sections 13, 14 and 15 to the GF Canal from the existing terminus of the Section 8 Canal (see Figure 2-9).

Gravelly Ford Canal Section 21 Northern Lateral. As under Alternative B, a new approximately 0.45-mile-long, 20- to 50-cfs earthen ditch would be constructed along the northern side of Section 21 from the GF Canal to a Phase 1 recharge basin located on farmland (see Figure 2-9).

Gravelly Ford Canal Section 21 Western Lateral. As under Alternative B, a new approximately 1-mile-long north/south canal would be constructed along the western side of Section 21 off of an existing 20- to 50-cfs earthen ditch bordering the southern side of the section (see Figure 2-9).

Gravelly Ford Canal Section 22 Southern Lateral. As under Alternative B, a approximately 0.28-mile-long, 20-to 50-cfs earthen ditch would be constructed along the southern side of Section 22 from the GF Canal to an existing ditch (see Figure 2-9).

Section 8 Canal Southwestern Extension. Sections 14 and 15 are bisected diagonally by a 30- to 40-foot-wide, dirt farm road that was previously a ditch. As under Alternative B, a new approximately 1.8-mile-long, 20-cfs earthen ditch would be constructed from the Section 8 Canal along the shoulder of this road and to the GF Canal. This canal would require at least one pumping plant to deliver water from the GF Canal to the east (see Figure 2-9).

Section 8 Canal Northern Extension. As under Alternative B, Sections 10 and 11 are divided by a 20- to 40-foot-wide dirt farm road bordered by the remnants of a ditch. A new approximately 1.2-mile-long, 20- to 50-cfs earthen ditch would be constructed along the alignment of the old ditch (see Figure 2-9).

Section 8 Canal Section 14 Lateral Extension. An existing Section 8 Canal Lateral (20 cfs) that flows across Section 13 would be extended 0.5 mile across Section 14. All work would be performed along the edge of row crop land. This canal would require one pumping plant to deliver water to the east (see Figure 2-9).

Reconditioning of Existing Ditches

As under Alternative B, reconditioning would involve replacement of turnout gates, brush removal, repair of berms that have been worn down over time, reconstruction of segments that have been filled by recent farm operations, and installation of farm road crossings as required.

Recharge Facilities

Recharge Basins

Phase 1 would involve construction of approximately 26 acres of basins, as shown in Figure 2-9, on agricultural land in order to:

- help regulate flows,
- allow settling of sediments prior to application of water to swales, and
- provide some recharge capacity.

The preliminary locations of two Phase 1 recharge basins are entirely on current agricultural land in Sections 21 and 22. The basins would be designed with 1.5:1 to 2:1 interior side slopes and average depths of 4 to 5 feet surrounded by low earthen dikes. Construction of the Phase 1 recharge basins could involve the movement of approximately 210,000 cubic yards of soil. Topsoil would be segregated during excavation and respread over the berm and construction disturbance areas to promote reestablishment of vegetation.

Swale Recharge Areas

As under Alternative B, water would be diverted into approximately 700 acres of swales. The water would be conveyed to Madera Ranch through the existing and upgraded MID conveyances and GF Canal and to the swales through the existing, rehabilitated, and new ditches described above. Locations of the swales anticipated to be used during Phase 1 are depicted on Figure 2-9.

In-Lieu Recharge Facilities

As under Alternative B, MID would recondition existing turnouts and install new turnouts from canals, pipelines, and ditches to enable delivery of surface water to these fields in lieu of groundwater pumping.

2.5.2 Phase 2 Facilities

Phase 2 would require the construction of wells and piping to recover the banked water, and installation of pumps to deliver the recovered water as shown in Figure 2-10.

Phase 2 recharge and recovery facilities would use or include:

- up to 15 existing wells for recovery,
- up to 49 new wells and recovery pipelines (in phases over several years) to provide 200 cfs of recovery capacity, and
- one lift station on GF Canal to provide 200 cfs of pump-back capacity to the San Joaquin River.

Diversion and Conveyance Facilities

Upgrades of Existing Canals

As under Alternative B, up to 3.2 miles of 20- to 100-cfs earthen ditches would be constructed within the Phase 2 basin window to distribute water into recharge areas.

Gravelly Ford Canal Section 21 Northern Lateral. As under Alternative B, the 0.45-mile-long Phase 1 ditch along the northern side of Section 21 would be replaced with an approximately 2.1-mile-long, 135-cfs east-west earthen lateral canal along the north side of Sections 21 and 20 with two north-south sub-lateral canals running northward along the east and the west sides of Section 17.

Recharge Facilities

Recharge Basins

As under Alternative B, depending on the performance of Phase 1 recharge facilities, up to approximately 1,000 acres of recharge basins may be constructed in a 1,300-acre area.

Recovery Facilities

Recovery Wells

As under Alternative B, banked water would be recovered using up to 15 existing wells and approximately 49 new wells (see Figure 2-10).

Recovery Pipelines and Electrical Facilities

As under Alternative B, up to 11.6 miles of 8-inch- to 60-inch-diameter PVC to RCP buried recovery pipelines would run from recovery wells to the GF Canal (see Figure 2-10).

Recovery Lift Station

One lift station would be constructed along the GF Canal to pump water recovered from wells back to the San Joaquin River through the canal.

2.5.3 Construction

All construction methodologies necessary to construct MID facilities under Alternative D are described in detail under Alternative B—Water Banking outside the MID Service Area Using Swales and Alteration of Reclamation-Owned Facilities. See Section 2.3.3 pages 2-10 through 2-16. Construction of facilities on GFWD land and in GF Canal is described below.

Gravelly Ford Canal Improvements

Construction methods necessary for the upgrade of GF Canal are discussed in Alternative B under the subsections Upgrade of Section 8 Canal, Cottonwood Creek, and Main No. 1 Canal Connection, Weir Installation, and Construction of Recovery Lift Stations. The regrading of the off-ranch portions of GF Canal will require the movement of an additional 15,000 cubic yards of soil.

2.5.4 Maintenance

All maintenance activities necessary to operate Alternative D are described in detail under Alternative B—Water Banking outside the MID Service Area Using Swales and Alteration of Reclamation-Owned Facilities. See Section 2.3.4 pages 2-17 and 2-18.

Maintenance Corridors

As under Alternative B, the maintenance corridors would include new roads in the recharge pond area and areas with heavy disturbance, and unimproved routes in grassland areas.

2.5.5 Operations

Madera Ranch operations, including banking, water recovery, and maintenance to support banking and recovery, are described below, including measures to monitor potential effects on neighboring farmers and districts (adjacent stakeholders).

Water Banking

Please refer to the Banking subsection of Alternative B—Water Banking outside MID Service Area Using Swales and Alteration of Reclamation-Owned Facilities. See Section 2.3.5 pages 2-19 through 2-24. Fewer swales, including those in Section 2, would be used under this alternative.

Monitoring and Operational Constraints Plan

Please refer to the Monitoring and Operational Constraints Plan subsection of Alternative B—Water Banking outside the MID Service Area Using Swales and Alteration of Reclamation-Owned Facilities. The MROC would revise the plan to accommodate additional monitoring in GF Canal if this alternative is selected.

Delivery Protocol

As no Reclamation or MID conveyances to Madera Ranch would be upgraded under this Alternative, MID would not be able to recover banked water for conveyance to MID's users or other bank participants.

