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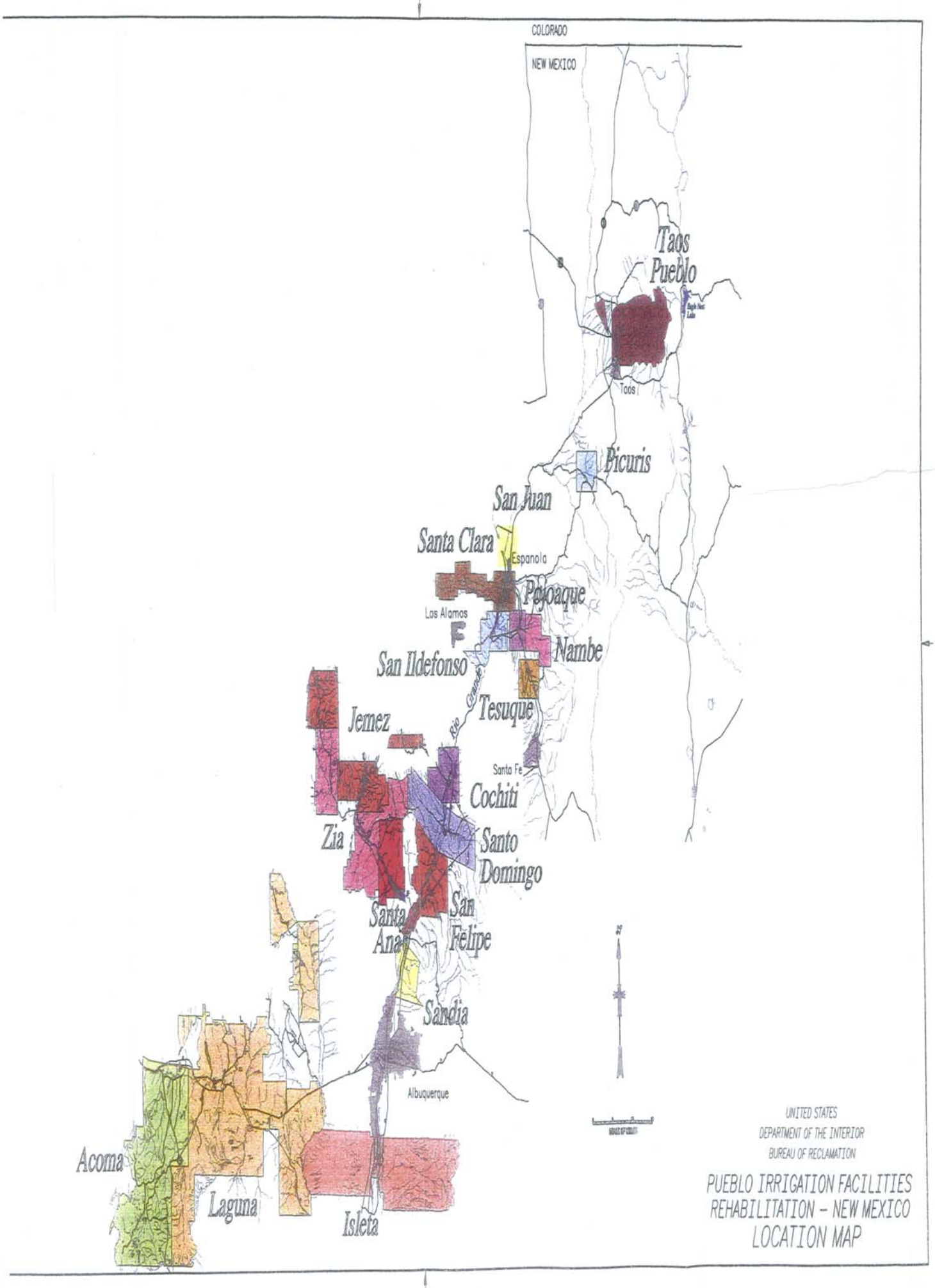
U.S. Bureau of Reclamation
U.S. Bureau of Indian Affairs

PUEBLO IRRIGATION FACILITIES REHABILITATION

Draft Report

April 9, 1999


COLORADO
NEW MEXICO
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Tesuque
Jemez
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Acoma
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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
PUEBLO IRRIGATION FACILITIES
REHABILITATION - NEW MEXICO
LOCATION MAP

PUEBLO IRRIGATION FACILITIES REHABILITATION

Executive Summary

This paper presents an overview of New Mexico Pueblo needs for irrigation rehabilitation, together with pertinent issues. It is a reconnaissance-level report to be used within the Department of Interior, Bureau of Reclamation (Reclamation), and Bureau of Indian Affairs (BIA) to help decide whether to support a Reclamation project (Project) to rehabilitate Pueblo irrigation facilities. Information presented includes background information, scope of work, tribal roles, legal issues, environmental issues, and a cost estimate.

Background information covered includes the cultural importance of irrigation to Pueblo Indians. This Project is needed because of the poor condition of existing facilities and because of its importance for Pueblo cultural and economic survival. Reclamation is the best agency to carry out such a project. Both Reclamation and the Corp of Engineers have other authorized projects for subsistence farmers where the project justification is historical and cultural preservation.

The scope of work includes the rehabilitation of lands and facilities in eighteen Pueblos which have historically been irrigated. It may be desirable to include water conservation measures, rehabilitation of existing water storage facilities, and rehabilitation of non-Indian facilities, which is strongly recommended by the BIA. A process is needed for deciding and prioritizing what work should be done, and including Pueblo and BIA participation in this process. Training users in proper operation and maintenance should also be included.

It is anticipated that the Pueblos will want to be active participants in the planning, design, and the construction of this project. Under current law, the Pueblos would be eligible to request this work under Public Law 93-638 As Amended, the Indian Self-Determination Act (638). Difficulty arises because there is one Project and eighteen tribes. Some options for dealing with this difficulty include forming one or several intertribal groups to minimize the number of contracts, or adding Indian preference to Reclamation's authorizing legislation to give the Pueblos an alternative to 638 contracting.

Legal issues examined include Reclamation authorization for such a project. Congressional authorization and appropriations for the feasibility study, design, and construction would have to be obtained. Some legal issues may arise when the Middle Rio Grande Conservancy District repays its Reclamation contract in the year 2000. A preliminary look at ongoing water rights adjudications indicates that they would not be affected by this project.

Environmental issues, including compliance with the National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act, and Clean Water Act will add to the cost of the Project but are not anticipated to stop construction.

Consultation with the Pueblos is vital in the early planning stages of this Project, especially in areas relating to 638 contracting, repayment of capital costs, operation and maintenance, scope of work, prioritization of work items, and legal issues.

A cost estimate for the next step, a feasibility study, is $3 million. The cost estimate for construction was divided into (1) necessary repair and rehabilitation and (2) water conservation measures (concrete lining of ditches). The total for necessary repair and rehabilitation is $65 million. Totals for all concrete lining considered would be $140 million, for a total of $205 million. As it would probably be politically unfeasible to fund every water conservation measure, this Project could be funded at a lower figure, say $80 to $100 million. This would cover necessary repair and rehabilitation and provide some funding for the most important water conservation measures. A more thorough cost estimate will be produced during the feasibility study.

The Project can be spread over a number of years to accommodate Reclamation and BIA manpower issues, contractor capabilities, and to minimize large swings in the overall Reclamation budget.

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PUEBLO IRRIGATION FACILITIES REHABILITATION

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PUEBLO IRRIGATION FACILITIES REHABILITATION

1.0 PURPOSE

This paper presents an overview of Pueblo needs for irrigation rehabilitation, together with pertinent issues, for Commissioner Eluid Martinez, Bureau of Reclamation (Reclamation), and Assistant Secretary Kevin Gover, Bureau of Indian Affairs (BIA). It is a reconnaissance-level report intended to serve as a basis of discussion within the Interior Department and Administration. Should the Administration decide to proceed with this proposed Pueblo Indian Irrigation Project (Project) under Reclamation auspices, authorization and funding must be secured from Congress, as well as tribal input and assent. This report would then be the first step in a process that includes a thorough analysis of Pueblo needs, design work, environmental compliance, and construction. A detailed investigation of how water rights issues will impact this Project may be considered in a subsequent document, per the direction of Commissioner Martinez.

2.0 BACKGROUND

The Bureau of Reclamation was approached by the Bureau of Indian Affairs in the spring of 1998 about opportunities for partnering on Pueblo water resource projects. The BIA has not had sufficient resources in recent years to take care of tribal water resource needs (Appendices A and B), and so is seeking financial and technical assistance from Reclamation. The scope of work has been defined to be the rehabilitation of existing irrigated lands and facilities within the eighteen New Mexico Pueblos in the Rio Grande drainage basin, excluding those facilities belonging to the Middle Rio Grande Conservancy District (MRGCD).

Some of the Pueblos have been concurrently requesting help for rehabilitating irrigation infrastructure from Interior Secretary Bruce Babbitt. Because of their efforts, they feel there is some support at the Departmental level for this work.

2.1 General Indian Views of Reclamation. Many tribes feel that the construction mission of Reclamation is not yet complete. Tribes often feel that Reclamation has labored since 1902 to develop non-Indian lands and irrigation facilities throughout the west, but for the most part has ignored Indian needs. Tribes have become more assertive in pursuing benefits once available mainly to non-Indians. They question the perceived unwillingness of Reclamation, Congress, and the Administration to undertake Reclamation projects on Indian lands, especially those which involve construction of reservoirs or improvement of irrigation facilities. The current emphasis on fiscal responsibility, environmental issues, and uncertainty on the mission of Reclamation imposes limitations, whether real or imagined, on construction of new Reclamation projects. This comes at a time when tribes throughout the West would like the benefits of the traditional Reclamation program brought to Indian country.

It should be noted that this Project is not an attempt at "mission creep" on the part of Reclamation into areas in which it historically has not been involved. On the contrary, the core of

Reclamation's mission has been the development of irrigation projects throughout the West. This Project represents the application of that historical mission to a customer base that has been neglected.

2.2 Past Attempts. An abortive attempt was made by Reclamation in the mid 1980's to assist with the irrigation rehabilitation needs of the six Middle Rio Grande Pueblos (Cochiti, Santo Domingo, San Felipe, Santa Ana, Sandia, and Isleta). A fairly detailed report was contracted for by Reclamation with HKM Associates in 1984 on the six middle Rio Grande pueblo lands served by MRGCD facilities. The report contains a comprehensive analysis of irrigation and drainage facilities and a recommended rehabilitation and betterment plan. Nearly all of the report is devoted to MRGCD facilities. Total rehabilitation costs were estimated at $9.4 million in 1984 dollars. Concerns about authorization and funding prevented work from being accomplished by Reclamation. Both Pueblo and Reclamation hopes were raised and then dashed as there was no follow-through on the promises and plans made.

