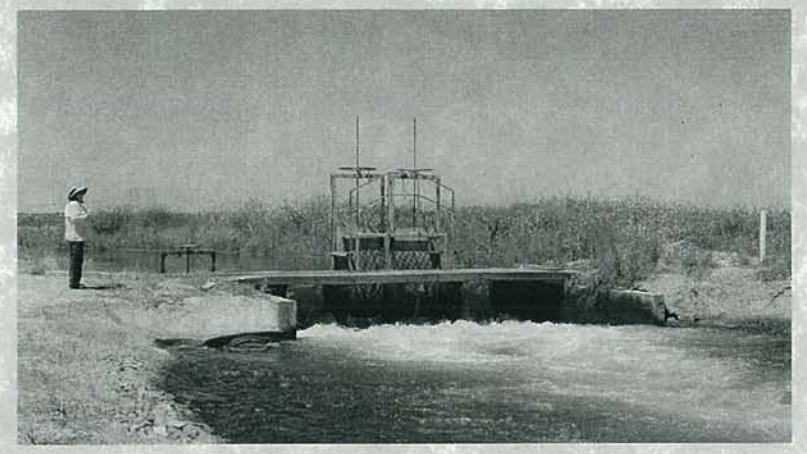
GRAY LODGE WATER SUPPLY PROJECT

Cultural Resources Inventory and Evaluation
Butte County, California

T. 17N, R. 1E: Sec. 1
T. 17N, R. 2E: Secs. 3, 4, 5, 7, 8, 9, 10, 17, 18
T. 18N. R. 1E: Sections 25, 36
T. 18N. R. 2E: Secs. 1, 2, 11, 14, 15, 22, 23, 25, 27, 28, 29, 30, 31, 34, 36
T. 18N. R. 3E: Sections 5, 6 (Mt. Diablo Meridian)
Biggs, Gridley, Pennington, West of Biggs USGS 7.5' Quadrangles
Approximately 24.3 Linear Miles



Prepared By
Ric Windmiller, M.A., R.P.A.
Kenneth L. Finger, Ph.D.
Carol Roland-Nawi, Ph.D.

Ric Windmiller
Consulting Archaeologist
2280 Grass Valley Hwy. #205
Auburn, CA 95603

Prepared For
Harvey Consulting Group LLC
1861 Coarse Gold Place
Gold River, CA 95670

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MANAGEMENT SUMMARY

The Gray Lodge Water Supply Project is a collaborative effort between the Biggs-West Gridley Water District and the U.S. Department of the Interior, Bureau of Reclamation to increase water for the Gray Lodge Wildlife Area. The wildlife refuge is located on the north side of the Sutter Buttes in the mid-Sacramento Valley, California.

In 1997, an environmental assessment (EA) and initial study (IS) included the use of the existing Biggs-West Gridley facilities with improvements to those facilities as one of the alternatives for enhancing water delivery to the wildlife area. The EA/IS concluded that no impacts to cultural resources were anticipated. However, additional improvements in the project design since the 1997 EA/IS included potential impacts to cultural resources not envisioned in the 1997 EA/IS.

The purpose of the present study is to identify all cultural resources that may be affected, evaluate the eligibility of those resources for the National Register of Historic Places, California Register of Historical Resources and determine if any of the resources qualify as "unique archaeological resources" under CEQA statutes and guidelines. The study also assesses the potential effect of the proposed project on historic properties, historical resources, and under CEQA's Appendix G, "unique paleontological and geological resources."

Efforts to identify historic properties eligible for the National Register, historical resources eligible for the California Register and unique archaeological, paleontological and geological resources included records searches by the Northeast Information Center, California Historical Resources Information System, a Paleo-Localities Database search at the University of California, Berkeley, a sacred lands file search by the Native American Heritage Commission, contacts with Native Americans listed by the commission, archival research and field inspections documenting cultural resources on DPR 523 series forms distributed by the California Office of Historic Preservation.

As a result of these efforts, the study identified seven canal laterals: Belding, Schwind, Traynor, Gerst, Sheppard, Cassady and Rising River. The study also identified two bridges and seven public road crossings at canal laterals. Two locations where Native American artifacts had been reported earlier lie adjacent to the project's Area of Potential Effect (APE). However, no Native American cultural resources were identified during the field inspection.

The two bridges, Belding/Biggs Extension Canal at S.R. 99 (Bridge #12-04) and Farris Road at Belding lateral (Bridge # 12C0123) have been determined not eligible for the National Register by the California Department of Transportation. The seven public road crossings are not eligible for either the California Register or the National Register [Afton Road at Belding lateral, Riley Road at Belding lateral, Farris Road (south) at Belding

lateral, Colusa Highway at Schwind lateral, Colusa Highway at Traynor lateral, West Liberty Road at Traynor lateral and West Evans-Reimer Road at Rising River lateral]. Although some of the canal laterals contained concrete structures dating back as far as 1908, very little information is available on the canals, the history of their initial construction, improvements and other information necessary to validate their eligibility for the California Register of Historical Resources or the National Register of Historic Places. As a consequence, none of the segments of these laterals included in the present study are eligible for either the National Register or the California Register.

No historical resources (Public Resources Code §5021.1) were identified in the project area. Also, no unique paleontological resources or unique geological features were identified during the study. No historic properties were identified [36 CFR Part 800.16(l)(1)] within the APE.

As a result of the above efforts to identify cultural resources eligible for the California Register or that qualify as unique archaeological resources, no historical resources will be affected (Public Resources Code §5021.1). Due to the rarity of significant paleontological finds in southwestern Butte County, it is unlikely that such finds would occur once the project is underway. As no cultural resources eligible for the National Register were identified within the APE, no historic properties will be affected [36 CFR Part 800.4(d)(1)].

Although no Native American artifacts or cultural deposits were found during the field inspection, there are verbal and archival reports of isolated Native American artifacts found in the vicinity of Potential Staging Area 3 (PSA-3) and in the general vicinity of proposed new canal construction for Alternative-2 and Alternative-3, the Cassady lateral alternative. It is recommended that an archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric archaeology monitor any ground disturbing activities in the vicinity of both locations, as the probability of discovering sub-surface cultural deposits may be greater at the two locations than in the remainder of the APE where the probability for encountering buried archaeological resources is relatively low.

In the unlikely event that buried archaeological resources are encountered during ground disturbing activities, an archaeologist meeting the Secretary of the Interior's professional qualifications standards in prehistoric or historical archaeology, as appropriate, should assess the importance of any find and recommend a course of action that would mitigate any adverse effects, if appropriate.

If human remains are encountered, all work must cease in the immediate vicinity of the find and the County Coroner must be notified in accordance with California law.

If the project area is expanded, a cultural resources inventory and evaluation shall be conducted for the expanded area(s) not encompassed by the present study.

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INTRODUCTION

The Gray Lodge Water Supply Project is a collaborative effort between the Biggs-West Gridley Water District and the U.S. Department of the Interior, Bureau of Reclamation. In 2003, the water district entered into an agreement with the Bureau of Reclamation to convey water by the water district to Gray Lodge Wildlife Area located on the north side of the Sutter Buttes in the mid-Sacramento Valley, California (see Figure 1). The long-term agreement included funding and construction of improvements to the Biggs-West Gridley Water District's distribution system. The agreement requires studies and phases of design to cooperatively develop the needed water system improvements.

The Gray Lodge Wildlife Area is owned and managed by the State of California Department of Fish and Game. The wildlife area depends on the Biggs-West Gridley Water District for most of its water supply. The water district conveys water to support the wildlife area's seasonal wetlands, irrigated pastures and crop lands, mostly leveled rice fields, through canals and ditches to three delivery points at the north boundary of Gray Lodge.

In 1997, an Environmental Assessment (EA) and Initial Study (IS) included the use of the existing Biggs-West Gridley facilities with improvements to those facilities as one of the alternatives for enhancing water delivery to the wildlife area (Bureau of Reclamation 1997). The EA/IS concluded that no impacts to cultural resources were anticipated. However, the EA/IS stipulated that prior to construction of the selected alternative, the following tasks would be necessary to comply with Section 106 of the National Historic Preservation Act, as amended:

- Identify an area of potential environmental effect (APEE) for the project.
- Field survey any areas in the APE that were not examined in the current project and record and formally evaluate all resources in the APE.
- Produce a technical report on the findings of the above, including recommendations for mitigation, if necessary.
- If no significant cultural resources are located in the APEE and if Reclamation and SHPO (State Historic Preservation Officer) concur in this finding, this completes the Section 106 process. If a significant property is located in the APEE and an adverse impact is determined, consult with the ACHP (Advisory Council on Historic Preservation), SHPO, and other parties, as necessary.

Since the 1997 EA/IS, a list of improvements has been added to the Biggs-West Gridley Water District's facilities including three alternatives. Either one of two of the three alternatives may require excavation of a new canal. Therefore, changes in the design of the project added potential impacts to cultural resources.