In order to implement this Alternative, MID would need to enter into a wheeling agreement with Reclamation using San Joaquin River Restoration water. Under this scenario, in years when water is available for banking, it would be wheeled through the San Joaquin River and then the GF Canal and banked at Madera

Ranch. In years when the water is needed by MID, it would be recovered from wells and allowed to flow back through the GF Canal to the San Joaquin River. MID's releases of recovered water to the San Joaquin River would be used as San Joaquin River Restoration flows in exchange for deliveries of San Joaquin River Restoration water from Millerton Lake to Madera Ranch water bank participants.

These deliveries would be made in lieu of normal surface water deliveries from Millerton Lake or Hensley Lake. Therefore, an equal volume of water would be made available to MID from these reservoirs for delivery to other parts of the MID service areas, increasing the net supply of available water.

Water Recovery Operations

Water would be recovered using existing wells and new wells installed in the vicinity and downgradient of the recharge areas. As noted above, recovery operations would be constrained by the MOCP to prevent unacceptable impact on surrounding landowners. Recovered water would be pumped into collection piping and into the GF Canal for delivery to the San Joaquin River. Recovered water would be delivered through exchange agreements as discussed above in the Delivery Protocol subsection of Alternative D.

The recovery operations described above do not depend on farmer irrigation demand but would depend on the schedule of required flows for San Joaquin River restoration, which may not match banking participant needs.

Use of the Water Bank Facilities by Other Entities

Please refer to the Use of the Water Bank Facilities by Other Entities subsection of Alternative B.

2.6 Environmental Commitments

The following environmental commitments would be implemented where applicable, in association with construction activities for the alternatives. These measures are consistent with the environmental setting and effects analyses presented in Chapter 4 of this EIS. The environmental commitments section was developed by Reclamation and MID. Each commitment would be implemented in accordance with each agency's policies, guidance, and authorities. Additional detail on the environmental setting and work completed to date to support the analysis and need for these commitments is provided in Chapter 4 of this EIS.

2.6.1 Agricultural

Environmental Commitment AG-1: Permanently Preserve Farmland by Establishing a Conservation Easement on Agricultural Land

MID will establish conservation easements on agricultural land at an effect-to-mitigation ratio of 2:1 to prevent permanent conversion of the land to urban uses and to increase farm viability. This mitigation will be in kind and used to mitigate the loss of farmland classified as prime farmland or farmland of statewide importance.

2.6.2 Air Quality

Environmental Commitment AQ-1: Implement San Joaquin Valley Air Pollution Control District Regulation VIII Control Measures

The following Regulation VIII control measures for construction emissions of PM10 are required by the San Joaquin Valley Air Pollution Control District (SJVAPCD).

- All disturbed areas, including storage piles, that are not being actively used for construction purposes will be effectively stabilized against dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover. Chemical stabilizer/suppressants will not be used near waters of the United States.
- All on-site unpaved roads and off-site unpaved access roads used during construction will be effectively stabilized against dust emissions using water or chemical stabilizer/suppressant.
- All land-clearing, grubbing, scraping, excavating, land-leveling, grading, cut-and-fill, and demolition activities will be effectively controlled against fugitive dust emissions by applying water or presoaking.
- All operations will limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours during operations. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit visible dust emissions. The use of blower devices is expressly forbidden.) After materials are added to or removed from the surface of outdoor storage piles, the piles will be effectively stabilized against fugitive dust emissions using sufficient water or chemical stabilizer/suppressant.

Environmental Commitment AQ-2: Reduce Emissions Associated with Idling Equipment

Per California Air Resources Board regulations (Title 13 of the California Code of Regulations, Sections 2480 and 2485), which limit idling of diesel-fueled

commercial motor vehicles, MID will require that all diesel engines be shut off when not in use to reduce emissions from idling.

Environmental Commitment AQ-3: Use Electric Pumps

MID will use as many electric pumps as possible for recovery operations to reduce emissions associated with propane. If propane pumps are needed MID will use engines with catalytic controls and that meet SJVAPCD best available control technology (BACT) requirement for engines over 50 hp.

2.6.3 Biological Resources

Environmental Commitment BIO-1: Establish a Grasslands Conservation Easement

Mitigation for the loss of California annual grassland, alkali grassland, or Great Valley iodine brush scrub would consist of establishing a grasslands conservation easement at Madera Ranch over an area of habitat equivalent in size to the area subject to long-term degradation or permanent displacement (1 acre conserved: 1 acre lost). This measure would not compensate completely for the loss of these habitats, but it would help slow the rate of loss of these habitats in this region.

Environmental Commitment BIO-2a: Preconstruction Surveys/Avoid Effects on Vernal Pools and Alkali Rain Pools

MID will minimize effects on species in this habitat by avoiding these wetlands to the extent practical. A buffer area will be established around suitable habitat for listed crustaceans in the action area, i.e., vernal pools. Buffer areas will be demarcated by installing fencing 250 feet from each occupied pool. A qualified biologist will flag the pools to be fenced, and temporary fences will be installed as the first order of work. Construction barrier fencing will be placed at the edge of the buffer areas. Temporary fences will be furnished, constructed, maintained, and later removed as shown on the construction plans, as specified in the special provisions, and as directed by the project engineer. Temporary fencing will be 4 feet high, orange, commercial-quality woven polypropylene. No construction activities will be permitted within the buffer zone (including staging or sidecasting of material) other than those activities necessary to erect the fencing. Erosion control measures will be employed adjacent to occupied listed crustacean habitat to prevent soil from eroding or falling into these areas. Natural/ biodegradable erosion control measures (e.g., straw wattles, hay bales) will be used. Plastic monofilament netting (erosion control matting) will not be allowed.

Environmental Commitment BIO-2b: Create, Restore, or Preserve Vernal Pools

MID will create, restore or preserve vernal pool habitat at Madera Ranch in the area protected under a conservation easement. One acre of vernal habitat would be restored or preserved for each acre of vernal pool or alkali rain pool habitat lost as a result of activities associated with the Proposed Action (1 acre created: 1 acre lost). The performance standard for created vernal pools is to ensure the new vernal pools emulate the natural pools at Madera Ranch. Created vernal pools would have similar plant species composition and vegetation cover and invertebrate fauna as the vernal pools that are being removed by activities associated with the Proposed Action. Success of the vernal pool creation would be assessed by comparing the pools with undisturbed natural vernal pools at Madera Ranch. Restored vernal pools will have similar success criteria. If successful, this mitigation would compensate for the loss of vernal pool habitat. Restoration is more likely to be successful in areas with degraded habitat and where preservation is the most assured. In addition, MID will comply with Reclamation's wetlands mitigation and enhancement policy, which focuses on protecting, restoring, and enhancing wetlands and ensuring no overall net loss of wetlands.

Environmental Commitment BIO-3a: Avoid Effects on Iodine Bush Scrub

MID will locate the well and pipeline to avoid direct effects on iodine bush scrub habitat in the northern portion of Section 7 associated with construction activities. If wells and pipelines need to be constructed in this habitat, MID will conduct botanical surveys and mark plants to be avoided during construction.

Environmental Commitment BIO-3b: Survey for Sensitive Plants

During Phase 1, two botanists will conduct visual surveys for palmate-bracted bird's beak (*Cordylanthus palmatus*) and other sensitive plant species along a 60-foot corridor (30 feet per side) along the proposed pipeline and canal alignments. The surveys will be conducted in April and July. Species information will be recorded in GPS. The results of the botanical surveys will be used to determine which avoidance, minimization, and environmental commitments will be employed. If palmate-bracted bird's beak is found, the population will be delineated with highly visible flagging tape or plastic fencing and avoided. If other sensitive species are found, MID, U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Game (DFG) will coordinate to determine the feasibility of avoiding the population. During Phase 2, additional botanical surveys will be conducted in the area proposed for recharge pond creation. Complete visual surveys will be conducted in a similar manner in all areas proposed for permanent ground disturbance. If other sensitive species are found, MID, DFG and USFWS will coordinate to determine the feasibility of avoiding the population.