2.3 Existing Information. Varying amounts of preliminary information are available for each tribe. To prepare the HKM Associates report for the six middle Rio Grande pueblos, every mile of ditch on the six pueblos was walked to obtain a detailed inventory of existing structures. However, a majority of the structures reported on are not proposed to be included in this Project. A similar report would have to generated for non-MRGCD facilities located on these six pueblos and most of the rest of the Pueblos. This level of report would be the next step in this Project.

There may be other information prepared for water rights settlement purposes. Usually these sources of information are confidential among the parties unless it is released to the public in some form. The parties would have to agree to release this information for this Project.

2.4 Other Agency Programs. Other federal, state, and local agencies were contacted to see if they had programs and funding which could meet Pueblo rehabilitation needs. None of the agencies contacted had a possibility of securing the amount of funding required for this project at this time. A discussion of the programs offered by other agencies follows.

(1) U.S. Army Corp of Engineers (COE).[1] The COE has an Acequia Program to help with rehabilitation of New Mexico acequia systems. The project was authorized in the Water Resources Development Act of 1986 by Section 1113 subject to the requirements of Section 903(a). The New Mexico Office of the State Engineer (OSE) administers the program. In the future, applications for funding will be sent to the OSE, which decides which projects are to be done. Once approved, the COE designs and constructs the facilities.

The authorizing legislation funded the Acequias Program for a total of $40,000,000. This is the "estimated first Federal cost", and is 75% of the total. The 25% non-federal cost share of $13,300,000 comes from the State of New Mexico. Total value of the Acequia program is $53,300,000. On an annual basis, the State of New Mexico typically sets aside $300,000 to $400,000 per year for the Acequia Program. The federal cost share brings the total available annually to $1,200,000 to $1,600,000.

The authorizing legislation states that:

> [T]he Congress finds that the irrigation ditch systems in New Mexico, known as the Acequia systems, date from the eighteenth century, and that these early engineering works have significance in the settlement and development of the western portion of the Unites States. . . . The Congress, therefore, declares that the restoration and preservation of the Acequia systems has cultural and historic values to the region.

Although many Pueblo acequia systems date from before the first European contact in the mid-1500's, and are several hundred years older than the non-Indian community ditches and acequias, they are excluded from the Acequia Program. The Acequia Program authorization further states,

> . . . the Secretary is authorized and directed to undertake, without regard to economic analysis, such measures as are necessary to protect and restore the river diversion structures and associated canals attendant to the operations of the community ditch and Acequia systems in New Mexico that are declared to be a political subdivision of the State of New Mexico.

Since Pueblos are not political subdivisions of the State of New Mexico, they have been excluded from the COE Acequia Program to date. The COE and OSE are currently investigating the possibility of including Pueblos in the Acequia Program.

The complete text of the COE Acequia Program authorizing legislation is included in Appendix C.

(2) Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture. The NRCS historically has done the type of rehabilitation proposed for this Project. The NRCS wishes to form a conservation partnership with Reclamation in the proposed Project to offer on-farm technical assistance, and to offer training to Pueblos and their farmers.

Discussions between the appropriate New Mexico NRCS and Reclamation officials will take place to explore the possibility of NRCS participation on the proposed Project. The NRCS may provide assistance for planning, design, on-farm improvements, and training.[2]

(3) Other agencies. No other federal, state, or local agencies are capable of accomplishing the proposed Project. Agencies contacted were the New Mexico State Department of Agriculture–Programs and Resources, Bernalillo County Cooperative Extension Service--New Mexico State University, and the New Mexico Office of the State Engineer.

2.5 History and Cultural Importance. The cultural importance of agriculture to Pueblo Indians cannot be overstated. The Pueblos were practicing both dryland farming and irrigation at the time of their first contact with Europeans.[3,4] Their proficiency in farming allowed, and even required them to become sedentary and establish permanent settlements, as opposed to nomadic Indian tribes which depended mainly on hunting and gathering for subsistence.

Some of the first Europeans to make contact with the Pueblo Indians of New Mexico were Francisco Vasquez de Coronado and his expedition members in 1540-1542. Other exploratory expeditions followed. In a letter to Viceroy Antonio de Mendoza, Coronado stated, "They cultivate the ground in the same way as in New Spain".[5] Some forty years later, Hernan de Alvarado, speaking of Rio Grande Pueblos near Bernalillo, said, "This river of Our Lady runs through a very broad valley dotted with cornfields . . . The people appear to be good, and land-tillers rather than warlike; they have much food in the shape of maize, beans, and melons and fowl in great abundance."[6]

Describing agriculture at Acoma in 1582-1583,[7] Captain Antonio de Espejo noted, "These people have their fields two leagues distant from the pueblos, near a medium-sized river, and irrigate their farms by little streams of water diverted from a marsh near the river."[8] Diego Perez de Luxan, one of Espejo's party members, commented, "We found many irrigated cornfields with canals and dams, built as if by Spaniards."[9]

In 1591, Gaspar Castaño de Sosa commented on farming in the Santa Fe region and Pojoaque Basin, "All six of these settlements had canals for irrigation, which would be incredible to anyone who had not seen them with his own eyes. The inhabitants harvest large quantities of corn, beans, and other vegetables."[10]

Similar comments were made later in New Mexico's history during the Mexican period from 1826-1846. "The observations of many travelers . . . attest to the persistence of a substantial agrarian society among the Indians. . . . Josiah Gregg described the Pueblo Indians generally as the best horticulturists in New Mexico, furnishing most of the fruits and a large percentage of the vegetables for the market of that province."[11]

The agricultural practices witnessed by the first Spaniards in New Mexico are not far removed from Pueblo agricultural practices today. Today there is very little dry land farming, and some innovations and new crops introduced by Spanish and Anglo influences have been adopted. However, the importance of irrigated agriculture continues for Pueblo Indians. The culture, life, social structure, and religion of the Pueblos are tied to agriculture. Agriculture is inseparably linked with the availability and ability to use water. Without adequate water, and the means to put it to agricultural use, the survival of Pueblo culture is in jeopardy. The Pueblos cannot simply pick up and move from their homelands in search of better water supplies. Nor can entire Pueblos simply disband in search of other livelihoods in other locations. To do so would be to give up their homeland and their culture.

2.6 Subsistence Farming. Irrigated agriculture is practiced today by Pueblo Indians for a variety of reasons and on a variety of scales. Although some Pueblo farming is commercial, most is subsistence-based, with fruits and vegetables raised for family consumption and alfalfa or pasture raised for family livestock on a few acres. Some crops are raised for religious and ceremonial usage, and some is used for barter. Some individuals farm for a living; others farm as a hobby or to supplement their income or food supply. Some Pueblos have formed tribal cooperatives, where the Pueblo owns large equipment such as tractors and bailers which are then shared by its farmers. In some cases these farmers are actually employees of the Pueblo; in other cases they are self-employed.

In many ways the subsistence farming practiced by Pueblo Indians is quite similar to the agriculture practiced by many of their non-Indian neighbors in the Rio Grande basin of New Mexico (from the Isleta Pueblo area north to the Taos area). Large farms in the non-Indian areas, where farming provides the entire livelihood of a family, are very rare. Large Indian farms, where farming provides the entire livelihood of a family, do not exist.[12]

Most Indian and non-Indian farms in the Rio Grande basin of New Mexico are too small to provide the entire livelihood of a farm family. For these families, farming is often practiced by both non-Indians and Indians to preserve culture; to pass on cherished practices to future generations; to protect the land; to supplement the food supplies available to families; to provide better quality foods for family consumption; to supplement family income; to provide feed and pasture for family livestock; to use in family and religious celebrations; and sometimes, simply to engage in a hobby. For many New Mexican families, both Indian and non-Indian, the food and income derived from farming is enough to ensure family survival. Many families live in economically depressed areas where unemployment is high and jobs are scarce and low-paying. The subsistence practices of many New Mexican families–including raising food and livestock for family consumption, gathering firewood for winter heating, and hunting for deer and elk–are indispensable to family survival, or "to make ends meet."

The type of New Mexico farming described above–with a few large farms and many small subsistence farms–is typical of the Velarde area. A Reclamation project is being constructed in this area, the Velarde Community Ditch Project. It is important to note that if the Pueblo Indian Irrigation Project described in this report is authorized and funded, it will not be the first time that a Reclamation project is justified for an area with such farming practices. It will not be the first time that Reclamation has recognized the value of subsistence farming, a value which involves the social fabric of a region and not merely monetary considerations.

Nor is the Velarde Community Ditch Project the only time that the federal government has recognized the importance of acequia irrigation systems. As described in Section 2.4 above, the Corp of Engineers has been authorized to expend up to $40,000,000 to rehabilitate acequias and diversion structures. The reason used to justify this program was the "cultural and historic value" of the acequia systems. The COE was directed to expend the funds "without regard to economic analysis." The profitability of the various acequia systems is not to be a criterion for expending federal funds to rehabilitate acequia systems under the COE Acequia Program.

The process of justifying a large government project usually involves a benefit-cost analysis. In a benefit-cost analysis for a typical Reclamation agriculturally-oriented project, the market value of agricultural goods and other economic benefits produced by the proposed project is divided by the cost of the proposed project, and if this ratio is at least one, then the proposed project is considered justifiable. Non-market values such as "cultural and historic value" are not considered in a traditional benefit-cost analysis. However, Congress has previously authorized both the Velarde Community Ditch Project and the Corp of Engineers Acequia Program without meeting the requirements of a minimum benefit-cost ratio of one because of "cultural and historic value," which cannot be quantified in dollar terms. It would seem unreasonable to deny the Pueblo Indians a similar project for their acequia facilities, which are even older and probably have even more cultural significance, because the required benefit-cost ratio cannot be met.

2.7 Trust Responsibility. The federal government, including Reclamation, has a trust responsibility to protect Indian assets. This includes Pueblo Indian agricultural lands and facilities. Reclamation's Indian Trust Asset Policy and NEPA Implementing Procedures dated August 31, 1994, states:

> Many Indian assets are held in trust by the United States for the benefit of an Indian tribe or Indian individual. Such trust status is derived from rights reserved by or granted to Indian tribes or individuals by treaties, statutes, and executive orders. The United States has a trust responsibility to protect and maintain these trust assets and rights. This responsibility requires that the United States as trustee, deals with the trust assets in the same manner a prudent person would deal with his own assets. All federal agencies, including Reclamation, must take reasonable actions necessary to protect [Indian trust assets]. The rationale is that where the government has power, it has the duty to exercise that power in a responsible manner.