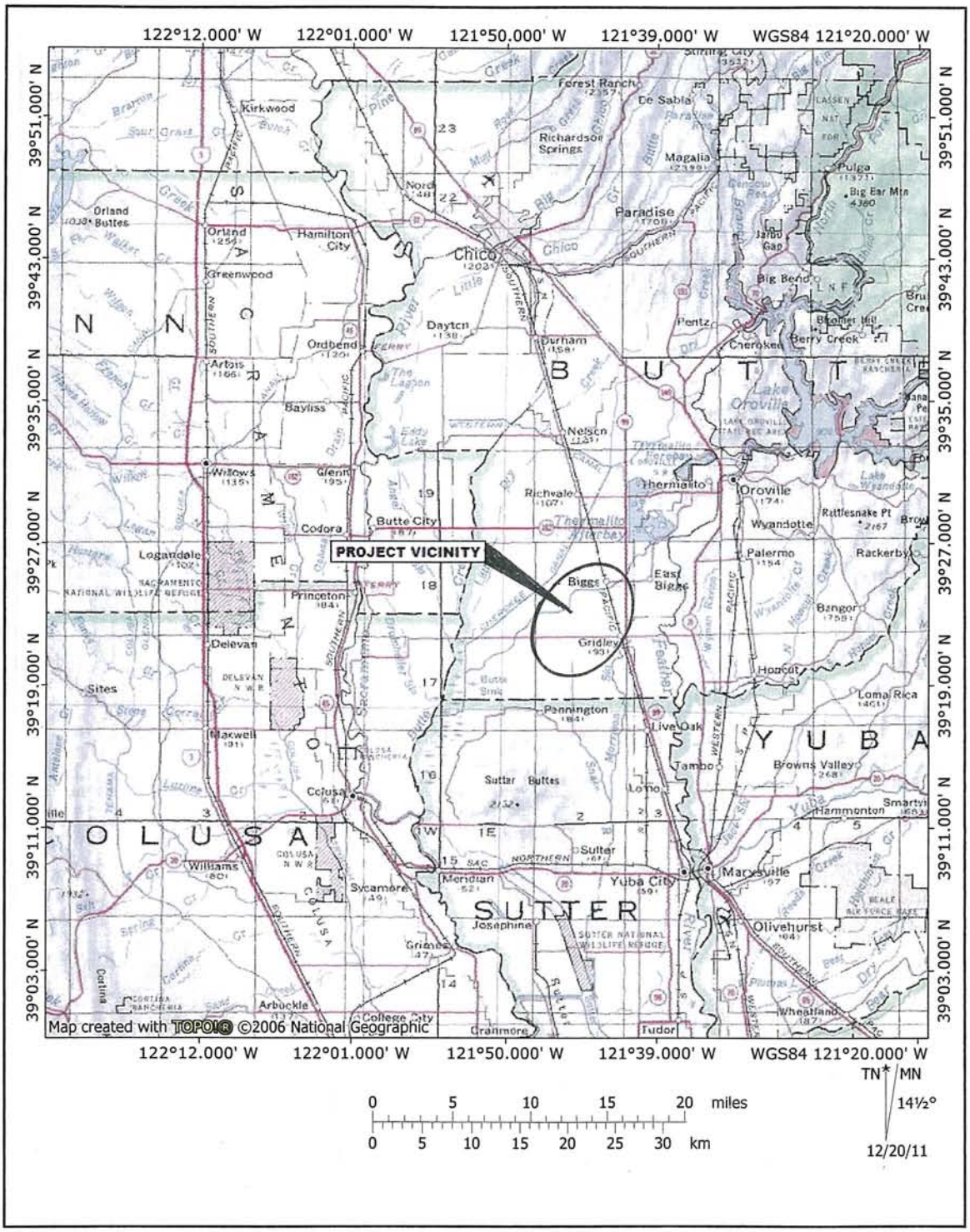

Figure 1. Gray Lodge Water Supply Project vicinity.

The purpose of the following cultural resources study is to identify cultural resources located within the current Area of Potential Effect (APE), assess the eligibility of those resources for the National Register of Historic Places, California Register of Historical Resources and assess eligibility as "unique archaeological resources" under California Environmental Quality Act (CEQA) statutes and guidelines. Under CEQA's Appendix G, unique paleontological and unique geological resources are also considered under the rubric, "cultural resources."

The cultural resources study was conducted by Ric Windmiller, Registered Professional Archaeologist, Carol Roland-Nawi, Architectural Historian and Kenneth L. Finger, Paleontologist. The project lead, Ric Windmiller, M.A., R.P.A., has more than 40 years experience directing archaeological, paleontological and historic building surveys and evaluations. Windmiller has conducted studies from Canada's eastern arctic to northwest Mexico. In northern California, his experience includes research projects in 36 counties north of the Tehachapis. Windmiller received his Bachelor's degree in anthropology from California State University, Sacramento, Master's degree in anthropology from the University of Manitoba, Canada and all but dissertation for a doctorate in the same field at the University of Colorado. Windmiller served as staff archaeologist at the University of Arizona and University of Colorado. He also served as staff archaeologist with the National Park Service Interagency Services where he oversaw all interagency cultural resource contracts for California, Nevada, Arizona and Hawaii. Windmiller meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric and historical archaeology.

Carol Roland-Nawi, Ph.D. has 30 years of active involvement in a broad range of cultural resource and environmental programs and issues in California. She has extensive knowledge of historic property designation, preservation policy, land use planning and environmental regulation at the local, state and federal levels. Dr. Roland-Nawi has wide experience in historic resource survey and individual building and district evaluation. Dr. Roland-Nawi has prepared a large number of historic resource Section 106 and CEQA cultural resource technical reports for purpose of NEPA and CEQA compliance. She is familiar with State Office of Historic Preservation policy and practice, California transportation and energy agency environmental processes. She meets the Secretary of the Interior's professional qualification standards in history and architectural history.

Kenneth L. Finger, Ph.D. is a Museum Scientist with the University of California, Museum of Paleontology, Berkeley, as well as a consulting paleontologist He has served as a senior project scientist/paleontologist with Michael Brandman Associates and LSA Associates. Dr. Finger has also served as an adjunct lecturer and professor at a number of colleges and universities in southern California. He is a former research geologist and exploration paleontologist for Chevron U.S.A.

Federal Regulatory Background

The U.S. Department of the Interior, Bureau of Reclamation is the lead federal agency for

the proposed project. The purpose of the present study in part is to assist the Bureau of Reclamation in meeting its responsibilities under Section 106 of the National Historic Preservation Act, as amended (see Appendix A: Statement of Qualifications). A Section 106 consultation is a federal review, separate from any environmental or planning reviews required by state and local laws and ordinances. The purpose of Section 106 is to avoid unnecessary harm to historic properties, which include any National Register of Historic Places listed or eligible prehistoric or historic objects, sites, buildings, structures or districts (National Park Service 1991b: Appendix IV-2). Under federal regulations at 36 CFR Part 800, effective January 11, 2001 and amended since then, the basic steps in a Section 106 review include:

- **Initiating the Section 106 process** (This step was added in 1999 to encourage early consideration of the potential effects of the federal permitting or other action, to coordinate with other reviews, to identify consulting parties such as the State Historic Preservation Officer and Federally recognized Indian tribes, and to make plans for other public involvement);

- **Identifying historic properties** (the federal agency is responsible for defining the Area or Areas of Potential Effects; also included in this step is the identification of cultural resources, evaluating the eligibility of those resources for the National Register, including sites to which Indian tribes attach religious and cultural significance, determining the eligibility of those resources for the National Register and determining whether or not historic properties will be affected);

- **Assessing Adverse Effects** (the federal agency must consider both direct and indirect effects, reasonably foreseeable effects that are cumulative, later in time or at a distance, and with respect to all qualifying characteristics of a historic property--*e.g.*, if an archaeological site is important for its scientific information potential and for its cultural or religious importance to an Indian tribe, then the adverse effects on both must be considered).

- **Resolving Adverse Effects** [the process of negotiating a Memorandum of Agreement (MOA) between the consulting parties was streamlined in 1999 and now may involve only the federal agency and the State Historic Preservation Officer as signatories. However, the Advisory Council recommends that the federal agency should invite federally-recognized Indian tribes that attach religious and cultural significance to properties off tribal lands to concur with the findings in the MOA].

Under federal regulations, where there is a federal undertaking on non-federal land (*e.g.*, federal funding), a consultant may gather information necessary for the federal agency to meet its responsibilities under Section 106, but the agency official remains legally responsible for all required findings and determinations [36 CFR Part 800.2(a)(3)].

In accordance with 36 CFR Part 800.2(c)(ii)(A), (B) and (C), it is the agency official who has the responsibility to make a reasonable and good faith effort to identify Indian tribes that shall be consulted in the Section 106 process. The federal government has a unique

legal relationship with Indian tribes set forth in the Constitution of the United States, treaties, statutes and court decisions, and, therefore, consultations must recognize this government-to-government relationship. However, the consultant may gather information that may be helpful in the consultation process.