Environmental Commitment BIO-4a: Preconstruction Surveys for California Tiger Salamander

A USFWS-approved biologist will conduct preconstruction surveys for California tiger salamander (*Ambystoma californiense [=A. tigrinum c.]*) in suitable aquatic and upland habitat. Before the start of ground-disturbing activities or vegetation removal, the approved biologist or biological monitor will survey the area to be affected that day for California tiger salamanders. The biologist also will examine any open trenches, which will have ramps or be closed when unattended, for the presence of salamanders. If a salamander is found in the construction area, the approved biologist will remove the animal from the area and release it into a suitable burrow at least 300 feet outside the construction area. The biologist will document the results of surveys on preconstruction survey log sheets, which will be kept on file at MID.

Environmental Commitment BIO-4b: Restrict Construction Activity in Suitable Aquatic and Upland Habitat for California Tiger Salamander to the Dry Season (April 1–November 1)

To avoid and minimize potential mortality and injury of breeding and dispersing California tiger salamanders, construction will take place only during the dry season (between April 1 and November 1 or before the onset of the rainy season, whichever occurs first) in suitable aquatic and upland habitat for the species. Upland habitat is defined as all habitat within 1 mile of occupied or suitable aquatic habitat. Specifically, this measure applies to all pipeline construction on Madera Ranch and during work at all delivery canals.

This measure does not apply to construction activities in gravel shoulders and heavily disturbed non-habitat areas where construction is confined entirely to areas devoid of upland grassland habitat.

Environmental Commitment BIO-4c: Fence the Construction Zone and Implement Erosion Control Measures in Areas Where Suitable Aquatic Habitat for California Tiger Salamander Is Present

The construction zone will be fenced in areas where suitable aquatic habitat for California tiger salamander is adjacent to the construction area. The purpose of the fence is to restrict construction equipment to the designated area only. Erosion control measures also will be implemented in these areas to prevent any soil or other materials from entering aquatic habitat. Locations of temporary fences and erosion control measures will be shown on the construction plans and will be reviewed by a qualified biologist. Construction barrier fencing will be installed along the edge of the work area as the first order of work. Temporary fences will be furnished, constructed, maintained, and later removed as shown on the plans, as specified in the special provisions, and as directed by the project engineer. No construction activities will be permitted outside the designated construction zone other than those activities necessary to erect the fencing. Erosion control measures

will be installed adjacent to suitable aquatic habitat to prevent soil from eroding or falling into these areas. Natural/biodegradable erosion control measures (e.g., straw wattles, hay bales) will be used. Plastic monofilament netting (erosion control matting) will not be allowed because salamanders can be caught in this type of material.

Environmental Commitment BIO-5: Pre-Activity Surveys for Blunt-Nosed Leopard Lizard

The objective of the blunt-nosed leopard lizard (*Gambelia [=Crotaphytus] sila*) (BNLL) surveys is to determine whether the BNLL is present on the portion of Madera Ranch that could be affected by use of the swales for water banking and construction of water delivery canals and other facilities. Initial surveys will focus on the swales and canals east of GF Canal. Subsequent surveys will occur prior to use of swales or construction of recovery facilities on the west side of GF Canal. Surveys in swales will be conducted 1 to 2 years before the first wetting of the swale, and will be valid for 5 years after the wetting of the swale. If the swale is re-wetted within the 5-year period, it will not need to be surveyed for another 5-year period. No additional survey efforts will be conducted of any swale areas that have been surveyed twice with neither survey resulting in a single observation of a BNLL.

BNLL surveys will be conducted in potential BNLL habitat (all grassland and shrub scrub habitat that contains small mammal burrows) by three qualified biologists walking parallel transects 20–30 feet apart along the proposed hard infrastructure facility alignments (corridor of 60 feet), and three to five biologists walking parallel transects 20–30 feet apart along the swales (corridor of 150 feet). These surveys will be conducted for 8 days between April 15 and July 15. A minimum of 3 survey days will be conducted consecutively, with a maximum of 6 days completed within any 30-day time period. Each survey will be conducted when the ambient air temperature is between 77^{o}F and 95^{o}F. Surveys will begin after sunrise when the minimum temperature criterion is met and will end by 2 pm or when the maximum temperature is reached, whichever occurs first. Surveyors should stop frequently and, using binoculars, scan the areas adjacent to the transect for BNLLs. Data from the mammal burrow surveys also may help inform these surveys and identify areas with the highest suitable habitat.

If a BNLL is detected, the surveyors should try to obtain photo documentation and document the location in GPS. The lead biologist will determine whether there is value in continuing the survey effort. MID, USFWS, and DFG will be notified. These surveys will be conducted as close to the construction period as possible.

Environmental Commitment BIO-6: Preconstruction Surveys and Avoidance Activities for Raptors

Preconstruction surveys would determine whether any sensitive raptors are nesting at Madera Ranch. If a tree is occupied at the time of construction, construction activities will be restricted to areas outside 0.5 mile of the tree. Setbacks will be marked with brightly colored temporary fencing.

Environmental Commitment BIO-7: Preconstruction Surveys for Western Burrowing Owl

The initial daytime burrow survey will help inform the Western burrowing owl (*Athene cunicularia*) survey. A qualified wildlife biologist will conduct a burrowing owl survey in accordance with DFG guidelines. The survey area will include the construction corridor and a 500-foot buffer. An initial survey will determine whether burrowing owls are present. Three additional surveys will be conducted to determine presence or absence of burrowing owls. In accordance with DFG survey guidelines, these surveys must be conducted on four separate days—two in the early morning and two in the late afternoon/early evening. Non-nesting owls may be passively relocated, also using DFG's guidelines.

Environmental Commitment BIO-8: Preconstruction Surveys for San Joaquin Kit Fox

Because of historical records and suitable San Joaquin kit fox (*Vulpes macrotis mutica*) habitat on or in the vicinity of Madera Ranch, it is assumed that kit foxes could be present at Madera Ranch. To avoid potential mortality of kit fox, a tiered preconstruction survey will be conducted to locate any natal dens, non-natal active dens, and/or potential dens in the Proposed Action area. This tiered-survey approach may include use of the current year's aerial photographs of Madera Ranch, if available, to locate any natal dens (as indicated by vegetation disturbance and movement trails) within 1,000 feet of all proposed pipeline alignments, canals, and facility sites. All den sites identified on the photographs will be ground-truthed by a qualified biologist to determine the use and activity status of the den(s). If an active natal den is found, DFG will be notified and informally consulted to determine appropriate avoidance measures, including delaying construction within 1,000 feet of the den until the pups have been weaned or moved to an off-site den, and/or rerouting the construction corridor to avoid impacts on the kit foxes. In the event aerial photographs are not available, visual surveys will be conducted during meandering transects of the 1,000 foot corridor.

