Appendix A
Cultural Resources Coordination

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DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

February 7, 2011

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Division

Honorable Leroy Shingoitewa
Chairman, Hopi Tribal Council
Post Office Box 123
Kykotsmovi, Arizona 86039

Dear Chairman Shingoitewa:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico Office of the State Engineer / Interstate Stream Commission and the Ramah Valley Acequia (Community Ditch) Association, is planning a construction project that would rehabilitate the Ramah Valley Acequia, McKinley County, New Mexico (see enclosed Figure 1). The project is authorized under Section 1113 of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The Act authorizes the Corps' Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico.

The Ramah acequia system was originally built in about 1878. The ditch system has been subject to numerous years of operations and maintenance activities. In 1982, the old open irrigation ditches were replaced with underground concrete pipeline. Currently, the existing concrete pipeline is experiencing significant water losses from seepage at many of the concrete joints and from breaks in the line. The existing acequia system also does not provide sufficient water pressure to effectively distribute water through the irrigation system for timely and efficient delivery of the irrigation water.

Irrigation water flows are diverted from the Ramah storage reservoir's outlet works into two primary irrigation ditches, one measuring about 2,579 feet in length that flows in a westerly direction and one measuring about 3,993 feet in length that generally flows in a southerly direction. The proposed project plans to rehabilitate both the western and southern ditches by installing underground PVC plastic pipeline, covering a total of

approximately 6,572 lineal feet, or about 1.24 miles, replacing the already existing concrete pipeline. The project is utilizing a design prepared by the USDA Natural Resources Conservation Service.

The project area is located along Cebolla Creek, a tributary of the Rio Pescado in the Zuni River Basin, and is within the community of Ramah. Ramah is located 50 miles south and west of Grants and 43 miles south and east of Gallup on New Mexico State Highway 53. The majority of the project area is located in the east one-half of Section 35, Township 11 North, Range 16 West, as shown on USGS Topographic Quadrangle map Ramah, NM, (35108-b4; 1963, Photorevised 1981)(see enclosed Figure 2).

Corps archaeologists conducted an archaeological survey of the acequia's project area/right-of-way on December 10, 2010. No prehistoric or historic archaeological resources were observed during the survey, other than the acequia system itself. The Ramah Valley acequia system is considered historic due to its age.

The Corps is seeking input for consideration during planning of the project. The purpose of this scoping letter is to provide you with the opportunity to submit comments or concerns you may have regarding potential effects for the proposed project. Specifically, any concerns you may have regarding the environment such as natural, biological, or cultural resources; wildlife, vegetation, and special status species; air, water, or sound quality; aesthetics; health and safety; or Indian Trust Assets that may occur in the project area. Your input will be used in preparing an environmental assessment to comply with the National Environmental Policy Act (NEPA).

Please provide written comments regarding environmental concerns to Dana Price, biologist; and, comments regarding cultural resources to Jonathan Van Hoose, archaeologist, at the above address. If you have any questions or require additional information on the Ramah Acequia Irrigation Pipeline Project, please contact Ms. Price at (505) 342-3378, Mr. Van Hoose at (505) 342-3687, or myself at (505) 342-3281.

Sincerely,

John D. Schelberg

for Julie Alcon,
Chief, Environmental Resources Section

no historic properties significant to the Hopi Tribe affected

for KUWANWISIWMA

2-14-11

Enclosures

PUEBLO OF LAGUNA
P.O. BOX 194
LAGUNA, NEW MEXICO 87026

(505) 552-6598
(505) 552-6654
(505) 552-6655

Office of:
The Governor
The Secretary
The Treasurer

February 14, 2011

Mr. Jonathan Van Hoose
Archaeologist
Department of the Army
Albuquerque District, Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109-3435

Dear Mr. Van Hoose:

RE: Propose Rehabilitation of the Ramah Valley Acequia, McKinley County, New Mexico

The Pueblo of Laguna appreciates your consideration to comment on the possible interests your projects may have on any traditional or cultural properties.

The Pueblo of Laguna has determined that the undertaking WILL NOT have a significant impact at this time. However, in the event that any new archaeological sites are discovered and any new artifacts are removed, we request to be notified to review items. We also request photographs of items. According to our unpublished migration history, our ancestors journeyed from the north through that area and settled for periods of time before traveling to our present location. Therefore, the possibilities of some findings may exist.

We thank you and your staff for the information provided.

Sincerely,

for Richard B. Luarkie
Governor
Pueblo of Laguna

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

March 3, 2011

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section

91592

MAR - 4 2011
JRE

Ms. Jan Biella
Interim State Historic Preservation Officer
New Mexico Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Dear Ms. Biella:

Pursuant to 36 CFR Part 800, the U.S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of no adverse effect to historic properties for a proposed rehabilitation of the Ramah Valley Acequia (Acequia), McKinley County, New Mexico (see Enclosure 1). The Corps, at the request of the New Mexico Office of the State Engineer (NMOSE) and the Ramah Valley Acequia (Community Ditch) Association, is planning a project that would replace 6,572 feet of buried concrete pipe with PVC pipe. Work would be conducted under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662), as amended.

The Ramah Valley Acequia was originally constructed c. 1878, with full operation commencing concurrent with the founding of the community of Ramah in 1882. The system was originally an "open earth ditch", and sections of the ditch to the south of the current project area still operate as open ditches. The acequia still operates basically within its original alignment, although the system was altered significantly in 1982 when a portion of the open ditch was piped with concrete and buried. Recently, concrete piped sections of the acequia have developed leaks impairing its function by leading to significant water loss, as well as impairing the system's ability to maintain water pressure for spray irrigation. The system serves 72 users on approximately 1200 acres, a number of which are negatively affected by the leaking pipes.

The Corps proposes to rehabilitate the Ramah Valley Acequia by replacing the existing concrete pipe with 24" polyvinyl chloride (PVC) irrigation pipe. Project design and specifications have been provided by the Natural Resources Conservation Service. Components include 6,572 feet of 24-inch diameter, 80 psi PVC plastic irrigation pipe and 223 feet of 10-inch diameter, 80 psi PVC pipe, with 3000 psi concrete thrust blocks, alfalfa valves and inline valves as needed. The new pipeline would follow the alignment of the existing pipeline for most of its length. Project construction is scheduled during the non-irrigation season beginning in spring of 2011 with an expected duration of about 3 months. The Community Ditch would be responsible for operation and maintenance upon project completion.

Irrigation water is diverted from the outlet works of the Ramah reservoir (Cebolla Creek, a tributary of the Rio Pescado in the Zuni River Basin) into two primary irrigation ditches: one measuring approximately 2,579 feet and flowing westward from the diversion (referred to here as the "west branch"), and one measuring approximately 3,992 feet and flowing southward (referred to here as the "south branch"). When the original ditch was converted to buried pipe, the new pipeline mostly followed the alignment of the old ditch, with occasional deviations; the most significant of these deviations occurred in the west branch (see Enclosure 2). Enclosure 2 shows approximate relative alignments for the original ditch, the present pipeline, and the proposed project. The proposed re-piping project would follow the current pipeline's alignment for most of its extent, with the exception of a realignment of approximately 900 feet, again in the western branch (Enclosure 2). The current piping in the area bypassed by this realignment will remain in place.

Pursuant to 36 CFR 800.4(a)(1), the Area of Potential Effects (APE) for this project is considered to a relatively narrow corridor totaling 10.5-acres along the west and east branches of the acequia where concrete pipe will be removed and replaced. The width of the APE is generally 10-15 meters along most of the alignment, although the width of the corridor varied based on the presence of heavily vegetated fields, a constructed earthen berm, fencelines, and road alignments.

Pursuant to 36 CFR 800.4(b), Corps archaeologist Jonathan Van Hoose conducted a field visit to the project area on June 10, 2010, and Corps archaeologists Van Hoose and Gregory Everhart surveyed the project area on December 10, 2010. Enclosed

for your review is the report titled "A 10.5-Acre Cultural Resources Inventory for the Ramah Valley Acequia Irrigation Pipeline Project, McKinley County, New Mexico", by Jonathan E. Van Hoose, Jeremy T. Decker, and Gregory D. Everhart (NMCRIS 119988, Corps Report No. USACE-ABQ-2011-001). With the exception of a single Isolated Occurrence (IO), the survey did not identify any historic properties aside from the Acequia itself. The IO is a single white chert flake (Enclosure 3). The flake is not considered significant and no further work is recommended for this IO.

Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, and based on the State of New Mexico Indian Affairs Department's 2011 Native American Consultations List, American Indian tribes that have indicated they have concerns in McKinley County were sent scoping letters regarding the proposed project. To date, the Corps has received no indication of tribal concerns that would impact this project; responses from the Hopi Tribe, Ysleta del Sur Pueblo, and the Pueblo of Laguna have indicated no tribal concerns at this time. No known Traditional Cultural Properties are known by the Corps to occur within the project area.

The Corps considers the Acequia to be eligible for listing on the National Register of Historic Places under Criterion (a) of 36 CFR 60.4, as irrigation systems such as this one made possible the settling and farming of the area, and is thus associated with events that have made a significant contribution to the broad patterns of our history. We seek your concurrence in our eligibility determination.

The purpose of this project is to rehabilitate the acequia system so that it may continue to function well in its current cultural context. The proposed project would affect one primary element: its form. However, the piping of the acequia in 1982 already substantially altered the ditch from its earlier "open earthen ditch" form, and the piping has not acquired historic significance in its own right (and is therefore neither historic nor distinctive). The form of the portions of the acequia to be impacted by this project thus lack integrity, and the Corps considers this to be a non-contributing element to the system's historic significance. Further, portions of the system outside the proposed project area retain their historically significant open earthen ditch form, and none of the system that retains

this form will be affected or altered by the current project. The project would also re-align an approximately 900-foot segment of the total 6,572 feet to be covered by the project. However, this represents only 14 percent of the current pipeline, and an even smaller proportion of the overall system.

The Corps considers the effects to the acequia system not to be adverse. While the Corps recognizes that the replacement of concrete piping with PVC piping will alter the form of the acequia, the concrete piping is a recent addition to the system and has not acquired historic significance in its own right. Additionally, the placement of pipe is a reversible condition that can be altered at any time to restore the system to its original open ditch design. We seek your concurrence on this determination of no adverse effect to historic properties. Should previously undiscovered artifacts or features be discovered during construction, work will stop in the immediate vicinity of the find, a determination of significance made, and consultation would take place with your office and with Native American groups that may have concerns in the project area, to determine the best course of action.

In sum, we seek your concurrence in our eligibility determination and in our determination of no adverse effect to historic properties by this project. If you have questions or concerns, or require additional information regarding the Ramah Valley Acequia Rehabilitation Project, please contact Dr. Jonathan Van Hoose, archaeologist, at (505) 342-3687, or me at (505) 342-3281.

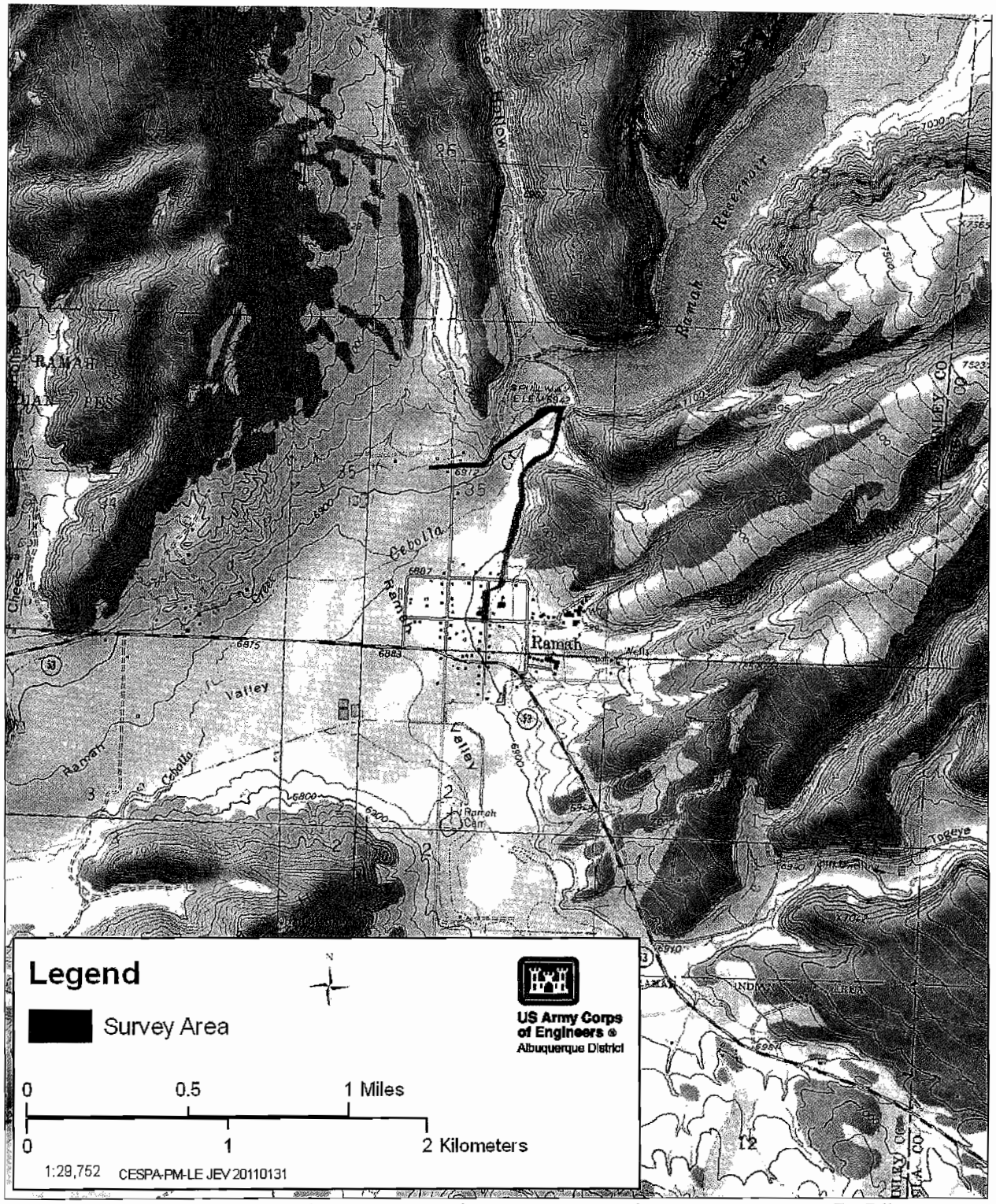
Sincerely,

Julie Alcon
Chief, Environmental Resources Section

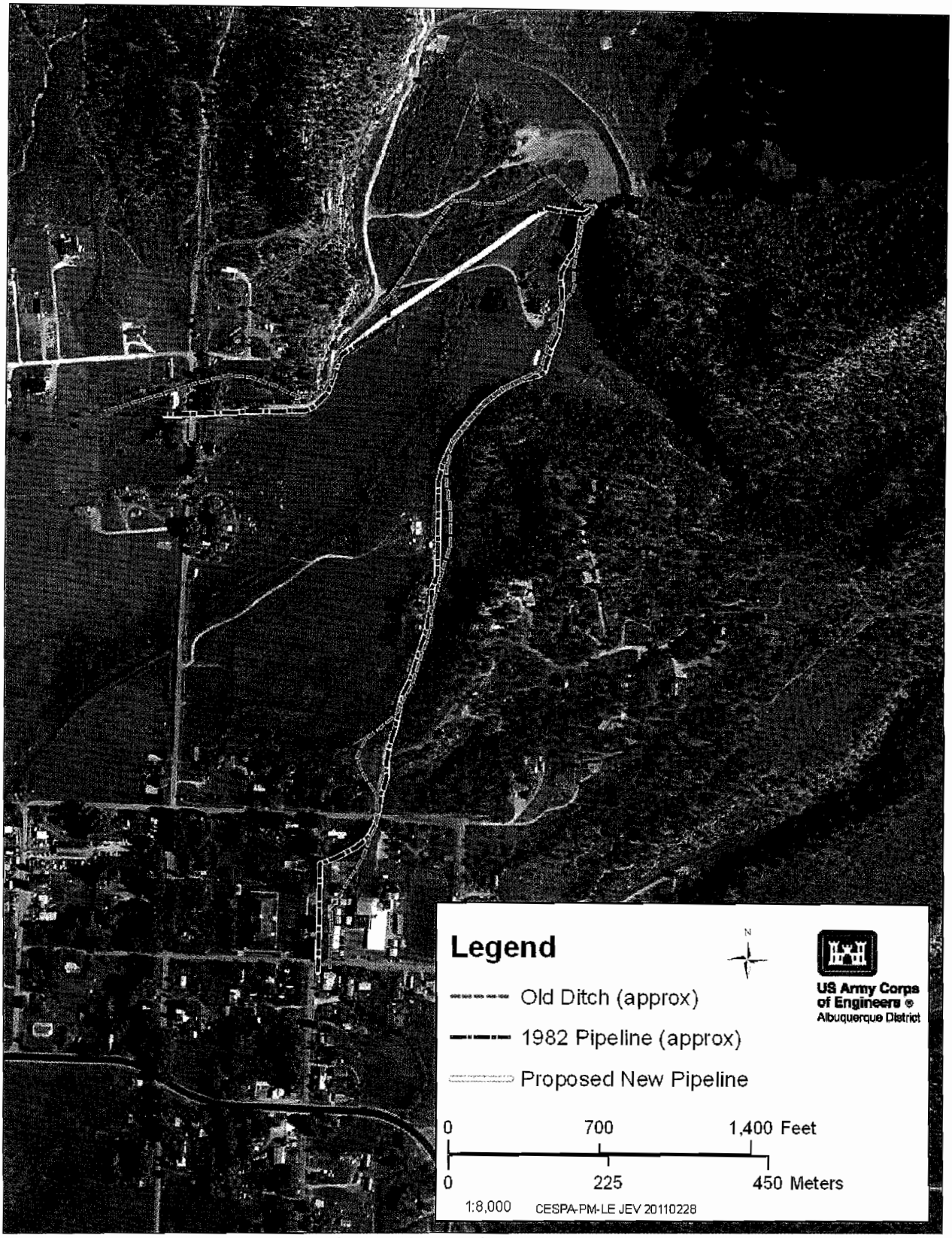
16-Mar-2011
Date

I CONCUR on behalf of
JAN BIELLA
Interim New Mexico State
Historic Preservation Officer

Enclosures



Enclosure 1. Location of project area, shown on USGS 7.5" quadrangles maps Ramah, NM (35108-B4), Burned Timber Canyon, NM (35108-B5), Togeye Lake, NM (35108-A4), and Pescado, NM (35108-A5).



Enclosure 2. Map showing historic, current, and proposed ditch alignments.

Enclosure 3. Single white chert flake recorded as an isolated occurrence.

NMCRIS No. 119988

A 10.5 -ACRE CULTURAL RESOURCES INVENTORY FOR THE RAMAH VALLEY ACEQUIA IRRIGATION PIPELINE PROJECT, MCKINLEY COUNTY, NEW MEXICO

Prepared by

Jonathan E. Van Hoose, Jeremy T. Decker, and Gregory D. Everhart

With contributions by

Dana M. Price

U.S. Army Corps of Engineers
Albuquerque District

Prepared for

U.S. Army Corps of Engineers, Albuquerque District
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435
Office: (505) 342-3283; Fax: (505) 342-3668

New Mexico Annual State General Permit No. NM-10-193

Report No. USACE-ABQ-2011-001

March 2, 2011

NMCRIS INVESTIGATION ABSTRACT FORM (NIAF)

1. NMCRIS Activity No.: 119988	2a. Lead (Sponsoring) Agency: US Army Corps of Engineers, Albuquerque District	2b. Other Permitting Agency(ies):	3. Lead Agency Report No.: USACE-ABQ-2011-001

4. Title of Report: A 10.5-Acre Cultural Resources Inventory for the Ramah Valley Acequia Irrigation Pipeline Project, McKinley County, New Mexico

Author(s) Jonathan E. Van Hoose, Jeremy T. Decker, and Gregory D. Everhart

5. Type of Report
☐ **Negative** ☒ **Positive**

6. Investigation Type
☐ Research Design ☒ Survey/Inventory ☐ Test Excavation ☐ Excavation ☐ Collections/Non-Field Study
☐ Overview/Lit Review ☐ Monitoring ☐ Ethnographic study ☐ Site specific visit ☐ Other

7. Description of Undertaking (what does the project entail?): The Corps proposes to rehabilitate the Ramah Valley Acequia by replacing the existing concrete pipe with 24" polyvinyl chloride (PVC) irrigation pipe. Project design and specifications have been provided by the Natural Resources Conservation Service. Components include 6,572 feet of 24-inch diameter, 80 psi PVC plastic irrigation pipe and 223 feet of 10-inch diameter, 80 psi PVC pipe, with 3000 psi concrete thrust blocks, alfalfa valves and inline valves as needed. The new pipeline would follow the alignment of the existing pipeline for most of its length.