Given the condition of Pueblo agricultural lands and facilities, it is obvious that the United States has failed to deal with these important assets "in the same manner a prudent person would deal with his own assets." [13] Appendices A and B has photos showing the general disrepair of Pueblo irrigation facilities. While the Pueblos have done what they could over the years to maintain their facilities, their lack of finances and resources, together with the neglect of the federal government, has resulted in the disrepair evident today. As described in Sections 2.3 and 2.6 above, Congress has authorized and funded repair of similar irrigation systems in New Mexico for non-Indians, where the federal government does not have a trust responsibility. When considering the federal trust responsibility for Indian irrigation facilities, there is even stronger justification for authorizing and funding this Pueblo Indian Irrigation Project.

2.8 Summary of Pueblo Farming. That irrigated agriculture is practiced at all in some Pueblos is a testament to its importance in Pueblo culture, given the deteriorated infrastructure of irrigation facilities, lack of water because of non-Indian consumption or inefficient delivery systems, and opportunities for employment off the reservations. Some Pueblos have to go to 24-hour irrigation scheduling, with some farmers having to irrigate through the night. Different crops have to be given priority in water distribution, usually with vegetables given a higher priority than alfalfa. Some farmers have had to limit themselves to small family-use vegetable gardens because there is not enough water to support a larger farming enterprise.

In general, Pueblo lands are farmed more intensively where there is a longer growing season and adequate water. Longer growing seasons and abundance of water make farming easier and more lucrative. That some Pueblos do not appear to be farming large areas of their land should not be interpreted as a lack of interest. In many cases, there is not enough water to irrigate crops through the entire growing season because of system inefficiencies. Sometimes the irrigation infrastructure is in such a state of disrepair that it is impossible to get the water to the farm fields, even when there is water available. Some farm fields are waterlogged and make farming unproductive. Each Pueblo is unique, and the conditions for farming differ from Pueblo to Pueblo. In general, Pueblos are doing an admirable job practicing agriculture given their

circumstances.

3.0 SCOPE OF WORK

As stated above, the scope of work has been defined to be the rehabilitation of existing irrigated lands within the Pueblos, excluding those facilities belonging to the Middle Rio Grande Conservancy District. Only lands which have historically been irrigated will be subject to the benefits of this Project. Some of the issues which can be raised in rehabilitating existing lands are: (1) rehabilitation of existing lands vs. existing facilities; (2) construction of new storage facilities; (3) water conservation; (4) on-farm improvements; (5) training; (6) which Pueblos to include; and (7) rehabilitation of non-Indian facilities.

3.1 Existing Lands vs. Existing Facilities. It is important to draw the distinction between rehabilitating existing facilities and rehabilitating existing lands. While all existing facilities in need of rehabilitation will be addressed through this project, some facilities on existing irrigated lands are in such a state of disrepair that entirely new facilities will need to be built. In some cases changes in conditions with time have rendered once productive farm lands unusable.

A prime example is lands which have historically been farmed but which are now waterlogged. This may have happened through deterioration of drains or through aggradation of an adjacent river, raising the water table in adjacent farm lands. Open drains or pipe drains need to be constructed to make the lands productive once again. A new outfall to the adjacent river may need to be established. This would be new construction as far as the drains and outfalls are concerned, and not rehabilitation of an existing structure. However, the effect would be to rehabilitate existing lands that were once productive. In some cases attempts are still being made to farm these lands. In other cases farming has not occurred in years. This is different than draining lands which were never farmed and which have always been wetlands. It does not add irrigated Indian acreage beyond that which was historically cultivated. Appendix D gives more examples comparing existing lands with existing facilities.

3.2 Storage Facilities. Another issue to be resolved when addressing the scope of work is the construction of storage facilities. Farming on some Pueblos is limited because of lack of water, not lack of irrigable land. In any year, the total land farmed is a small percentage of the total irrigable land available. Farmers are unwilling to take the financial risk of planting crops which then dry up when dependable water sources originating from spring snowmelt becomes unavailable, usually between June and August. Often, the reason for this lack of water is the proliferation of upstream water users. In centuries past, when the only water users were Indian, there was generally enough water to support agriculture through the summer as the smaller rivers in New Mexico tended to be perennial streams. With more non-Indian diverters upstream of some Pueblos, there is no longer enough water in the smaller rivers to make it to the downstream Indian diverters, and rivers once perennial are now intermittent streams.

It is possible that Pueblos will want to include at least five items in the scope of work for this Project to address water shortages: (1) construction of new reservoirs; (2) rehabilitation of old reservoirs; (3) modifications to existing dams to allow more storage; (4) re-regulation of dams

to allow for more Indian storage; and (5) obtaining an allocation of San Juan-Chama water. None of these items, except possibly for the second item, fit into the Project as currently envisioned. However, a brief discussion follows in case these issues are brought up by Pueblos for inclusion in the Project.

(1) Constructing New Reservoirs. The lack of a reliable water supply for many Pueblos makes the construction of storage reservoirs an attractive possibility for these Pueblos. Some new reservoir construction might be contemplated as a part of various water rights settlements. Coordination with the various federal water rights negotiating teams should take place should new storage reservoirs be contemplated as part of this Project.

Given the high cost and environmental hurdles, it is likely that including construction of a new reservoir could seriously impede, if not kill, opportunities for authorizing this Project. A benefit-cost analysis might be necessary to justify new reservoir construction if it is done as part of this Project (benefit-cost analysis is not commonly used in reservoir construction for Indian water rights settlements). It would be unlikely, under this Project, to justify such an expensive item for subsistence farming through benefit-cost analysis.

If the decision is reached to exclude new reservoir construction from the Project scope of work, then Reclamation and BIA should be prepared to explain this to interested Pueblos. It might be preferable to direct the Pueblos to secure new reservoir construction through water rights settlements, where benefit-cost issues are not considered.

(2) Rehabilitating Old Reservoirs. Zia Pueblo has an existing facility, Zia Lake, to store spring runoff flows for later in the irrigation season when river flows diminish. Zia Lake is filled through an irrigation ditch, and is not an impoundment of the Rio Jemez. Although water is impounded in the reservoir, it cannot be released into the irrigation system because of defective outlet works. Leakage problems through the dam also need to be addressed. Similar situations exist at Seama Reservoir, used by Laguna Pueblo, and at Acomita Lake, used by Acoma Pueblo. Rehabilitating these existing reservoirs, which are considered existing irrigation facilities, would not be nearly as costly economically or environmentally as constructing a new reservoir. Including rehabilitation and expansion of current reservoirs into the Project scope of work should be considered.

(3) Modifying Existing Dams. It is remotely possible that Pueblos which benefit from Nambe Dam and Reservoir might ask for raising of the dam to enlarge the reservoir. This would not be a successful addition to the Project scope of work because of the cost, environmental impacts, and ramifications to the San Juan-Chama Project and Colorado River water users. Reclamation and BIA should be prepared to deal with this question should it arise.

(4) Re-regulating Existing Reservoirs. It is remotely possible that some Pueblos may ask for re-regulation of existing reservoirs, such as Heron, El Vado, Abiquiu, or Cochiti to increase Indian storage capabilities. This has never been considered to be part of the scope of work of this Project. Should such a request arise, Reclamation and BIA can request that Pueblos pursue this option on their own initiative outside the scope of work of this Project.

(5) Obtaining an Allocation of San Juan-Chama Water. It is also remotely possible that some Pueblos may ask for an allocation of San Juan-Chama water for irrigation purposes as part of the scope of work of this Project. Such requests should be handled separately from this Project, and should follow the process used by other entities to obtain San Juan-Chama water.

3.3 Water Conservation. A major benefit of this Project would be water conservation. Rehabilitating the water distribution system can significantly improve efficiency. Concrete lining ditches through highly permeable soils, installing pipe through highly permeable soils, leveling fields, smoothing fields, and installing water measurement devices are possible water conservation measures.

The magnitude of these benefits can be demonstrated by comparison to a non-Indian farm near Isleta Pueblo.[14] A large farm in Adelino, NM was created by purchase of many small properties. The resulting farm had too many ditches for the amount of land irrigated. The ditches were in poor condition. Uneven land required that fields be over-irrigated, with low spots filling to the point that they looked like lakes in order for the water to reach higher areas. Fields that were too steep required over-irrigation because waters would run off the fields rather than seep into the ground. This excessive irrigation resulted in water logging of the land, raising the water table and decreasing crop production. It required two check structures on the Peralta Main Canal and three weeks to irrigate this farm before improvements were made. After the ditch distribution system was redesigned and rebuilt and the fields were laser leveled, the time required to irrigate the same farm dropped to 30-36 hours. Much less water was required, and crop production increased.

Efficiency estimates for water use in some Pueblo lands are currently as low as 10%. Improving the distribution system can raise the efficiency to 50%, while on-farm improvements can raise the efficiency as high as 70-80%.[15] Maximizing water use efficiency is critical in Pueblos with water shortage problems.

Water conservation measures can be divided into two categories: distribution system improvements and on-farm improvements. Rehabilitating Pueblo distribution systems to the point of delivery to farms is envisioned in this Project. This rehabilitation will improve distribution system efficiencies, especially when ditches through highly permeable soils are concrete-lined or placed in pipes. Addition of water measurement structures to the distribution system, such as Parshall flumes, ramp flumes, and water level recorders, can easily be included in the Project.

Inclusion of on-farm improvements for water conservation can be considered separately from on-farm improvements which do not result in water conservation. Water-conservation improvements considered for Project inclusion are land leveling, land smoothing, and on-farm water measurement devices.

It should be noted that not all Pueblo lands are good candidates for land leveling. Land leveling requires a sufficient depth of topsoil so that the leveling process does not remove all the topsoil from certain areas and leave unproductive soil exposed at ground level. In places where there is insufficient depth of topsoil to do leveling, land smoothing is done. Land smoothing involves knocking down some of the higher points and filling in some lower points to the extent

possible without denuding the ground of topsoil. While the land is not left completely leveled, its condition is usually improved somewhat.

There are four options for dealing with water conserving on-farm improvements: (1) include them in the Project scope of work: (2) fund 35% of the cost, with 50% coming from NRCS and 15% coming from the individual farmer or Pueblo; (3) maintain the current BIA program of and leveling (other conservation measures are not included); or (4) leave water conserving on-farm improvements out of the Project scope of work.