The second tier of surveying will include meandering transect surveys for active dens (non-natal) out to 250 feet from the proposed facilities, which will involve simultaneous surveys for potential den sites out to 100 feet. If an active den is found, it will be avoided until the foxes have vacated the den. All potential dens will be flagged. Any potential den immediately in the construction corridor may

need additional monitoring. Because construction is expected to proceed quickly—approximately 1,000 feet per day with trenches being open for 1 to 2 nights—potential dens will not be collapsed. All surveys will be conducted within 30 days of site-specific construction by a qualified biologist. In addition, during construction, USFWS standard kit fox conservation measures such as speed limits, exit ramps, and covering pipes will be implemented to prevent harm or disturbance to kit foxes using the area. Any open pipes, newly dug pipeline trenches, and canals will be surveyed daily prior to construction to ensure kit foxes are not present.

Environmental Commitment BIO 9: Conduct Pre-Activity Surveys for Fresno Kangaroo Rat

The objective of the Fresno kangaroo rat (*Dipodomys nitratoides exilis*) surveys is to determine whether the Fresno kangaroo rat is present on the portion of Madera Ranch that could be affected by use of the swales for water banking and construction of water delivery canals. Initial trapping will focus on the swales and canals east of GF Canal. Subsequent trapping will occur before use of swales or construction of facilities west of GF Canal. Surveys in swales will be conducted 1 to 2 years before the first wetting of the swale and will be valid for 5 years after the wetting of the swale. If the swale is re-wetted within the 5-year period, it will not need to be surveyed for another 5-year period. No additional survey efforts will be conducted of any swale areas that have been surveyed twice with neither survey resulting in a single trapping of the Fresno kangaroo rat.

Kangaroo rat trapping efforts will be conducted by a surveyor holding a recovery permit/scientific sampling permit for the Fresno kangaroo rat (10[a][1][A] permit). Meandering visual transect surveys for kangaroo rat burrow complexes and sign (e.g., tail drags, sand baths, food caches) will be conducted by two to four biologists over all habitat within and out to 250 feet from the edge of the WSEP footprint, including swales, and within 100 feet of the top of GF Canal. All burrow complexes found will be recorded on a GPS unit, and data on the number of burrows, level of activity, and general suitability for kangaroo rats will be recorded in field notes (burrows suitable for kit fox also will be noted on GPS as part of this effort); information on vegetation type and percent cover also will be recorded.

Following completion of the survey, the burrow sites will be prioritized according to probability of kangaroo rat presence. Live trap stations and trap lines then will be established (staked and recorded with a GPS unit) by permitted biologists at the highest priority sites. The Endangered Species Recovery Program (ESRP) will be approached to lead this effort. Traps (Sherman live traps [Model XLKR: 13 inches x 3.5 inches x 3 inches]) will be set near active burrows, dust baths, or tracks, particularly along evident runways. Ten or more traps (or a number determined by the surveyor) will be set in relatively tight clusters (5-foot trap spacing) at high activity areas. Traps also will be set at 10 to 15 meter intervals (two traps per station) along evident movement corridors.

Traps will be baited with a mixture of millet seed, crimped oats, wild birdseed, or a mixture of these. Bedding (crumpled unbleached paper towel) will be placed at the inside end of each trap and will not be allowed to contact the tripping mechanism. Paper towels will be replaced each time an animal is captured in the trap. Traps will be opened and baited at sunset and checked every 2–3 hours after sunset until dawn. All traps will be closed after they have been checked at dawn. Trapping will be conducted at each trap site for five consecutive nights. Trapping will not be conducted during the week of a full moon, unless the sky is overcast and moonlight is substantially reduced. Trapping will not be conducted in December or January or in periods of cold or inclement weather detrimental to kangaroo rats and as stipulated in the surveyor's recovery permit. Although Fresno kangaroo rats are active year round, their populations generally are lowest at this time. The proposed trapping effort started in May 2009, depending on weather conditions.

All non-Fresno kangaroo rats captured will be marked with a nontoxic semi-permanent ink marker to identify the re-trapping of the same animal(s). Trapping will cease with the capture of a Fresno kangaroo rat and MID, the USFWS, and DFG will be notified the next workday, or no later than the Monday following the capture should it occur on a Friday or Saturday night. Any measurements obtained to provide evidence that the animal captured is a Fresno kangaroo rat will be achieved with minimal and delicate handling; no hair or fur will be removed; tissue samples will be taken only by a qualified, permitted biologist in accordance with their permit terms. A photo of the animal's hind legs (showing toes and including a ruler) will be taken and the animal will be immediately released; the animal's eyes will be shielded from the flash.

The lead biologist will notify MID of the proposed trapping schedule and weekly will inform MID which trapping areas have been completed. Any capture of Fresno kangaroo rat will be reported immediately to MID, the USFWS, and DFG.

Environmental Commitment BIO-10: Conduct Preconstruction Surveys for Sensitive Species along the Off-Ranch Portion of Gravelly Ford Canal

Proposed off-ranch work areas associated with GF Canal improvements will be evaluated by a USFWS-approved biologist to determine whether habitat suitable to support sensitive species is present. If suitable habitat is discovered, MID will evaluate work locations to determine which species could be present and whether additional surveys may be needed. Depending on the results of this survey, MID also may implement Environmental Commitment BIO-1: Establish a Grasslands Conservation Easement, Environmental Commitment BIO-5: Pre-Activity Surveys for Blunt-Nosed Leopard Lizard, Environmental Commitment BIO-6: Preconstruction Surveys and Avoidance Activities for Raptors, and Environmental Commitment BIO-7: Preconstruction Surveys for Western Burrowing Owl.

Environmental Commitment BIO-11: Implement Protective Measures for Anadromous Fish.

MID would work with Reclamation and the National Marine Fisheries Service (NMFS) to determine appropriate protective measures for migratory fish once they are restored to the San Joaquin River, including seasonal restrictions on diversions or intake screening in the event water is moved to and from Madera Ranch via GF Canal (Alternative D). Inter-agency discussions should occur at least 2 years in advance of the reintroduction of these species to the San Joaquin River.

2.6.4 Cultural Resources

Environmental Commitment CR-1: Stop Construction If Cultural Resources Are Discovered

Should any artifacts or an unusual amount of bone, shell, or nonnative stone be uncovered during construction or other ground-disturbing activities, the construction contractor will immediately stop work in the immediate vicinity and a minimum buffer area 100 feet from the find. The contractor will notify MID immediately. MID will notify Reclamation immediately of the inadvertent discovery. Reclamation will have a professionally qualified archaeologist evaluate the inadvertent discovery for National Registry of Historic Places (NRHP) eligibility.

If human remains are discovered during ground-disturbing activities, Reclamation and MID will comply with state laws[1] relating to the disposition of human remains, including Native American burials, which fall within the jurisdiction of the Native American Heritage Commission (NAHC) pursuant to Public Resources Code (PRC) section 5097.

If human remains are discovered or recognized in any location other than a dedicated cemetery, Reclamation will not allow further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

- the County coroner has been informed and has determined that no investigation of the cause of death is required; and
- if the remains are of Native American origin,
  - the descendants from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with

[1] Madera Ranch does not include federal land, so only state human-remains laws apply.

appropriate dignity, the human remains and any associated grave goods as provided in PRC 5097.98; or

- the NAHC was unable to identify a descendant or the descendant failed to make a recommendation within 48 hours of being notified by the NAHC.

2.6.5 Geology

Environmental Commitment GEO-1: Amend Soils as Required in Topsoiled Areas

Topsoiled areas with insufficient vegetation cover will be amended with gypsum and/or elemental sulfur in combination with high-quality irrigation water to reduce soil salinity, alkalinity, and exchangeable sodium to acceptable levels, such that acceptable vegetation cover is established in such areas within 1 year after topsoil is applied. All soil sampling and amendment recommendations will be conducted by, or under the supervision of, a certified professional soil scientist.