CEQA Regulatory Background

In 1992, the Public Resources Code was amended as it affects cultural resources. The amendments included creation of the California Register of Historical Resources (Public Resources Code §5020.4, §5024.1 and §5024.6). While the amendments became effective in 1993, it was not until January 1, 1998, that the implementing regulations for the California Register were officially adopted (Public Resources Code §4850 *et seq.*).

The purpose of the present study is also to identify any cultural resources eligible for the California Register of Historical Resources and archaeological resources that potentially meet criteria as "unique archaeological resources" under current CEQA statutes and guidelines. Under CEQA's Appendix G, "cultural resources" include not only historical resources but paleontological resources and unique geological features.

CEQA statutes [Public Resources Code §21001(b) *et seq.*] require planning agencies to carefully consider the potential effects of a project on historical resources. Under the revised and adopted CEQA guidelines in §15064.5, a "historical resource" includes: a resource listed in or eligible for the California Register of Historical Resources; or listed in a local register of historical resources; or identified in a historical resource survey and meeting requirements in §5024.1(g) of the Public Resources Code; or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines historically significant, provided the determination is supported by substantial evidence in light of the whole record; or a resource so determined by a lead agency as defined in Public Resources Code §5020.1(j) or §5024.1.

Under CEQA guidelines, "A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment [Public Resources Code §15064.5(b)]. "Substantial adverse change" is ". . . physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired [Public Resources Code §15064.5(b)(2)].

While alteration of the setting of an archaeological site that is eligible only for its information potential may not affect the site's significant characteristics, alteration of a property's location (*viz.*, removing or damaging all or part of the site) may have a significant adverse effect. CEQA's Guidelines §15126.4(b)(3) state, "Public agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature." The guidelines further state that preservation in place is the preferred manner of mitigating impacts, and that preservation ". . may be accomplished by, but is not limited to, the following":

1. Planning construction to avoid archaeological sites;

2. Incorporation of sites within parks, greenspace, or other open space;

3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site.

4. Deeding the site into a permanent conservation easement.

CEQA guidelines state, "when data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken" [CEQA Guidelines §15126.4(b)(3)(C)]. However, "data recovery shall not be required for a historical resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource . . ." [CEQA Guidelines §15126.4(b)(3)(D)].

CEQA also requires planning agencies to consider the effects of a project on "unique archaeological resources." If an archaeological site meets the definition of a unique archaeological resource (Public Resources Code §21083.2), then the site must be treated in accordance with the special provisions for such resources, which include time and cost limitations for implementing mitigation.

California law also protects Native American burials, skeletal remains and associated grave goods regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains (Health and Safety Code §7050.5, Public Resources Code §5097.94 *et seq.*).

PROJECT DESCRIPTION

The proposed project consists of improving or replacing individual structures along the Biggs-West Gridley Water District's canal system, which consist of bridges, siphons, flumes, weirs, checks, and farm crossings. Improvement of the water conveyance facilities will be accomplished by retro-fitting or replacing these structures throughout the canal system, as well as modifying canal cross-sections to improve hydraulics. The canal system will be graded to "smooth" the channel to improve the hydraulics and portions will be widened to increase capacity.

Biggs-West Gridley Water District's irrigation canal system is divided into the following laterals: Belding, Schwind, Traynor, Rising River, Casssady, Gerst, and Shepperd. The proposed project is comprised of a linear corridor approximately 16.5 miles in length covering the length of all canals included in the project design. In addition to the above proposed action, three alternative segments have been examined based on the design analysis (see figures 2 and 3).

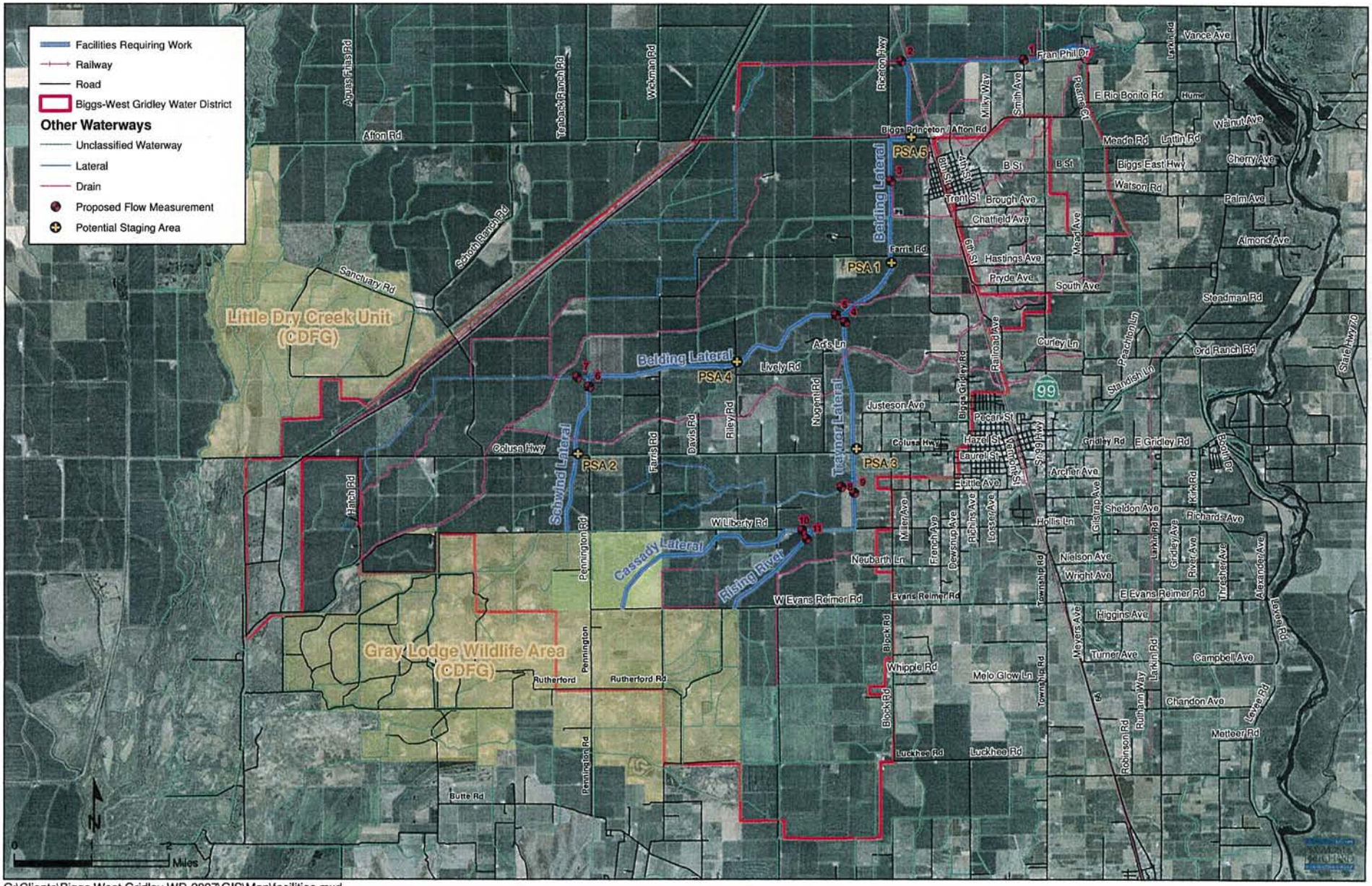

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Figure 2. Location of canal laterals and staging areas.