If water conserving on-farm improvements are included in the Project scope of work, a method of accountability similar to the NRCS method may be considered. Some elements might include a requirement of land usage for some years prior to improvements being made (if conditions permit), a requirement of land usage for some years after improvements are made, developing a water conservation plan, and adhering to key elements of the water conservation plan. If these are not met, repayment of the cost of on-farm improvements can be required.

If cost sharing up to 35% through the NRCS EQUIP program is included, the NRCS would administer implementation of the on-farm improvements according to their own requirements. Accountability is included in the EQUIP program requirements.

The BIA Northern Pueblos Agency does a limited amount of land leveling free of charge. Because of limited funds and a huge backlog, small parcels of land are leveled as an educational or demonstration project. For example, a farmer can get one of his fields leveled to show him the effectiveness of land leveling. It is hoped that the farmer would then have the resources and desire to level his other fields. There is almost no leveling done out of the BIA Southern Pueblos Agency, and none is done out of the Laguna Agency. None of the BIA agencies provide any other source of water conservation improvements, such as addition of water measurement devices.

If on-farm water conservation measures are not included in the Project scope of work, individual landowners and Pueblos can still seek NRCS assistance on their own, or they can proceed to improve their farms individually. Although there will be less incentive to maximize on-farm water conservation, there will still be dramatic improvements in water efficiency by improving the water distribution system to the farms' point of delivery.

Development of a water conservation plan and receiving training in water conservation is something that can be required for beneficiaries of this Project, regardless of whether on-farm improvements are included in the Project.

There is a potential negative side to water conservation. Infiltration from irrigated fields and leaky ditches currently provides a large part of the recharge into the alluvial aquifers which provide drinking water to both the Pueblos and surrounding non-Indian communities. These effects can be further studied to better quantify the impact of improved water conservation on aquifer recharge.

3.4 On-Farm Improvements. As currently envisioned, the Project will provide for

efficient delivery of water to farms, but not on-farm improvements. Examples of on-farm improvements include fencing, creation of borders, installation of sprinkler or drip irrigation systems, provision of tractors and other farm machinery, provision of seed or plants, and planting of windbreaks.

The only exceptions to on-farm improvements which might be included in the Project scope of work are these water conserving items: land leveling, land smoothing, and installation of water measuring devices. As discussed in Section 3.3 above, these measures improve the efficiency of the system as a whole by conserving water and thereby maximizing the water available to other users.

3.5 Safety. Many of the Pueblo irrigation facilities present a safety hazard to both users and the general public. Appendices A and B show examples. Resolving irrigation facility safety concerns would be an important part of this Project.

3.6 Training. It would be a waste of money to fund and construct new irrigation facilities without providing the users with adequate education and information (often referred to as "scientific assistance") on proper operation procedures and maintenance requirements. This is especially true for larger structures such as diversions. Providing training will decrease maintenance requirements, which often result from improper operation. Training will minimize unwanted consequences, such as impounding sediment or raising the groundwater table.

Different options for providing training should be explored. It can be funded through this Project or other programs within Reclamation. It might also be funded or provided through BIA or the NRCS. Providing training in conjunction with constructing new irrigation facilities should be seriously considered.

3.7 Which Pueblos Should Be Included? This paper assumes that the Pueblos in the Rio Grande watershed in New Mexico would be included in the Project. This includes eighteen Pueblos, all of which are in the geographical area served by the Reclamation Albuquerque Area Office: Acoma, Cochiti, Isleta, Jemez, Laguna, Nambe, Picuris, Pojoaque, San Felipe, San Ildefonso, San Juan, Sandia, Santa Ana, Santa Clara, Santo Domingo, Taos, Tesuque, and Zia.

One other Pueblo is the Rio Grande watershed and in the geographical area served by the Reclamation Albuquerque Area Office: Ysleta del Sur, south of El Paso in Texas. This Pueblo's entire reservation is only 69 acres, and is located in suburban El Paso. It does not have enough farmland to be considered for inclusion into this Project. One New Mexico Pueblo, Zuni, is not in the Rio Grande watershed.

Including Zuni Pueblo is an issue that should be given careful thought, since it would be the only one of the nineteen New Mexico pueblos left out of the Project. The Project was originally envisioned as a pilot project for the Rio Grande basin. If this Project could be successful, it would serve as a prototype for other Reclamation projects in Indian country throughout the western United States. Zuni might then be included in a subsequent Reclamation project.

Zuni presents an interesting situation. Because it is a Pueblo, it has close historical and cultural ties with the other eighteen New Mexico Pueblos. This lends justification for including it in the Project. Because it lies in another drainage basin, it would have its own unique circumstances regarding history, water rights, and agency jurisdictions, and might be more suited to a subsequent Reclamation project in the Colorado River drainage basin. Zuni Pueblo is not in Reclamation's Albuquerque Area Office jurisdiction. If Zuni Pueblo were included in this Project, internal agency arrangements can be worked out to provide proper service to Zuni Pueblo.

3.8 Non-Indian Facilities. The BIA supports inclusion of limited non-Indian facilities in this Project. Some of the ditches and diversions are shared with non-Indians, particularly in northern New Mexico. There are two instances where Indians and non-Indians share facilities: (1) where there are private inholdings within reservation boundaries, and (2) where there are private lands sandwiched between two different reservations.

At other times, upstream non-Indian irrigators can affect the downstream Indian irrigators, even if they do not share the same facilities. For example, if an upstream non-Indian diversion is a rock and brush structure, the timing and amount of diversions cannot be controlled. It is not possible to bypass flows to downstream Indian irrigators during periods of irrigation rotation.

At a minimum, this Project must not negatively impact non-Indian facilities. Including non-Indian facilities in the scope of work might bolster Congressional support for the Project. It could also induce better planning and sharing of the water resource. For example, in exchange for upgrading a non-Indian facility, the users of that facility might be required to enter into a rotation program. Under such a program, the non-Indian users would refrain from diverting at certain times so flows could be bypassed to downstream Indian irrigators. A more system-wide approach could be taken to maximizing the benefits of the water resource for all its users. Mayordomos or ditch masters might have jurisdiction over multiple acequia groups on a given tributary to maximize efficiency and fairness.

Another possibility would be to take care of the non-Indian irrigators through the Corp of Engineer's acequia program. This option would have to be investigated with the Corp of Engineers and New Mexico Office of the State Engineer, which is a cost-sharing partner and helps administer the program.

4.0 TRIBAL ROLES.

4.1 Tribal Plans for Agriculture. Thus far, there seems to be strong interest shown by the Pueblos regarding this project. If the proposed project is to become a reality, it will require Pueblo involvement in many different arenas. First, each Pueblo will have to decide that they want to participate in the project. They will have to provide access to designers and other personnel. They will have to provide some historical information. Most of all, they will have to determine their future plans for agriculture in order to arrive at a coherent plan for rehabilitation. For example, if the main concern of Pueblo members is to grow a small amount of vegetables for personal consumption, acreage and irrigation rehabilitation needs will be different from a Pueblo that wants to put every possible acre into production for a commercial alfalfa operation.

Likewise, a Pueblo that wants to venture into organic farming, tree farming, or the raising of ornamental native shrubs will have different acreage and irrigation needs.

When considering the needs of the eighteen different Pueblos, there is a wide variation in growing season, soil types, water availability, irrigable acreage, and economic dependence on agriculture. Rather than simply coming up with a "one-size-fits-all" federal government solution to Pueblo irrigation needs, each Pueblo should be required to determine and state their individual needs. Working in partnership with the tribes in such a manner will take time. However, it will result in a greater Pueblo stake in the project, with subsequent better use, care, and maintenance of the facilities. This approach will also show sensitivity to the fact that irrigated agriculture is a cherished cultural value and way of life to Pueblo peoples.

4.2 Public Law 93-638 Contracting (As Amended). An irrigation project for the New Mexico Pueblos would clearly qualify for Indian Self-Determination (638) contracting under Public Law 93-638 (as amended), since it would be for "the benefit of Indians because of their status as Indians".[16] There is currently a moratorium on new Self-Determination contracts for Interior Department agencies funded through the Interior Appropriations Bill. Since Reclamation is funded through the Water and Energy Bill, it is not under this moratorium. However, Reclamation could be placed under the moratorium at any time, should Congress so desire.

All phases of the construction program would qualify for a Self-Determination contract, including the preplanning phase, the planning phase, the design phase, and the construction phase[17]. This would include management, inspection, and "environmental, archeological, cultural resource, historic preservation, and similar assessments and associated activities".[18] Under Self-Determination law, each Pueblo would have the right to ask for the funding to perform all phases of the Project which take place on their land. Each Pueblo could also refuse any part or all of the work, and Reclamation would be responsible for accomplishing the work for those Pueblos which refuse 638 contracts. If the Project scope of work includes non-Indian facilities, Reclamation would also be responsible for the non-Indian portion of the Project.

Funding under 638 contracts would cover costs for performing the contract, preparing the contract proposal and supporting cost data, and auditing the general and administrative costs of the tribal organization associated with the management of the construction contract. If the Indian tribe or tribal organization submits a fixed-price construction contract, then funding would also cover reasonable costs to the Indian tribe or tribal organization for general administration and a reasonable profit for the contractor. Each of the eighteen Pueblos could have several contracts–one or more for planning and design, one or more for construction, one for inspection, and the possibility of even more subcontractors.

Other costs to the government would include those associated with cost estimating, negotiating the self-determination contracts, paying tribal overhead, and performing contract administration for the duration of the contracts. It is likely that Reclamation would review the designs of all 638 architectural and engineering design contractors.

Unlike the BIA or the Indian Health Service, only a small amount of contracts which Reclamation enters into are 638 contracts. The few that Reclamation does enter into usually

involve a single project for a single tribe. The complexities with this proposed Project arise from the fact that there will be eighteen different tribes involved in the same Project.

Another complexity involves the spending ceiling imposed by Congress on Reclamation projects in general. This is different than the situation faced by BIA for programs involving multiple tribes. For example, a priority list for building new schools can be established by BIA, and the yearly amount allocated for building new schools will be given to the schools with the highest priority until all funds are expended. The next year, the remaining schools move up in priority, and more schools will be funded. This will continue as long as BIA has the Congressionally mandated responsibility of providing for the construction of tribal schools. Reclamation, however, will have a ceiling on the amount that can ultimately be spent on the Project. Once that ceiling is reached, the remaining items of work still awaiting construction will not be built under this Project.