8. Dates of Investigation: (from: 12/10/2010 to: 12/10/2010)

9. Report Date: 3/2/2011

10. Performing Agency/Consultant: US Army Corps of Engineers, Albuquerque District
Principal Investigator: Jonathan E. Van Hoose
Field Supervisor: Jonathan E. Van Hoose
Field Personnel Names: Jonathan E. Van Hoose, Gregory D. Everhart

11. Performing Agency/Consultant Report No.: USACE-ABQ-2011-001

12. Applicable Cultural Resource Permit No(s):
New Mexico Annual State General Permit NM-10-193

13. Client/Customer (project proponent): S Army Corps of Engineers, Albuquerque District
Contact: Jonathan Van Hoose
Address: US Army Corps of Engineers, Albuquerque District
4101 Jefferson Plaza NE
Albuquerque, NM 87109
Phone: ((505) 342-3687)

14. Client/Customer Project No.: n/a

15. Land Ownership Status ***(Must be indicated on project map):***

Land Owner	Acres Surveyed	Acres in APE
Private	10.5	10.5
TOTALS	10.5	10.5

16 Records Search(es):

Date(s) of ARMS File Review 12/9/2010	Name of Reviewer(s) Jonathan Van Hoose	
Date(s) of NR/SR File Review 12/9/2010	Name of Reviewer(s) Jonathan Van Hoose	
Date(s) of Other Agency File Review 12/9/2010	Name of Reviewer(s) Jonathan Van Hoose	Agency USACE

17. Survey Data:

a. Source Graphics ☐ NAD 27 ☒ NAD 83

☒ USGS 7.5' (1:24,000) topo map ☐ Other topo map, Scale:

☒ GPS Unit Accuracy ☒<1.0m ☐ 1-10m ☐ 10-100m ☐>100m

b. USGS 7.5' Topographic Map Name **USGS Quad Code**

Ramah, NM	35108-b4

c. County(ies): McKinley

17. Survey Data (continued):

d. Nearest City or Town: Ramah, NM

e. Legal Description:

Township (N/S)	Range (E/W)	Section	¼ ¼ ¼
11 N	16 W	35	NW, SE, SE.
11 N	16 W	35	NE, SW, NE.
11 N	16 W	35	SE, SW, NE.
11 N	16 W	35	SW, SW, NE.
11 N	16 W	35	SE, SE, NW.
11 N	16 W	35	SW, SE, NE.
11 N	16 W	35	NE, NW, SE.
11 N	16 W	35	SE, NW, SE.
11 N	16 W	35	NE, SW, SE.
11 N	16 W	35	NW, SW, SE.
11 N	16 W	35	SW, SW, SE.

Projected legal description? Yes [X] , No [ ] Unplatted [ ]

f. Other Description (e.g. well pad footages, mile markers, plats, land grant name, etc.): The Project area is on private land just north of Ramah, NM, and beginning at the Ramah reservoir storage dam.

18. Survey Field Methods:

Intensity: ☒ 100% coverage ☐ <100% coverage

Configuration: ☒ block survey units ☒ linear survey units (l x w): ☐ other survey units (specify):

Scope: ☒ non-selective (all sites recorded) ☐ selective/thematic (selected sites recorded)

Coverage Method: ☒ systematic pedestrian coverage ☐ other method (describe)

Survey Interval (m): 5 Crew Size: 2 Fieldwork Dates: 12/10/2010

Survey Person Hours: 12 Recording Person Hours: 2 Total Hours: 14

Additional Narrative:

19. Environmental Setting (NRCS soil designation; vegetative community; elevation; etc.): Soils within the project area are mapped in 5 units: Catman variant clay loam, Catman clay loam, Hickman sandy clay loam, Rock outcrop-Vessilla-Mion complex, and Pinitos-Ribera sandy loams (USDA NRCS 2010). The majority of the soils in the project area, including the entire valley bottom, are classified as Catman variant clay loam. Elevation ranges from 6,900 ft to 6,942 ft amsl. The proposed project area lies within the Great Basin Woodland biotic community.

20. a. Percent Ground Visibility: 40-100 b. Condition of Survey Area (grazed, bladed, undisturbed, etc.): The entire project area has been disturbed by previous work, either through installation of buried pipe in 1982, or through recent blading.

21. CULTURAL RESOURCE FINDINGS ☒ Yes, See Page 3 ☐No, Discuss Why:

22. Required Attachments (check all appropriate boxes):	23. Other Attachments:
☒ USGS 7.5 Topographic Map with sites, isolates, and survey area clearly drawn ☒ Copy of NMCRIS Mapserver Map Check ☐ LA Site Forms - new sites (*with sketch map & topographic map*) ☐ LA Site Forms (update) - previously recorded & un-relocated sites (*first 2 pages minimum*) ☐ Historic Cultural Property Inventory Forms ☒ List and Description of isolates, if applicable ☐ List and Description of Collections, if applicable	☐ Photographs and Log ☒ Other Attachments *(Describe)*: HWDSIF

24. I certify the information provided above is correct and accurate and meets all applicable agency standards.

Principal Investigator/Responsible Archaeologist: Jonathan E. Van Hoose

Signature Jonathan E. Van Hoose Date 3/3/2011 Title (if not PI):

25. Reviewing Agency:	26. SHPO
Reviewer's Name/Date Gregory D. Gaechter 3-3-2011 Accepted (X) Rejected ( ) Tribal Consultation (if applicable): ☒ Yes ☐ No	Reviewer's Name/Date: HPD Log #: SHPO File Location: Date sent to ARMS:

CULTURAL RESOURCE FINDINGS

[fill in appropriate section(s)]

1. NMCRIS Activity No.:	2. Lead (Sponsoring) Agency:	3. Lead Agency Report No.:
119988	USACE, Albuquerque District	USACE-ABQ-2011-001

SURVEY RESULTS:

Sites discovered and registered: 0
Sites discovered and NOT registered: 0
Previously recorded sites revisited (*site update form required*): **0**
Previously recorded sites not relocated *(site update form required):* 0
TOTAL SITES VISITED: 0
Total isolates recorded: 1 **Non-selective isolate recording?** ☐
Total structures recorded (*new and previously recorded, including acequias*): **1**

MANAGEMENT SUMMARY: The US Army Corps of Engineers, Albuquerque District (Corps), at the request of the New Mexico Office of the State Engineer (NMOSE) and the Ramah Valley Acequia (Community Ditch) Association, is planning a project that would replace 6,572 feet of buried concrete pipe with PVC pipe. Work would be conducted under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662), as amended.

The Ramah Valley Acequia was originally constructed c. 1878, with full operation commencing concurrent with the founding of the community of Ramah in 1882. The system was originally an "open earth ditch", and sections of the ditch to the south of the current project area still operate as open ditches. The acequia still operates basically within its original alignment, although the system was altered significantly in 1982 when a portion of the open ditch was piped with concrete and buried. Recently, concrete piped sections of the acequia have developed leaks impairing its function by leading to significant water loss, as well as impairing the system's ability to maintain water pressure for spray irrigation. The system serves 72 users on approximately 1200 acres, a number of which are negatively affected by the leaking pipes.

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Pursuant to 36 CFR 800.4(a)(1), the Area of Potential Effects (APE) for this project is considered to a relatively narrow corridor totaling 10.5-acres along the west and east branches of the acequia where concrete pipe will be removed and replaced. The width of the APE is generally 10-15 meters along most of the alignment, although the width of the corridor varied based on the presence of heavily vegetated fields, a constructed earthen berm, fencelines, and road alignments.

Pursuant to 36 CFR 800.4(b), Corps archaeologist Jonathan Van Hoose conducted a field visit to the project area on June 10, 2010, and Corps archaeologists Van Hoose and Gregory Ever-hart surveyed the project area on December 10, 2010. With the exception of a single Isolated Occurrence (IO), the survey did not identify any historic properties aside from the Acequia itself. The IO is a single white chert flake. The flake is not considered significant and no further work is recommended for this IO.

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has received no indication of tribal concerns that would impact this project; responses from the Hopi Tribe, Ysleta del Sur Pueblo, and the Pueblo of Laguna have indicated no tribal concerns at this time. No known Traditional Cultural Properties are known by the Corps to occur within the project area.

The Corps considers the Acequia to be eligible for listing on the National Register of Historic Places under Criterion (a) of 36 CFR 60.4, as irrigation systems such as this one made possible the settling and farming of the area, and is thus associated with events that have made a significant contribution to the broad patterns of our history.

The purpose of this project is to rehabilitate the acequia system so that it may continue to function well in its current cultural context. The proposed project would affect one primary element: its form. However, the piping of the acequia in 1982 already substantially altered the ditch from its earlier "open earthen ditch" form, and the piping has not acquired historic significance in its own right (and is therefore neither historic nor distinctive). The form of the portions of the acequia to be impacted by this project thus lack integrity, and the Corps considers this to be a non-contributing element to the system's historic significance. Further, portions of the system outside the proposed project area retain their historically significant open earthen ditch form, and none of the system that retains this form will be affected or altered by the current project. The project would also re-align an approximately 900-foot segment of the total 6,572 feet to be covered by the project. However, this represents only 14 percent of the current pipeline, and an even smaller proportion of the overall system.

The Corps considers the effects to the acequia system not to be adverse. While the Corps recognizes that the replacement of concrete piping with PVC piping will alter the form of the acequia, the concrete piping is a recent addition to the system and has not acquired historic significance in its own right. Additionally, the placement of pipe is a reversible condition that can be altered at any time to restore the system to its original open ditch design.

IF REPORT IS NEGATIVE YOU ARE DONE AT THIS POINT.

SURVEY LA NUMBER LOG

Sites Discovered:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

Previously recorded revisited sites:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

MONITORING LA NUMBER LOG *(site form required)*

Sites Discovered (*site form required*) **:** **Previously recorded sites** ***(Site update form required):***

LA No.	Field/Agency No.	LA No.	Field/Agency No.

Areas outside known nearby site boundaries monitored? Yes ☐, No ☐ If no explain why:

TESTING & EXCAVATION LA NUMBER LOG (*site form required)*

Tested LA number(s)	Excavated LA number(s)

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CHAPTER 1
INTRODUCTION AND PROJECT DESCRIPTION

Dana M. Price and Jonathan E. Van Hoose

Purpose of the Survey and Project Background

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with and at the request of the New Mexico State Engineer's Office and the members of the Ramah Valley Acequia (Community Ditch) Association, is planning a project to rehabilitate the Ramah Valley Acequia, McKinley County, New Mexico. The project area is located along Cebolla Creek, a tributary of the Rio Pescado in the Zuni River Basin, in the community of Ramah. Ramah is located 50 miles west of Grants and 43 miles southeast of Gallup on NM Highway 53.

The proposed rehabilitation work on the Ramah Valley Acequia would be conducted under Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662), as amended. Section 1113 authorizes the Acequia Rehabilitation Program for the restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. This acequia rehabilitation project also qualifies under Section 215 of the Flood Control Act of 1968 (Public Law 90-483) as amended. Section 215 provides that the Secretary of the Army may enter into an agreement to credit or reimburse the costs of certain work accomplished by states or political subdivisions thereof, which later is incorporated into an authorized project.

Ramah Valley Acequia diverts water from Cebolla Creek at the Ramah Lake dam. The dam was constructed beginning c. 1878 and is owned and operated by Ramah Land and Irrigation Company. The acequia, which has been in operation since about 1882, currently serves 72 members to irrigate about 1,200 acres of cropland. The portion of the system to be impacted by the project consists of two main branches stemming from the diversion at the Ramah Dam: the west branch, measuring approximately 2,579 feet, and the south branch, measuring approximately 3,993 feet, for a total of 6,572 lineal feet within the project area. The entire extent of the system within the project area was converted to buried concrete and corrugated metal pipe in 1982.

The purposes of the acequia rehabilitation project are to improve water delivery efficiency by limiting seepage in the existing concrete pipes and to provide a pressurized pipeline for spray irrigation. The present system of concrete pipes conveys water inefficiently with numerous leaks that prevent the system from maintaining adequate pressure for sprinkler irrigation.

The Corps proposes to rehabilitate the Ramah Valley Acequia by replacing the existing concrete and corrugated metal pipe with 24-inch polyvinyl chloride (PVC) irrigation pipe. Project design and specifications have been provided by the Natural Resources Conservation Service. Components include 6,572 feet of 24-inch diameter, 80 psi PVC plastic irrigation pipe and 223 feet of 10-inch diameter, 80 psi PVC pipe, with 3,000 psi concrete thrust blocks, alfalfa valves and inline valves as needed. The new pipeline would follow the alignment of the existing pipeline for most of its length. Project construction is scheduled during the non-irrigation season beginning in early spring of 2011 with an expected duration of about 3 months. The Community

Ditch members would be responsible for assuring operation and maintenance upon project completion.

The primary objectives of the acequia rehabilitation project are to improve the efficiency of water delivery to the acequia members by minimizing leakage and seepage losses and to provide high pressure suitable for spray irrigation. A secondary benefit of the proposed action would be to reduce maintenance costs for the members of the acequia. Currently, the old concrete pipelines experience water losses to leakage at many joints and breaks in the line. The acequia members do not have sufficient water pressure to update their irrigation systems. Repairing leaks in the buried pipelines is difficult and costly, and without replacing the pipeline any repairs are only temporary.

Land Ownership

Land in the project area is privately owned. Project construction will occur within the Ramah Valley Acequia's right-of-way.

Project Personnel and Schedule

Jonathan Van Hoose, Corps archaeologist, conducted a visit to the project area with Corps biologist Dana Price and Project Manager Patricia Phillips on June 10, 2010. Subsequently, Van Hoose and Corps archaeologist Gregory Everhart conducted a cultural resources survey on December 10, 2010. Photographs from both visits are included in this report. Jonathan Van Hoose, Jeremy Decker, and Gregory Everhart prepared this report, and Dana Price prepared the natural setting section appearing in Chapter 2 and contributed to this chapter. Gregory Everhart peer-reviewed this document. The project proponents would prefer to begin construction before the beginning of irrigation season in April 2011.

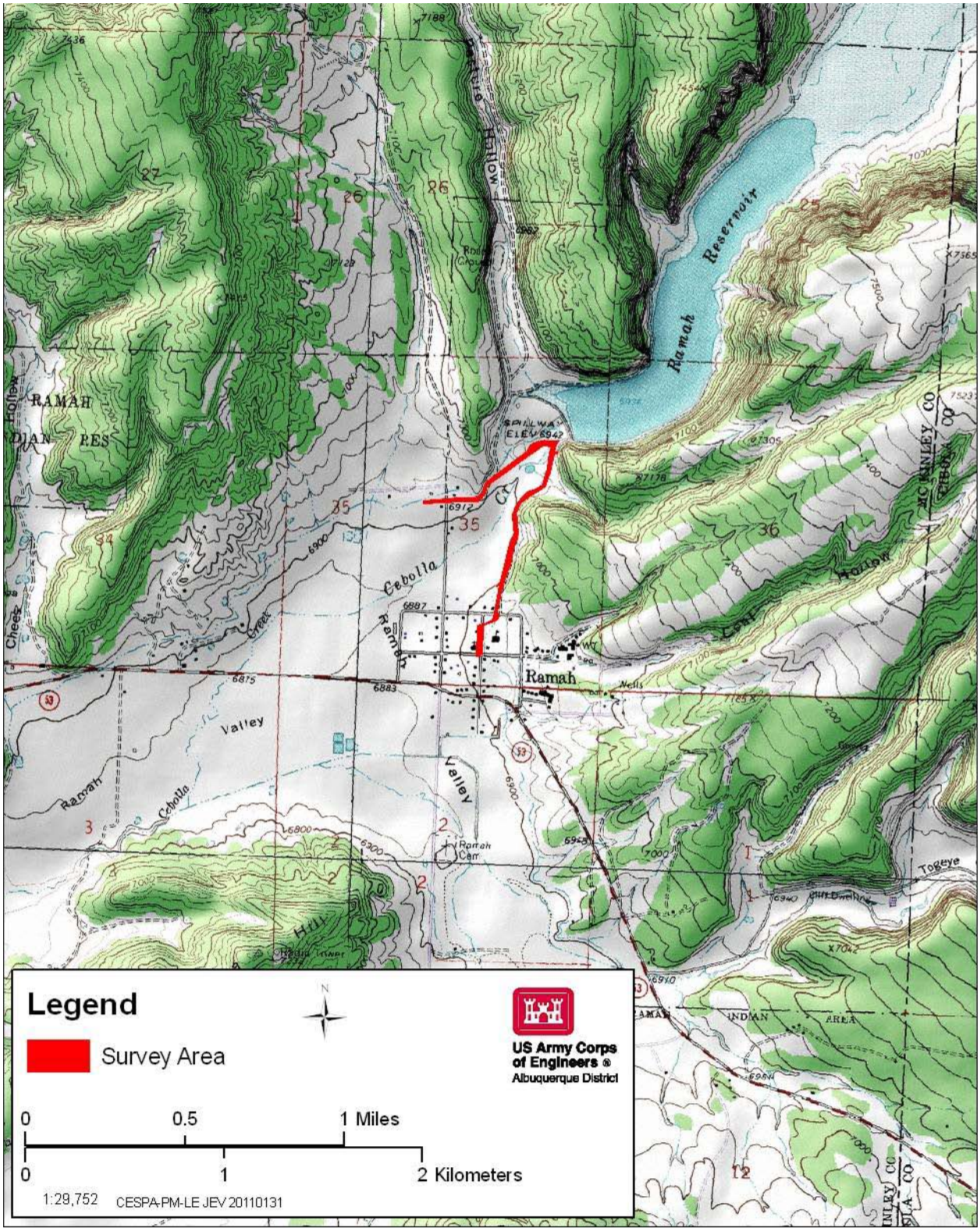

Figure 1.1. Location of project area, shown on USGS 7.5" quadrangles maps Ramah, NM (35108-B4), Burned Timber Canyon, NM (35108-B5), Togeye Lake, NM (35108-A4), and Pescado, NM (35108-A5).

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CHAPTER 2
ENVIRONMENTAL AND CULTURAL SETTING

Jeremy T. Decker, Gregory D. Everhart, Dana M. Price, and Jonathan E. Van Hoose

Natural Environment

Physiography and Geology

The Ramah Valley lies within the Great Basin Conifer Woodland biotic province as defined by Brown and Lowe (1977), in the Zuni River basin in northwest New Mexico. Elevations in the region vary from about 6,100 feet near the Zuni River to over 8,000 feet in the Zuni Mountains. The surface geology of the Ramah area includes primarily sandstones of Cretaceous age, with progressively older rocks lying northwards in the Zuni Mountains. In the immediate project area, surface geology in the Cebolla Creek valley is intertongued Mancos shale and Dakota sandstone. Above the Ramah reservoir are red sandstones including Jurassic Zuni and Entrada sandstone, and Triassic Chinle Group. Higher in the Zuni Mountains are Permian sedimentary rocks and granite. An interesting geological feature east of Ramah, the Malpais lava flows, are geologically recent (Quaternary age), dating from 115,000 to only 3,000 years before present (NMBGMR 2003).