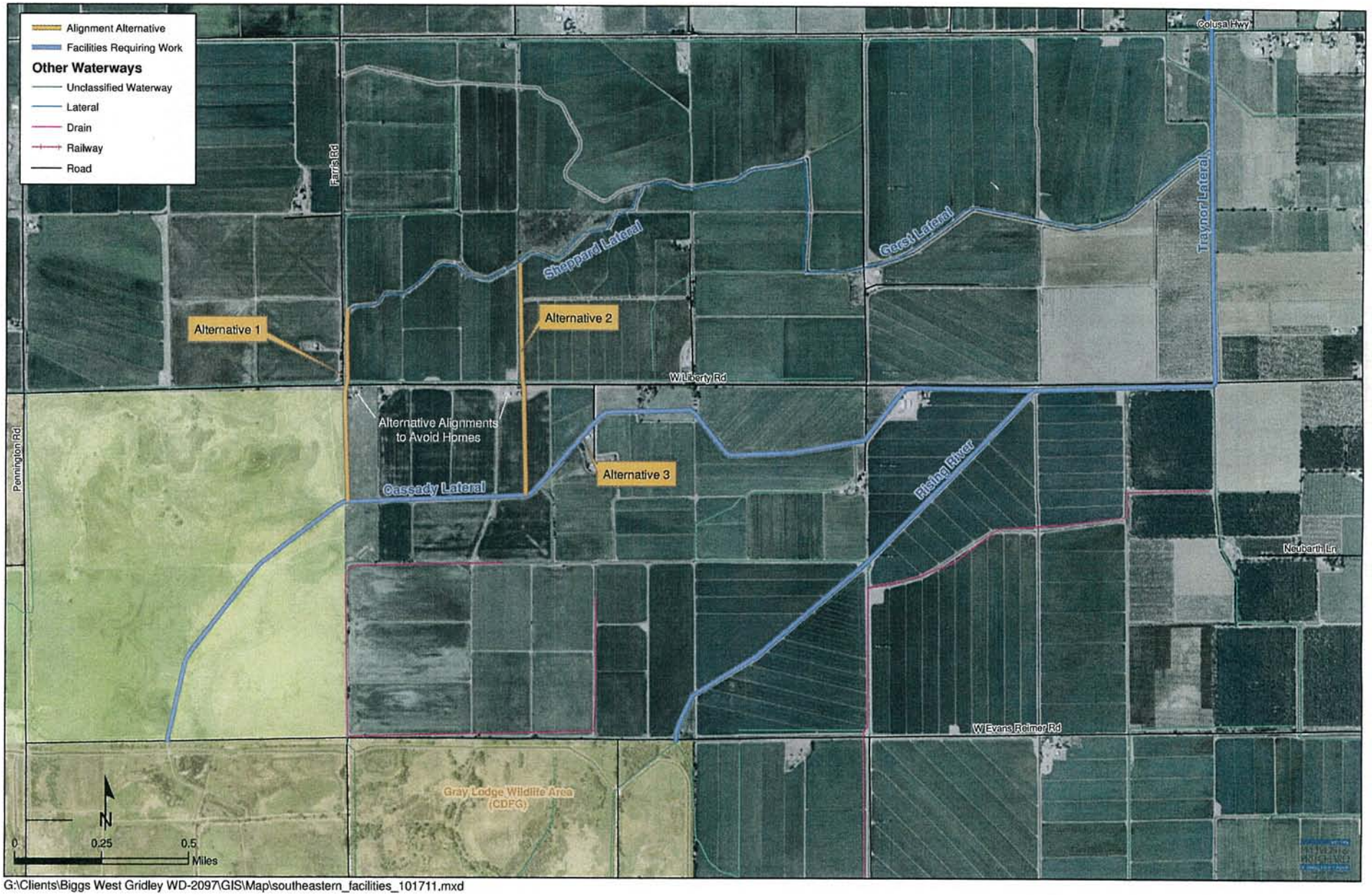

Figure 3. Location of Alternatives 1, 2 and 3.

The Belding, Schwind, Traynor and Rising River Laterals have been modified since 1999, and therefore required resurveying. The modifications made by the Water District included reshaping or armoring sections of the canal banks. Additionally, the Water District has removed a structure on the Belding Lateral and replaced the Cassady head gates.

The proposed system improvements represent general agreement between the Bureau of Reclamation and the Water District, reached in this stage of project development, regarding the improvements necessary to accomplish project objectives and mitigate project effects. During final design, the operational role of each major structure will be investigated cooperatively with the Water District to ensure that the specific structure type will achieve its desired function. These structure refinements would benefit the Gray Lodge Water Supply Project by enhancing the Water District's ability to run its system efficiently while reliably delivering water to the Gray Lodge Wildlife Area.

Three alternative canal routes have been identified, in part to avoid landowner concerns along a lower portion of the Cassady lateral. Alternative 1 involves the conveyance of water along the Traynor lateral to the Gerst lateral to the Sheppard lateral along Farris Road to the Cassady lateral and into the refuge. Alternative 2 conveys water along the Traynor lateral to the Gerst lateral to the Sheppard lateral along Davis Road into the Cassady lateral and into the refuge. Alternative 3 implements using the Cassady lateral from the Traynor lateral and into the refuge.

Five staging areas have been identified for construction equipment. Among these five, the specific sites to be used for staging construction equipment will depend upon the selected routing alternative selected. The staging areas are located near the Farris Road and Belding lateral intersection, Colusa Highway and Schwind lateral, Colusa Highway and Traynor lateral, Riley Road and Belding lateral, and Biggs Princeton/Afton Road and Belding lateral.

The major construction activities for the project consist of canal and concrete structure improvements. The canal work consists primarily of raising, reshaping, or widening the canal banks. The concrete structure work consists primarily of siphon, bridge, flume, and head gate improvements.

At 90 percent completion of the project design, typical canal excavation and embankment work will consist of shaving off the top of the levee on one side of the existing canal and dumping that fill into the existing drainage ditch at the outside foot of the levee. Then, the inside bank of the levee would be excavated to broaden the width of the existing canal. The excavated material will be placed on top of the levee, smoothed and compacted. An excavator will then dig a new drainage ditch at the outside foot of the reshaped levee and the excavated material would be placed on top of the adjacent levee, smoothed and compacted. The existing drainage ditch would be replaced approximately 4-10 feet farther away from the canal bank. All work would be performed over the existing drainage ditch or from the top of the existing canal bank. Therefore, the limits of ground disturbance beyond the outer edge of the existing narrow drainage ditch will be no more than 20 feet.

Table 1. List of proposed improvements to canal structures.

LATERAL	NAME & TYPE	IMPROVEMENT	DETAILS/NOTES
BELDING			
B-1	Raxorback Siphon	Remove existing siphon. Construct new siphon to take Dietzler Ditch flows under BWG main canal.	Remove existing siphon. Install two cross-drainage box siphons, each 50 feet long, 8 feet wide, six feet deep.
B-3	Railroad Culvert	Improve canal capacity under railroad crossing by installing two additional culverts.	Bore and jack two eight foot diameter pipe culverts adjacent to existing culverts.
B-5	Garcia Check/Weir	Replace structure with long-crested weir.	Remove existing check and replace with 70-foot long crested weir. Weir to be seven feet high and include three 3.3-foot wide overshot gates, maximum opening 6.5 feet.
B-6	Garcia Siphon	Remove existing canal siphon. Construct new siphon to take RD 833 flow under BWG main canal.	Remove existing canal siphon and replace with trapezoidal earthen canal section. Reconfigure RD 833 drainage by installing two cross-drainage box siphons, each 100 feet long by eight feet wide by six feet deep.
B-8	Biggs/Princeton (Afton) Road "Bridge"	Replace "bridge" with higher deck height and larger culvert opening.	Replace with two foot thick flat slab bridge deck with at least seven foot culvert opening. Assumes asphalt concrete (AC) driving surface will be applied.
B-10	Banion Check/Weir	Replace structure with long-crested weir.	Remove existing check and replace with 70 foot long crested weir. Weir to be 6.4 feet high and include three 4.5 foot wide overshot gates, maximum opening, 6.25 feet.
B-13	Fields Flume	Replace flume	Replace with 26 foot long flume with 8.5 foot high embankment walls, each six inches thick. Install two foot wide walkways. During final design, consider wasteway at this location to spill excess water.
B-16	Division 2 headgate (Belding/Traynor split)	Replace with three-bay sluice gate and relocate farm crossing bridge nearby.	Replace farm crossing with two foot thick flat slab deck and seven foot opening to canal bottom. Replace existing headgate structure with three-bay sluice gate, each four feet wide by seven feet deep. Increase height of adjacent canal banks to achieve 18 inches of freeboard.
B-18	Check #1889 or #349 Weir	Replace structure with long-crested weir.	Replace with 45 foot long crested weir. Weir to be 5.3 feet high and include one-four foot wide overshot gate, maximum opening, five feet.
B-20	Check #1845	Replace structure with long-crested weir.	Replace with 83 foot long-crested weir. Weir to be 4.7 feet high and include two-3.5 foot wide overshot gates, maximum opening 4.5 feet.
B-22	Farm crossing #1786 or #407.	Replace farm crossing to improve capacity and meet freeboard requirement.	Replace farm crossing with two foot thick flat slab bridge deck and eight foot opening to canal bottom. Assume deck and soffit will be raised by one foot to improve freeboard. Assume aggregate base backfill for driving surface.