Reclamation cannot contract out its trust responsibility, and will retain certain roles and responsibilities even if all the work is given to the Pueblos under 638 contracts. The role of Reclamation would include making sure that the individuals, companies or tribes doing the work are qualified. Reclamation might retain a role in prioritizing the items of work among the eighteen Pueblos, setting design standards, setting cost containment standards, and reviewing design. However, the extent of Reclamation's involvement in these activities is unclear at this point, since each tribe can contract out planning functions under a 638 contract, and this includes developing a Program of Requirements (POR) for the Project.

It would be prudent to meet with the Pueblos to determine their level of interest in seeking 638 contracts for the various phases of the Project. This includes the next phase in this Project, the feasibility study. In some cases, tribes choose not to obtain 638 contracts because of their limited staff resources. They often want to maximize employment opportunities for tribal members, to retain decision-making authority, and to assure that they will have input into the final product. It would be prudent to inform the Pueblos that many of their concerns can be met outside of the 638 process, especially if Indian Preference is made part of the authorizing legislation. This includes hiring Indian contractors, hiring Pueblo members or Pueblo staff to do as much work as possible, and maximizing Pueblo input into the design and prioritization process.

The Pueblos should also be approached about their interest in forming one or more multi-tribal organizations for the purpose of carrying out this Project. For example, if the Pueblos formed a single organization with which Reclamation could enter into 638 contracts on behalf of all Pueblos, this would greatly simplify the 638 contracting process.

Should any Pueblo choose not to enter into 638 contracts, Reclamation can practice Indian preference by using the BIA as an intermediary. It would require that Reclamation funnel the funds for the Project through the BIA, which can then exercise Indian preference in contracting. Reclamation does not have authority to exercise Indian preference under existing Reclamation law. However, it may be possible to stipulate that Reclamation practice Indian preference in the authorizing legislation if any tribes elect not to participate in the 638 process. This might give the tribes another option besides 638 contracting which might better meet their goals.

Other contracting approaches which might be used if tribes do not request 638 contracts and if Indian preference is not followed include: (1) sealed bid contracting open to all qualified bidders, administered by Reclamation; (2) two-step, or regular Request for Proposals contracting administered by Reclamation; (3) minority and Small Business Administration Section 8A (SBA 8A) contracting; and (4) performing the work through Reclamation personnel. Each of these has different advantages and disadvantages, and different applications for the different phases of the Project (preplanning, planning, design, and construction). The level of involvement that can be exercised by Pueblos under each approach can be discussed with the Pueblos to determine whether they are interested in any of these other contracting approaches.

4.3 Prioritization of the Work. If this Project is authorized and funded, it is anticipated to be done over a five to ten year period. Since not all of the work will be done at once, a method for prioritizing work needs to be devised. An equitable means of evaluating the necessity of Pueblo requests is also needed. The role of Reclamation and the Pueblos in the prioritization process must be addressed.

There are three possible approaches to prioritizing the work. Each Pueblo can be given a priority, with all the work at the highest priority Pueblos being performed first, and all the work at the lowest priority Pueblos being performed last. A second possibility is to divide the work into river drainage groupings. Priorities would be set according to tributaries or river reaches. All work for the highest priority tributary or river reach would be done before work at other tributaries or river reaches would commence. A third possibility is for all items of work at all the different Pueblos to be considered and prioritized. The highest priority items would be done first, regardless of Pueblo.

The first prioritization method would make 638 contracting easier for Reclamation. However, it would lend itself to inequities because of fluctuations in the funded amounts from year to year. Should Congress decide to curtail funding, or should cost overruns take place on earlier items of work, Pueblos with the lowest priority may not see any improvements. Less important work at Pueblos with higher priorities would be accomplished ahead of more important work at Pueblos with lower priorities.

The second prioritization method would also lend itself more easily to 638 contracting. It would minimize the number of 638 contracts in place at a given time. As in the first prioritization method, Pueblos in lower priority river reaches or tributaries might not see any improvements should funding be cut or overspending take place at higher priority tributaries or river reaches.

The third prioritization method would be the most equitable. It would still require a method of establishing which items of work should have the highest priority. Things like current interest in farming, economic impact, willingness and ability to begin farming rehabilitated areas, and maximizing benefit for the least cost can be considered. To effect the most benefit for the most farmers, diversions and reservoirs might take first priority, followed by main canals, laterals, and on-farm improvements. There is much variability in each Pueblos' situation, and much subjectivity in the factors which can be used to prioritize.

The role of the Pueblos, BIA and Reclamation is this prioritization process needs to be

established. Would Reclamation be abrogating its trust responsibility if it allowed the Pueblos or some intertribal entity to set the priorities, as is done with the Velarde Community Ditch Project? What would tribal reaction be to Reclamation setting priorities on an intertribal basis? Who would decide what criteria to use for prioritization? These are issues that would have to be researched against the backdrop of Reclamation's trust responsibility, and discussed with the Pueblos.

4.4 Operation and Maintenance (O&M). Although this Project is being contemplated as a Reclamation project, it is useful to compare BIA's classification of Pueblo agriculture for O&M purposes with Reclamation's provisions for O&M. BIA has separate laws and authorities for determining how much O&M is paid. BIA has discretion to forgive, defer, or otherwise make O&M payments non-reimbursable, depending on the profitability of the agriculture practiced. In contrast, Reclamation law requires all O&M to be paid by the project beneficiaries and does not provide for subsidizing annual O&M costs.

(1) BIA O&M. The BIA breaks Indian irrigation projects into six different categories for O&M, depending on the ability of the Indian irrigation project to pay O&M costs. These categories are listed below. A more detailed description is given in Appendix A. These categories are listed below. A more detailed description is given in Appendix A.

> Category 1. - Self-Supporting. Economically feasible projects where the land owners and water users as a whole are generally financially able to pay the full cost of operation, repair, rehabilitation and maintenance of such projects.
>
> Category 2 - Partial Subsidy. Projects where the majority of the land owners are Indians and operation and maintenance costs are generally in excess of the ability of the Indian operators to pay in full.
>
> Category 3 - Total Subsidy. Irrigated areas, such as subsistence garden tracts and tracts of a few acres which do not represent economical units but do provide Indian land owners with a means of supplementing their livelihood.
>
> Category 4 - Indian Irrigation/Private Systems. Irrigation systems and reservoirs serving Indian-owned lands located within and operated by various private and public irrigation districts and water users associations.
>
> Category 5 - Mandatory Payment (legal requirement). Projects that are operated by the Bureau [of Indian Affairs] at no cost to the Indian land owners and water users as provided for under legislation.
>
> Category 6 - Navajo Indian Irrigation Project (NIIP). Reimbursement of construction charges as well as operation and maintenance charges are deferred pending completion of the various phases of the Navajo Indian Irrigation Project, which is still under construction.

The Pueblo Indian lands to be rehabilitated under this Project come under Category 3,

describing subsistence garden tracts. These are referred to as irrigated areas, rather than irrigated projects. The O&M costs of such irrigated areas is covered by non-reimbursable appropriated funds. No lien is placed on these lands for the O&M costs in recognition of their nonviable commercial status and the low income levels of the Indian land owners and water users.

> Because of the low income of the Indian land owners and water users on these irrigated areas and tracts, it is not feasible from an economic standpoint to assess these lands. Accordingly the operation and maintenance costs are a nonreimbursable and did not become a lien against the lands benefitted.

Pueblo Indians are settled agriculturalists with a historical community approach to O&M of their irrigation facilities. Pueblo irrigators generally operate the diversion structures and perform a limited amount of maintenance work. Maintenance includes cleaning the acequias, usually in the late winter before diversions begin. Often, these activities have some ceremonial or community significance. For example, at Zia Pueblo, the diversion structure operator or "ditch boss" is appointed annually by the religious leader. Zia Pueblo also has a rule requiring all males at least 18 years of age to take part in cleaning of the acequias. This model is not unique to Pueblo irrigators. Non-Indian acequia groups in New Mexico typically follow the same pattern, with monetary charges levied against those who do not assist in cleaning the acequias, so that a laborer can be hired to take the place of the absent individual.

It is assumed that the above arrangement for limited operation and maintenance will continue for the Pueblos both during and after construction of this Project. The willingness and effectiveness of such arrangements can even be used to help set priorities for accomplishing the Project. For example, a Pueblo with dedicated and effective community involvement in O&M of their irrigation infrastructure can receive a higher priority for Project work than a Pueblo with little or ineffective organization for such O&M.

The main concern in paying for Pueblo O&M is for larger replacement, additions and extraordinary items. The actual yearly amount required by the Pueblos for O&M is unknown at this point. Design features can be incorporated which can minimize out-year O&M costs. In general, the more that is spent up-front on initial construction, the less is required later on for maintenance. Taking this approach can minimize future O&M costs for Pueblo irrigation infrastructure. However, some funding will be necessary for future O&M.

(2) Reclamation O&M. Reclamation law requires all O&M to be paid by the project beneficiaries after completion of the project. O&M costs occurring prior to project completion are generally capitalized as a construction cost, which in this case would be nonreimbursable or deferred under the Leavitt Act.

(3) Financial Management Alternatives Given that the insignificant financial returns from Pueblo subsistence farming make it unfeasible to pay for continuing O&M through agricultural returns, other avenues for funding O&M need to be explored. Several such avenues are listed below.

(a) Have the BIA continue or increase its role in Pueblo irrigation O&M. BIA would

have to reverse the current declining budgetary constraints on O&M if they are to take on an increased role. This avenue can be further explored within the BIA.

(b) Have Reclamation assume responsibility for Pueblo irrigation O&M within the limits of its annual O&M budget. Budget personnel within Reclamation would have to determine if this is a feasible alternative. However, there appears to be a trend in this direction within Reclamation, especially with Indian rural water supply projects for municipal and industrial uses. If this trend continues, and Reclamation's overall O&M budget remains the same or decreases, there will eventually come a time when Reclamation cannot meet all of its O&M responsibilities to both Indians and non-Indians within its annual O&M budget.

© Have Congress authorize and appropriate ne funds for Reclamation to fund the Pueblo Irrigation Project O&M in perpetuity. This would make the Pueblo irrigation project an O&M project, similar to the Middle Rio Grande Project. This would be a feasible way to provide adequate funding, provided Congress is willing to continue setting aside adequate amounts each year. However, this approach might be difficult to get through Congress, as it would obligate the United States to provide the O&M funding, probably in perpetuity.