Soils

Soils within the project area are mapped in 5 units: Catman variant clay loam, Catman clay loam, Hickman sandy clay loam, Rock outcrop-Vessilla-Mion complex, and Pinitos-Ribera sandy loams (USDA NRCS 2010). The majority of the soils in the project area, including the entire valley bottom, are classified as Catman variant clay loam. This soil type occurs on floodplains and alluvial fans with slopes of 1 to 3%. It is somewhat poorly drained and very slightly to moderately saline. Depth to water table in areas with this soil type averages 24 to 48 inches, which is shallow enough to support established riparian plants such as willows. Catman clay loam covers a small area near the downstream end of the north acequia pipeline. It is similar to Catman variant clay loam, but occurs where the depth to the water table averages about 4 inches. There is most likely a gradation of depth to water table between these two soil types. Catman clay loam is the only hydric soil type in the project area. Hickman sandy clay loam covers the alluvial fan of a tributary drainage on the east side of Cebolla Creek. This soil occurs on gently sloping (1-3%) surfaces with significant depth to the water table (>80 inches). It is non-saline and well-drained. Rock outcrop-Vessilla-Mion complex and Pinitos-Ribera sandy loams are found in the hills and footslopes alongside the acequia route at the edges of the valley. Rock outcrop-Vessilla-Mion is a thin soil occurring on steeply sloping (3-55%) surfaces with shallow depths to bedrock. Pinitos-Ribera sandy loams occur on well-drained surfaces with slopes of 1-10% that have 80 or more inches of depth to the water table.

Climate

McKinley County has a semiarid climate. However, local climate is highly varied because of the wide range in elevation and the uneven topography. The elevation at the project site varies from

6,900 feet in the town of Ramah to 6,942 feet at Ramah Dam. Climate records are available from the weather station at Zuni, 20 miles west of Ramah at an elevation of 6311 feet MSL. The average winter temperature at Zuni is 33.7°F, with an average daily minimum of 18.2°F. Summer temperature averages 68.6°F, with average daily maximum of 86.6°F. Average annual precipitation ranges from about 8 to 18 inches within McKinley County and is 12.88 inches in Zuni. About 40% of the total precipitation falls during the frost-free season of May to September, with most falling as brief, generally heavy thunderstorms in the period of July through September (USDA NRCS 2010). Graphs of Ramah climate are shown in Figure 2.1 and Figure 2.2.

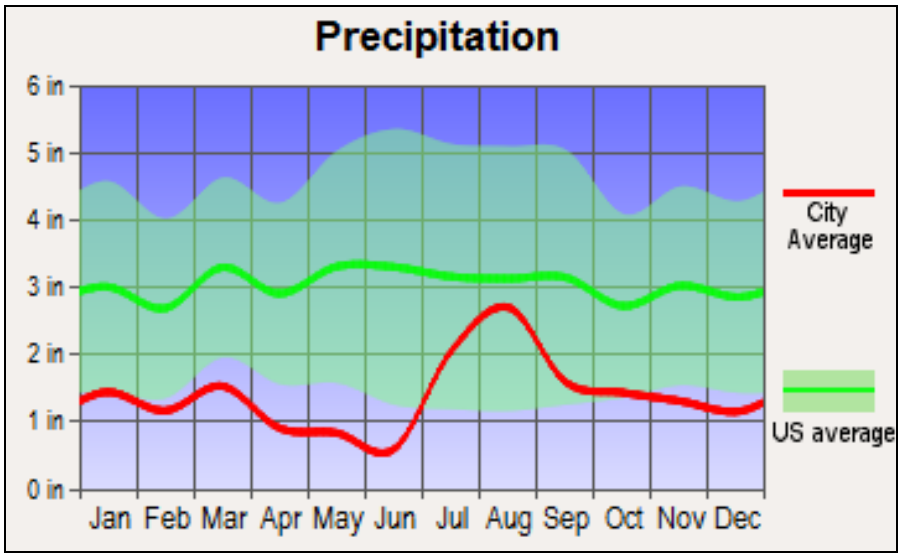

Figure 2.1. Precipitation characteristics in Ramah, Mc Kinley County, NM near project area. Graph generated by City-data.com (2010).

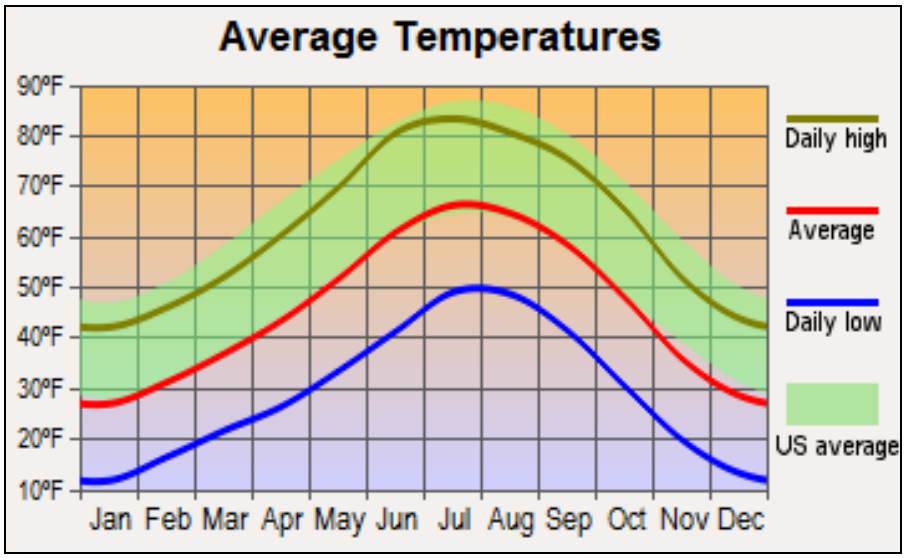

Figure 2.2. Temperature characteristics in Ramah, Mc Kinley County, NM near project area. Graph generated by City-data.com (2010).

Vegetation and Wildlife

The proposed project area lies within the Great Basin Woodland biotic community (D. Brown and Lowe 1977; D. Brown 1982). New Mexico's Comprehensive Wildlife Conservation Strategy (NMDGF 2006) places the Ramah area within a narrow band of the Arizona-New Mexico Mountains Ecoregion that is bordered by the Colorado Plateau Ecoregion. Corps personnel visited the site on June 10 and December 10, 2010. The Ramah Valley from the reservoir down into the town of Ramah spans a variety of natural and anthropogenic vegetation types. The predominant vegetation on hill slopes and uplands is pinyon-juniper woodland, with ponderosa pines in cooler, moister microsites such as within the canyon adjacent to the reservoir. At lower elevations the woodland thins into a juniper savannah and shrublands. The gently sloped valley bottom has been converted to agricultural fields. Vegetation in the irrigated valley includes pasture grasses, alfalfa and annual crops. Cebolla Creek runs through the Ramah Valley. Although it does not have permanent flow, the creek channel supports a riparian community of willow, sedges, and rushes.

Mammals occurring in McKinley County and in the Great Basin Conifer Woodland biotic community typically include small mammals such as squirrels, mice, gophers, rats, rabbits, badgers, raccoon, and skunks as well as larger mammals such as gray, kit, and red foxes (*Urocyon cinereoargenteus, Vulpes macrotis, V. vulpes*,), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mule deer (*Odocoileus hemionus*). Mountain lion (*Puma concolor*) are unlikely to venture within the project area due to proximity to humans.

Resident and migratory birds expected in the area include Western Kingbird (*Tyrannus verticalis*), Northern Mockingbird (*Mimus polyglottos*), Broad-tailed and Rufous Hummingbirds (*Selasphorus platycercus, S. rufus*) Black-chinned Hummingbird (*Archilochus alexandri*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Northern Flicker (*Colaptes auratus*), Dark-eyed Junco (*Junco hyemalis*), Red-breasted, White-breasted and Pygmy Nuthatches (*Sitta canadensis, S. carolinensis, S. pygmaea*), Western Meadowlark (*Sturnella neglecta*), Pinyon Jay (*Gymnorhinus cyanocephalus*), Common Raven (*Corvus corax*), Great Horned Owl (*Bubo virginianus*), Red-tailed Hawk *(Buteo jamaicensis*), American Kestrel (*Falco sparverius*), Northern Harrier (*Circus cyaneus*), Turkey Vulture (*Cathartes aura*), several species of warblers, vireos, wrens, swallows and sparrows, and numerous others.

Although waterfowl and shorebirds were not observed at Ramah Reservoir on the Corps' site visits, they may use the lake occasionally, such as during migration. Waterfowl that have been observed at the Zuni wetlands, 20 miles west of Ramah, include Mallard (*Anas platyrhynchos*), shoveler (*Anas clypeata*), Cinnamon Teal (*A. cyanoptera*), Ruddy Ducks (*Oxyura jamaicensis*), Canada Geese (*Branta canadensis)*, American Coot (*Fulica americana*), and Great Blue Heron (*Ardea herodias)*. Additionally, Bald Eagles (*Haliaeetus leucocephalus*) have been observed at the Zuni wetlands and may forage occasionally at Ramah Reservoir. Reptiles and amphibians (herptiles) in the area may include northern leopard frog *(Rana pipiens)* and tiger salamander (*Ambystoma tigrinum*).

Results of Records Check

A pre-field online records check of the New Mexico Office of Cultural Affairs, Historic Preservation Division, Archaeological Records Management Section's (ARMS) database was conducted by Jonathan Van Hoose on December 9, 2010, and another records check was made by Jeremy Decker on February 23, 2011. According to the ARMS database, seven surveys have been conducted within 0.5 miles of the project area. Table 2.1 lists archaeological surveys that have been conducted within 0.5 miles of the project area. A screen capture of the ARMS map server search is provided in Appendix A, Figure A.1.

Table 2.1. Surveys conducted within 0.5 miles of project area.

NMCRIS Number	Performing Agency	Survey End Date	Acres	Number of Sites	Survey Type
8932	BIA	4/11/1985	0.08	0	Intensive
16295	Pueblo of Zuni Archaeology Program	8/31/1986	374.00	80	Intensive
20956	Pueblo of Zuni Archaeology Program	5/31/1988	8.58	0	Intensive
22420	Pueblo of Zuni Archaeology Program	6/30/1982	143.20	0	Intensive
47280	BIA	8/2/1992	5.52	0	Intensive
54449	USFS	1/11/1996	10.40	0	Intensive
101789	NMDGF	10/27/2006	19.00	1	Intensive

These surveys total 560.78 acres and resulted in the recording of 81 unique historic properties. In total, there are nine known archaeological sites within one-half mile of the project area; ARMS data for these sites are presented in Table 2.2. Four of the sites are prehistoric, and five are historic. Seven of these sites were located on the above mentioned previous surveys, while two additional sites (LA 29993 and LA 29994) were located by the New Mexico state office of the Natural Resource Conservation Service (NRCS) in 1980. The NRCS project was never given a NMCRIS activity number and details of the survey are not available. Sites LA 29993 and LA 29994 have very poor documentation, but both are reported to have prehistoric ceramics, suggesting that they at least have a prehistoric component. See Appendix A, Figure A.2 for locations of these two sites and previous surveys relative to the current survey area boundaries. The proposed project does not overlap with any historic properties other than the Ramah Acequia itself. No state or National Register listed properties are located within 0.5 miles of the project area.

Table 2.2. Known archaeological sites within 0.5 miles of project area.

LA Number	Site Type	Occupation Type	Site Size (sq. m)
LA 29993	Structural	Prehistoric (?)	12
LA 29994	Non-structural	Prehistoric (?)	300
LA 56709	Non-structural	Historic	62
LA 56710	Non-structural	Historic	12
LA 56711	Non-structural	Historic	12
LA 56712	Structural	Historic	62
LA 56713	Non-structural	Prehistoric	3000
LA 56714	Non-structural	Historic	300
LA154377	Non-structural	Prehistoric	470

Results of Tribal Consultation

Pursuant to 36 CFR 800.2, consulting parties in the Section 106 process identified for the Undertaking include the Corps, the Ramah Valley Acequia (Community Ditch) Association, and the New Mexico State Historic Preservation Office. Consistent with the Department of Defense's American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, and based on the State of New Mexico Indian Affairs Department's 2011 Native American Consultations List, American Indian tribes that have indicated they have concerns in McKinley County were sent scoping letters regarding the proposed project. To date, the Corps has received no indication of tribal concerns that would impact this project; as of the date of this report, both the Hopi Tribe, Ysleta del Sur Pueblo, and the Pueblo of Laguna have responded indicating that they have no concerns at this time.

Culture History and Literature Review

Although there is debate about certain aspects of the descriptions (Cordell and Gumerman 1989), the culture history for the project area generally follows that of the Southwest, and has been chronologically generalized into several classification schemes. These descriptions utilize noticeable changes in the archaeological record, as seen in temporal and spatial similarities and differences, to assist in the explanation and interpretation of the cultural record. The primary periods and their approximate dates for the project area are as follows (Table 2.3):

Table 2.3. General chronological sequence.

Period Name	Approximate Date Range
Paleoindian	11,500 BC – 5,500 BC
Archaic	5,500 BC to AD 400
Formative / Puebloan	AD 400 – AD 1350
Protohistoric	AD 1350 – AD 1540
Historic	AD 1540 - Present

These periods are further subdivided to describe specific regional and local variations in the archaeological record (Schutt and Chapman 1997:13-25; Cordell 1997:187-220, 1984:95-119; Cordell and Gumerman 1989; Simmons et al. 1989; Breternitz and Ash 1984; Stuart and Gauthier 1984:28-43; Vierra 1992).

Previous cultural resources studies in the region include several extensive archaeological surveys and regional summaries that cover areas of west-central New Mexico. One relatively recent and large survey, covering 20,816 acres at Fort Wingate, is reported by Schutt and Chapman (1997). Fort Wingate is located approximately 20 miles north of the Ramah Valley Acequia project area. Four related reports on Fort Wingate include Dongoske and Nieto (2005) on Zuni use of the Fort Wingate area, Kurley-Begay (2007) on Navajo use of the Fort Wingate area, Perlman's (1997) ethnographic study of the Ft. Wingate area, as well as the original work by Breternitz and Ash (1984). Other documentation covering the region include Simmons et al. (1989), Nials et al. (1987), Stuart and Gauthier (1984), Allen and Nelson (1982), Plog (1981); Tainter and Gillio (1980); and Berman (1979). Other Southwest overviews include Cordell (1997, 1984), Huckell

(1996), and Wills (1988). Other archaeological surveys conducted in the vicinity of the project area include Hammack (2004), McKenna (1996), Gilbert (1994), Evans (1992), and Vercruysse (1987).

Documentation more specific to acequias, or irrigation ditches, in the state and near the project area includes Ackerly (1996), Rivera (1998), and Rodríguez (2006), Baxter (1997), and Clark (1987). Several short histories of the local Ramah Valley area include those prepared by Gary Tietjen (2007; 1980).

Paleoindian Period (11,500-5,500 BC)

In New Mexico, Paleoindian sites are known primarily from the eastern plains and the Rio Grande valley with a few being known in the western part of the state (Cordell 1997:67-100, 1984:121-151; Stuart and Gauthier 1984:28-33, 291-300; Simmons et al. 1989:21-38). There are also numerous, scattered isolated artifacts reported from across the state. The Paleoindian studies in the Rio Grande valley, reported by Judge and Dawson (1972) and Judge (1973) are widely referenced for the Paleoindian sequence in New Mexico. Their studies indicate that there are Clovis, Folsom, and Plano sites in the Rio Grande valley consisting mostly of surface finds of isolated artifacts; however, stratified sites have been found such as the Rio Rancho Folsom (camp) Site excavated on Albuquerque's West Mesa (Judge and Dawson 1969; Cordell 1984:148). More recently, Dr. Bruce Huckell of the University of New Mexico's Department of Anthropology has conducted archaeological survey and excavations at Folsom sites on Albuquerque's West Mesa during the Department's annual summer archaeological field school.

Paleoindian peoples have been characterized as primarily mobile big game hunter-gathers. In addition, Paleoindian peoples are known to have utilized ground stone tools to process plant food, and likely scavenged as well. Paleoindian sites in New Mexico have been found primarily on eroded surfaces, especially in sand dune areas and on upper terraces along rivers and their tributaries. Paleoindian sites in the western portion of New Mexico, the San Juan Basin, and eastern Arizona are generally limited to isolated projectile points; however, there may be problems with site visibility (Cordell 1997:72-74, 1979:10-22; Schutt and Chapman 1997:13-14; Tainter 1995:6-7; Simmons et al. 1989:33-34; Stuart and Gauthier 1984:28; Plog 1981:49-52). Closer to the project area, no Paleoindian artifacts or evidence for Paleoindian occupation were identified during the 14,300 acre McKinley Mine survey northeast of Gallup (Allen and Nelson 1982:76-77) nor during the extensive 20,816 acre (32.5 square miles) survey conducted at the Fort Wingate Depot Activity (Schutt and Chapman 1997:13-14). The Paleoindian and subsequent Archaic time periods are typically identified by the presence of morphologically diagnostic projectile points.

Archaic Period (5,500 BC-AD 400)

In New Mexico, the chronology defined by Cynthia Irwin-Williams (1973) for the Arroyo Cuervo region in northwestern New Mexico has been the most widely utilized for the Archaic Period (Tainter 1995:6-7; and see Tainter and Gillio 1980:41-48; see Chapin 2005 for a recent revision). The Cochise Tradition as described by Sayles and Antevs for Arizona (1941) is reported to extend into the western portion of New Mexico (Schutt and Chapman 1997:16). Huckell (1996) has brought together recent documentation for the period in the Southwest. While the Southwest's Archaic Period is becoming fairly well defined, sites across the state remain difficult to distin-

guish. Many lithic scatters in the Southwest may date to the Archaic, but positive dating and association to the Archaic Period often eludes archaeologists due to a lack of diagnostic artifacts and datable contexts. Dating sites is usually accomplished with diagnostic projectile points, although many newly discovered Archaic sites are producing dateable materials from other contexts (Huckell 1996:325-327).

Archaic peoples continued to be very mobile, had an increased reliance on small game and collecting and gathering plant foods, and likely utilized a seasonal migratory pattern in their subsistence strategies. Projectile point typology, settlement type and site locations are still primary elements in the identification of Archaic sites, again however, site visibility may be a factor in identification. While Archaic sites are reported as being uncommon in many portions of western New Mexico, especially for the early and middle period subdivisions, numerous sites are reported for the north and northeastern San Juan Basin and the Albuquerque West Mesa areas (Simmons et al. 1989:66-68; Schutt and Chapman 1997:16). Over 50 sites were assigned to the Archaic Period during the surveys in and around Chaco Canyon in the 1970s (Pers. comm. Dr. John Schelberg, Archaeologist, U.S. Army Corps of Engineers, August 6, 1998).

Significant Late Archaic occupations are known broadly in the state. For example, extensive pithouse settlements are known from studies on Albuquerque's West Mesa (Tainter and Gillio 1980:41-48); and shallow pithouse sites are known to occur in the Zuni area at this time as well (Ferguson and Mills 1982:32). Many social and technological changes occur with increased dependence on wild plants and the adoption of Mesoamerican cultigens. Examples would include changes in ground stone technology, site sizes and distributions, increasing sedentism, and the introduction of the bow and arrow about AD 200. The end of the Archaic Period is difficult to define chronologically because hunter-gatherers lifeways persist into the following Puebloan period, but the adoption of ceramics and the appearance of substantial residential architecture are generally used to mark the end of the Archaic (Cordell 1997:221). As with the Paleoindian Period, there were few Archaic Period artifacts/components found during the McKinley Mine and Fort Wingate surveys (Allen and Nelson 1982:78-79; Schutt and Chapman 1997:16) and no Paleoindian nor Archaic Period components were reported for the nine archaeological sites located near the project area.