LATERAL	NAME & TYPE	IMPROVEMENT	DETAILS/NOTES
B-23	Check #422/Farm crossing #443 or Farm Crossing #1719	Replace farm crossing to improve capacity and meet freeboard requirement.	Replace farm crossing with two foot thick flat slab bridge deck and 8.5 foot opening to canal bottom. Assumes deck with be raised by 0.7 feet and soffit by one foot to improve freeboard. Assume AC driving surface.
B-24	Farris Road Bridge	Replace farm crossing to improve capacity and meet freeboard requirement.	Replace bridge with open span, 1.7 foot thick slab deck with aggregate base backfill driving surface and 8.5 foot opening to canal bottom.
B-25	Bonslett Bridge or Bonslett check/farm crosssing	Replace bridge and replace control structure with long-crested weir.	Replace bridge with bridge-box culvert structure, with two foot thick slab deck and six foot by five foot culvert. Install 50 foot long-crested weir. Weir to be seven feet high and include one four foot wide overshot gate with maximum opening, 6.5 feet.
SCHWIND			
S-3	Farm Crossing #054	Replace with concrete box culvert and farm crossing	Replace with concrete box culvert, 24 feet long by nine feet wide by four feet high, with integrated farm crossing.
S-4	Schwind Flume/Crossing	Replace flume, eight feet wide by five feet deep.	Replace with 60 foot long by eight foot wide by five foot deep flume. Install check bays on both sides of flume to allow for spill.
S-5	Farm crossing/Check #58	Replace with long-crested weir and farm crossing.	Replace with 37-foot long crested weir. Wier to be 6.5 feet high and include one-three foot wide overshot gate, maximum opening, 6.5 feet.
S-6	Farm crossing #1491 or #71.	Replace with concrete box culvert and farm crossing.	Replace with concrete box culvert, 20 feet long by nine feet wide by four feet high, with integrated farm crossing.
S-8	Farm Crossing #1438	Replace with concrete box culvert.	Replace with concrete box culvert, 19 feet long by seven feet wide by four feet high with integrated farm crossing.
S-9	W. Liberty Road Siphon	Replace e3xisting structure4 with siphon.	Remove existing structure and install 16.2 foot long by siix foot diameter siphon. Single siphon will replace structures and accommodate flow between Farm Crossing #5021 and W. Libarty Road crossing.
S-10	W. Liberty Road Siphon	Remove existing structure.	Remove two-14.0 feet long by three foot diameter CMP culverts.
S-11	W. Liberty Road Siphon	Remove existing structure.	Remove 26 foot long by four foot diameter CMP culvert.
TRAYNOR			
T-3	Traynor headgates	Replace structure with long-crested weir.	Replace with 62-foot long-crested weir. Weir to be 7.5 feet high and include two three foot wide overshot gates, maximum opening, 6.5 feet.

LATERAL	NAME & TYPE	IMPROVEMENT	DETAILS/NOTES
T-4	Nugent Flume	Replace flume to improve freeboard and capacity.	Replace with 60 foot long by 22 foot side by 10.5 feet deep flume. Install two check bays, one on either side of flume, to allow for spill.
T-9	Farm Crossing #077	Replace farm crossing.	Replace with two foot thick flat slab bridge deck. Assumes asphalt concrete (AC) driving surface will be applied.
T-10	Check #099 Weir	Construct long-crested weir.	Construct 48 foot long crested weir. Weir to be 8.7 feet high and include two-three foot wide overshot gates, maximum opening, seven feet.
T-12	Colusa Highway "Bridge"	Replace bridge with larger culvert opening.	Replace bridge with flat slab, three foot deck height and two foot wide center pier. Maintain existing road height. Consider siphon under bridge. Assume AC driving surface.
RISING RIVER			
R-2	Check #059 weir	Replace structure with long-crested weir.	Long-crested weir will be 19 feet long and 3.1 feet high. Include one-four foot wide gate, maximum opening, three feet.
R-4	W. Evans Reimer Road "Bridge"	Replace bridge.	Replace with bridge having one foot thick center pier, two foot thick slab with seven foot opening to canal base. Bridge deck should have 2-3/8 inch thick AC road surface.
CASSADY			
C-1	Canal Section/Freeboard	Raise canal banks to meet freeboard requirements.	Increase height of 8,607 linear feet of canal banks to achieve 12 inches of freeboard and reshape to provide 14 foot minimum top width for canal banks.
C-2	Farm crossing #1226	Replace box culvert/crossing	Replace with concrete box culvert, eight feet wide by four feet deep by 24 feet long, with integrated farm crossing.
C-3	Bonslett's Driveway S#1199	Replace box culvert/crossing	Replace with concrete box culvert, four feet wide by six feet deep by seven feet long. Structure to have six foot high sidewalls and wingwalls adjacent to driveway.
C-4	Bonslett's Weir 1198	Replace structure with long-crested weir.	Replace with 56 foot long crested weir. Weir to be 2.7 feet high and include one-three foot wide overshot gate, maximum opening, 2.5 feet.
C-5	Culvert #1163	Replace structure with long-crested weir.	Replace with 27-foot long crested weir. Weir to be 6.3 feet high and include one three foot wide gate, maximum opening, 3.5 feet.
C-6	Canal Section/freeboard	Raise canal banks to meet freeboard requirements.	Increase height of 1,714 linear feet of canal banks to achieve 12 inches of freeboard and reshape to provide 14-feet minimum top width for canal banks..
C-7	Canal Section/freeboard	Raise canal banks to meet freeboard requirements.	Increase height of 980 linear feet of canal banks to achieve 12 inches of freeboard and reshape to provide 14 feet minimum top width for canal banks.

LATERAL	NAME & TYPE	IMPROVEMENT	DETAILS/NOTES
C-8	Canal Section	Raise canal banks to meet freeboard requirements.	Increase height of 1,982 linear feet of canal banks to achieve 12 inches of freeboard and reshape to provide 14 feet minimum top width for canal banks.

Maximum depth of excavation into native soil will be approximately four feet.

It is anticipated the following equipment would be used to complete this work, and that multiple structures and improvement segments would likely be underway at any given time: Cat 322 excavator; side-dump trucks, end-dump truck, Cat 966 wheel loader, Cat 446 backhoe; Cat CP-323 padded drum compactor; Cat 120H motor grader; water truck, mechanics truck; pickup trucks.

Typical concrete structure work would consist of structure excavation, demolition work, concrete placement and structure backfill. It is anticipated that the following equipment would be used to complete this work: Cat 322 excavator; Cat 966 wheel loader; Cat 446 backhoe; end-dump truck; concrete mixer trucks; concrete pump truck; 30-ton hydraulic crane; Cat CP323 padded drum compactor; water truck; 2-ton flatbed truck; pickup trucks.

Construction activities will include the demolition of existing structures, excavation to accommodate new structures and channel improvements, cast-in-place concrete work and earthwork to reshape canals so they meet design criteria (see Table 1, above).

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THE UNDERTAKING

The U.S. Department of the Interior, Bureau of Reclamation is providing funding for the Gray Lodge Water Supply project. This undertaking is subject to a Section 106 consultation under the National Historic Preservation Act, as amended (36 CFR Part 800).

AREA OF POTENTIAL EFFECT

The Area of Potential Effect (APE) for cultural resources is comprised of a linear corridor approximately 16.5 miles in length covering the length of all canals included in the project design, Belding, Traynor, Gerst, Sheppard, Schwind, Rising River and Cassady. In addition, three alternative segments are under consideration, which brings the total length of the geographic Area of Potential Effect (APE), including alternatives, to approximately 24.3 miles.

The setting is agricultural. Adjacent rice fields comprise 82 percent of the setting. Orchards comprise nine percent. Pastures make up six percent. Wetlands are three percent of the setting.