(d) Have Congress authorize Reclamation to pay for Pueblo irrigation O&M out of the Middle Rio Grande project. This would extend the authority of the Middle Rio Grande Project from efficient water and sediment transport in the main stem of the middle reach of the Middle Rio Grande to include O&M of Pueblo irrigation facilities. Additional funds would have to be appropriated to the Middle Rio Grande project to cover the costs of Pueblo irrigation O&M as well as river maintenance needs. If insufficient funds were allocated to accomplish both, this would put additional pressure on the Middle Rio Grande Project budget in future years. Reclamation would have discretion to prioritize Middle Rio Grande Project spending according to the yearly needs on the river and the Pueblos. Provision would have to be made for Pueblo participation in the prioritization process.

The Middle Rio Grande Project historically included rehabilitation of irrigation works in its scope of work along with river rectification. It might be more difficult to make the Middle Rio Grande Project a dual-purpose project today. There would be pressures on a single budget between the Pueblos, who would like to concentrate on irrigation O&M, and Reclamation, which would still have responsibility for river rectification.

(e) Market conserved water to non-Indians, and use the proceeds to pay for O&M. Analysis needs to be done to quantify the amount of water saved through this Project's water conservation measures. When quantified, this water can be leased to other users, whether municipalities, states, or the federal government for environmental concerns. A similar plan is currently envisioned in California, where conserved water from the lining of the All-American Canal will be marketed.

In this Project, it is possible that any water conserved will be put to use by the same Pueblos if increased interest in agriculture is generated. Lands which were historically irrigated but are currently lying fallow might be put into production. If water conserved by the Pueblos is used by the Pueblos for agriculture, then this water could not be marketed to others.

There may be some legal issues with this approach, as it could set the stage for quantification of Indian water rights. If this approach is considered, possible water rights ramifications should be reviewed by the Solicitor's office.

(f) Have Congress include language in the Project authorizing legislation to set up a trust fund to pay for future Project O&M. This would require that Congress provide up-front funding specifically for Project O&M, and those funds would be placed into a trust fund to carry out specific purposes or programs according to the terms of a trust agreement or statute. These funds could be established to serve as a perpetual funding source for all or a portion of the annual O&M costs associated with the Project.

Interest earned from the trust fund should be sufficient to cover all or a portion of the annual O&M costs. Trust funds are appropriate for interest accruals and accountability as long as inflation doesn't exceed the interest rate. For long term success, the trust fund has to be able to earn enough income to pay the annual O&M costs without dipping into the capital. Either BIA, the individual Pueblos, or an intertribal organization, such as the All-Indian Pueblo Council, could be in charge of administering the trust fund account. Reclamation lacks investment authority, so it could not administer a trust fund on behalf of the tribes without some special Congressional authorization.

Assume that $600,000 were made available yearly through the Project's construction appropriation to be set aside into a trust fund. Assume 5% interest and a ten-year period before funds have to be withdrawn. The principal balance available after ten years would be $8,000,000, and the yearly interest payment available for O&M would be $400,000. If withdrawals for O&M were not made until tens years after completion of the project, the principal balance available after twenty years would be $13,000,000, and the yearly interest payment available for O&M would be $650,000.

These totals are only for illustration. Actual amounts available would depend on the interest rate earned, the actual amount set aside each year, and the actual O&M needs. If the Pueblos were responsible for investing their trust fund, they might be able to earn significantly higher interest rates by investing in the stock market or other things. Some of the interest earned should be kept in the trust fund to make up for inflation in years to come.

(g) Purchase machinery and other necessities as part of the Project which the Pueblos can use for future O&M. There are several problems with this approach. First, the machinery would be purchased during construction of the Project, when O&M needs are at their lowest. The machinery would age, and when the time came that it was needed, the machinery might no longer be functional. Some of the future materials needed, such as concrete, cannot be purchased years in advance. It would be impossible to purchase all the equipment that could foreseeably be needed. Examples include bridge girders and pile drivers for replacement of bridges. There would still be a need for cash to cover future O&M needs. While this option may not be feasible as the only provision for all future Project O&M needs, it might be an option for some needs.

(h) Require Pueblos to take on responsibility for O&M after Project completion. The Pueblos might need to request BIA reclassification from Category 3 to Category 1 or 2 so the

Pueblos can use other tribal revenues to pay for O&M. These other tribal revenues might include mineral or gaming revenues. Some Pueblos would not have sufficient revenues from other sources to pay for Project O&M.

Velarde Community Ditch Project O&M will be paid for by the beneficiaries after construction is completed. After Reclamation finishes rehabilitation, each acequia group will be responsible for maintaining its infrastructure. Having the Pueblos agree to a similar arrangement might prove to be the only way to get the Project authorized and approved in Congress.

Whichever approach is taken for Project O&M will require extensive consultation with the Pueblos.

Other groups within Reclamation are addressing rural and Indian water supply O&M issues independently. Reference should be made to these documents for more information and ideas.

4.5 Pueblo and Individual Roles. Whether Reclamation and the BIA would interact with a consortium of all the different Pueblo governments, with each individual Pueblo government, with a farm committee, a ditch association, a tribal farming cooperative, or with individual farmers needs to be determined. Different Pueblos may have different desires as far as their roles and the roles of individual farmers. Also, land ownership rules may vary at the different Pueblos. In some Pueblos, land ownership may be with the Pueblo government; in others, it may be with individuals. Reclamation would need access to Indian lands to carry out the Project. Also, Reclamation would need to work with a decision-making group or individual to carry out the Project. Reclamation's local point of contact will probably need to be worked out with each Pueblo.

5.0 LEGAL ISSUES.

5.1 Authorizations and Appropriations. For Reclamation to do rehabilitation work on Pueblo lands, both authorizations and appropriations must be sought by Congress. Currently, only BIA has authority to do work on Pueblo land. This authority is granted through the Snyder Act (U.S.C. Title 25, Chapter 1, § 13), which states:

> "The Bureau of Indian Affairs, under the supervision of the Secretary of the Interior, shall direct, supervise, and expend such moneys as Congress may from time to time appropriate, for the benefit, care, and assistance of the Indians throughout the United States for the following purposes. . . . For extension, improvement, operation, and maintenance of existing Indian irrigation systems and for development of water supplies."

Table 12 shows the differences between BIA and Reclamation authorization and appropriations. BIA is funded through the Interior Committee, while Reclamation is funded through the Energy and Water Committee. The BIA has already been authorized by Congress to

work on Indian irrigation systems, including planning, feasibility, construction, and operation and maintenance (O&M). Reclamation must be granted Congressional authorization to work on Indian irrigation systems. A separate authorization must be granted for feasibility, construction, and O&M. The Secretary of the Interior (Secretary) may lobby Congress for funding on behalf of the tribes. Reclamation is not allowed to lobby Congress for funding. Congress must fund large planning efforts, feasibility, construction, and O&M for Reclamation projects separately.

Table 1. Authorization and Appropriation Comparison Between BIA and Reclamation.

	BIA	Reclamation
General Information		
Congressional Funding	Interior Committee	Energy and Water Committee
Authorization for Working in Indian Country	Given through Snyder Act	Special Congressional Authorization Required for Each Project
Appropriations	Secretary can Lobby Congress on Behalf of Indians	Reclamation Cannot Lobby Congress for Funding
Specifics of Authorization		
Authorization for Planning	Given through Snyder Act	Congress Generally Appraised of Large Planning Efforts
Authorization for Feasibility Study	Given through Snyder Act	Requires Separate Congressional Authorization
Authorization for Construction	Given through Snyder Act	Requires Separate Congressional Authorization
Authorization for O&M	Given through Snyder Act	Requires Separate Congressional Authorization
Specifics of Appropriation		
Appropriations for Planning	Secretary Can Lobby Congress. Recent Appropriations Insufficient. Funds Can Be Diverted to Other Areas.	Congressional Funding Sought for Large Planning Efforts. Funds Cannot Be Diverted Elsewhere.
Appropriations for Feasibility Study	Secretary Can Lobby Congress. Recent Appropriations Insufficient. Funds Can Be Diverted to Other Areas.	Requires Separate Congressional Appropriation. Funds Cannot Be Diverted Elsewhere.
Appropriations for Construction	Secretary Can Lobby Congress. Recent Appropriations Insufficient. Funds Can Be Diverted to Other Areas.	Requires Separate Congressional Appropriation. Funds Cannot Be Diverted Elsewhere.
Appropriations for O&M	Secretary Can Lobby Congress. Recent Appropriations Insufficient. Funds Can Be Diverted to Other Areas.	Requires Separate Congressional Appropriation. Funds Cannot Be Diverted Elsewhere.

BIA is responsible for many other functions besides irrigation and water resources, such as education and law enforcement. Very little attention has been paid to irrigation facilities, and as a result they are in serious need of repair. Since Reclamation is exclusively a water resource agency, the funds cannot be diverted to non-water resource areas. If funds are allocated to a specific project, the requirements of that project must be addressed.

For each project, Reclamation must obtain authorization and/or appropriations at each step beyond planning. These steps are feasibility, construction, and operations and maintenance (O&M). This report is at a reconnaissance level, prior to the planning process.

While Reclamation has authority to do water resource planning throughout the West, Congress is generally appraised of large planning projects to secure funding. Then, both authorization and appropriations must be sought for a feasibility study. After the feasibility study, both authorization and appropriations must be sought for construction (including design). If O&M is authorized to be performed by Reclamation, then appropriations to do the work must be given.

5.2 Reclamation Projects, Repayment of Capital Costs, and the Leavitt Act. Authorizing and funding this Project under Reclamation law will be different than funding it through BIA and Indian law. In general, Reclamation law does not make a distinction between Indian and non-Indian beneficiaries, unless such distinctions are made part of the authorizing legislation.

According to Reclamation law, the ability of Reclamation project beneficiaries to repay capital costs, with interest, of a Reclamation project are considered before a Reclamation project is authorized. In general, the authorization will not take place unless a repayment study shows that the Reclamation project beneficiaries are capable of repaying the capital costs. Such projects are 100% reimbursable.

Some Reclamation projects are non-reimbursable, or are only partially reimbursable. The Middle Rio Grande Project in New Mexico is one example. Part of the Middle Rio Grande Project has a clearly identified beneficiary. The beneficiary of the irrigation rehabilitation portion of the Middle Rio Grande Project, the Middle Rio Grande Conservancy, was required to enter into a repayment contract. Part of the Middle Rio Grande Project did not have a clearly identified beneficiary. River rectification benefits the general public in Colorado, New Mexico, Texas, and the Republic of Mexico, their respective economies, and by extension the economies of other states. Because the beneficiaries were not a clearly defined entity from which repayment could be obtained, this portion of the Middle Rio Grande Project was deemed non-reimbursable.