Formative / Puebloan Period (AD 400-1350)

In the Gallup-Fort Wingate-Grants area, the Puebloan Period generally follows the Pecos classification developed in the late 1920s and 1930s and utilizes major changes in populations and cultural interaction, ceramics, architecture, and settlement patterns to establish a chronology for the Basketmaker and ancestral Puebloan phases (Schutt and Chapman 1997:16-17; Simmons et al. 1989:75-97, 102-106; Cordell 1982:65-73; Allen and Nelson 1982:79-83). Schutt and Chapman (1997:17, Table 2.1) provide a table of classificatory schemes developed for the western part of the state. The San Juan Basin, including Chaco Canyon and the adjacent Red Mesa, Chuska, and San Juan River valleys, are locations where primary developments in Puebloan culture have been identified. Stuart (2000:60, 68-69, 75) argues that the Red Mesa Valley, located a short distance north of the project area, was one of the oldest and primary "breadbaskets" that fueled the development of the Chaco Culture (and see Physiographic Map in Marshall et al. 1979:22a).

The Ramah Valley Acequia project area is nearly centrally located between the Ancestral Puebloan (known in the early literature as the Anasazi) peoples to the north and east, the Mogollon culture to the south, and the Hohokam culture to the southwest (Cordell 1997:187-220). The Puebloan Period is characterized by the development and increasing dependence on agriculture and farming, ceramic technologies and food storage, increasing population sizes and sedentism, regional population movements and areas of abandonment, aggregation into larger villages, and more intense and efficient use of the landscape (Schutt and Chapman 1997:16-20; Simmons et al. 1989:102-106). There is an increasing use of water control features and water conservation methods over time and local and long distance trade is important, particularly at Zuni near the project area. Puebloan sites in the area range from small groups of 1-3 large pithouses, small pithouse villages, small above-ground stone masonry, to large room-blocks of stone architecture. While construction in the area is primarily of stone masonry, jacal structures, wattle and daub, and adobe are also found. These sites are generally located on terraces near arable land.

One major development in the Puebloan Period is the rise of the "Chaco Phenomenon" (Cordell 1997) around AD 900. Chacoan culture is characterized by large multi-storied communities surrounded with associated great kivas, roads, and smaller habitation sites. The large great house structures are generally thought to be "over-engineered", and are constructed from well-executed core and veneer masonry (Schutt and Chapman 1997:19). During Chaco's period of prominence, general population increase occurs in adjacent regions (Schutt and Chapman 1997:20). There are no recorded Chacoan outliers in the Ramah area.

For years archaeologists have been trying to adequately describe the rather sudden collapse of Chacoan culture in the early AD 1100's. As the Chacoan system unravels with no new construction in Chaco Canyon proper after 1130 AD, there is evidence that the peoples of the San Juan Basin were abandoning the area and moving out to adjacent areas at slightly higher elevations such as the Mesa Verde, Zuni, Manuelito, San Mateo, and Acoma-Cebollita Mesa areas (Tainter and Gillio 1980:48-94, 99-116). Another major regional population shift with implications for the project area occurred with the depopulation of the Mesa Verde region in the Four Corners area. Mesa Verde was abandoned by 1280 following a series of droughts affecting the Southwest culminating with the one known as "the great drought of 1276-1299" (Cordell 1997:383-389). As people migrated out of the Mesa Verde area, significant development along the Rio Grande valley began (Cordell 1997:192-195; Simmons et al. 1989:102-106). In addition to the Rio Grande Valley, the Cebolleta Mesa area including Acoma and Pottery Mound, and closer to the Ramah Valley project area, the Manuelito Plateau and the Zuni area became intensely occupied (Cordell 1979:399-409). However, these land use changes were not uniform. For instance, the results of the Fort Wingate survey suggests that there was an occupation hiatus in that portion of the Red Mesa Valley from about 1250 AD to the late 1700s (Schutt and Chapman 1997:20-21; Simmons et al. 1989:126-127).

Within the Ramah area and the nearby El Morro Valley, developments in the Formative/Puebloan period contributed significantly to the development of the Zuni area, including the make-up of modern Zuni populations. Tainter and Gillio (1980) note that in the period from AD 900-1000 a small population of people constructed a relatively small number of pithouses in the El Morro Valley, particularly focusing on the valley margins in the pinyon-juniper zone (Tainter and Gillio 1980:90). This early occupation is followed by an occupational hiatus ending in the mid-thirteenth century as populations from the Zuni area spread eastward (Tainter and Gillio

1980:90). This population shift from the lower elevations of the Zuni valley to higher elevations appears related to the same drought conditions resulting in the abandonment of the Four Corners area. Unlike the Four Corners area, however, populations remained relatively close to home. Following a brief period of population growth and the development of seven large aggregated communities in the El Morro Valley (greater than 500 rooms), people began to shift settlement back to the lower elevations of the Zuni River basin in the early AD 1300's (Tainter and Gillio 1980:90; Leblanc 1978; Watson, Leblanc, and Redman, n.d.) and the large pueblos of the El Morro Valley were gradually abandoned.

Though it had been occupied for centuries prior to the collapse of Chaco and Mesa Verde, the Zuni area did not become distinctively "Zuni" until sometime in the fourteenth century. In the period from AD 1250-1450 people in the Zuni area were occupying several large pueblos in the Zuni river drainage from Hawikku east to El Morro in the Zuni Mountains. Zuni Pueblo itself was likely established around AD 1350 (Perlman 1997:21; Dongoske and Nieto 2005:31). An influx of Mogollon people migrating northward to Zuni Pueblo between AD 1350 and 1540 is purported to have merged into the ancestral Puebloan population in the Zuni river drainage (Perlman 1997), and Ferguson observes that: "This small group of immigrants was assimilated into the Anasazi population which had been long resident in the Zuni drainage, and modern Zuni culture and society emerged from the amalgam" (1991:4, quoted from Perlman 1997:21).

Protohistoric Period (AD1350-1540)

In general the early Protohistoric period in the project area is marked by populations generally merging into the lower Zuni River basin, with the project area being exploited for a variety of Zuni traditional uses (e.g. hunting, plant collection, mineral collection) (Perlman 1997:25-28, Ferguson and Hart 1985). The Zuni developed a major regional trade network that had its roots in the seventh century AD, with extensive trade with tribes from the Gulf of California and U.S. west coast (Hart 1981:4-7; Perlman 1997:21). According to Hart (1981), "By the fifteenth and sixteenth centuries, the villages of Zuni had become one of the major trading complexes of the Southwest" (Hart 1981:8). This trade was accomplished through the development and use of a system of trade routes covering an expanse from the Pacific Ocean to the Plains, and as far south as Mexico (Perlman 1997:21). Several of these routes identified by Ferguson and Hart (1985:54, depicted in Perlman 1997:22) run along the Rio Pescado and Rio Nutria drainages to the south and north of the current project area respectively.

In addition to the Zuni use of the region, the first evidence of Navajo occupation occurs in the late Protohistoric Period to the north of Ramah. In the 1500s and perhaps slightly earlier, Athabaskan groups began arriving in areas of northern New Mexico and the "Apaches de Navajo" (farmer Apaches [Schutt and Chapman 1997:21]) are known to have occupied the Dinetah (the traditional Navajo homeland, encompassing the modern Farmington-Bloomfield-Aztec area) in the upper San Juan Basin, including the areas around the Animas and La Plata Rivers, the location of the modern Navajo Reservoir, and areas south of the river such as Largo and Gobernador Canyons (G. Brown 1996; Brown and Hancock 1992; Brugge 1983; Hogan 1989; Honeycutt and Fetterman 1994; Kurley-Begay 2007:2; Schaafsma 2002; Perlman 1997:15; Towner 1996). These populations eventually started using the vast and generally vacated areas to the east, south, and west including the old Chacoan homeland (Schaafsma 2002; Stuart 2000:135-136; Cordell 1997:216-217; Simmons et al. 1989:106, 126; Eddy 1966:505-515). Although it is possible the

Navajo were making forays into the Zuni area at this time, the Navajo presence in the Zuni Mountains and Ft. Wingate area is not well-documented until well after the arrival of the Spanish in 1540.

Historic Period (AD 1540-Present)

The Historic Period in the Southwest is initiated with Coronado's 1540 entrada into the southwest. Coronado's initial destination was the mythical Seven Cities of Cibola, later discovered to be the six Zuni pueblos (Simmons 1988:20; deBuys 1988:46) west of the current project area. The westernmost Zuni pueblo, Hawikuh, was the first village encountered by Coronado's expedition and was captured by force on July 7, 1540 (Hammond and Rey 1940; Woodbury 1979). Following the Spanish victory at Hawikuh, Coronado and his men continued exploration throughout the southwest, including stops at the Hopi Mesas in Arizona, Tiwa Pueblos in the Bernalillo area, and eventually the Great Plains in his famous failed search for the golden kingdom of Quivira (Simmons 1979:178).

Following Coronado's expedition, Spanish presence in northwestern New Mexico was limited until the arrival of Don Juan de Oñate in 1598. Two expeditions did pass through the Zuni area between 1540 and 1598, however, including Chamuscado in 1581 and Espejo in 1583 (Woodbury 1979:470). As influential and devastating as Coronado's expedition had been, the real impact to local populations began in 1598 when Oñate arrived in the Rio Grande Valley and began the Spanish colonization effort. Oñate arrived at Zuni in that same year to force the Zuni to swear loyalty to the Spanish crown, through a Spanish Act of Obedience and Vassalage (Perlman 1997:22), which they signed peaceably. Onate's passage into the region is captured through an inscription at El Morro, southeast of the project area, indicating that Oñate's route passed very near the Ramah area. Oñate's stop at Zuni marked the beginning of missionizing efforts at the pueblo that lasted until 1820 (Woodbury 1979:472).

During these early explorations, Spaniards observed Navajos in the Mt. Taylor area as early as 1583 (Bailey and Bailey 1986; Kurley-Begay 2007:4). Early Zuni-Navajo relations in the project area were tenuous at best, with the two groups periodically in conflict as well as allied against the Spanish (Kelley 1982:9, 136; Schutt and Chapman 1997:22). This on and off relationship between the Navajo and Zuni continued throughout the early historic period and well into the nineteenth century. More permanent Navajo settlement in the project area likely began in the late 1700's. Several factors including drought, Ute raids, and the need for additional grazing land caused the Navajo to expand outward from, and eventually abandon the Gobernador area of northern New Mexico around 1750 (Perlman 1997:22; Schutt and Chapman 1997:21). There is strong documentation indicating that the Navajos inhabited the areas adjacent to, and likely within, the project area by 1776 (Correll 1979; Keur 1941; Schutt and Chapman 1997).

The period from the late 1700's to the beginning of the Mexican era (1821-1848) was a time of relative quiet in the project area (Scutt and Chapman 1997:22). Conflicts began to escalate, however, during the period of Mexican control and Navajos continued to clash with Zunis as well as Hispanic and Anglo settlers. During this time the Navajo expanded their territory to its largest range. The Navajo territory began to diminish in size steadily only after Americans assumed control over New Mexico in 1848. The Navajo territory reduction resulted from an influx of Hispanic and Anglo settlers, as well as an increased U.S. military presence in the region (Perlman

1997:16) beginning with the establishment of an outpost at the village of Cebolleta north of Laguna Pueblo (James 1967) in 1846. In response to these transgressions, Navajo raiding escalated. The outpost at Cebolleta, though short-lived, was the first step in a series of events that had devastating effects on the Navajo people, including some from the town of Ramah.

In 1850 the United States recognized New Mexico as a U.S. territory. In an effort to protect settlers in the territory, in 1851 the U.S. Army closed the outpost at Cebolleta and constructed a new fort in Northeastern Arizona, Ft. Defiance (Kurley-Begay 2007:4). The establishment of Ft. Defiance successfully brought peace to the region for the majority of the 1850's (James 1967:153). The peace, however, did not last. The Navajos had been restricted in their movements to reservation boundaries created through several treaties, and hostilities arose over the lack of access to non-reservation lands. In 1860, the Navajos had finally had enough and staged a major attack on Ft. Defiance (James 1967). Though the garrisons at the Fort survived the attack, it prompted the U.S. to establish a new fort to the north of the Ramah area called Ft. Fauntleroy (renamed Ft. Lyon in 1861 and Ft. Wingate in 1868) (James 1967; Kurley-Begay 2007; Schutt and Chapman 1997:23). The effort to subdue Navajo raids was halted from 1860-1862 due to the need for Union soldiers in the Civil War, and it wasn't until late in 1862 that U.S. forces were able to resume their assault on the Navajos (James 1967; Schutt and Chapman 1997). Brigadier General James H. Carleton headed the campaign to finally end the Navajo threat by forcibly moving the tribe to a military reservation at newly commissioned Ft. Sumner (James 1967:155) in east-central New Mexico along the Pecos River. The Navajo people were rounded up over a period from 1863 to 1864, their homes and lands burned; and were incarcerated at the experimental Bosque Redondo Reservation at Ft. Sumner until 1868 (James 1967; Kurley-Begay 2007; Schutt and Chapman 1997; Thompson 1976). The forced march of over 300 miles to Bosque Redondo is known as the "Long Walk" (James 1967:156; Kurley-Begay 2007:5).

The "Indian Policy" (James 1967:155) unleashed by Carleton had a direct effect on the Navajos living in the vicinity of Ramah in 1862. After their release from the Bosque Redondo Reservation, nearly 7,000 Navajos returned to western New Mexico where they were received at newly commissioned Ft. Wingate (James 1967:157-158; Kurley-Begay 20075-6; Perlman 1997:12; Scutt and Chapman 1997:23). While a number of Navajos stayed in the immediate vicinity of Ft. Wingate where they were provided supplies, some began dispersing outward from the Fort back into their prior homelands (Kurley-Begay 2007:5-6; Perlman 1997:16). Historical accounts from the Ramah Navajo Chapter indicate that seven Navajo families returned to the Ramah area in 1868 (Rodgers 1993:241; Ramah Navajo Chapter, 2011) indicating that the Ramah area was settled by Navajos prior to 1862. The place that was resettled by these families is now believed to be underwater in present day Ramah Lake (Rodgers 1993:241).

In addition to the return of the Navajos in the late 1860's and 1870's, a new group of settlers were moving into the Zuni drainage near Ramah. Mormon settlers, intent of establishing communities and missionizing Navajos and Zunis, began moving into New Mexico from Utah and Arizona in the late 1870's (Tietjen 1980). The Mormon settlers established communities near Zuni Pueblo (Savoia and Savoietta) to work with the Zuni, and the town of Ramah to focus their mission efforts on Navajos (Tietjen 1980). The site that was to become Ramah was first visited by its Mormon founders in 1882, and was originally called "Navajo". The name had to be changed, however, as the town of Navajo had already been established elsewhere in the state (Ju-

lyan 1996:284). The place-name Ramah ("high place" in Hebrew), found in the Bible and the Book of Mormon, was chosen (Julyan 1996:284).

The dam that now contains the town's community ditch irrigation water (Ramah Lake) was constructed in 1882 (Tietjen 1980:40-41). Interestingly, an account from the Ramah Navajo Chapter places the construction of the dam and reservoir as early as 1877 (Rodgers 1993), although Tietjen's history of Ramah notes that the men who built the reservoir did not leave Utah in route to Ramah until 1878 (Tietjen 1980). Joe and Ernst Tietjen, along with a Navajo named Sam began construction of the earthen diversion dam for the acequia system, in addition to planting the first trees and building the first house (Tietjen 1980:41). One of the main streets in the town of Ramah today is Tietjen Ave., underscoring the importance of the Tietjen family in the founding of the town. Based on historical journal entries, Tietjen describes the construction of the Ramah Dam as follows:

> According to S.C. Young, a son-in-law [of Ernst Tietjen], the dam was built with the aid of 20 Navajos with shovels and a scraper made from scrap iron picked up at the Ft. Wingate dump. (1) At a later stage, dirt for the dam was transported as follows: A bridge was built across a wash which was wide enough and deep enough to allow one wagon and team to pass under the bridge and another team and scraper to pass over the bridge. The team on the bridge straddled a large hole in the bridge, and the scraper of dirt was dumped through the hole into the wagon waiting below. This wagon was pulled onto the dam and at the appropriate spot the teamster dumped the load by rotating the loose floorboards of the wagon. The floorboards were 2x6's with the ends whittled into handles. (2). Each year additional work was done on the dam. In 1931 the Government assisted in sloping the sides of the dam. Stock in the reservoir was given in proportion to the work done by each family on the dam. Credit for 50 cents an hour was given for a #1 scraper and team, 40 cents for a #2 scraper, and 30 cents for a #3 scraper [1980:41].

Tietjen goes on further to describe the founding of the town and the process by which fields and family lots were arranged and disseminated. The following paragraph is an account from Leonard Arrington, the "current church historian" (presumably in 1980 at the time of publication) provided by Tietjen:

> "Upon reaching their destination…After the land had been suitably dedicated by prayer, a fort or stockade was cooperatively erected which would serve as a temporary home and community center, as well as a protection against Indians. From this fort colonists went forth each day in organized groups…to dig canals, erect fences, plant crops, build roads, erect homes… During this period… the settlement area was surveyed and divided into blocks… The blocks were separated by wide streets and varied from five to ten acres in size. A large block in the center was reserved for public buildings,

> and an important early task was the construction of a combination meetinghouse-schoolhouse on the lot. Each block… was divided into equal lots of an acre or more each of which were distributed among the colonists in a community drawing in which each family was to receive one lot… Outside the village, the surveyor located an area that could be conveniently irrigated called the Big Field, which was divided into lots ranging from five to twenty acres each, depending upon the amount of land available and the number of colonists. One of these farming lots was assigned to each family, again by a community drawing… Lots not taken were reserved for newcomers… All farming land was usually fenced in by cooperative effort in order to secure crops against livestock. The area outside the fenced portion was given over to common pasture. Stock were bedded down for the night in barns constructed by owners on their town lots. Early in the morning, "herd boys" would walk down the village streets, pick up the stock of each owner, and drive them outside the Big Field for daytime grazing. In the evening, the herd boys would drive the stock back to the village, and down the streets on once more." (3) Except for the fort, the Ramah settlers followed this procedure to the last detail [1980:42].

The town of Ramah nearly ceased to exist in the late 1880's, and without the efforts of the newly formed Ramah Land and Irrigation Co. (RLIC) the town would have been another failed western settlement. The land on which Ramah sits was originally granted to the Atlantic and Pacific Railroad, and subsequently sold to the commanding officer at Ft. Wingate, Col. Carr (Tietjen 1980:53). In order to raise the necessary money to purchase the land on which Ramah sits, the community began planning the RLIC in 1891. The company purchased the land and water rights around Ramah, and began formally managing the community water system with stockholder input in 1894 (Tietjen 1980:53). According to the New Mexico Office of the State Engineer 2011 water rights summary, the RLIC still owns the rights to the water within the Ramah acequia system (New Mexico Office of the State Engineer 2011).

Though the discussion on Ramah's founding to this point has focused on Mormon settlers, the area was, and continues to be, in Zuni and Navajo territory. Indeed, Ramah was chosen by the Mormon settlers for its location within Navajo country and (as noted above) was originally named Navajo. According to Navajo Chapter records, the town was recognized as a Navajo community in the 1930's, but was not formally recognized as a chapter until October 31, 1957 (Rodgers 1993:241). While the name Ramah has been adopted by Navajos today, the Navajo name for this area is Tl'ohchinì meaning "place of wild onion" (Ramah Navajo Chapter, n.d; Rodgers 1993:240). The town is now within the Ramah Navajo Indian Reservation, established by U.S. Public Law 96-333 on August 29, 1980.

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CHAPTER 3
FIELD METHODS

Jonathan E. Van Hoose

Introduction

Corps archaeologists conducted the cultural resources survey of the proposed project area. This area covered 100 percent of the project area and totaled 10.5 acres. The survey area included the alignments of two branches of the acequia system stemming from just south of the diversion point on the Ramah Dam: one branch (referred to here as the west branch) running in a generally westerly direction and measuring approximately 2,579 feet, and another (the south branch) running southward and measuring approximately 3,993 feet. An initial site visit was conducted on June 10, 2010, followed by a full survey on December 10, 2010.