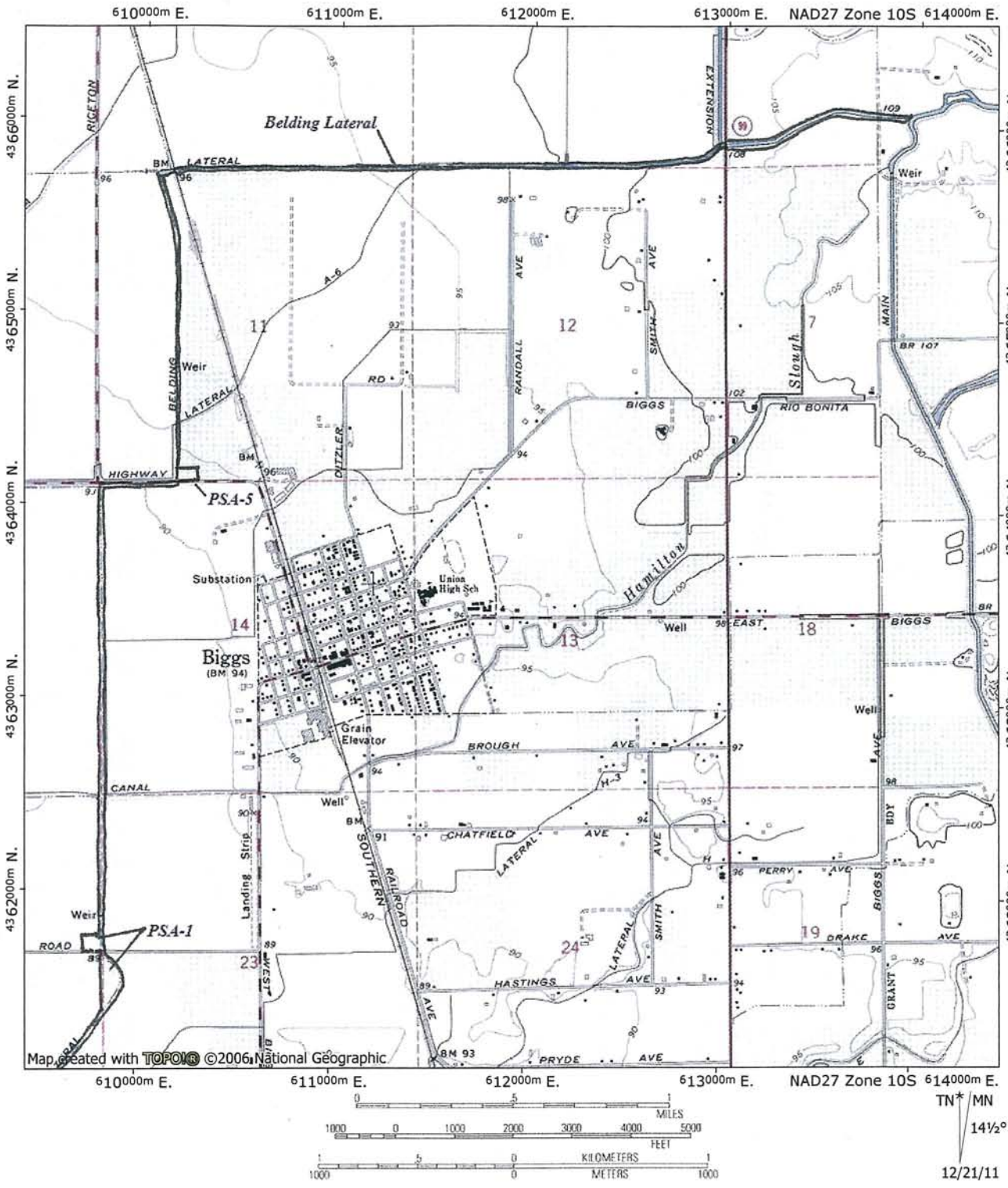

Figure 4. Gray Lodge Water Supply Project APE.

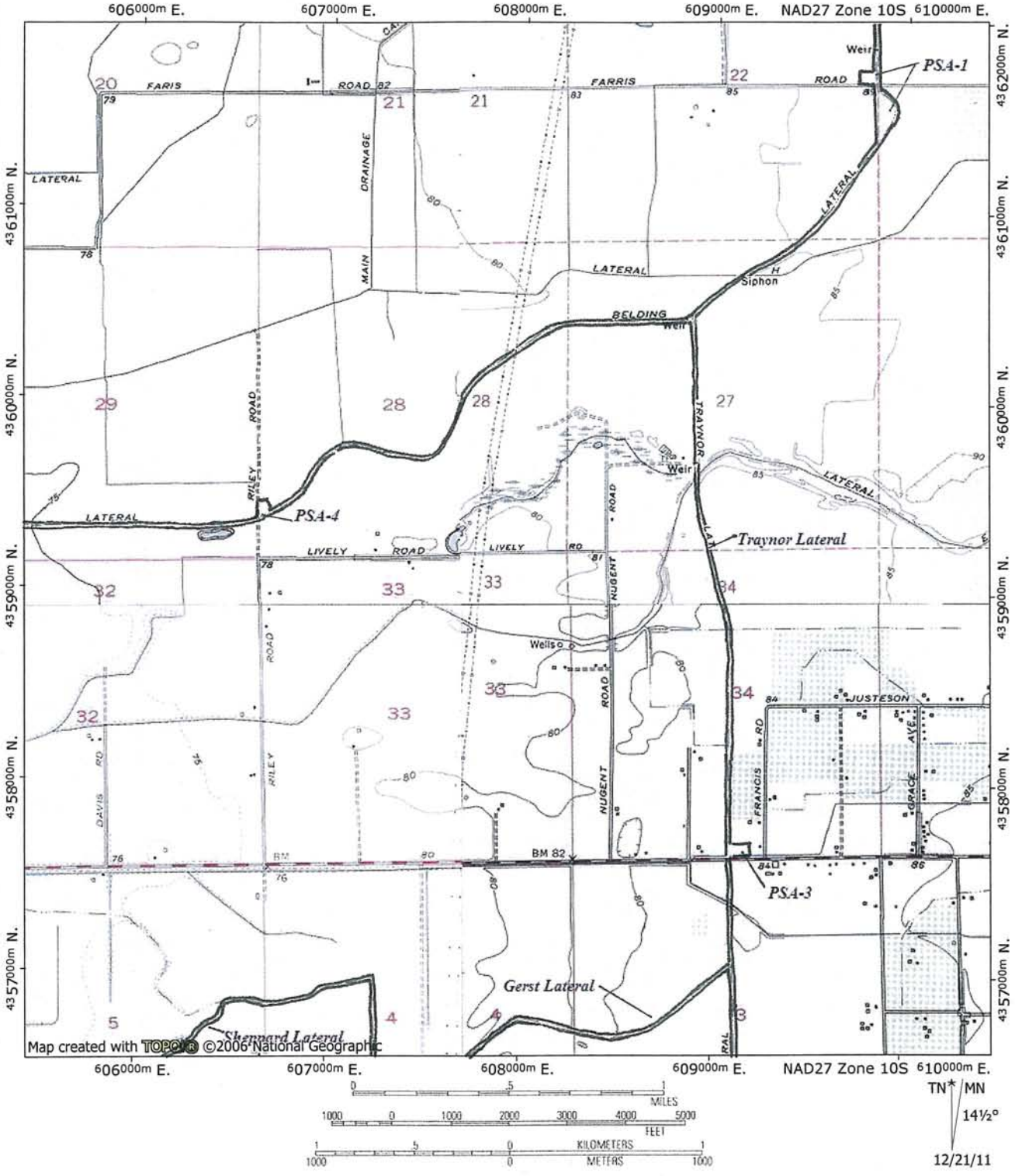

Figure 5. Gray Lodge Water Supply Project APE (continued).

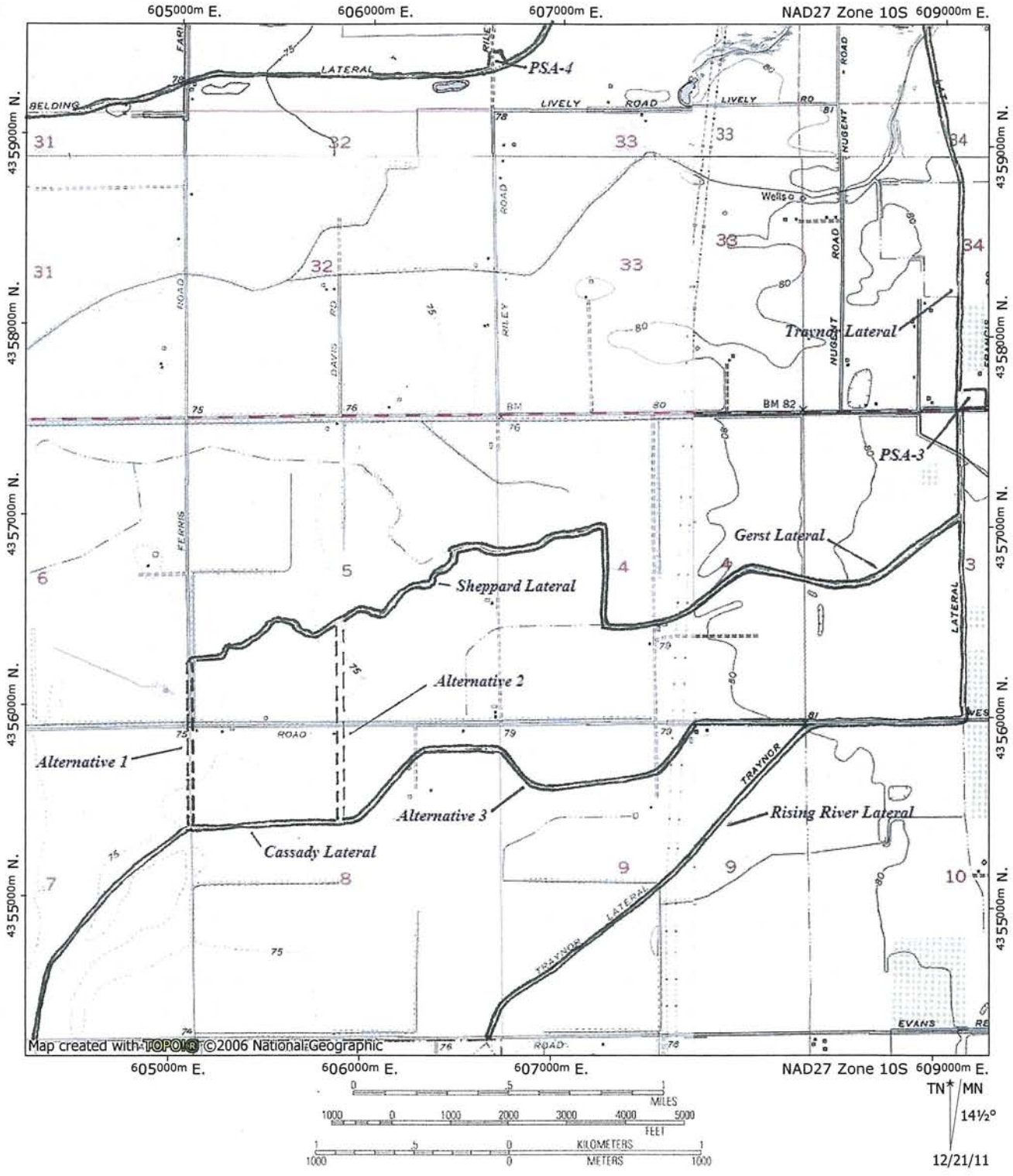

Figure 6. Gray Lodge Water Supply APE (continued).