Environmental Commitment GEO-2: Stop Work in Event of Fossil Discovery

In the event that a fossil or material that could be a fossil is unexpectedly discovered during excavation operations, work will cease in the immediate vicinity of the find. A qualified paleontologist will be called to the site to evaluate the find and determine the sensitivity of the fossil. If the fossil is determined to be sensitive, the paleontologist will recover it from the site and submit it to an appropriate museum or other repository for curation.

2.6.6 Noise

Environmental Commitment NOI-1: Employ Noise-Reducing Construction Practices

The construction contractor will employ noise-reducing construction practices so that noise from construction does not exceed County noise-level standards at adjacent residences. Measures to be implemented may include those following.

- Restrict construction to beyond 3,900 feet from residences during nighttime hours (10 p.m. to 7 a.m.).
- Provide construction equipment with sound-control devices no less effective than those provided on the original equipment. No equipment will have an unmuffled exhaust.
- Implement appropriate additional noise environmental commitments, including (but not limited to) changing the location of stationary construction equipment, shutting off idling equipment, rescheduling

construction activity, notifying adjacent residents in advance of construction work, and installing acoustic barriers around stationary construction noise sources.

Environmental Commitment NOI-2: Employ Noise-Reducing Methods during Well Drilling Operations

The drilling contractor will employ noise-reducing construction practices so that noise from drilling does not exceed County noise-level standards at adjacent residences. Measures to be implemented may include those following.

- Restrict well drilling to beyond 2,900 feet from residences during nighttime hours (10 p.m. to 7 a.m.), where feasible.
- Use sound attenuation enclosures around noise-generating elements of the drilling operation.

Environmental Commitment NOI-3: Employ Noise-Reducing Methods during Well Pumping Operations

The Proposed Action applicant will employ noise-reducing practices so that noise from well operations does not exceed County noise-level standards at adjacent residences. Measures to be implemented may include:

- restricting well installations to beyond 1,250 feet from residences, where feasible;
- using electric pumps where well installations are within 1,250 feet of residences; and
- using sound attenuation enclosures designed to achieve noise reductions sufficient to comply with County standards for noise-generating elements of the well operation when no other feasible control method is available.

Environmental Commitment NOI-4: Employ Noise-Reducing Methods during Lift Station Operations

The applicant will employ noise-reducing practices so that noise from lift station operations does not exceed County noise-level standards at adjacent residences. Measures to be implemented may include:

- restricting lift station installations to beyond 1,600 feet from residences, where feasible;
- using electric pumps where lift station installations are within 1,600 feet of residences; or
- using sound attenuation enclosures designed to achieve noise reductions sufficient to comply with County standards for noise-generating elements of the lift station operation when no other feasible control method is available.

2.6.7 Public Health and Safety

Environmental Commitment PHS-1a: Implement Necessary Emergency Preparedness Plan(s)

MID will work with the Madera County Department of Public Health and the local fire districts to coordinate the preparation of emergency preparedness plan(s) that may be required by federal, state, and County statutes and regulations.

Environmental Commitment PHS-1b: Comply with Local Fire District Requirements

MID will consult the local fire districts to ensure that all regulations are complied with during construction.

Environmental Commitment PHS-2: Implement an Agreement with the Madera County Mosquito and Vector Control District

MID will enter into an agreement with the Madera County Mosquito Abatement & Vector Control District (MCMAVCD) regarding a specific mosquito abatement program. The agreement will allow the MCMAVCD to access Madera Ranch and also will include quantitative abatement thresholds and financial compensation requirements for MCMAVCD activities, if necessary.

The MCMAVCD will monitor mosquito larvae production in the recharge basins, drainages, and distribution canals at no cost to MID, given that the amount of monitoring required is not excessive. Larvae populations will be tracked using methods and thresholds approved by the MCMAVCD, and suppression measures will be employed when thresholds are exceeded. Suppression measures may include environmental and biological methods, such as stocking mosquitofish, controlling emergent vegetation, and applying insecticides. Insecticide controls will be used only as a last resort, and use of insecticides over open water will be minimized to the extent feasible, given the mosquito abatement mandate of the MCMAVCD. The insecticides that may be used are only those that are approved for such uses by the U.S. Environmental Protection Agency (EPA). Mosquitofish, if used, will need to be stocked annually by the MCMAVCD.

If operations result in an increase in mosquito production such that an extensive monitoring program is needed, MID will hire a professional pest control service and will bear the cost of that service.

2.6.8 Public Services

Environmental Commitment PSU-1a: Notify Emergency-Response Agencies of Proposed Traffic-Route Changes

Before beginning construction activities, MID or the construction contractor will contact local emergency-response agencies (law enforcement and fire protection) to provide information on the timing and location of any traffic control measures required during construction activities. Emergency-response agencies will be notified of any change to traffic control measures as the construction phases proceed so that emergency-response providers can modify their response routes to ensure that response time would not be affected.

Environmental Commitment PSU-1b: Implement a Traffic Safety Plan

MID will require the construction contractor to prepare and implement a traffic safety plan (TSP) before the onset of construction activities. The TSP will address:

- appropriate vehicle size and speed,
- travel routes,
- detour or lane-closure plans,
- flag person requirements,
- locations of turnouts to be constructed,
- coordination with law enforcement and fire control agencies,
- coordination with California Department of Transportation (Caltrans) personnel (for work affecting state road rights-of way),
- emergency access to ensure public safety, and
- traffic and speed-limit signs.

2.6.9 Traffic

Environmental Commitment TRAF-1: Implement a Road Improvement Plan

MID will require the construction contractor to prepare and implement a road improvement plan (RIP) before the onset of the construction phase. The RIP will identify road segments, bridges, and culverts that need to be improved and turnout locations that need to be constructed (as applicable) to accommodate construction activities. The plan also will identify damage that is caused by construction vehicles and that needs to be repaired.

2.6.10 Water Quality

Environmental Commitment WQ-1a: Comply with National Pollutant Discharge Elimination System General Construction Permit

To reduce or eliminate construction-related water quality effects, before onset of any construction activities, MID or its contractor will obtain coverage under the National Pollutant Discharge Elimination System (NPDES) General Construction Permit. MID will be responsible to ensure that construction activities comply with the conditions in this permit, which will require development of a stormwater pollution prevention plan (SWPPP), implementation of best management practices (BMPs) identified in the SWPPP, and monitoring to ensure that effects on water quality are minimized.

As part of this process, MID will implement multiple erosion and sediment control BMPs in areas with potential to drain to surface water (see Section 3.6, Geology, for a discussion of erosion and sediment control BMPs). These BMPs will be selected to achieve maximum sediment removal and represent the Best Available Technology (BAT) that is economically achievable. BMPs to be implemented as part of this environmental commitment may include, but are not limited to, the following measures.

- Temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) would be employed to control erosion from disturbed areas.
- Drainage facilities in downstream off-site areas would be protected from sediment using BMPs acceptable to the Regional Water Quality Control Board (RWQCB).

MID or its agent will perform routine inspections of the construction area to verify that the BMPs specified in the SWPPP are properly implemented and maintained. MID will notify its contractors immediately if there is a noncompliance issue and will require compliance.

Environmental Commitment WQ-1b: Implement a Spill Prevention and Control Program

MID or its contractor will develop and implement a spill prevention control and countermeasures program (SPCCP) to minimize the potential for, and effects from, spills of hazardous, toxic, or petroleum substances during construction activities for all contractors. The program will be completed before any construction activities begin. Implementation of this measure will comply with state and federal water quality regulations and minimize the effects of the Proposed Action.