The area surveyed included the entire alignment for the proposed piping project, including both the current acequia pipeline alignment insofar as it will be re-piped, and the area of the new alignment of one portion of the system. The following methods were used for the survey.

Size of the Survey Crew, Transect Interval(s) and Transect Method

The survey crew consisted of Corps archaeologists Jonathan Van Hoose and Gregory Everhart. In addition, the survey crew included Corps biologist Dana Price, who provided additional photographs included in this report. The area surveyed included the entire alignment of the irrigation system that will be (re)piped by the proposed project. This system consists of two main branches: the west branch extends approximately westward from an area near the eastern end of the dam; and south branch extends from approximately the same point southward in a generally north-south alignment (Figure 1.1). The entire survey area totals 10.5 acres. Except for a single isolated occurrence (a chert flake fragment), no archaeological sites, features, or other historic properties other than the acequia itself were noted during survey. The acequia was recorded on a New Mexico Historic Water Delivery System Inventory Form (HWDSIF).

The acequia alignment was walked over twice, during the June 10th visit and the December 10th survey. The precise route and alignment of the acequia were recorded via GPS on the December 10 survey. All locational information, including acequia alignment and survey boundaries, was recorded with a Trimble Geo-XH GPS sub-foot unit. Key elements of the acequia, associated structures and features, and the acequia's context were photographed.

The December 10, 2010 survey began with Corps personnel meeting Ramah Valley Acequia Association members Olin Klausen, mayordomo Dane Lambson, and Tony Tanner at the Ramah Dam. After this meeting and a brief discussion, Corps personnel began the survey. Both archaeologists walked in parallel along the proposed pipeline alignment, beginning at the northernmost point of the project area (where the west and south branches intersect) and first walking the western branch to the project endpoint, and then returning to the intersection and then following the south branch to its project endpoint. The terrain along both of these branches varied, includ-

ing heavily vegetated fields, a constructed earthen berm, fencelines, and road alignments. Due to the narrow span of most of the survey corridor, the archaeologists conducted most of the survey by walking a single linear transect with spacing of between five and seven meters. In areas where the corridor was wider, archaeologists walked multiple transects with similar spacing.

Field Conditions

During the June 10, 2010 field visit, temperatures ranged in the high 70s to low 80s degrees Fahrenheit, with sunny skies, good visibility, and no precipitation. During the December 10, 2010 survey, average temperatures were in the mid-50 degrees Fahrenheit, with clear sunny skies, a westerly breeze, and no precipitation.

Ground visibility varied widely depending on the location being surveyed. Visibility for much of the pipe alignments following current roads was medium to high (approaching 100 percent), while other areas (including much of the northern portion of the survey area, where the west pipeline and south pipeline intersect) were heavily vegetated with resulting low ground visibility. In these areas, most of which were previously disturbed by the original pipeline construction, agricultural use, dam construction, and road construction, archaeologists closely inspected any cut banks, profiles, or other exposed areas opportunistically, while walking transects within the entire survey area.

Methods of Site Location and Site Recording

As noted in Chapter 2, a pre-field check of the New Mexico Office of Cultural Affairs Archaeological Records Management Section's (ARMS) database on December 9, 2010 by Jonathan Van Hoose indicated the presence of two archaeological sites within 50 meters of the project area (LA 29993 and LA 29994), and several additional sites within 0.5 miles of the project area. See Appendix A, Figure A.1 for the results of this ARMS search.

Standard survey criteria, such as the presence of features and artifacts, were used to identify historic properties. Prior to going to the field, a 100 m UTM grid was superimposed over a color aerial image of the project area. The alignment of the acequia and the locations of individual features such as exposed portions of pipe were mapped via GPS. A single lithic artifact identified at the edge of the project area during the survey was piece-plotted using the GPS unit.

As noted in Chapter 2, pre-field records check showed several archaeological sites within 0.5 miles of the project area, but only two that potentially intersected the narrow corridor of the proposed project. One of these sites, LA 29994, was identified by the survey crew and determined to be outside the project area. It was therefore photographed, and field personnel verified that it was outside of the project area and would not be affected by the project, but was not formally recorded as part of this survey due to its location outside the project area. The other site was not relocated during the course of the survey.

Photography and Documentation Methods

Digital photographs were taken at different points during the survey using a Ricoh Caplio 500SE 8.0-megapixel camera with GPS capabilities. Additional photographs were taken by Corps archaeologist Gregory Everhart with a personal camera, a Nikon CoolPix L20 10.0-megapixel camera, some of which have been incorporated into this document. This report was prepared using notes and photographs taken in the field. Notes, photographs, and copies of the report are stored at the Corps' Albuquerque District office.

Strategies Employed for Collection or Limited Tests

No artifact collection or testing was conducted as part of this project.

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CHAPTER 4
RESULTS OF SURVEY

Jonathan E. Van Hoose

Location of Cultural Properties

The public disclosure of the location of archaeological sites on state and private lands is prohibited by Section 18-6-11.1 NMSA 1978. Public disclosure of archaeological site locations is federally prohibited by 16 USC 470hh (36 CFR 296.18). Confidential site location information is provided in Appendix A. Appendix A should be removed prior to public disclosure of this report.

Ramah Valley Acequia

Overview

The Ramah Valley acequia system, originally built around the year 1878, irrigates approximately 1,200 acres of agricultural land and serves 72 acequia members within the community of Ramah, NM in McKinley County, New Mexico. Crops grown by acequia members include oats, wheat, alfalfa, field corn, apples, plums, and apricots. Irrigation water flows are diverted from the outlet works of the Ramah storage reservoir (Cebolla Creek, a tributary of the Rio Pescado in the Zuni River Basin) into two primary irrigation ditches: one measuring approximately 2,579 feet and flowing westward from the diversion (referred to here as the "west branch"), and one measuring approximately 3,993 feet and flowing southward (referred to here as the "south branch").

Corps personnel conducted an initial visit to the project area on June 10, 2010, and Corps archaeologists returned to conduct a cultural resources survey on December 10, 2010. The purpose of the survey was to examine the alignment of the acequia to be affected by the proposed project. The survey area is shown in Figure 4.1.

The system originally consisted of open earthen ditch; after approximately 100 years of operations and maintenance, this form was replaced with underground concrete pipe in 1982 along the entire extent of the proposed project. When the original ditch was converted to buried pipe, the new pipeline mostly followed the alignment of the old ditch, with occasional deviations; the most significant of these deviations occurred in the west branch. Figure 4.2 shows approximate relative alignments for the original ditch, the present pipeline, and the proposed project; the ditch system extends an unknown distance out of the project area. The historic alignment is based on an alignment visible on the USGS Ramah, NM 7.5-minute quadrangle map (35108-B4), and therefore is likely to be imprecise in some respects. The proposed repiping project would follow the current pipeline's alignment for most of its extent, with the exception of a realignment of approximately 900 feet, again in the western branch (Figure 4.2). The current piping in the area bypassed by this realignment will remain in place. Portions of the system extending southward for an undetermined distance from the southern end of the current pipeline (and outside of the project area) do maintain an open earthen ditch form.

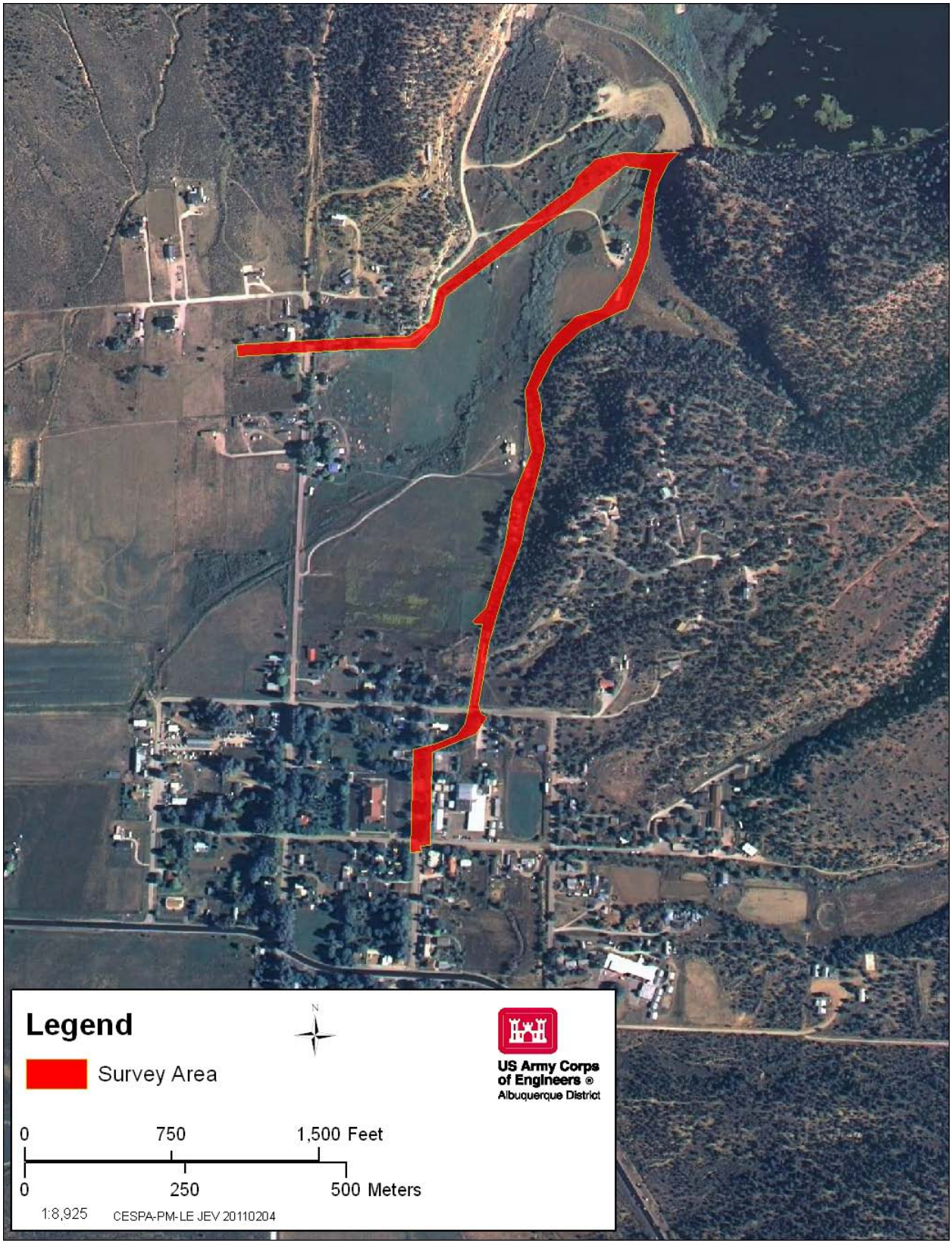

Figure 4.1. Survey area for the Ramah Valley Acequia project.

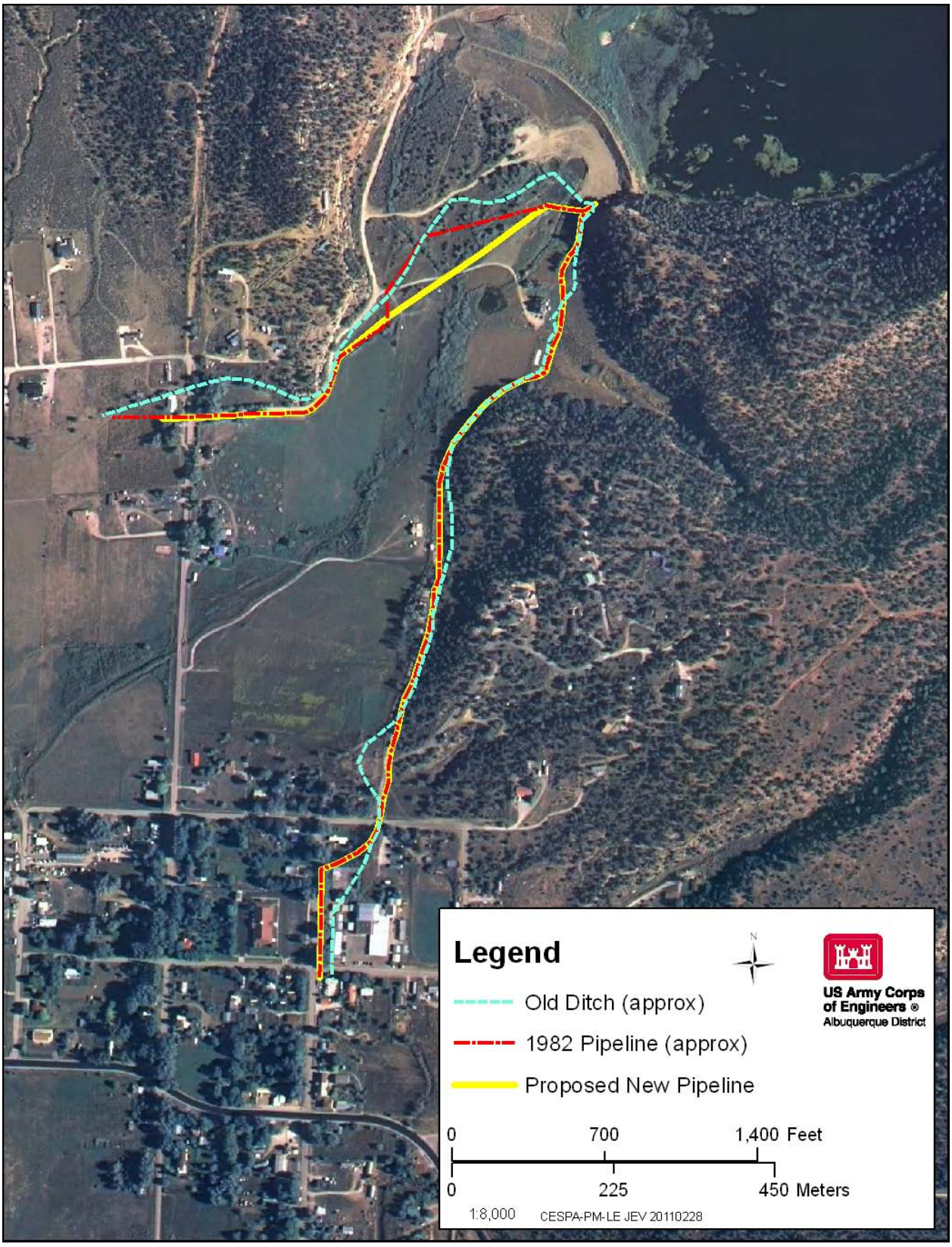

Figure 4.2. Comparison of different historical alignments of the Ramah Valley Acequia.

The existing concrete and corrugated metal pipeline is currently experiencing significant water loss from leaks at numerous locations, including both seepage at the joints between concrete segments and leaks from breaks in the line. Further, the pipeline does not currently maintain sufficient water pressure to effectively distribute water throughout the system.

Ramah Valley Acequia Irrigation System Alignment

Survey proceeded from the northernmost point of the project area, where the two pipeline branches intersect near the diversion at the Ramah Dam. Field personnel first walked the west branch alignment to its endpoint, and then returned to the original starting point and walked the south branch alignment to its endpoint at the southernmost end of the project area. The following description details elements of the system in the sequence in which they were encountered during survey.

West Branch

Beginning at the intersection between west and south branches, field personnel observed a small pond at least partially fed by water coming through the irrigation system (Figure 4.3). In addition, in this immediate location there is an excavated pit (Figure 4.4) that appears to have once been the location for a large concrete diversion box that was removed and now sits some 59 meters (194 feet) away along the west branch alignment (Figure 4.5; also visible in Figure 4.3). The pit measures approximately 3.3 meters (10.8 feet) by 6.5 meters (21.3 feet). A spoil pile is present immediately to the southeast of the pit (Figure 4.6).

Proceeding westward from this intersection point, much of the pipeline alignment shows moderate to heavy vegetation cover. The pipeline is mostly concrete, with small portions having been replaced with corrugated galvanized metal pipe. The pipeline is intermittently visible near the surface, however, due to erosion and fragmentation of the line. Several meters west of the pit and spoil pile, a portion of buried corrugated metal pipe is visible protruding from the ground surface (Figure 4.7). Further west, the pipeline is again visible where it crosses Cebolla Creek (Figure 4.8). The pipe is concrete, with an approximate diameter of 24 inches. Relative locations for these elements are shown in Figure 4.5.

Diversion Box

Located along the west branch of the pipeline is a large concrete diversion box, once buried, but now resting on its side on the ground surface. This diversion box appears to have been removed from the ground at the intersection between the west and south branches, where it served to divert the flow of water into both branches, as well as feeding the adjacent pond (see Figure 4.5 for relative positions of the intersection and the box's current location). The diversion box is roughly cubical, open at the top, and has a total of four holes for pipe connections in three walls. The box has been removed from its original location, the junction between the west and south branches of the pipeline. The original bottom and top are clearly identifiable; the following discussion will therefore refer to the walls according to their presumed original orientations.

Figure 4.3. View of small pond (foreground) and unburied concrete diversion box. Photograph taken from point where west and south branches intersect at northern end of project area, facing west.

Figure 4.4. Pit at intersection of west and south branches of irrigation system, with corrugated metal pipe in the foreground, facing southwest.

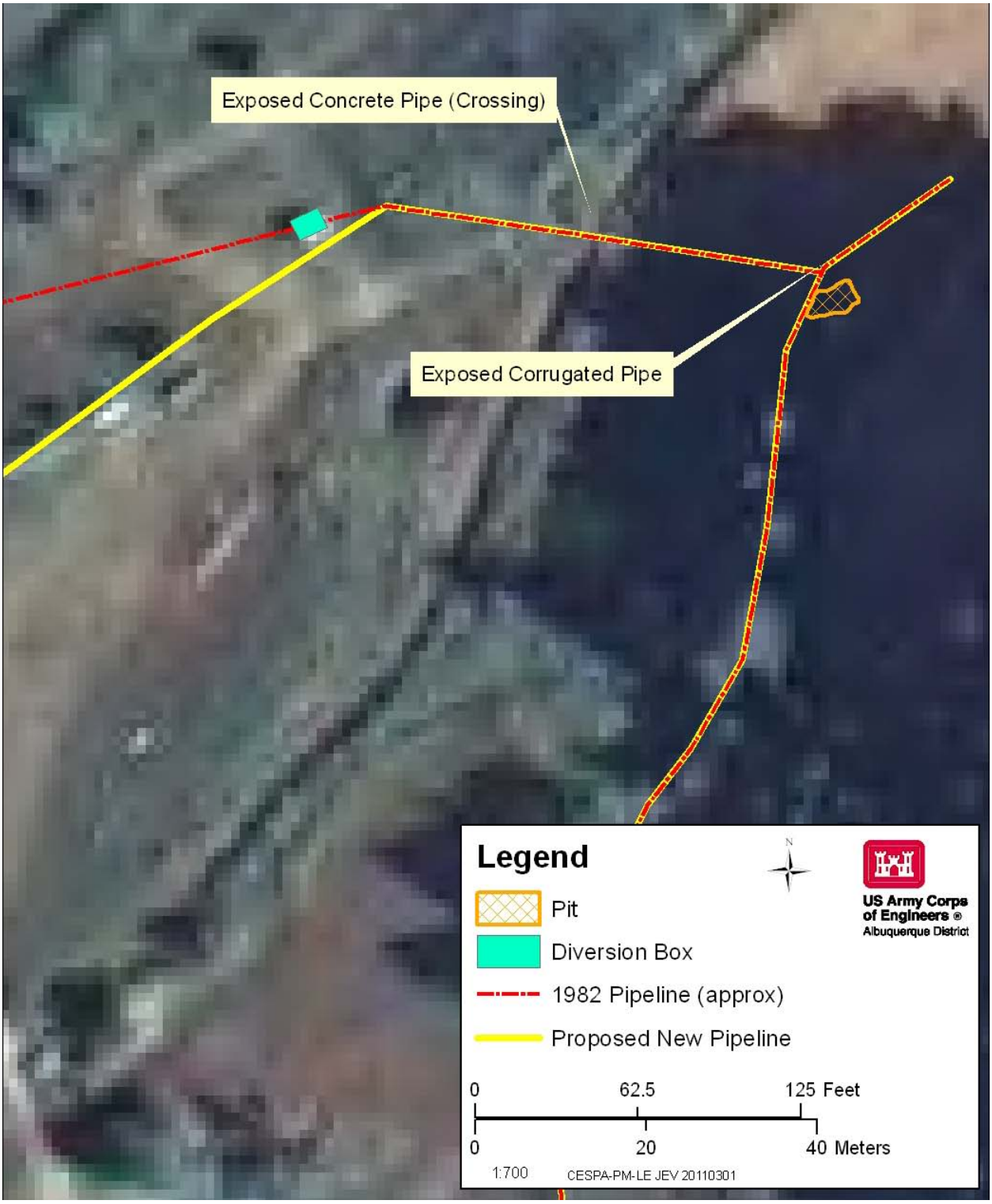

Figure 4.5. Location of removed diversion box, exposed pipe, and open pit relative to pipeline alignments. Pit is at the intersection point between the branches of the pipeline, bordering the spoil pile to the southeast.