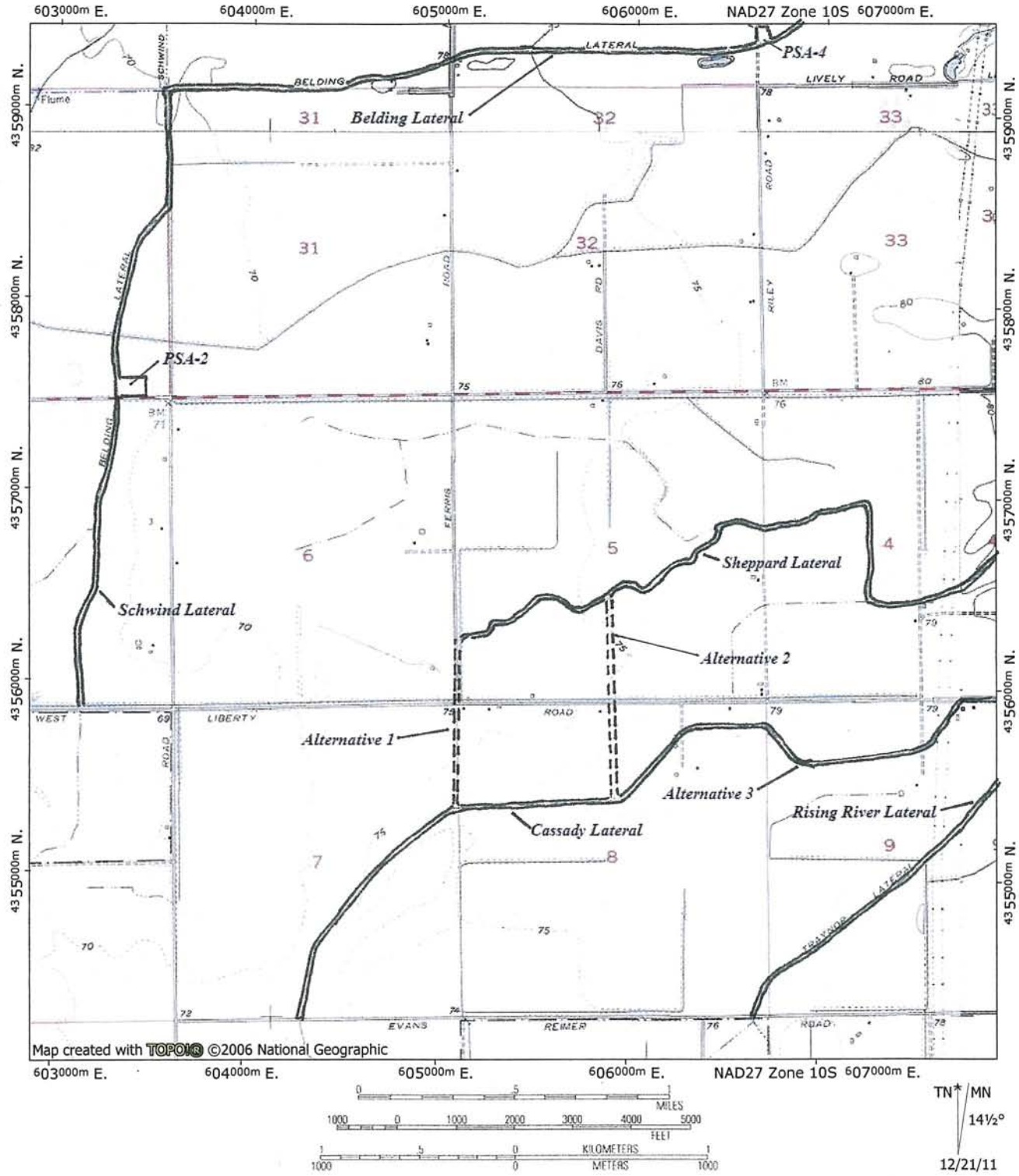

Figure 7. Gray Lodge Water Supply APE (continued).

The width of the APE includes the existing canals, a levee on each side of the canals, the narrow drainage or seepage ditch at the outer base of each levee and 20 feet beyond the outer edge of each existing drainage ditch. This width dimension, which varies with the varying width of the canals, levees and drainage ditches, encompasses the area of potential ground disturbance. The geographic APE would also include each of the five proposed staging areas. Ingress and egress to the APE would be on existing roads.

The vertical Area of Potential Effect is approximately four feet into native soil. This is the depth to which the new drainage ditches will be excavated. No deeper excavation into native soil is anticipated during the project. The geology of the entire project area is mapped as Quaternary alluvium (Burnett and Jennings 1962). While Quaternary alluvium was deposited within the generally accepted period of human occupation in North America, there is a moderate sensitivity for buried prehistoric archaeological resources, but low potential because of the rarity of significant archaeological finds in this expanse of low plains and wetlands between the Sacramento and Feather rivers.

LITERATURE REVIEW

The Gray Lodge Water Supply Project APE lies in the low plains north of the Marysville (Sutter) Buttes. Elevation varies from about 109 feet above mean sea level at the northeast extent of the project to approximately 70 feet above mean sea level at the southwest terminus of the project. The buttes are principally a laccolithic intrusion with remnants of a central crater and minor craters near the margins. The buttes occupy an area of 10 square miles and rise 2,132 feet in elevation. Rhyolitic intrusions and explosion products such as fine tuffs, as well as sedimentary rocks pushed up from the valley floor are a few of the rocks found in the buttes (Hinds 1952:148-150).

The low plains in which the Gray Lodge Water Supply Project is located, consist of alluvial fan and flood plain deposits. To the west lie the river lands of the Sacramento and to the east, the Feather River, the two principal streams in this portion of the Sacramento Valley. Natural levees along the rivers rise five to 20 feet above the surrounding land. The natural levees have very gentle slopes towards the flood basins and adjacent low plains. In both prehistoric and historic times, these low, broad levees were habitable, where the adjacent submerged and swampy country was inhospitable until the major reclamation projects provided a network of man-made levees, drainage canals and other facilities to control surface water (Hinds 1952:146-147).

Geology/Paleontology

A recent aerial image of the Gray Lodge Water Supply Project APE shows the project terrain to be typically flat agricultural land of the Sacramento Valley. The geology of the entire project area is mapped as Quaternary alluvium, although Plio-Pleistocene non-marine deposits are mapped just east of the project area (Burnett and Jennings 1962).

Few fossil sites are known for the Sacramento Valley portion of Butte County. Paleontological records searches of the University of California's Museum of Paleontology locality and specimen databases were conducted by Kenneth L. Finger, Ph.D. to determine if any significant fossils have been recorded from the Pleistocene or Pliocene in Butte County. The results were one late Pleistocene (Rancholabrean) vertebrate locality (V3739) in Oroville that yielded bird eggshell, and one Pliocene (Blancan) vertebrate locality (V4403) in sandy gravel of the Tehama Formation in the Gridley area that yielded a metatarsal of *Equus* cf. *E. simplicens* (Hagerman horse). No plant or invertebrate fossil localities of these ages have been recorded in Butte County. East of the valley, there are another 125 vertebrate localities in Permian, Jurassic, Cretaceous, Eocene and Miocene beds.

Overall, Pleistocene and Pliocene alluvium have high paleontological sensitivity but low potential of yielding significant paleontological resources. Because the ground surface of the area around the project APE is devoid of outcrops and has been thoroughly tilled in most cases, the potential for encountering significant fossil finds is low. The rarity of significant paleontological discoveries in southwestern Butte County suggests that it would be unlikely to encounter any such finds while the proposed project is underway.

Sacramento Valley Prehistory, 10,000 B.C.-A.D. 1800

Evidence in northern California of the First Americans dates back 10,000 years or more (Fredrickson 1994:100, Figure. 9.1). These mobile hunters left behind campsites on the shores of ancient pluvial lakes such as Borax and Clear lakes in the north coast ranges, and Tulare Lake in the southern San Joaquin Valley. The early Holocene climate of 10,000-6000 B.C. was generally moist and warm with periods of drought (*cf.* Moratto 1984 and Haynes 1991).

Since the early 1950s, stone tools of the Farmington Complex have been unearthed periodically along the Sacramento Valley-Sierra foothills ecotone (Moratto 19784:62). Archaeological Eric Ritter has shown that the artifacts are either contemporaneous with, or older than the Modesto Formation, which would date the tools between 10,000 and 5000 B.C. (Ritter *et al.* 1976).