MID will review and approve the SPCCP before the onset of construction activities. MID will routinely inspect the construction area to verify that the measures specified in the SPCCP are properly implemented and maintained. MID will notify its contractors immediately if there is a noncompliance issue and will require compliance.

The federal reportable spill quantity for petroleum products, as defined in the EPA's CFR (40 CFR 110), is any oil spill that (1) violates applicable water quality standards, (2) causes a film or sheen upon or discoloration of the water surface or adjoining shoreline, or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or on adjoining shorelines.

If a spill is reportable, the contractor's superintendent will notify MID, and MID will need to contact the appropriate safety and clean-up crews to ensure the SPCCP is followed. A written description of reportable releases must be submitted to the RWQCB. This submittal must include a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases will be documented on a spill report form.

If a spill has occurred, MID will coordinate with responsible regulatory agencies to implement measures to control and abate contamination.

Environmental Commitment WQ-2: Implement Provisions for Dewatering

Before discharging any water from dewatering operations to surface water, MID or its contractors will obtain an NPDES permit and Waste Discharge Requirements (WDRs) from the RWQCB. Depending on the volume and characteristics of the discharge, coverage under the RWQCB's General Construction Permit or General Dewatering Permit is possible. As part of the permit, the permittee would design and implement measures as necessary so that the discharge limits identified in the relevant permit are met. As a performance standard, these measures will be selected to achieve maximum sediment removal and represent the BAT that is economically achievable. Implemented measures may include retention of water from dewatering operations until particulate matter has settled before it is discharged, use of infiltration areas, and other BMPs. Final selection of water quality control measures will be subject to approval by the RWQCB.

MID will verify that coverage under the appropriate NPDES permit has been obtained before allowing dewatering activities to begin. MID or its agent will perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained. MID will notify its contractors immediately if there is a noncompliance issue and will require compliance.

2.7 Environmentally Preferable Alternative

As described above, the Proposed Action is the preferred alternative. The No Action Alternative would not satisfy the purpose and need. Under this alternative, no additional banking of available surface water would occur. In addition, groundwater overdraft would continue in Madera County. While Alternatives B, C, and D would facilitate growth that would not likely occur under the No Action Alternative, the No Action Alternative results in greater adverse effects on both water quality and water supply in Madera Ranch and the surrounding area. Alternative C has reduced effects on biological resources, but is considered financially infeasible for MID as the cost outlay for 1,000 acres of recharge basins in Phase 1 of Alternative C does not give time for the bank to be operational prior to construction of basins (which under Alternative B banking within the swales would provide the financial ability to implement Phase 2). Alternative D reduces impacts on farmland of statewide importance relative to Alternative B and C, and results in nearly identical effects on biological resources relative to Alternative B and C. However, Alternative D includes the complication of having to operate the bank solely through water exchanges with the San Joaquin Settlement Water and could result in increased air quality effects during construction. While feasible, basing the bank on exchanges makes MID dependent on other agencies to receive water. Reliance on other agencies for water is not desirable, and the benefits of the alternative are not enough to compensate for this deficiency. In addition, it should be noted that Alternative D would rely on San Joaquin River restoration operations that have not yet been finalized and that may not come online within the time frame of desired Proposed Action implementation. Otherwise, effects are anticipated, at a minimum, to be similar in extent, regardless of alternative. Each of the alternatives has environmental benefits and effects as described above. As such, a single environmentally preferred alternative cannot be identified. Based on this information, Reclamation considers Alternative B to be the best overall alternative for approval.

2.8 Alternatives Screening Process

The draft EIS must present the environmental effects of the Proposed Action and alternatives in comparative form, sharply defining the issues and providing a clear basis for choice by decision-makers and the public (40 CFR 1502.14; Forty Questions No. 1).

The draft EIS must rigorously explore and objectively evaluate a reasonable range of alternatives along with the Proposed Action. Reasonable alternatives are those that feasibly may be carried out based on technical, economic, and environmental factors. Reclamation is not required to evaluate alternatives beyond the reasonable range of alternatives discussed in the environmental document. If alternatives have been eliminated from detailed study, the EIS must briefly discuss the reasons for their elimination (40 CFR 1502.14[a]; Forty Questions No. 1[a]).

The screening of alternatives starts with the statement of purpose and need, as identified in Chapter 1. In addition to the statement of purpose and need, Reclamation developed screening factors, based on cost, logistics, technology, social, environmental, and legal factors, that were considered in alternatives screening.

Typically, the development, evaluation, and selection of alternatives is a process in which Reclamation first lists a broad range of choices and then progressively narrows down the list to meet the purpose and need for action and feasibility factors. However, since the early 1990s the property has been conceived of for use as a groundwater bank, and an array of regional and site-specific alternatives has been considered. This information and past screening of viable approaches to water banking provide important context in the evaluation of alternatives and the reasoning that has led to the currently proposed alternatives. The screening process is described following Background.

2.8.1 Background

Early project screening was conducted by former property owner Heber Perrett, Reclamation, California Department of Water Resources (DWR), former property owner Azurix Corporation, and MID. These groups explored a variety of alternatives, structural and nonstructural, throughout California. However, almost all of the proposed alternatives did not meet the objectives of a regional conjunctive-use groundwater bank in Madera County with an objective of increasing water supply reliability to MID farmers. Consequentially, these alternatives were not advanced as feasible alternatives because they failed screening as discussed below. Past alternatives considered and eliminated by these groups, including MID, included the following:

Water Conservation

Water conservation–related alternatives have limited potential to increase water supply reliability and reduce groundwater degradation in Madera County given the amount of water demand and size of the current and future overdraft anticipated. Water conservation is a component of all water management plans, but it is only one small component of voluntary and regulatory programs that are needed in Madera County (Madera County 2008).

Surface Water Storage

Surface water storage likely will be needed over the long term to address ongoing water supply and reliability issues throughout California and possibly in Madera County. However, there are few surface water storage options in Madera County that provide MID with necessary capacity to provide increased operational

flexibility and groundwater overdraft protection. Furthermore, the surface water storage options are in the foothills, are likely to cost hundreds of millions of dollars, and are many years from obtaining water right entitlements and construction. The primary storage facility under consideration is Temperance Flat. This regional facility is still in the early planning phase and the cost required by MID and MID farmers would be substantially higher for a surface storage facility. Valley floor facilities are not feasible because of the limiting nature of geologic, topographic, and land use conditions in Madera County that eliminate the possibility of surface water storage.

Groundwater Banking in Other Areas

A variety of groundwater banking options in other areas was considered, including groundwater banking north of the Delta; groundwater banking in San Joaquin, Kern, or Fresno County; groundwater banking in other areas outside Madera County; and other groundwater banking sites in Madera County.

These alternatives were eliminated because of lack of existing water rights; lack of storage space in other areas; a substantial increase in water costs because of incurring storage and conveyance costs (see Water Transfers below); lack of contribution to groundwater overdraft protection in Madera County because there would be no recharge to the local aquifer; and significantly higher costs to construct a project on high-value land.

Water Transfers

Water transfers from imported water supplies likely would have to come from other CVP contractors. The CVP as a whole, like the Friant Division, is experiencing water supply reliability problems attributable to drought, water quality, and biological issues. Therefore, basing the project on water transfers would, in essence, be predicating achieving the purpose and need on long-term transfer agreements for another unreliable water supply. Water delivery through the Delta is constrained significantly per the 2008 BO on the Continued Operations of the CVP on CVP and SWP operations.