Figure 4.6. Spoil pile immediately adjacent to pit at intersection of west and south branches, with pond immediately beyond, facing southwest.

Figure 4.7. Exposed east-west-oriented corrugated metal pipe near northernmost end of project area.

Figure 4.8. Concrete pipe exposed at crossing of Cebolla Creek, facing northeast.

The diversion box is square in when viewed from the top, measuring exactly eight feet by eight feet measured between outside edges (Figure 4.9). The height from bottom to top is nine feet on the outside, and walls are approximately one foot thick (resulting in an interior space of approximately 343 cubic feet). The walls of the box contain four openings for pipe attachments: two with diameters of 24 inches, and two with 30-inch diameters. Figure 4.9 shows the relative relationships of these openings within the box. Functionally, water would enter the box through a pipe attached to one of these, and would flow out again through the other three holes as controlled by sliding gates. Remnants of rails for gates to open and close each of these openings remain visible on the box's interior (Figure 4.11, Figure 4.12, and Figure 4.13).

The differing hole sizes appear to reflect different kinds of attached pipe. The two 24-inch holes are smooth around the edges, suggesting attachment to smooth concrete pipe (and matching the diameter of other concrete pipe segments visible elsewhere in the system), while the 30-inch holes show undulations corresponding to the surfaces of corrugated metal pipe. In addition, there are several segments of damaged corrugated metal pipe in the immediate vicinity of the box's current location which may have been attached to the box; these are 30 inches in diameter. The lowermost 24-inch hole still has a portion of cylindrical concrete pipe extending from the box exterior (Figure 4.9 and Figure 4.10). The bottom of the diversion box, now visible due to the box's current placement on its side, shows abundant protruding gravel (Figure 4.13).

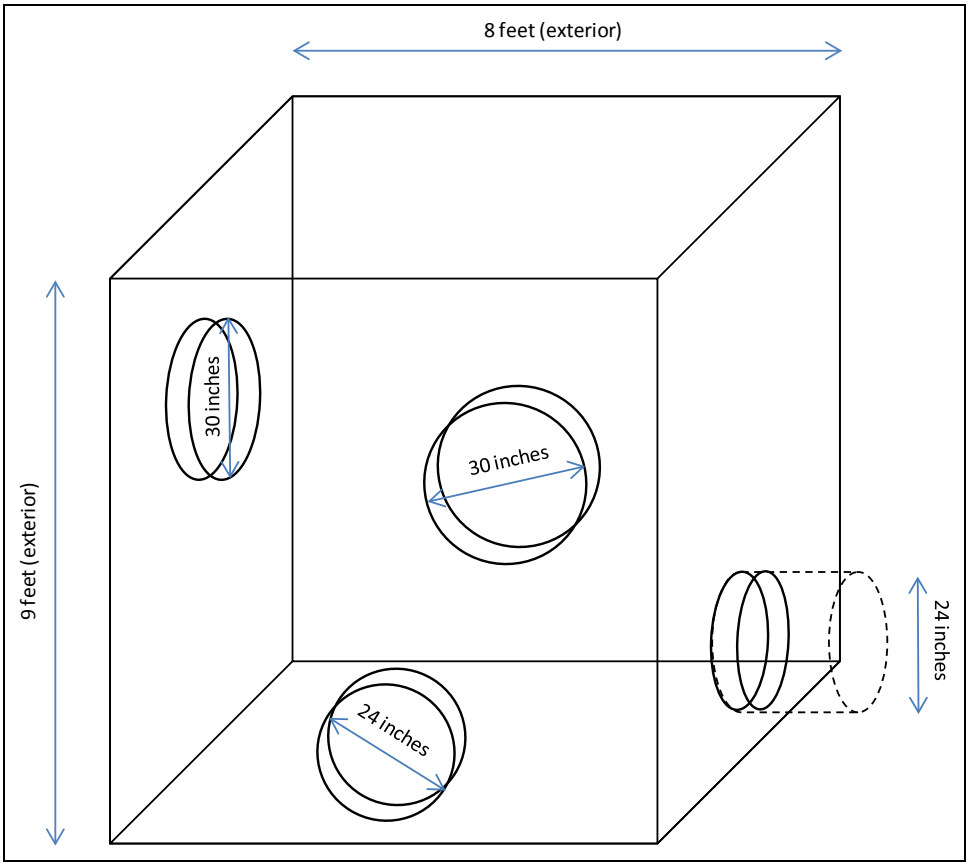

Figure 4.9. Generalized schematic diagram of concrete diversion box, showing the approximate relative positions of the holes. The box is oriented with open face upward, as would have been the case when it was connected to the system.

NEW ALIGNMENT

In the vicinity of the diversion box's current displaced location, the proposed project begins to diverge from the pipeline's current alignment. Rather than continuing approximately westward, the project would install approximately 900 feet of new pipe in an alignment following a more southwestern direction (see Figure 4.2 and Figure 4.5). The portion of this alignment north of the dirt road leading to a private residence (Figure 4.14) would parallel a recently bladed or bulldozed cut bank (Figure 4.15), which is approximately 173 meters (568 feet) long and extends from a point immediately west of the diversion box southwest to the dirt road. Field personnel surveyed this corridor, including walking along the entire length of the recent cut bank, and observed no archaeological materials or other historic properties.

South of the dirt road (Figure 4.14), the new alignment follows the west side of a fenceline that extends an additional100 meters (328 feet) before it rejoins the current pipeline alignment (Figure 4.16).

Figure 4.10. Large concrete diversion box removed from system, facing north. Note corrugated metal pipe fragments in foreground.

Figure 4.11. Interior of diversion box, facing northeast, showing rails for gate mechanisms and gouges from backhoe.

Figure 4.12. Interior of diversion box, facing east, showing rails for gate mechanisms.

Figure 4.13. Bottom of concrete diversion box, facing southeast.

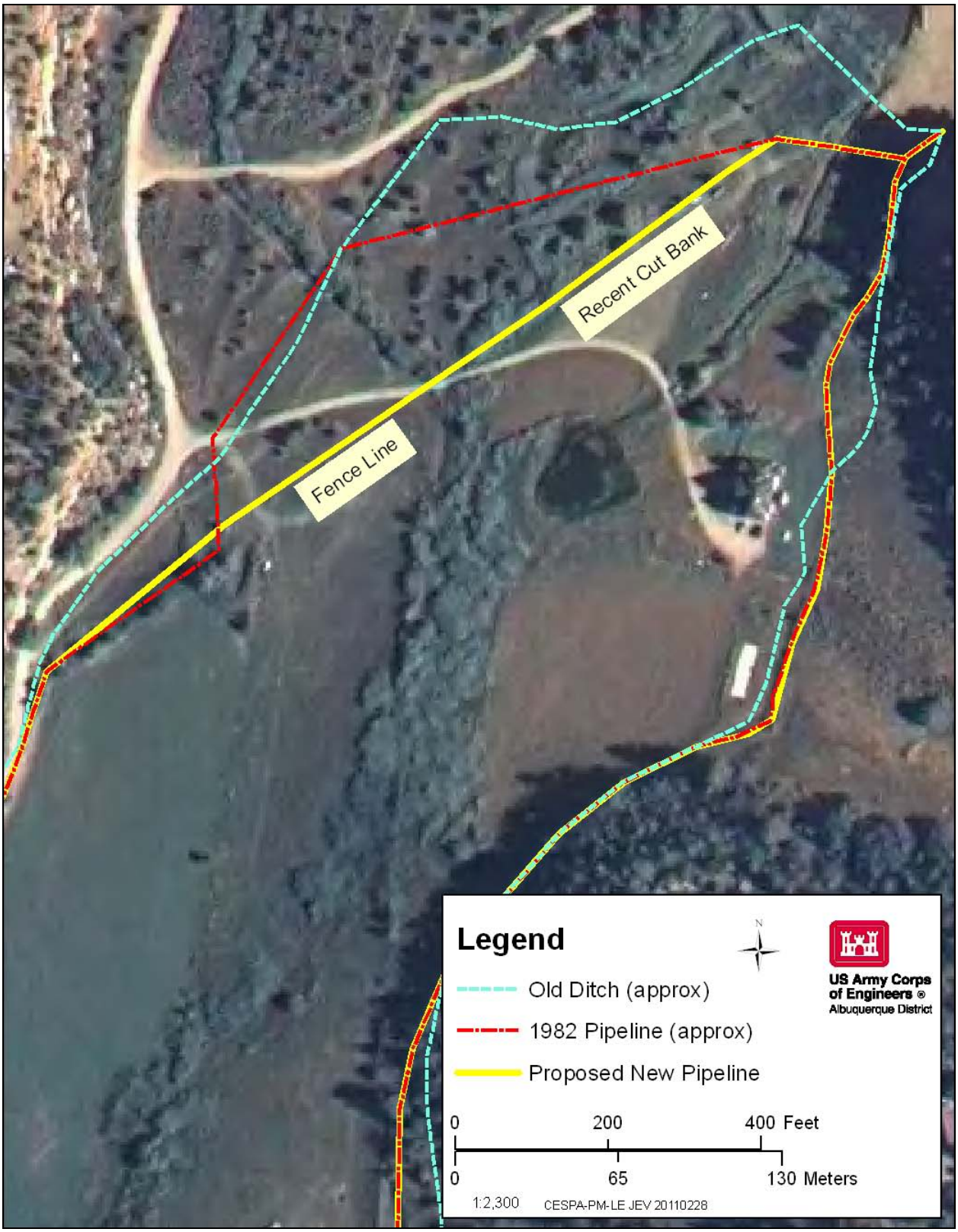

Figure 4.14. Proposed new alignment for a portion of west branch, showing locations of the cut bank and fence line.

Figure 4.15. Recently bladed cut bank oriented approximately northeast-southwest, following proposed new pipeline alignment. Photograph taken facing northeast.

Figure 4.16. Fenceline paralleling proposed new pipeline alignment, facing southwest from the road.

OLD DITCH SEGMENT

At the approximate location where the current project corridor rejoins the current pipeline alignment along the fenceline (Figure 4.14), an abandoned segment of the old open earthen ditch is visible (Figure 4.17). This ditch segment deviates from the approximate location of the ditch based on an alignment taken from the USGS quadrangle, as shown in Figure 4.14; this could result from the earlier map being imprecise, or from the location of the ditch changing over time; it could also indicate that this visible segment may have been a field ditch extending from the main ditch. The ditch segment is oriented approximately north to south at this location. As shown in Figure 4.18, the ditch is roughly symmetrical, with a shallow bowl-shaped cross-section bounded on both sides by slightly raised spoil banks. Field personnel measured the width of the ditch to be 108 inches from the tops of the spoil banks, and 59 inches at the upper margin of the ditch channel. The approximate width at the bottom of the channel was 12 inches, and the maximum depth of the ditch was eight inches as measured from the top of the channel.

Figure 4.17. Abandoned portion of earlier open earthen ditch where it intersects the current project alignment, facing south.

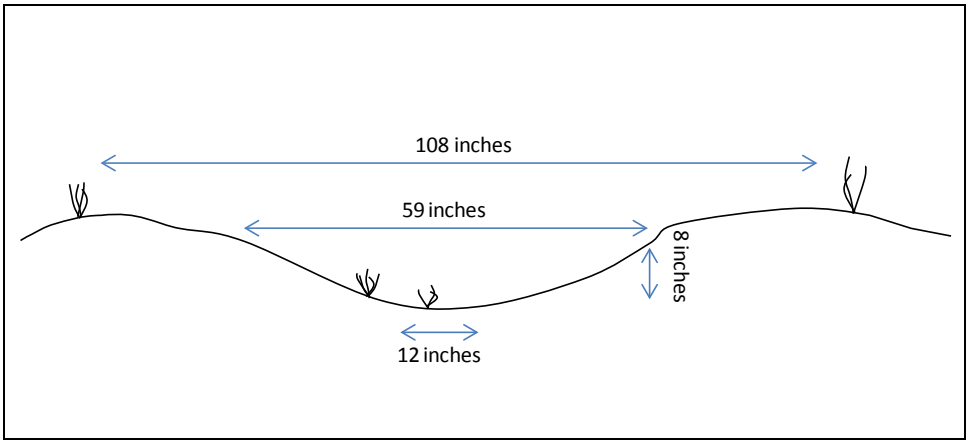

Figure 4.18. Schematic cross-section of ditch remnant intersecting west branch, facing south.

REMAINDER OF WEST BRANCH

The remainder of the west branch parallels the road to the dam (Figure 4.19) until it crosses Bloomfield Road (oriented north-south), after which it proceeds westward through a residential property for another 37 meters (120 feet) to the project endpoint. This follows the current alignment of the pipeline, but diverges from the apparent earlier ditch alignment (cf. Figure 4.2). Along the route, various features associated with the pipeline are visible from the surface. Vent pipes made of PVC protrude from the ground at various points along the pipeline, as shown in

Figure 4.20. In addition, other features such as metal valves and pipes can be seen at various points, including some apparently no longer connected to the system or functioning (see Figure 4.21). The endpoint of the project is a valve feature protruding from the surface and surrounded by PVC (Figure 4.22).

Figure 4.19. View of road following pipeline alignment, facing east. Irrigation valve for private property use is visible at left.

Figure 4.20. Vent pipe on current pipeline alignment next to road, facing north.

Figure 4.21. Unburied valve along current pipeline alignment, facing approximately west.

Figure 4.22. Project endpoint at westernmost end of west branch.

South Branch

Survey of the system's south branch proceeded from the point where the two branches intersect, which includes the area containing the open pit where the diversion box was once buried. The south branch extends southward, passing behind two residences and eventually crossing McNiel Street to the south, before ending at the intersection of North Tietjen and Lewis Streets.

Walking southward along the pipeline alignment, field personnel inspected the northern portion of this branch for any evidence of features or materials likely to be associated with previously documented site LA 29994, shown in the ARMS database as being located close to the project area (see Appendix A, Figure A.2). This extent of the south branch follows the base of a steep slope to the east for approximately 60 meters (197 feet); the project will not impact any portion of this slope.

Rock Wall

As noted in Chapter 2, an archaeological site (LA 29994) is documented in the ARMS database as being located near the project area in this vicinity. pproximately 35 meters (116 feet) south of the open pit, archaeologists observed and photographed a rock wall alignment oriented east-west on the slope of the hill to the east (Figure 4.23). While its location on the map appears fairly close to the pipeline (see Appendix A, Figure A.3), its location is actually some distance upslope of the acequia, at a significantly higher elevation than the proposed project. Field personnel confirmed that this feature is located entirely outside of the project area and will not be affected by the proposed project. Appendix A, Figure A.3 shows that its location is some 55 meters (180 feet) from the documented site center point of LA 29994 in the ARMS database; however, given the imprecision of mapping of this earlier documented site, as well as a lack of true site boundaries in the database, it is entirely possible that this feature is associated with that site.

Chert Flake

Some distance south of this rock wall, field personnel observed a single isolated occurrence (IO): a white chert flake fragment measuring 30 millimeters in maximum dimension (Figure 4.24). Inspection of the surrounding area showed no further evidence of historic properties. The location of the IO is shown in Appendix A, Figure A.4.

Raised Berm

Further south, the pipeline continues southward, buried within an earthen berm that follows the old acequia alignment (Figure 4.25). This berm continues to follow the base of the hills to the east for approximately 670 meters (2,200 feet), and becomes a road further to the south. Along this berm, near a residence, field personnel observed a concrete-lined feature containing a vent and a water hookup for residential use of irrigation water (Figure 4.26).

Further south, the project area approaches the documented location for LA 29993 as shown in the ARMS database (Appendix A, Figure A.2). According to ARMS information, this site is located to the east and upslope of the acequia; however, given imprecision in mapping and incomplete site boundary information, archaeologists inspected the project area in the vicinity thoroughly and confirmed that no evidence for any archaeological site occurs within the project area.

Figure 4.23. Rock wall possibly associated with LA 29994 as viewed from the eastern edge of the survey area, facing southeast.

Figure 4.24. Isolated chert flake.

OLD DITCH SEGMENT

As the pipeline approaches McNiel Street, its alignment diverges from the older open ditch alignment, and the abandoned segment of the open ditch is visible to the west (Figure 4.27; Figure 4.28).

As shown in Figure 4.29 and Figure 4.30, the ditch is similar to the segment observed on the west branch: it has a shallow bowl-shaped cross-section bounded on the west side by a raised spoil bank that also doubles as a foot path. On the other (east) side, it is bounded by the steep slope of the raised berm / road. Field personnel measured the width of the ditch to be approximately 33 inches from at the upper margin of the ditch channel, and the approximate depth of the ditch at 16 inches as measured from the top of the channel.

Figure 4.25. View of raised berm containing buried pipe alignment, facing south.

Figure 4.26. Air vent and water hookup near residence.

The current pipeline crosses McNiel Street and angles slightly to the west, cutting through an empty residential lot (Figure 4.31) until it intersects with Tietjen Avenue, a north-south oriented paved street. From this point, the pipeline continues beneath the paved street and adjacent sidewalks to the intersection of North Tietjen Street and Lewis Street, where the project ends. Immediately south of this point, outside of the project area and following the west side of Lewis Street south of the intersection, the system continues to retain an open earthen ditch form (Figure 4.32). This segment is still in use.

Description of Other Archaeological Sites and Other Sites Not Relocated

No previously recorded archaeological sites were encountered within the survey area. As noted above and in Chapter 2, the ARMS database shows two sites being potentially close enough to the project area to intersect with it (Appendix A, Figure A.2). However, the locational information and site boundaries as they exist within the ARMS database are imprecise, and the present survey confirmed that neither site exists within the survey area. As noted in the above survey description, a rock wall alignment possibly associated with LA 29994 was observed upslope and well outside of the survey area, but was not recorded due to its being outside the project area.

Figure 4.27. Southern portion of the south branch, showing the divergence of the current pipeline alignment and the approximate old ditch alignments.

Figure 4.28. Abandoned segment of open ditch as it diverges from the current pipeline alignment.

Figure 4.29. Abandoned ditch segment paralleling berm as it diverges from current pipeline alignment. Note foot path to the right.

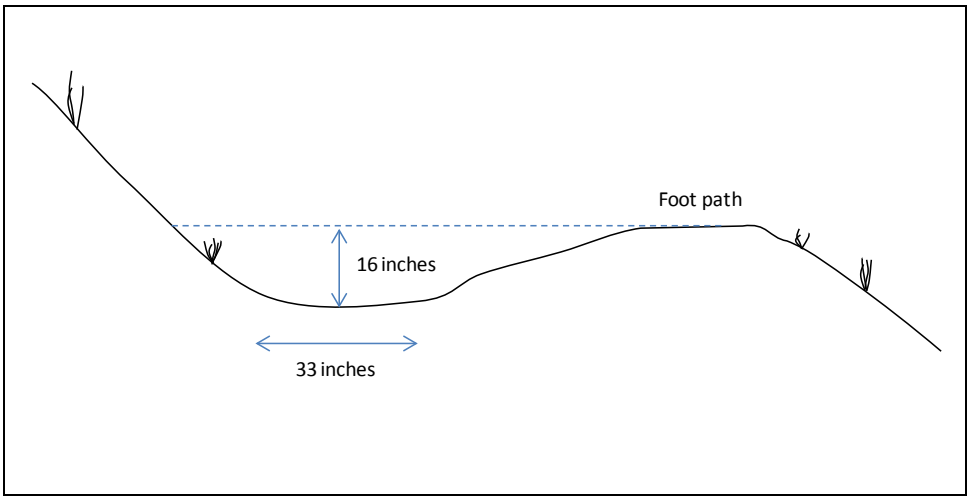

Figure 4.30. Cross-section of abandoned acequia section where it diverges from the current pipeline alignment, facing south.