The Leavitt Act (Appendix F) allows for repayment of the construction of Indian irrigation projects to be deferred or forgiven. The Leavitt Act (Act of July 1, 1932, ch. 369, 47 Stat. 564) states:

> The Secretary of the Interior is hereby authorized and directed to adjust or eliminate reimbursable charges of the Government of the United States existing as debts against individual Indians or tribes of Indians in such a way as shall be equitable and just in consideration of all the circumstances under which such charges were made: *Provided,*

> That the collection of all construction costs against any Indian owned lands within any Government irrigation project is hereby deferred, and no assessments shall be made on behalf of such charges against such lands until the Indian title thereto shall have been extinguished . . . . *Provided further,* That any proceedings hereunder shall not be effective until approved by Congress unless Congress shall have failed to act favorably or unfavorably thereon by concurrent resolution within sixty legislative days after the filing of said report, in which case they shall become effective at the termination of the said sixty legislative days.[19]

A Solicitor's opinion in 1932 interpreted the Leavitt Act as applying only to Indian irrigation projects and not Reclamation projects:

> The reference in the first proviso to any "Government irrigation project" should be construed as applying only to a Government *Indian* irrigation project, and does not include reclamation projects.[20]

There have been times when Congress has extended the Leavitt Act to Reclamation projects. This happened with the Indian lands irrigated under the Missouri River Basin project and with all participating projects of the Colorado River Storage Project Act. Therefore, the Leavitt Act applies to Pueblo Indian lands in the Middle Rio Grande Conservancy District served by the San Juan-Chama project. [21]

A repayment study on this proposed Project would likely show that the Pueblos and/or individual farmers would be unable to repay capital costs. There are two options under Reclamation Law for dealing with this inability to repay capital costs: (1) extend the Leavitt Act to the proposed Project, or (2) make the proposed Project non-reimbursable.

Extending the Leavitt Act would mean that the capital costs would be deferred, but not necessarily forgiven. To forgive the capital costs would require the assent of the Secretary of Interior and Congressional approval. If capital costs are merely deferred, it is remotely possible that Congress would change its mind and require repayment sometime in the future. However, there is precedent for extending the Leavitt Act to Indian irrigation projects, as noted above.

The proposed Project can be made non-reimbursable when authorizing legislation for the proposed Project is written. Another example of a non-reimbursable project is the Velarde Community Ditch Project. This can be done, provided that Congress and the administration is willing.

There may be some hesitancy to make the Project non-reimbursable because it may be viewed as a precedent by other tribes who would also like Reclamation to build irrigation projects on their land. Reclamation has had a similar experience with the Mni Wiconi project.

Making the Project partly reimbursable based on the results of a repayment study is likely not an option. The ability to repay computed for subsistence farming would likely be so low as to be negligible, and not worth the effort to pursue repayment contracts.

If no provisions are made in the authorizing legislation specifying repayment requirements (such as extending the Leavitt Act or making the Project nonreimbursable), then the Project would be 100% reimbursable under Reclamation law.

5.3 Middle Rio Grande Conservancy District (MRGCD). Many of the irrigation facilities in the six Middle Rio Grande Pueblos of Cochiti, Santo Domingo, San Felipe, Santa Ana, Sandia, and Isleta are part of the MRGCD distribution and drainage infrastructure. Although the six Middle Rio Grande Pueblos have lived on and farmed their lands since before recorded history, deterioration of irrigated lands in the Middle Rio Grande valley in the early twentieth century led to the formation of the MRGCD in 1925. In 1928, Congress authorized the Secretary of the Interior to enter into an agreement with MRGCD to extend conservation, irrigation, drainage, and flood control to Pueblo Indian lands in the Middle Rio Grande Valley (MRGCD-BIA contract).

During its first twenty years of operation, the MRGCD set about to rehabilitate the irrigation works and to provide drainage, sediment, and flood control in the entire Middle Rio Grande Valley. By the late 1940's, this task overwhelmed the MRGCD, which was facing insolvency even as floods of the early 1940's brought drainage, sediment and flood control issues to a critical point. Congress then authorized the Middle Rio Grande Project, with Reclamation taking over the facilities of the MRGCD and rehabilitating irrigation and drainage works formerly belonging to the MRGCD. Reclamation also performed channel rectification to control and confine flows of the Rio Grande, and constructed the Low Flow Conveyance Channel. The Corps of Engineers constructed flood and sediment control structures in the Rio Grande and its tributaries, including reservoirs, levees, and Kelner jack (jetty) fields.

In 1975, when rehabilitation of the irrigation and drainage facilities was complete, Reclamation returned these facilities back to MRGCD, which agreed to repay Reclamation the cost of the rehabilitation (MRGCD-Reclamation repayment contract). Repayment of capital costs through Pueblo lands was deferred.

The MRGCD-BIA contract stipulates that the BIA will pay a yearly fee to MRGCD in lieu of the MRGCD assessment which is charged to landowners within the MRGCD boundaries. Currently, the amount paid by the BIA to MRGCD is roughly $300,000 per year. This is a payment for O&M services through Pueblo lands. The MRGCD is required to maintain their infrastructure through Pueblo lands with the same diligence as it maintains its infrastructure through non-Pueblo lands under the terms of the same MRGCD-BIA contract. Originating in 1928, this contract is renewed on a regular basis, normally every five years.

The six Middle Rio Grande Pueblos have repeatedly complained about the lack of accountability in the contract, as the MRGCD does not provide a record of how the money is spent. It is impossible, with the current arrangement, to determine if the money BIA pays MRGCD is actually spent on Pueblo lands for maintenance. The dilapidated condition of MRGCD facilities through Pueblo lands and perceived lack of maintenance cause further Pueblo dissatisfaction with the current arrangement.

The amount paid annually to MRGCD is probably insufficient to provide adequate maintenance of the facilities through Pueblo lands.

It may be possible for one or more of the six Middle Rio Grande Pueblos to request the maintenance of MRGCD facilities under provisions of the Indian Self-Determination Act, Public Law 93-638 as Amended. However, there is currently a moratorium imposed by Congress on new BIA Self-Determination contracts, so this could not take place until the moratorium is lifted. The moratorium was written into the 1999 Interior Appropriations bill, which applies to BIA but not to Reclamation.

As this Project is currently envisioned, the facilities of the MRGCD through Indian lands of the six Middle Rio Grande Pueblos would not be included in the scope of work. To do so would require the concurrence of the MRGCD, and might require that they enter into another repayment contract with Reclamation for the work. The MRGCD would not agree to this arrangement, and it is doubtful that Reclamation or Congress would be interested in this proposition.

However, the MRGCD-Reclamation repayment contract will be paid off in August 2000, if the current payment schedule is followed. At that point, it is unsure what the relationship will be between the MRGCD and the six Middle Rio Grande Pueblos. The Pueblos might seek to sever their relationship with the MRGCD and take back control of those irrigation and drainage facilities. The six Middle Rio Grande Pueblos may request that the BIA perform the maintenance, or that the money be given to the Pueblos so they can perform their own maintenance.

This Project could make a takeover of MRGCD facilities a more attractive option for the Pueblos. If all irrigation and drainage facilities on the six Middle Rio Grande Pueblos were to belong to the Pueblos and not MRGCD, this would make them eligible for rehabilitation under this Project. With improvements to the system, the cost of maintenance would be lowered, especially for the near future, and the Pueblos may feel that they would be capable of performing the maintenance with the funding BIA is currently providing to MRGCD. This scenario would significantly increase the cost of this Project by adding to the scope of work.

Repayment of a Reclamation project is done so infrequently that it is unclear what exactly could happen when MRGCD's contract is paid off in 2000. It might not even be legally possible for the Pueblos to withdraw from MRGCD. The uncertainty associated with repayment of the MRGCD-Reclamation contract should be considered in planning for this Project.

It might be desirable to exempt the facilities currently operated and maintained by the MRGCD from this Project, regardless of the ramifications of repayment of the MRGCD-Reclamation contract. Language to that effect may need to be included in the authorizing legislation, so that even if these facilities are taken over by the Pueblos, they would not be included in the scope of work of this Project. The six Middle Rio Grande Pueblos would be free to pursue other avenues for rehabilitating the former MRGCD facilities. There would still be many Indian facilities within the six Middle Rio Grande Pueblos which would be rehabilitated under this Project.

It might be possible to improve the MRGCD-BIA maintenance contract to improve maintenance of MRGCD facilities through Pueblo lands. This is a separate issue from this Project. The MRGCD-BIA contract is being examined by BIA as it is up for renewal at the end

of 1999. Better attention to the legal details of the MRGCD-BIA contract, better enforcement, and probably better funding might help resolve Pueblo complaints about the maintenance performed by MRGCD through Pueblo lands.

5.4 Railroad. Interesting legal questions arise when considering ditch crossings through railroad track embankments. At Sandia Pueblo, a railroad culvert at the upper end of the Pueblo system and another at the lower end act as pinch points, restricting flow to entire system. A similar problem at Isleta exists where a railroad culvert restricts flow in a drainage ditch, backing up the drain and causing waterlogging of lands. These structures are in decent structural shape, so they do not need to be replaced because of structural deficiencies. They may need to be replaced because they are undersized. It would be pointless to pay for system-wide improvements when the underlying problem caused by railroad culverts are not addressed.

In the late 1800's, Congress gave railroads the right to take any federal land, including Indian land, for construction of railroads. The railroad companies never consulted the Pueblos on placement of the tracks on Indian lands. Neither did they consult with the Pueblos or the BIA on the construction of ditch culverts, either when they were first constructed in the late 1880's or when they were reconstructed within the last 60 years. The railroad maintains that they do not have to replace these structures because they are undersized.

The only known ditch culverts through railroad embankments are currently on facilities of the MRGCD. Provided these facilities are not incorporated into the Project's scope of work through an Indian takeover, railroad issues will not have to be addressed. However, should there be a Pueblo takeover of MRGCD facilities after MRGCD repayment, or should some railroad culverts on Indian facilities be discovered, then legal issues regarding the railroad would have to be addressed.

5.5 Water Rights. A full discussion of water rights issues may be left to a subsequent document. Much available information has been left out of this report because of confidentiality and sensitivity concerns related to water rights issues and potential or ongoing litigation.

As the Project is envisioned, it would not affect ongoing litigation or negotiations in which some of the Pueblos are involved. The scope of work for this Project does not include increasing historically irrigated acreage or increasing diversions.

The Solicitor's Office in Albuquerque favors the incorporation of language in the authorizing legislation which affirms that this Project is not intended to quantify unquantified Indian water rights.