In-Lieu Recharge

In-lieu recharge is a component of an overall water management program. Encouraging farmers to use surface supplies in-lieu of pumping groundwater would depend on the water year type and availability of the water supply, including a component of the water supply being available via banking or transfers. As described above, groundwater banking in other areas and water transfers are costly and do not meet the purpose and need. In-lieu recharge has limited potential to increase water supply reliability in Madera County and would increase the cost of conveyance to MID users if using out-of-area water.

MID's Alternatives

Previous screening as described above narrowed the range of alternatives to the use of the Madera Ranch property and potentially other locations in Madera County. However, as detailed below, other potential locations in Madera County were not found to be large enough, or underlain by sufficient banking space, to meet WSEP needs. Therefore, alternatives screening ultimately focused on alternative configurations and layouts for the project-specific facilities to minimize effects on biological resources while still meeting the objectives of the Proposed Action and the engineering design requirements.

The primary objective "is to meet the need for additional storage and reliable and affordable water supplies for MID customers." Accordingly, MID's 2005 EIR alternatives analysis, which is incorporated by reference, was limited to Madera County. As such, a wide variety of potential water delivery and banking locations was evaluated in or adjacent to MID's existing service area. MID, through the 2005 EIR process, determined that only Madera Ranch offered sufficient areas of land with adequate groundwater recharge qualities, proximity to existing water conveyances, and available groundwater banking space to meet its identified objectives. Areas considered to be fatally flawed or impractical were screened out because of effects related to land use conversion, neighboring groundwater users, habitat, geohydrologic resources, and cost (Madera Irrigation District 2005).

MID developed alternatives based on the sources of water to be recharged, the capacities of the groundwater banking facilities, and the configuration of proposed facilities within the boundaries of Madera Ranch. Based on MID's screening during the 2005 EIR process, two alternatives were carried forward for analysis in the EIR.

Alternative 1 in the 2005 EIR (previously proposed by Azurix) is an "engineered" alternative that focused on the construction of percolation ponds and a large 12-mile delivery canal. It would require an approximately 3,000-acre area and use of both grassland and agricultural land. It would include a diversion site approximately 1 mile upstream of Mendota Dam on a portion of the San Joaquin River that receives water from the Bay-Delta. An intake channel and 12-mile-long canal would need to be constructed to convey the diverted water via three lift stations to Madera Ranch. The canal would be lined with concrete between the first pumping plant and Madera Ranch. MID did not select this alternative because of the environmental effects associated with using lower-quality water and removing agricultural land from production, and the higher cost associated with constructing the canal.

Alternative 2 in the 2005 EIR (MID's Proposed Action, or Alternative B) would upgrade existing MID conveyances and add additional recharge areas and new recovery wells on the Madera Ranch property. These facilities would be used to bank San Joaquin River and Fresno River surface water and to recover the banked water when needed. The recovery of water would be limited to 90% of the

amount recharged, thereby reducing the rate of overdraft of the underlying aquifer. MID would construct Alternative B in two phases.

A No Action Alternative (Alternative A), consisting of the sale and use of the property for other agricultural uses (e.g., dairies), also was analyzed.

2.8.2 Alternatives Screening

Alternatives that do not meet the purpose and need or cannot be technically implemented can be eliminated from detailed study, but the EIS must contain a description of the screening process used to exclude alternatives from the reasonable range. While Reclamation's scope is fairly narrowly defined to include improvements to Reclamation's facilities and banking outside MID's service area, Reclamation is compelled under NEPA to review all potential alternatives to ensure that no feasible alternatives are capriciously excluded from consideration. Viable alternatives brought forward for consideration in the NEPA process were evaluated using the following criteria.

- The alternative can meet the purpose and need.
- The alternative can be reasonably and technically implemented.
- The cost or environmental impacts would not be prohibitive.

Screening criteria against which all alternatives should be measured should include such items as cost limits, geographical boundaries, and meeting the purpose and need.

The study area for Reclamation was limited to the regional area of Madera County, primarily MID's service area, in order to meet the purpose and need. The range of alternatives for this alternatives analysis was not limited to the Madera Ranch property, as alternatives outside of Madera Ranch still have the potential to meet the purpose and need. Reclamation's analysis also considered nonstructural alternatives. The following alternatives were considered.

- Nonstructural alternatives, including water transfers and conservation.
- New recharge ponds on Madera Ranch within MID service area.
- New recharge ponds on other properties (i.e., not on Madera Ranch) within MID service area.
- A Mendota Pool–supplied project (the Azurix project).
- Injection well recharge.
- Expansion of MID's delivery facilities.
- The Proposed Action with swale recharge only.
- Other users of the bank for storage.

Each of these alternatives is described below.

Alternatives Considered but Eliminated from Further Consideration

Nonstructural Alternatives, Including Water Transfers and Conservation

The groundwater overdraft situation in Madera County is so dire that many techniques and projects will need to be implemented to meet future agricultural and urban water demand (Madera County 2008). Water transfers and conservation are being explored and implemented by various water districts as part of a comprehensive county-wide water management approach. However, the yield from these projects is small compared to MID's needs, these approaches do not result in additional dry-year banking capacity to support a reliable water supply, and these projects contribute only a small amount to reducing groundwater overdraft (Madera County 2008). MID, Madera County, and other local irrigation and water districts will continue to implement transfer and conservation efforts, but this alternative would not meet MID's objectives or Reclamation's purpose and need and would not be reasonable to implement.

New Recharge Ponds on Madera Ranch within MID Service Area

This alternative would involve the creation of recharge ponds on portions of Madera Ranch within MID's service area (Figure 2-1). This alternative was rejected for three key reasons.

1. Soils on Madera Ranch within MID's service area are not appropriate to allow for sufficient recharge and would require an additional 1,000 acres of recharge area on properties along the eastern edge of Madera Ranch (Bookman-Edmonston 2003).
2. Construction of ponds on Madera Ranch in MID's service area would require conversion of 1,600 acres of prime agricultural lands on Madera Ranch and another 1,000 acres of prime agricultural lands on adjacent properties in MID's service area; this would results in effects that are contrary to MID's mission of providing water to farmers by removing existing agricultural lands from production and would require substantial additional capital expenditures. It does not meet MID's objectives or Reclamation's purpose and need, and cannot be reasonably implemented.

New Ponds on Other Properties within MID Service Area

This alternative would involve the expansion of MID's existing recharge ponds and/or construction of new recharge ponds on other properties within MID's service area. MID's existing recharge ponds are not large enough to meet the required recharge needs and could not meet the recharge needs even if expanded. The key reason the use of other properties was rejected is that other sites with

permeable soils cannot achieve the 55,000 af/year volume anticipated at Madera Ranch. Madera Ranch is relatively large and is in a key location near the end of MID's service area and conveyance facilities. The Madera Ranch property also has a smaller number of adjacent groundwater users compared to the majority of MID's service area, which reduces the risk of infiltrated water being withdrawn by adjacent users. Use of other sites for recharge also would require conversion of prime agricultural lands, thus resulting in increased agricultural effects. Acquisition necessary to implement this alternative would require substantial additional capital expenditures and be cost-prohibitive for MID under current market conditions.