Figure 4.31. Empty lot south of McNiel Street that is traversed by the pipeline.

Figure 4.32. Portion of the acequia outside of the project area retaining an open earthen ditch form, extending southward from the project's southern endpoint, facing south.

Interpretive Summary

In sum, the survey examined the portions of the Ramah Valley Acequia that would be impacted by the proposed project that would include the replacement and installation of buried pipe and associated structures. The survey identified no historic properties except for the acequia itself.

The Ramah Valley Acequia is an approximately 130-year-old acequia system extending in two main branches from the Ramah Dam, one extending approximately southward, and the other extending westward. The system conveys irrigation water from the Cebolla Creek to approximately 1,200 acres of cultivated land. The portion of the system to be affected by the proposed project consists of buried concrete pipe (with small segments consisting of corrugated metal pipe) which was installed in 1982 along the approximate alignment of the earlier open earthen ditch, and all associated features within the project area post-date the buried pipe (and are therefore 28 years old or less); further, an additional segment of approximately 900 feet will be realigned, and the survey encountered no historic properties in this area. An additional extent of the acequia outside of the project area retains an historic open earthen ditch form. The present acequia pipeline is currently in a state of disrepair, leading to the loss of large quantities of water through multiple leaks.

CHAPTER 5
SUMMARY AND RECOMMENDATIONS

Jonathan E. Van Hoose

Evaluation and Statement of Significance

The present survey examined the extent of the Ramah Valley Acequia system to be impacted by the proposed piping project. The project is on private land owned by members of the Ramah Valley Acequia association and within the acequia's right of way. The Ramah Valley Acequia is located in McKinley County, with its headgate on the Cebolla Creek where it diverts water at the downstream toe of the Ramah Dam. The survey identified no new archaeological sites or other historic properties except for the Ramah Valley Acequia itself. Field personnel confirmed that two sites with potential to overlap the project based on ARMS data did not enter or intersect the survey area.

The proposed project would replace 6,572 feet of buried concrete pipe with PVC pipe. The acequia system currently irrigates approximately 1,200 acres of agricultural land owned by 72 acequia members. The proposed project is being undertaken to address and alleviate significant leakage currently being experienced by the acequia system, impairing its function by leading to significant water loss, as well as impairing the system's ability to maintain water pressure for sprinkler irrigation.

The Corps determines that the Ramah Valley Acequia, which was originally constructed around 1878, is eligible for listing on the National Register of Historic Places (NRHP) under Criterion (a) of 36 CFR 60.4, as irrigation systems such as this one made possible the settlement and agricultural development of the area, and is thus associated with events that have made a significant contribution to the broad patterns of our history.

Effect Determination

In New Mexico, historic elements that are considered to contribute to an acequia's eligibility for listing on the NRHP include alignment, visual qualities (form), and function (irrigation). Significant alteration of any of these, if they retain integrity, may be considered to be an adverse effect.

Under 36 CFR 800.5, Assessment of Adverse Effects, examples are provided in subsection (2) and include seven examples of adverse effects to historic properties. This project has the potential to affect the Ramah Valley Acequia. The criteria of adverse effect pursuant to the seven examples of types of adverse effects as listed in 36 CFR 800.5 (a)(2) are applied below.

(i) Physical destruction of or damage to all or part of the property;

The proposed construction would be confined to approximately 6,572 feet of the acequia itself, which will not destroy the property or alter its basic form; it will be buried pipe replacing buried

pipe. Neither the current buried pipe nor any of the existing water control structures (gates, valves, etc.) are more than 50 years old, as all are superimposed on or integrated within the buried pipe installed in 1982. Accordingly, all of these materials are 28 years old or less. In addition, associated features have been variously modified throughout their use lives. No historic materials that have acquired historic significance in their own right will be destroyed, damaged, or removed.

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines;

The purpose of this project is to rehabilitate the acequia system so that it may continue to function well in its current cultural context. The proposed project would affect one primary element: its form. However, the piping of the acequia in 1982 already substantially altered the ditch from its earlier "open earthen ditch" form, and the piping has not acquired historic significance in its own right (and is therefore neither historic nor distinctive). The form of the portions of the acequia to be impacted by this project thus lacks integrity, and the Corps considers this to be a non-contributing element to the system's historic significance. Further, portions of the system outside the proposed project area retain their historically significant open earthen ditch form, and none of the system that retains this form will be affected or altered by the current project. All parts of the system that currently retain the earlier "open earthen ditch" form will retain that historic form and will not be altered by the current project. All portions of the ditch outside the area to be re-piped would remain eligible. Further, the addition of pipe is reversible; if removed in the future, the ditch could be returned to its historic open-ditch form and the essential form and integrity of the property would be unimpaired.

In addition, the project would change the alignment of a small (approximately 900-foot) segment of the total 6,572 feet to be covered by the project. However, this represents only 14 percent of the current pipeline, and an even smaller proportion of the overall acequia system.

(iii) Removal of the property from its historic location;

This category does not apply to this project. The acequia will remain in its current location, with a short segment to be realigned.

(iv) Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;

The proposed project will alter one aspect of the acequia, its present buried-pipe configuration, by replacing the current failing pipe with new pipe. This will not qualitatively change the form, as it will be replacing one pipe with another. Therefore, as above, the Corps considers this element of form not to be a contributing element to the system's historical significance:

(1) The entirety of the segment to be re-piped has already been substantially altered from its historic open earthen ditch form as a result of the installation of buried pipe in 1982; thus, the current form of this segment of the ditch does not contribute to the acequia's overall eligibility.

(2) All portions of the ditch system that currently retain the historic open earthen ditch form, such as the segment extending southward from the project's southern endpoint, will remain unchanged by the proposed project.

The proposed project will not change the character and purpose of the acequia's use as a conveyance for irrigation water from the Cebolla Creek. Thus, the proposed project does not damage, remove, or destroy original components that retain integrity.

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

This category does not apply to this project. The acequia alignment traverses private land consisting primarily of active agricultural fields owned largely by Acequia Association members, the project proponents.

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

This category does not apply to this project.

(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

This category does not apply to this project.

Summary and Recommendations

The Ramah Valley Acequia system is eligible for nomination to the National Register of Historic Places and the New Mexico State Register of Cultural Properties under Criterion (a), as irrigation systems such as this one made possible the settling and farming of the area, and is thus associated with events that have made a significant contribution to the broad patterns of our history.

Replacing the current buried pipeline with new pipe will affect the acequia. However, the Corps determines that the proposed project will result in **no adverse effect to historic properties** for the following reasons:

- The current detrimental impacts of leaking and water loss hinder adequate function of the acequia.

- While the proposed project would alter the acequia's form somewhat by replacing concrete pipe with new pipe, this does not constitute an alteration of any element of the system that contributes to its eligibility for the NRHP; the current buried pipe form of the system dates only to 1982, and has not acquired historic significance in its own right. The proposed project would preserve the continued use of the acequia; further all portions of the acequia system

that do retain the earlier historic open earthen ditch form (all of which are outside of the proposed project area) will remain unaltered by this project.

- The proposed project will result in only a minor change in the alignment of part of the buried pipe system (approximately 14 percent of the portion within the project area, and a smaller proportion of the overall system). The vast majority of the system will be replaced in its current location.

- The function of the system (the delivery of water for irrigation) will remain unchanged.

For these reasons, the Corps considers the effects to the acequia not to be adverse.

Consistent with the Department of Defense American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, tribes indicating an interest in activities in McKinley County (based on the State of New Mexico Indian Affairs Department's 2011 American Indian Consultations List) were sent a scoping letter to assess whether there were any potential tribal concerns with the project. To date, no tribal concerns have been identified, and no traditional cultural properties are known to occur within or in the vicinity of the project area.

The Corps therefore is of the opinion that the proposed Ramah Valley Acequia project will have **no adverse effect to historic properties**. Should previously undiscovered artifacts or features be unearthed during construction, work will be stopped in the immediate vicinity of the find, a determination of significance made, and further consultation conducted in coordination with the New Mexico State Historic Preservation Officer and with American Indian Tribes that may have concerns in the project area to determine the best course of action.

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APPENDIX A

CONFIDENTIAL SITE LOCATION DATA

— FOR OFFICIAL USE ONLY —

The public disclosure of the location of archaeological sites on state and private lands is prohibited by Section 18-6-11.1 NMSA 1978. Public disclosure of archaeological site locations is federally prohibited by 16 USC 470hh (36 CFR 296.18).

If the pages in this appendix are missing, then this copy was intended for public distribution.

— REMOVE APPENDIX PRIOR TO PUBLIC DISTRIBUTION —

Appendix B

Summary of Irrigation Exemption, Clean Water Act Section 404
Regulatory Division, US Army Corps of Engineers, Albuquerque District

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US Army Corps of Engineers
Albuquerque District
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435
Fax No. 505-342-3498

Irrigation Exemption Summary

FARM OR STOCK POND OR IRRIGATION DITCH CONSTRUCTION OR MAINTENANCE

Pursuant to Section 404 of the Clean Water Act (33 USC 1344) and Federal Regulations (33 CFR 323.4(a)(3)), certain discharges for the construction or maintenance of farm or stock ponds or irrigation ditches have been exempted from requiring a Section 404 permit. Included in the exemption are the construction or maintenance of farm or stock ponds or irrigation ditches, or the maintenance (but not the construction) of drainage ditches. Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption.

A Section 404 permit is required if either of the following occurs:

(1) Any discharge of dredged or fill material resulting from the above activities which contains any toxic pollutant listed under Section 307 of the Clean Water Act shall be subject to any applicable toxic effluent standard or prohibition, and shall require a permit.

(2) Any discharge of dredged or fill material into waters of the United States incidental to the above activities must have a permit if it is part of an activity whose purpose is to convert an area of the waters of the United States into a use to which it was not previously subject, where the flow or circulation of waters of the United States may be impaired or the reach of such waters reduced. Where the proposed discharge will result in significant discernible alterations to flow or circulation, the presumption is that flow or circulation may be impaired by such alteration. For example, a permit will be required for the conversion of a wetland from silvicultural to agricultural use when there is a discharge of dredged or fill material into waters of the United States in conjunction with construction of dikes, drainage ditches, or other works or structures used to effect such conversion. A discharge which elevates the bottom of waters of the United States without converting it to dry land does not thereby reduce the reach of, but may alter the flow or circulation of, waters of the United States.

If the proposed discharge satisfies all of the above restrictions, it is automatically exempted and no further permit action from the Corps of Engineers is required. If any of the restrictions of this irrigation exemption will not be complied with, an individual permit is required and should be requested using ENG Form 4345 (Application for a Department of the Army permit). A nationwide permit authorized by the Clean Water Act may be available for the proposed work. State or local approval of the work may also be required.

For additional information concerning exemptions, nationwide permits, or for a written determination regarding a specific project, please contact the Corps at the following addresses:

In New Mexico:
Albuquerque District Corps of Engineers
ATTN: Regulatory Branch
4101 Jefferson Plaza, NE
Albuquerque, New Mexico 87109-3435
Phone: (505) 342-3283

In southeastern Colorado:
Southern Colorado Regulatory Office
720 North Main Street, Room 300
Pueblo, Colorado 81003-3047
Phone: (719) 543-9459

In southern New Mexico and western Texas:
El Paso Regulatory Office
P.O. Box 6096
Ft. Bliss, Texas 79906-0096
Phone: (915) 568-1359

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Appendix C
Wetland Delineation Forms

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WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Ramah Valley Acequia City/County: Ramah / mckinley Sampling Date: 5/11/2011
Applicant/Owner: Ramah Land & Irrigation Co. State: NM Sampling Point: 1
Investigator(s): Alcon, Hummel, Price Section, Township, Range: sec. 35 T 11 N R 16 W
Landform (hillslope, terrace, etc.): Valley, adj. to creek Local relief (concave, convex, none): _____ Slope (%): _____
Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: _____ NWI classification: _____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.) drought
Are Vegetation N, Soil N, or Hydrology Y significantly disturbed? Y Are "Normal Circumstances" present? Yes _____ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)
Rill area adjacent to sample point

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Typha sp.	80	Y	OBL
2. Juncus sp.	40	Y	OBL
3. Carex sp.			
4. Schoenoplectus sp.			
5. Anemopsis californica			OBL
6.			
7.			
8.			
	120 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No _____

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7"	10YR 3/2			80				matrix
			10R 4/6	20				oxidized root channels
~~7-12"~~				~~5~~				mottling
7-12"			10YR 4/2	65%				matrix
			2.5YR 4/2	35%				redox
beyond 12"								sandy layer above more clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✓ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✓ Biotic Crust (B12)
- ✓ Aquatic Invertebrates (B13) snail shell
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 54"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 48"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Former Cibola Creek channel cut off by driveway

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Ramah Valley Acequia City/County: Ramah / mckinley Sampling Date: 5/11/2011
Applicant/Owner: Ramah Land & Irrigation Co. State: NM Sampling Point: 2
Investigator(s): Alcon, Hummel, Price Section, Township, Range: sec. 35 T11N R16W
Landform (hillslope, terrace, etc.): Depressional, valley Local relief (concave, convex, none): _____ Slope (%): _____
Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: _____ NWI classification: _____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:
near pipline split

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Salix exigua (leaf off)	10%		OBL
2. Juncus balticus	80%		OBL
3. Carex sp.	~~80%~~	50%	OBL
4. Equisetum	5%		
5. Muhlenbergia asperifolia	5%		
6.			
7.			
8.			
	150 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No _____

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2							Organic material high
2-15	10YR 3/2							matrix
	7.5YR 4/4							redox concentration

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No _____ Depth (inches): 2.1 ft

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 2 ft

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Ant hills (1 - 14 in height) (2 - 32 in. height)

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Ramah Valley Acequia City/County: Ramah / McKinley Sampling Date: 5/11/2011
Applicant/Owner: Ramah Land & Irrigation Co. State: NM Sampling Point: 3
Investigator(s): Alcon, Hummel, Price Section, Township, Range: sec. 35 T11N R16W
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): _____
Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: _____ NWI classification: _____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.) Drought

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: This area was excluded from the delineated wetland (because hydric soil indicators were not present in first 4 ft.) - despite presence of vegetative and hydrologic factors described below.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Salix gooddingii		Y	OBL
2. Typha sp.			
3. ~~Juncus balticus~~			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Typha sp.		Y	OBL
2. Helianthus annuus			FAC-
3. Juncus balticus			OBL
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x 1 =	_____
FACW species	_____	x 2 =	_____
FAC species	_____	x 3 =	_____
FACU species	_____	x 4 =	_____
UPL species	_____	x 5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: Plant data for this immediate depression. 5-8 m radius. Deepest part has bare ground w/ dead aquatic plants (floating). Groundwater table is deep. Est. 8-10'. Plant reach w/auger

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks: Bored with auger to approx. 4 ft. Surface was dry; sub-surface was heavy, wet clay. Hydric soils were not present to depth of bore hole but both vegetation and hydrology had wetland indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ✓ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): est. 8-10 ft.

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Boring did not reach water table. Estimate 8-10 ft. Dead remains of floating aquatic vegetation cover central part of depression. Surface water was not present on this date, although intermittent flow obviously occurs. Area receives intermittent surface and sub-surface flows sufficient to support wetland vegetation.

Appendix D

Public Review Letter, Notice of Availability, and Affidavit of Publication

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DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

February 28, 2011

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section

Mr. Wally Murphy
Field Supervisor
U.S. Fish and Wildlife Service
NM Ecological Services Field Office
2105 Osuna Road NE
Albuquerque, NM 87113

Dear Mr. Murphy:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with the Office of the State Engineer and the members of the Ramah Valley Acequia, is planning a project to rehabilitate the Ramah Valley Acequia, McKinley County, New Mexico. The proposed project is located north of the community of Ramah along Cebolla Creek, a tributary of the Rio Pescado in the Zuni River Basin. Ramah is located 50 miles west of Grants and 43 miles southeast of Gallup on NM highway 53 (see enclosure). The proposed work would replace approximately 6572 feet of leaking concrete pipe with 24" polyvinyl chloride (PVC) irrigation pipe. The proposed construction period is three months and is expected to start in April, 2011.

The Corps is soliciting comments from Federal, State, and local interests for compliance under the National Environmental Policy Act (NEPA) and the Endangered Species Act. The Draft Environmental Assessment (DEA), entitled "Ramah Valley Acequia Rehabilitation Project, McKinley County, New Mexico" **is electronically available for viewing and copying at the Albuquerque District website at** http://www.spa.usace.army.mil/fonsi **or hard copies will be sent upon request.**

The Corps has reviewed information on the NMESFO website and determined that no endangered or threatened species would be affected by the proposed project. We would appreciate any

additional information on endangered and threatened animal species or species of concern within McKinley County and the proposed project area that could be affected by the proposed project. **Please see Sections 3.8, Wildlife and 3.9, Special Status Species.**

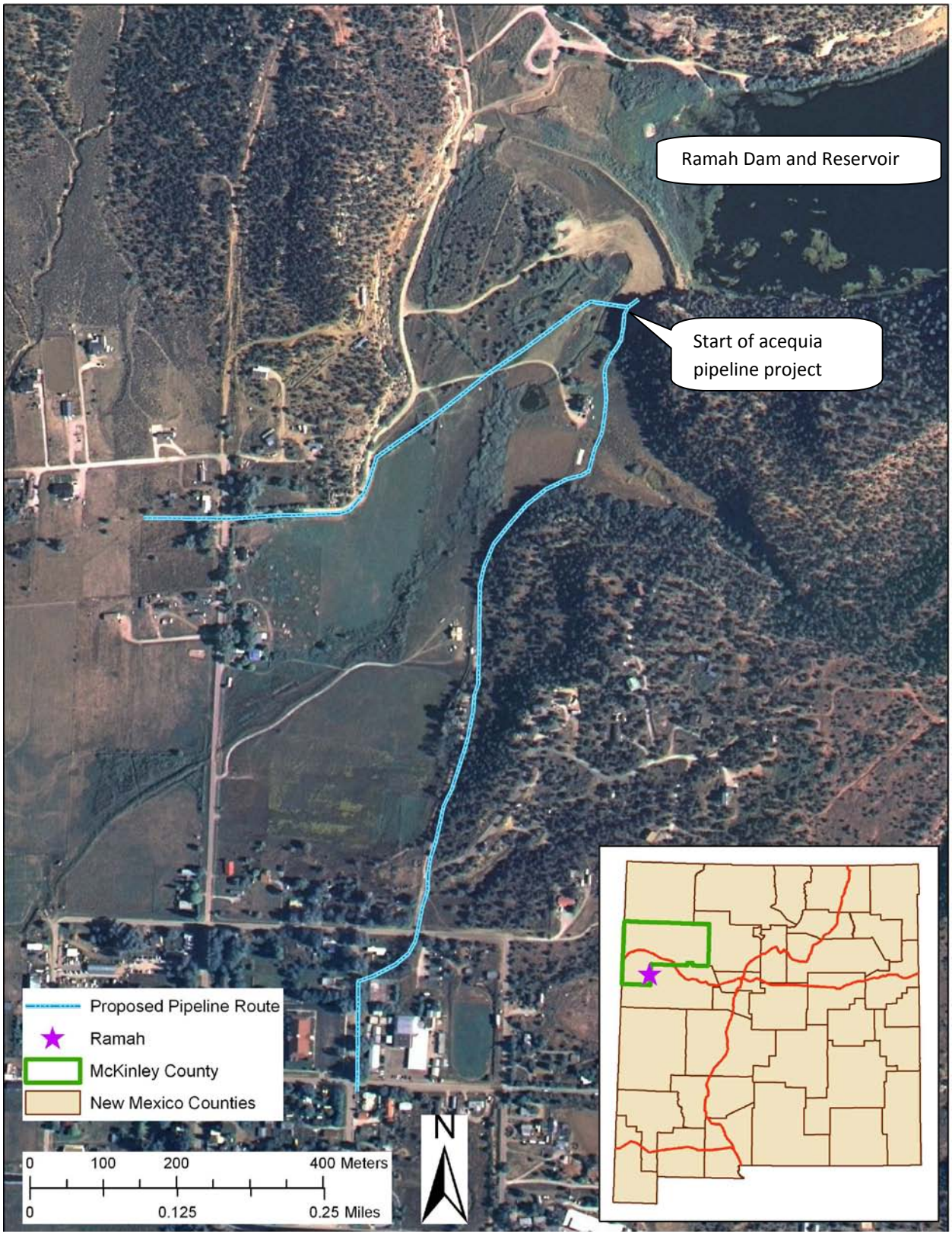
Please review the DEA and provide any written comments to the above address, Attn: Ms. Dana Price, Environmental Resources Section. Written comments must be received **no later than March 29, 2011**, so that comments can be addressed and revisions made to the DEA in a timely manner. If we do not receive comments by this date, we will assume you have no concerns or have no objections to the project. You may also facsimile your correspondence to (505) 342-3668 or e-mail to dana.m.price@usace.army.mil. If you need additional information, please contact Ms. Dana Price at (505) 342-3378. Thank you.