The late Southwestern archaeologist, Julian Hayden once remarked about the similarity of the Farmington artifacts and those of Dan Dieguito II from southern California and the Lower Colorado River area (Julian Hayden, personal communication 1994). San Dieguito II is coeval with the Western Pluvial Lakes Tradition, an adaptation of ancient cultures to lake, marsh and grassland habitats along the eastern side of the Sierra Nevada as early as 9000 B.C. (Moratto 1984:90-91). The development of the Western Pluvial Lakes Tradition and its regional variants such as the Farmington Complex may, as Moratto suggested, correspond to the emergence and initial differentiation among Hokan languages (Moratto 1984:544).

In the flood basins and low plains of the mid-Sacramento Valley, it is doubtful that stone tools and other indicators of these early cultures would be found on the ground surface, as seasonal inundation carried sediments that would have eventually buried such remains.

The Archaic Period, which in California lasted from about 6000 B.C. to A.D. 1000, is divided by archaeologists into three sub-periods: lower, middle and upper (Fredrickson 1994:100). During the Lower Archaic, between 6000 and 3000 B.C., many of the state's pluvial lakes dried up as a result of climatic changes. Early milling stone complexes were identified by scholars at a number of sites in southern and northern California. Seed gathering, inferred from the use of milling stones, was an arid land adaptation. Speakers of Hokan languages probably brought the concept of milling stones to California, since archaeologists recognized that Hokan peoples were in the regions of the western United States where deserts first appeared after the end of the last Ice Age (Moratto 1984:546-547).

The Middle Archaic, dating between 3000 and 500 B.C., marked a beginning of the fluorescence of Native American cultures in California's Central Valley. Reliance on acorns as a staple is inferred from the first appearance of mortars and pestles in archaeological sites dating early in the period. Sedentary villages were built at this time; also there is evidence of marked population growth. In the Sacramento Valley, these developments followed the formation of the Sacramento Delta and marsh lands, a consequence of rising sea level caused by global warming and the melting of glaciers (Fredrickson 1994:100).

Between 4000 and 2000 B.C., it is likely that Hokan languages were spoken in much of California. However, with increased aridity in the Great Basin, speakers of Penutian languages apparently began moving from the deserts of the northwestern Great Basin and southern Columbia Plateau into northern California. By 2500 B.C., a Utian population of the Penutian stock ancestral to Miwok-Costanoan apparently entered the lower Sacramento Valley presumably from the Great Basin and Plateau physiographic provinces. Archaeologists recognize this intrusion as the Windmiller Pattern, a culture adapted to river and marsh land and whose culture is characterized, archaeologically, by extended burials, red ochre and quartz crystals in graves, charmstones and projectile point styles shared with Altithermal cultures of the Columbia Plateau (Moratto 1984:552).

Ancestors of the River Patwin, a Wintuan people, built villages on the natural levees along the Sacramento River west of the Gray Lodge Water Supply Project area. The Patwin may also have come from the northwestern Great Basin and Columbia Plateau. East of the project area was historic Konkow (Maidu) territory. It seems probable that Wintuan, Maiduan as well as Yokutsan languages derived from a single Great Basin-Plateau speech community (Moratto 1984:555).

During the Upper Archaic, 500 B.C.-A.D. 1000, a number of dramatic cultural changes seem to have occurred in the Sacramento Valley. In the southern portion of the valley, the Windmiller Pattern was displaced by the Morse Aspect of the Berkeley Pattern (Bennyhoff 1994:83). Most Windmiller sites were abandoned by 200 B.C. and the

Windmiller population in the Cosumnes District appears to have moved southward into the Stockton area. Archaeologist Michael Moratto interpreted these findings to mean that Miwokan peoples moved eastward from the San Francisco Bay area into the older Utian and Yokusan domain of the Sacramento Delta. As a result, Yokuts shifted southward into the San Joaquin Valley and east into the central Sierra (Moratto 1984:557).

Moratto also suggested that ancestral Wintuans probably entered the upper Sacramento Valley sometime between the birth of Christ and A.D. 500. By A.D. 700, possibly earlier, ancestral Patwin-speakers settled the lower Sacramento Valley, apparently displacing a Miwok group, then expanded their territory up drainages of the Coast Range towards Clear Lake (Moratto 1984:562).

The Wintu immigration coincides with the beginning of the Augustine Pattern. Wintuan traits contributing to the archaeological assemblages of that pattern include: bows and arrows tipped with distinctive "Gunther barbed" projectile points of chipped stone, harpoons, flanged stone pipes and pre-internment grave pit burning (Moratto 1984:211, 563). Bennyhoff agreed that these traits were almost certainly brought south by the ancestors of the intrusive Patwin at roughly A.D. 700-900 (Bennyhoff 1994:83).

The following Emergent Period, A.D. 1000-1800, was characterized by a proliferation of settlements, intensified trade, general use of clamshell disk beads as money and increasingly complex native societies (Moratto 1984: 213). While the expansion southward of Wintuan people into the Sacramento Valley was certainly a stimulus for culture change, archaeologists tend to view the Augustine Pattern more as a product of continued population growth stimulated by the evolving river delta environment. Incipient chiefdoms are recognized during this period. The resulting consolidation of territories probably remained in much the same location noted by early Spanish observers. Interregional trade seems to have expanded greatly during the Emergent, up to the succeeding Mission Period when Spanish intrusions began tearing the fabric of native life in Central California.

South Butte County Ethnography/Ethnohistory (1800-1930)

South and west of the Gray Lodge Water Supply Project area, the Patwin or Southern Wintu occupied a territory 40 miles wide east to west and 90 miles long north to south. The River Patwin occupied villages within a strip of land several miles wide along the Sacramento River. The Marysville Buttes along the northeast periphery of Patwin territory were excluded from Patwin ownership. The buttes were considered unclaimed land (Johnson 1978:350-351).

Johnson illustrated the location of four historic Patwin villages along the Sacramento River between Colusa and Princeton (from south to north): *Ti-til*, *Si'ko-pe*, *Katsil* and *Bo'-do*. The eastern boundary of Patwin territory is shown five miles east of these villages, although no villages are shown away from the river (Johnson 1978:350).

On Kroeber's map of the southern Wintun (Patwin), seven villages are illustrated along a similar reach of the Sacramento River (south to north): *Koru, Kashi*, Tarno, *Kachil*, *Waitere*, *Cha* and *Bodope*. All are shown on the west bank of the river. No villages are shown on the major tributary east of the Sacramento–Big Butte Creek (Kroeber 1925:Plate 34).

The Konkow (Northwestern Maidu) lived in villages along the Feather River, principally east and northeast of the Gray Lodge Water Supply Project area. Konkow territory also included the Sacramento River north of and including some land occupied by the Patwin after A.D. 1700, according to Riddell. The southernmost Konkow villages on the Sacramento were *Kobatasdayim* (*Kotasi*?) and *Kowkowki yakim*. Konkow territory could be described as a large inverted "V" shape north of the Marysville Buttes, with the interior of the "V" remaining vacant land that may have been used for hunting and gathering. East and north of the buttes and two to four miles east of the nearest portion of the Gray Lodge Water Supply Project area to the Feather River were the closest Konkow villages (south to north): *Bauka*, *Hincho*, *Taichida, Botok* and *Wabusi* (Riddell 1978:370).

Anthropologist Alfred Kroeber indicated it was likely that a Maidu individual probably had only the vaguest recognition of any Pomo-speaking people farther to the west, and even of the intervening Wintuan-speakers (River Patwin) who occupied, in his words, "a comparatively narrow and open strip of land" along the Sacramento River. In Kroeber's experience and in the experience of Kroeber's students interviewing native people, no northern Californian would go far from his home. This situation changed, of course, after European contact when native militarism was on the rise (Kroeber 1925:395).

In the Sacramento Valley, Maiduan-speaking people used the same term, *K'umi*, to describe their semi-subterranean, earth-covered dance house, their small sweat house and their individual dwellings. These three types of structures differed mainly in relative size. Villages of importance had a dance house. Small villages did not have a dance house, although ceremonials may have been conducted there nonetheless. Dwellings ranged in size and so any one village may have had both large and small houses (Kroeber 1925:407).

Among the stone tools used by Maiduan-speakers, Kroeber notes that in the California coast region, metates were not known from San Francisco Bay, north. At the same latitude in the interior of California, Maidu people used the metate, which was nothing more than a slab tilted at a slight angle. The metate was used to grind dry seeds, such as grass, sage and *Compositae*, as opposed to the mortar, which was used to pulverize acorns and for other purposes. Other stone artifacts included grooved pieces of sandstone used to smooth arrow shafts, chipped stone skin dressing tools, chipped stone and ground stone axes, chipped stone knives and arrowheads of traded obsidian and local flint-like and basalt-like rocks. A sacred flint mine was located at Table Mountain near Oroville (Kroeber 1925:411-419).

Maiduan-speakers were hunters-fishers-gatherers. Salmon and eels were taken seasonally. Elk and deer were hunted by individual hunters. Kroeber reported that deer were also