Mendota Pool Supplied Project

The Mendota Pool Supplied Project (the Azurix project) was one of the alternatives analyzed by MID in its 2005 EIR. This alternative would consist of a combination of distribution system improvements and groundwater recharge conducted using engineered recharge basins constructed on the portions of the Madera Ranch property where active cultivation currently exists. The water supply for the alternative would be Bay-Delta CVP water from Mendota Pool. The diversion site would be approximately 1 mile upstream from Mendota Dam. An intake channel and 12-mile-long canal would need to be constructed to convey the diverted water via three lift stations to the Proposed Action area. The canal would be concrete-lined between the first pumping plant and Madera Ranch. In order to finance the acquisition of land for the new canal and finance construction of the engineered recharge basins, the project would require double the capacity of the Proposed Action and would require non-local participation to facilitate the water transfers necessary to acquire water from Mendota Pool. MID does not hold water rights to water in Mendota Pool and therefore would be required to enter into long-term transfer and exchange agreements with third parties such as the San Joaquin River Exchange Contractors to make water available for banking. In addition, the project would not include conveyances for direct delivery of recovered water into MID. Rather, it would rely on the following chains of exchanges and transfers to enable delivery of banked water back to MID.

- Banked water would be recovered from Madera Ranch and pumped back to Mendota Pool for use by others such as the San Joaquin River Exchange Contractors in lieu of their normal Delta-Mendota Canal deliveries.
- The equivalent volume of water now made available in the Bay-Delta would be conveyed through the California Aqueduct to the southern part of the Central Valley and delivered to a southern Friant Division contractor in lieu of its normal Friant deliveries, making an equivalent volume of water available in Millerton Reservoir available for delivery to MID farmers.

As analyzed in MID's 2005 EIR, water quality in Mendota Pool is of substantially lower quality compared to MID's Friant Division and Hidden Unit contract supplies and compared to the existing groundwater quality beneath Madera Ranch. For this reason, the MROC, the committee responsible for monitoring the operations of the WSEP, requires prior approval before any use of Mendota Pool water by a vote of 9 consenting, with no dissenters among the 10-person committee. This requirement, as well as concerns regarding water quality and cost of constructing a new 12-mile canal, resulted in MID determining that this alternative does not meet the purpose and need. In addition, for MID to physically receive water from this configuration for its farmers, MID would be required to perform a complex set of exchanges and transfers with State Water Project (SWP) and Southern Friant Contractors, resulting in reduced reliability due to uncertainties associated with long-term availability of pumping capacity in the Delta, as well as delivery capacity in other conveyances not controlled by MID and long-term willingness of several third parties to perform exchanges and transfers. This alternative would not meet the screening criteria for Reclamation as the alternative is prohibitively greater in cost and in environmental impacts than the other alternatives, and the alternative cannot be reasonably implemented.

Injection Well Recharge

This alternative would achieve recharge directly using injection wells rather than swales and basins as proposed by MID. This alternative does not satisfy MID's purpose and need because of costs and technical and logistical issues. Similarly, Reclamation eliminated this alternative from further analysis because of its technical infeasibility and high costs compared to the cost of other feasible alternatives. Recharge using injection wells would pose the following significant challenges (Schmidt 2009).

- Injection wells typically accept water at lower rates than they can pump. Assuming that the Proposed Action (Alternative B) planned project wells are configured for both injection and recovery, Schmidt (2009) estimated that an additional 60 injection wells would be required to attain a recharge rate of 200 cfs. Injection wells require a higher quality of construction, instrumentation, and control than pumping wells. Taken together, Schmidt (2009) estimated that use of injection wells would increase well field capital costs by at least 50%. This increase in costs does not include the significant additional piping and a regulation reservoir that also would be required.
- Water would require treatment before injection to remove air, suspended particulates, bacteriological constituents, nutrients, organic constituents, and algae that would clog the wells, clog the geologic formation the water is injected into, and degrade groundwater quality. In addition, treatment may create trihalomethanes. Schmidt (2009) estimates that a 130-million gallon per day (mgd) treatment plant would be required, with capital costs "in the hundreds of millions of dollars." MID does not have the staffing or

equipment to operate a treatment plant and would be required to invest millions of dollars to obtain this functionality. It also should be noted that operation of the treatment system would generate solid wastes requiring disposal.

- A high degree of expertise and operational infrastructure that MID lacks would be required to successfully operate and maintain injection wells over the long term, significantly increasing project operations and maintenance (O&M) costs. Schmidt (2009) estimated that injection wells would increase O&M costs by approximately $2.4 million dollars per year. This O&M estimate does not include O&M costs associated with the treatment plant.
- Surface-based recharge systems can last indefinitely with appropriate maintenance. However, even with treatment systems and the facilities summarized above, the useful life of injection wells would be no more than 30 years, resulting in a need for MID to incur periodic replacement costs.

Taken together, use of injection wells would increase WSEP capital costs by hundreds of millions of dollars, increase O&M costs by millions of dollars per year, provide uncertain performance, and require a complete reinvention of MID's O&M staffing and equipment resources. Schmidt (2009) reviewed numerous water banking and recharge projects throughout the Central Valley and found that injection wells were not selected for any of the projects for the variety of reasons summarized above.

Expansion of MID's Delivery Facilities

This alternative would involve the expansion of delivery facilities, including widening, deepening, and constructing new canals within MID's service area to attain storage, recharge, and conveyance goals. This would allow MID to move their water allocation to users more effectively without requiring additional banking. MID could further enlarge the Section 8 Canal and also use Cottonwood Creek, which would contribute a small amount to groundwater recharge. However, the groundwater overdraft situation in Madera County is so dire that canal expansion and extensions would not reduce this problem; many techniques and projects, including conveyance projects, would need to be implemented to meet future agricultural and urban water demand (Madera County 2008). More importantly, this alternative would not meet MID's needs, as it would not provide sufficient banking to enable provision of water to users in dry years because the recharge amounts would be small. This alternative was not advanced for technical reasons and because it does not meet the overall purpose and need.

The Proposed Action with Swale Recharge Only

This alternative would be similar to the Proposed Action, but would rely solely on the swales to put water into the bank. This alternative assumes that engineered recharge ponds would not be needed. This alternative could meet the purpose and need. MID has proposed retaining the recharge ponds to ensure the alternative remains technically feasible and acceptable from a regulatory perspective. Extensive pilot testing indicates that the identified swales could provide the required recharge capacity, but the long-term performance is uncertain. Additionally, controversy remains regarding the use of the swales relative to biological impacts because of the uncertainty of these effects on endangered species. Therefore, in order to provide certainty that the project can meet objectives, MID is obligated to contemplate Phase 2 recharge basins as a back-up in the event that the swales cannot provide the required long-term performance. A swale-only alternative provides a reduction in biological effects associated with grassland conversion and a reduction in air quality effects from construction of the ponds. However, as described above, other biological resources could be adversely and unacceptably affected by use of the swales. Because there is still some question regarding its feasibility and because of existing concerns by the U.S. Fish and Wildlife Service and California Department of Fish and Game, it was eliminated according to Reclamation's screening criteria.

Other Users of the Bank for Storage

MID's Proposed Action identifies agricultural users with 64% of the bank's annual operational capacity; industrial, commercial, and residential users with 18% of the capacity; and environmental users with 18% of the capacity. Under an Other Users alternative, the percentage of capacity used for urban or environmental purposes could be increased. This would increase the water supply reliability for urban or environmental users provided they could obtain the needed water rights to bank the water. The direct, indirect, and cumulative effects of this alternative would vary depending on which user received the majority allocation. However, this alternative would not achieve MID's objectives of providing its customers with a significant increase of dry year water supply. This alternative would not meet Reclamation's purpose of and need for this project.