Sincerely,

Julie Alcon
Chief, Environmental Resources Section

Enclosure

Aerial Photo of Proposed Project Area, McKinley County, New Mexico.



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Notice of Availability
Draft Environmental Assessment for the
Ramah Valley Acequia Rehabilitation Project, McKinley County, New Mexico

Pursuant to the Council on Environmental Quality regulations that implement the National Environmental Policy Act, the U.S. Army Corps of Engineers (Corps), Albuquerque District, completed a draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) to rehabilitate the **Ramah Valley Acequia** in McKinley County, New Mexico. The proposed project is located north of the community of Ramah, 50 miles west of Grants and 43 miles southeast of Gallup on NM highway 53.

The Corps, in cooperation with the members of the Ramah Valley Acequia Association, proposes to rehabilitate the Ramah Valley Acequia by replacing approximately 6,572 feet of leaking concrete pipe with 24" polyvinyl chloride (PVC) irrigation pipe. The proposed construction period is three months and is expected to start in April, 2011.

Public review of the draft EA/FONSI will begin on February 28, 2011 and will run for 30 days until March 29, 2011. The document will be available on the Corps web site at http://www.spa.usace.army.mil/fonsi/. A hard copy will be sent upon request. Comments on the draft EA/FONSI should be sent to:

U.S. Army Corps of Engineers, Albuquerque District
Environmental Resources Section
Attn: CESPA-PM-LE (Dana Price)
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109-3435

Paper copies of this document are also available for review at:

Octavia Fellin Public Library
115 West Hill Avenue
Gallup, NM 87301
505-863-1291

Mother Whiteside Memorial Library
525 West High Street
Grants, NM 87020

Zuni Public Library
P.O. Box 339
Zuni, NM 87327-0339

For more information please contact Dana Price, USACE, (505) 342-3378 or dana.m.price@usace.army.mil
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Affidavit of Publication

STATE OF NEW MEXICO
) SS
COUNTY OF MCKINLEY

REBECCA PAQUIN being duly sworn upon oath, deposes and says:

As LEGAL CLERK of The Independent, a newspaper published in and having a general circulation in McKinley County, New Mexico and in the City of Gallup, New Mexico and having a general circulation in Cibola County, New Mexico and in the City of Grants, New Mexico and having a general circulation in Apache County, Arizona and in the City of St. Johns and in the City of Window Rock, Arizona therein: that this affiant makes the affidavit based upon personal knowledge of the facts herein sworn to. That the publication, a copy of which is hereto attached was published in said newspaper during the period time of publication and said notice was published in the newspaper proper, and not in a supplement thereof, for One Time, the first publication being on the _____ day of _____, 2011, the second publication being on the _____ day of _____, 2010, the third publication being on the _____ day of _____, 2011,

and the last publication being on the 28th day of February, 2011. That such newspaper, in which such notice or advertisement was published, is now and has been at all times material hereto, duly qualified for such purpose, and to publish legal notices and advertisements within the meaning of Chapter 12, of the statutes of the State of New Mexico, 1941 compilation,

Affiant.

Sworn and Subscribed to before me this 28th day of February, A.D., 2011.

Notary Public

My commission expires:
June 25th, 2014

LEGAL NOTICE
Ramah - McKinley County
New Mexico

Notice of Availability
Draft Environmental
Assessment for the
Ramah Valley Acequia Rehabilitation Project, McKinley County, New Mexico

Pursuant to the Council on Environmental Quality regulations that implement the National Environmental Policy Act, the U.S. Army Corps of Engineers (Corps), Albuquerque District, completed a draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) to rehabilitate the **Ramah Valley Acequia** in McKinley County, New Mexico. The proposed project is located north of the community of Ramah, 50 miles west of Grants and 43 miles southeast of Gallup on NM highway 53.

1The Corps, in cooperation with the members of the Ramah Valley Acequia Association, proposes to rehabilitate the Ramah Valley Acequia by replacing approximately 6,572 feet of leaking concrete pipe with 24" polyvinyl chloride (PVC) irrigation pipe. The proposed construction period is three months and is expected to start in April, 2011.

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U.S. Army Corps of Engineers,
Albuquerque District
Environmental Resources Section
Attn: CESPA-PM-LE (Dana Price)
4101 Jefferson Plaza NE
Albuquerque, New Mexico
87109-3435

Paper copies of this document are also available for review at:

Octavia Fellin Public Library
115 West Hill Avenue
Gallup, NM 87301
505-863-1291

Mother Whiteside
Memorial Library
525 West High Street
Grants, NM 87020

Zuni Public Library
P.O. Box 339
Zuni, NM 87327-0339

For more information please contact Dana Price, USACE, (505) 342-3378 or dana.m.price@usace.army.mil

Legal #12377 Published in The Independent February 28, 2011.

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PROOF OF PUBLICATION

STATE OF NEW MEXICO }
COUNTY OF CIBOLA } §

Donald Jaramillo, being duly sworn deposes and says that he is the publisher of THE CIBOLA COUNTY BEACON, a newspaper published in Grants, Cibola County, New Mexico, that the notice of

Legal

a copy of which is hereto attached was first published in said newspaper in its issue dated 03/01/11 and was published in an issue of said newspaper, once each week, and not in any supplement, thereafter for the full period of (1) one consecutive weeks, the last publication thereof being an issue dated

Subscribed and sworn to before me on March 01, 2011

Notary Public

OFFICIAL SEAL
BERNA P. A. MARTINEZ
Notary Public
State of New Mexico
My Comm. Expires

My Commission Expires 08/20/14

Publisher's Fees $ 120.96 + 9.68 = 130.64

PUBLIC NOTICE

Notice of Availability Draft Environmental Assessment for the Ramah Valley Acequia Rehabilitation Project, McKinley County, New Mexico

Pursuant to the Council on Environmental Quality regulations that implement the National Environmental Policy Act, the U.S. Army Corps of Engineers (Corps), Albuquerque District, completed a draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) to rehabilitate the Ramah Valley Acequia in McKinley County, New Mexico. The proposed project is located north of the community of Ramah, 50 miles west of Grants and 43 miles southeast of Gallup on NM highway 53.

The Corps, in cooperation with the members of the Ramah Valley Acequia Association, proposes to rehabilitate the Ramah Valley Acequia by replacing approximately 6,572 feet of leaking concrete pipe with 24" polyvinyl chloride (PVC) irrigation pipe. The proposed construction period is three months and is expected to start in April, 2011.

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U.S. Army Corps of Engineers, Albuquerque District
Environmental Resources Section
Attn: CESPA-PM-LE (Dana Price)
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109-3435

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Zuni Public Library
P.O. Box 339
Zuni, NM 87327-0339

For more information please contact Dana Price, USACE, (505) 342-3378 or dana.m.price@usace.army.mil

Published in the Cibola County Beacon March 1, 2011. Invoice #11296.

Appendix E
Public Review Comment Letters

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CESPA-RD
Oberle/wmo/3284

March 2, 2011

MEMORANDUM FOR, Environmental Resources Section, (CESPA-PM-LE/Dana Price)

SUBJECT: Action Number SPA-2011-00110-ABQ; Ramah Valley Acequia, Irrigation Pipeline Repairs, Ramah, NM

1. This memorandum is in response to a request from Ms. Julie Alcon, dated February 28, 2011, concerning the Draft Environmental Assessment (DEA) for the Ramah Valley Acequia Rehabilitation Project near Ramah, McKinley County, New Mexico. The work would involve irrigation system maintenance to replace 6572 linear feet of leaking 24-inch pipe with new 24-inch PVC piping. This project has been assigned Action Number SPA-2011-00110-ABQ.

2. We have reviewed this proposed project in accordance with Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899 (RHA).

3. Based on your description of the proposed work, and other information available to us, we have determined that the project may involve discharges of dredged or fill material into waters of the United.

4. We have reviewed this project in accordance with Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899 (RHA). Under Section 404, the Corps regulates the discharge of dredged and fill material into waters of the United States, including wetlands. The Corps responsibility under Section 10 is to regulate any work in, or affecting, navigable waters of the United States. Based on your description of the proposed work, and other information available to us, we have determined that your project will involve discharges of dredged or fill material into a water of the United States. However, the specific activity that you propose is currently exempted from regulation by a specific provision of the Clean Water Act as implemented by the USACE regulations at 33 CFR 323.4(a) (see enclosure). Therefore, your project will not require Department of the Army authorization under the above laws. However, it is incumbent upon you to remain informed of any changes in the Corps Regulatory Program regulations and policy as they relate to your project.

5. The Corps based this decision on a preliminary jurisdictional determination (JD) that there may be waters of the United States on the project site. Preliminary JDs are advisory in nature and may not be appealed. An approved JD is an official Corps determination that "waters of the U.S." and/or "navigable waters of the U.S." are either present or absent on a particular site. An approved JD precisely identifies the limits of those waters on the project site determined to be jurisdictional under the CWA or RHA. If you wish, you may request that we reevaluate this case and issue an approved JD.

6. If you have any questions or need additional information, please contact me at 505-342-3284 or by e-mail at William.M.Oberle@usace.army.mil.

William M. Oberle

William M. Oberle
Project Manager

Enclosure

GOVERNOR
Susana Martinez

DIRECTOR AND SECRETARY
TO THE COMMISSION
Tod W. Stevenson

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way
Post Office Box 25112
Santa Fe, NM 87504
Phone: (505) 476-8008
Fax: (505) 476-8124

Visit our website at www.wildlife.state.nm.us
For information call: 505/476-8000
To order free publications call: 1-800-862-9310

STATE GAME COMMISSION

JIM McCLINTIC, Chairman
Albuquerque, NM

SANDY BUFFETT, Vice-Chairwoman
Santa Fe, NM

DR. TOM ARVAS, Commissioner
Albuquerque, NM

GARY W. FONAY, Commissioner
Hobbs, NM

KENT A. SALAZAR, Commissioner
Albuquerque, NM

M.H. "DUTCH" SALMON, Commissioner
Silver City, NM

THOMAS "DICK" SALOPEK, Commissioner
Las Cruces, NM

March 7, 2011

Dana Price
Environmental Resources Section
Department of the Army
Corps of Engineers
4101 Jefferson Plaza
Albuquerque, NM 87109-3435

Re: Ramah Valley Acequia rehabilitation; NMDGF Doc. No. 14148

Dear Ms. Price,

The Department of Game and Fish (Department) has reviewed your request for information regarding the above-referenced project, and provides the following recommendations to minimize or eliminate impacts to wildlife.

Open trenches and ditches can trap small mammals, amphibians and reptiles and can cause injury to large mammals. Periods of highest activity for many of these species include night time, summer months and wet weather.

- To minimize the amount of open trenches at any given time, keep trenching and back-filling crews close together.
- Trench during the cooler months (October – March). However, there may be exceptions (e.g., critical wintering areas) which need to be assessed on a site-specific basis.
- Avoid leaving trenches open overnight. Where trenches cannot be back-filled immediately, escape ramps should be constructed at least every 90 meters. Escape ramps can be short lateral trenches sloping to the surface or wooden planks extending to the surface. The slope should be less than 45 degrees (100%). Trenches that have been left open overnight, especially where endangered species occur, should be inspected and animals removed prior to back-filling.

With implementation of these recommendations during construction, the Department believes that effects of the proposed action on wildlife would be minor, of short duration, and temporary in nature. All areas of soil disturbance should be replanted with native plant species and existing riparian areas should be avoided. To avoid permanent loss of wetlands, which are created by the existing leaking acequia pipeline, current wetlands should be mapped and monitored during and after construction with rewatering of these areas incorporated into the design of the new pipeline. For your convenience, we have enclosed a copy of New Mexico Wildlife of Concern for McKinley County (Biota Information System of New Mexico, BISON-M, New Mexico Dept. of Game and Fish electronic database). Species accounts, habitat

associations and county species lists (use the "Database Query" option) can be accessed from the BISON-M database via the World-wide Web at http://www.bison-m.org The Department recommends that you contact the U.S. Fish and Wildlife Service for current listing of federally listed species.

Thank you for the opportunity to review and comment on your project. If you have any questions, please contact Mark Birkhauser, Northwest Area Habitat Specialist at (505) 222-4708 or mark.birkhauser@state.nm.us.

Sincerely,

Eliza Gilbert
Permits/Biological Information/ZBS Recovery
Conservation Services Division

EG/MB

xc: Wally Murphy, Ecological Services Field Supervisor, USFWS
Brian Gleadle, NW Area Operations Chief, NMDGF
Mark Birkhauser, NW Area Habitat Specialist, NMDGF

NEW MEXICO WILDLIFE OF CONCERN
MCKINLEY COUNTY

For complete up-dated information on federal-listed species, including plants, see the US Fish & Wildlife Service NM Ecological Services Field Office website at http://www.fws.gov/southwest/es/NewMexico/SBC.cfm. For information on state-listed plants, contact the NM Energy, Minerals and Natural Resources Department, Division of Forestry, or go to http://nmrareplants.unm.edu/. If your project is on Bureau of Land Management, contact the local BLM Field Office for information on species of particular concern. If your project is on a National Forest, contact the Forest Supervisor's office for species information. E = Endangered; T = Threatened; s = sensitive; SOC = Species of Concern; C = Candidate; Exp = Experimental non-essential population; P = Proposed

Common Name	Scientific Name		NMGF	US FWS	critical habitat
Catostomus discobolus yarrowi		E	C		
Haliaeetus leucocephalus		T			
Accipiter gentilis		s	SOC		
Falco peregrinus		T	SOC		
Charadrius montanus		s	SOC		
Sterna antillarum		E	E		
Chlidonias niger surinamensis			SOC		
Coccyzus americanus		s	C		
Strix occidentalis lucida		s	T	Y	
Athene cunicularia			SOC		
Calypte costae		T			
Empidonax traillii extimus		E	E	Y	
Lanius ludovicianus		s			
Vireo vicinior		T			
Myotis ciliolabrum melanorhinus		s			
Myotis lucifugus occultus		s			
Myotis volans interior		s			
Myotis thysanodes thysanodes		s			
Myotis evotis evotis		s			
Cynomys gunnisoni		s			
Vulpes vulpes		s			
Mustela nigripes			E		
Spilogale gracilis		s			

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

April 1, 2011

Cons. #22420-2011-CPA-0013

Julie Alcon, Chief
ATTN: Dana Price
Environmental Resources Section
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109-3435

Dear Ms. Alcon:

Thank you for your letter of February 28, 2011, requesting review of the Draft Environmental Assessment and Finding of No Significant Impact (DEA/FONSI) for the Ramah Valley Acequia Rehabilitation Project, McKinley County, New Mexico. The U.S. Army Corps of Engineers (Corps) is proposing to rehabilitate the Ramah Valley Acequia to improve water delivery efficiency, and provide a pressurized pipeline for spray irrigation. The proposed action includes replacement of approximately 2,003 meters (m)(6,572 feet (ft)) of leaking 61-centimeter (cm) (24-inch (in)) diameter concrete pipe of the north and south main irrigation pipelines, which prevent the system from maintaining adequate pressure, with 61-cm (24-in) polyvinyl chloride (PVC) irrigation pipe. Additionally, a 68-m (223-ft) spur of 25.4-cm (10-in) diameter PVC pipe will be installed to connect Ramah residential irrigators. The pipeline route would use the existing alignment except for one segment that would take a shorter route along a fence line.

The original project construction date was scheduled during the nonirrigation season beginning in early spring 2011 and with an expected duration of approximately 3 months. On March 29, 2011, we were notified that the construction has been postponed to fall-winter 2011.

The DEA/FONSI addresses work activities associated with the proposed project. The proposed project will occur north of the community of Ramah along Cebolla Creek, a tributary of the Rio Pescado in the Zuni River Basin. The amount of water withdrawn from Cebolla Creek or used in agriculture would not change with the proposed pipe installation. Two areas may be fed by leaks from the existing pipeline: 1) a 0.2 hectares (0.5 acres) area of emergent wetland vegetation located along the south pipeline, and 2) a small pond below the north pipeline, about 46 m (150 ft) from where the two pipelines diverge. Replacement of the pipeline may have a negative effect on these two areas through reduced water availability.

In general, the DEA/FONSI adequately addresses fish and wildlife resource concerns. Based upon our review of information provided, we found the federally listed species review complete and accurate. However, to ensure that all fish and wildlife resources are protected, we provide the following recommendations:

- Conservation measures identified in the DEA/FONSI should be incorporated into the workplan.
- To accurately determine loss of wetlands, we recommend that a longer term (up to 5 years) monitoring and action plan be developed after assessing results of the first year of monitoring.
- Mitigation should cover any indirect loss of wetlands due to a lowering of the water table.
  - To mitigate for losses of coyote willows (*Salix exigua*) along the north pipeline, and elsewhere, we recommend that 2 acres (0.81 hectares) of willows be established for every acre impacted. Planting of coyote willow should be dense and in a location where adequate water is available to ensure that mitigation is successful.
  - To mitigate for potential losses of other trees through indirect effects, we recommend that two native trees be established for each tree lost. Planting of these trees should be in a location where the water table is adequate to ensure survival.
  - Plantings to mitigate loss of mature tree cover should be monitored and survival rate criteria established and achieved over some period of years.
- Restoration of the area disturbed by trenching should include reseeding areas with native grass and forbs.
  - Restoration should be monitored and survival rate criteria established and achieved over some period of years.
- The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, as identified in the DEA/FONSI. Surveys for migratory birds should be conducted if construction activities continue into the migratory bird nesting season and all sites occupied by nesting birds should be avoided until nesting is complete.
- All species in the action area listed by the State of New Mexico as threatened or endangered in accordance with State law and Forest Service regulations and guidance as addressed in the March 7, 2010, State of New Mexico, Department of Game & Fish memo (species) list attachment to the Corps should be conserved.

Additional comments include:

- Provide a detailed plan for groundwater monitoring and vegetation success.
- Work with the Ramah Valley Acequia Association on an agreement to support a 5-year plan to monitor groundwater levels and plant survivability.

Thank you for your concern for endangered and threatened species and wildlife habitats. In future correspondence regarding this project, please refer to consultation #22420-2011-CPA-0013. If you have any questions about the information in this letter, please contact Cyndie Abeyta at the letterhead address or at (505) 761-4738 or Cyndie_Abeyta@fws.gov.

Sincerely,

for Wally Murphy
Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, NM
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, NM