None of the current adjudications or negotiated settlements have progressed to the global settlement stage, where discussions and plans are made for repairs to irrigation infrastructure. Given the progress to date on some of the adjudications and settlements, this may never happen, or it could take years or even decades to reach this point. Only the Abeyta settlement shows promise of arriving at this stage within the next decade, and even this is not a certainty. Thus, this Project will not interfere with the pursuit of federal dollars for irrigation infrastructure rehabilitation resulting from water rights settlements.

Repairing irrigation infrastructure may put a damper on some Pueblos' desire to pursue negotiated settlements. Aspects of negotiating a water rights settlement might include federal dollars for repair of irrigation infrastructure.

Repairing irrigation infrastructure could also work to encourage negotiated settlements. If the Pueblos were able to put all of their agricultural lands into production as a result of this Project, this might spur non-Indian entities to take seriously Pueblo water rights claims, and encourage the non-Indian entities to pursue negotiated settlements with Pueblos.

There is a potential for increasing water consumption as a result of this Project. Rehabilitating irrigated lands and infrastructure may result in a decrease of lands lying fallow, with the attendant increase in water needed for irrigation. However, there is also a potential for increasing return flows to rivers. Water conserving items in this Project may result in more water being returned to the river system from which it was diverted. Likewise, drainage of waterlogged lands would also increase return flows. A determination of the actual amount of return flows resulting from water conservation practices and drainage would likely have to wait until the feasibility or even design stages of the Project. Environmental issues will arise if wetlands are drained. However, it is probably safe to say that any increased water consumption as a result of this Project would be more than offset by water conservation savings and drainage improvements.

Some of the diversion structures have fallen into such a state of disrepair that the water required (if available) for historically irrigated lands is no longer being diverted. Repairing or replacing these diversion structures would increase the amount of water diverted compared to current levels. However, it would not increase the diverted amount beyond that historically diverted since the acreage farmed would not change from that historically cultivated.

A listing of the relevant adjudications follows. Further information on the status of each adjudication is not given because of confidentiality concerns. Any further information can be obtained from federal negotiating team members, the Solicitor's office, Reclamation's Native American Affairs Office in Washington, D.C., or BIA's Branch of Area Water Rights, Albuquerque Area Office, Albuquerque, NM.

(1) Aamodt Adjudication. The Aamodt Adjudication involves the Pueblos of Nambe, Tesuque, Pojoaque, and San Ildefonso. These are on the Rio Tesuque and Rio Pojoaque, small tributaries to the Rio Grande. There is a federal negotiating team in place.

(2) Abbott Adjudication. The Abbott Adjudication involves the Pueblos of Santa Clara, San Juan, and San Ildefonso. Currently, there is no federal negotiating team in place on the Abbot Adjudication.

(3) Abeyta Adjudication. The Abeyta Adjudication primarily involves the Pueblo of Taos, the Town of Taos, and the Taos Valley Acequia Association.

Because of the timing of a possible negotiated settlement in relation to this Project, it would be prudent to have close coordination between the federal negotiating team and the planners of this Project so that Project activities do not negatively impact settlement

activities.

(4) Abouselman Adjudication. The Abouselman Adjudication on the Rio Jemez involves the Pueblos of Jemez, Zia, Santa Ana, and their neighboring non-Indians. There is a federal negotiating team in place on the Abouselman Adjudication.

(5) Anaya Adjudication. The Anaya adjudication involves the Pueblo of Cochiti. There is no federal negotiating team in place.

(6) Aragon Adjudication. The Aragon Adjudication involves the Pueblo of San Juan. There is no federal negotiating team in place on the Aragon Adjudication.

(7) Kerr-McGee Adjudication. The Kerr-McGee Adjudication on the Rio San Jose involves the Pueblos of Laguna, Acoma, and their non-Indian neighbors. There is a federal negotiating team in place.

5.6 Easements. In some cases easements, ownership of facilities, and water use agreements are unclear where irrigation facilities are shared with non-Indians. These would have to be resolved on a case-by-case basis prior to accomplishment of some work items. This situation affects a very small percentage of the total work items.

6.0 ENVIRONMENTAL ISSUES.

To carry out work on Pueblo irrigation facilities, environmental considerations will be addressed and incorporated into project planning. Compliance will be completed according to various laws and their implementing regulations such as the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Clean Water Act (CWA), and the National Historic Preservation Act (NHPA). Environmental compliance will include consideration of the array of biological resources (including endangered species), cultural resources (including traditional cultural properties and sacred sites), water quality issues, social and economic impacts, Indian trust assets, and environmental justice.

NEPA compliance, which considers all effects on the human environment, can serve as the umbrella process to provide a framework for incorporating all other requirements. As the program develops and specific proposals are identified, NEPA compliance will be initiated. These proposals will likely include many individual projects at different Pueblos, but may also include a broader conceptual-scale assessment of a more programmatic nature. These proposals will also likely vary in their complexity and potential for environmental effects. The level and complexity of environmental compliance will depend on the specific activities being proposed. With sufficient funding to fully meet compliance related activities, either the BIA or Reclamation can take the lead on compliance activities. The agencies may choose to contract compliance work if staffing level is insufficient.

A brief discussion of the effects of the various laws follows.

6.1 Endangered Species Act. There are numerous listed species that could be affected by the project. Those of main concern are the Rio Grande Silvery Minnow (Minnow) and the Southwestern Willow Flycatcher (Flycatcher).

(1) Rio Grande Silvery Minnow. There are two factors to consider which could impact Minnow habitat. The first is direct impacts from construction in Minnow habitat. The second is indirect impacts to Rio Grande flows through Minnow habitat resulting from construction activities outside of Minnow habitat.

(a) *Direct Impacts.* Direct impacts from construction in Minnow habitat are not anticipated to be an issue. Minnow habitat of concern for construction of this Project would be the Rio Grande from Cochiti Dam south to Isleta Pueblo. No new river diversion construction is anticipated in the Rio Grande. The two diversions between Cochiti Dam and Isleta Pueblo, Angostura and Isleta diversion dams, belong to the MRGCD. Unless these facilities are taken over by the Pueblos (see Section 3.2 above), rehabilitating these facilities would not be part of the scope of work of this Project. Any construction work on river diversion structures would be in tributaries of the Rio Grande which are not considered Minnow habitat. Therefore, there would not be any direct construction impacts to Minnow habitat.

(b) *Indirect impacts.* Indirect impacts to Rio Grande flows through Minnow habitat resulting from construction activities outside of Minnow habitat are potentially of greater concern. An example which would be detrimental to Minnow habitat is increasing the amount of flows diverted from tributaries, which could lessen the flows in the Rio Grande's Minnow habitat. An example which would be beneficial to Minnow habitat would be to improve drainage of farm lands, thereby increasing the return flows to the Rio Grande. Impoundment and storage of tributary waters during high spring flows for later release during low summer flows could also benefit Minnow habitat.

The work envisioned is to rehabilitate existing river diversion structures which already divert water from tributaries. This rehabilitation could involve either repairing an existing structure or tearing out the old structure and constructing a new one in its place. Possibly, the impact to stream flow of the Rio Grande would be the same as it is currently, since diversions are already taking place. If new or repaired structures prove more efficient than the existing structures, there might be an increase in diverted flows, and consequently a decrease in the amount of tributary flows available for Minnow habitat in the Rio Grande. The amount of conveyance losses between the point of diversion and the Minnow habitat would have to be addressed. It is possible that the increased amount diverted would not make it to the Minnow habitat.

Repairing or replacing old diversions can sometimes be avoided by connecting existing acequias. It may be possible to eliminate some existing diversions by connecting acequias. This would be a favorable environmental feature of this Project. However, it might not be a favorable cultural resource feature, as some of the diversions proposed for abandonment might have important historical or cultural significance.

If modifications to diversions or new impoundments on tributaries of the Rio Grande do

become part of this Project (see Section 6.2 below), these may have an effect on the quantity or timing of flows entering the Rio Grande and thus affect the Minnow. These effects on the Minnow would have to be addressed and mitigated if required.

(2) Southwestern Willow Flycatcher. As with the Minnow, there are two factors to consider which could impact Flycatcher habitat. The first is direct impacts from construction in Flycatcher habitat. The second is indirect impacts to Rio Grande flows through Flycatcher habitat.

(a) *Direct Impacts*. The Project might impact some willow stands in Pueblos along the Rio Grande. If some of this habitat included nesting sites for Flycatchers, it could stop construction in areas near the nesting sites. Currently, the Project is not anticipated to affect Flycatcher nesting sites since the known sites are not located near any Pueblo irrigation facilities. However, this could change from year to year, depending on future Flycatcher nesting practices.

If the habitat is only used for migration, it would not stop construction in the vicinity, but mitigation would be required for loss of these migratory areas. If the habitat only has a potential for nesting or migration stops, construction would not be stopped, but mitigation would be required if any stands of willow are destroyed. Mitigation would likely consist of purchasing or obtaining conservation easements on other known or potential Flycatcher habitat sites. Because the Project will be on Indian lands, purchase of lands for mitigation would have to be done on neighboring non-Indian lands. It is probable that many, if not all, of the Pueblos would be open setting aside some of their non-agricultural lands for Flycatcher habitat under a conservation easement. These might be negotiated free of charge in exchange for the irrigation improvements.

Construction effects on Flycatcher habitat would be determined immediately prior to construction with bird surveys. Some Pueblos do not give permission for Reclamation or Fish and Wildlife personnel to conduct bird surveys on their lands. To participate in this Project, these Pueblos would have to consent to the bird surveys being performed in construction areas and the near vicinity

(b) *Indirect impacts*. Willows do not require overbank river flows to propagate, like cottonwoods. It is required that the willow root system reach the groundwater table. Dropping the groundwater table below the level of willow root systems could take place in two ways: if Rio Grande stream flows are significantly diminished, or through improvements to a drainage system.

Diminishing Rio Grande flows enough to lower the adjacent groundwater table will not happen because of this Project.

Improving drainage systems could possibly lower the groundwater table enough to affect willows. If this were to happen to existing nesting sites, it could stop improvements to the drainage system. More likely, it would modify the improvements so that the relatively small nesting area and its environs were preserved, while drainage could still take place in areas away from the nesting site.

If migratory habitat or potential nesting habitat were to be affected by drops in the

groundwater table, mitigation would be required but it would not stop the improvements to the drainage system.

(3) Summary of Endangered Species Effects. The Project might affect both Flycatcher and Minnow habitat. These could be direct effects due to construction in the habitat. They could be indirect effect to habitat from changes in river flows and groundwater levels due to construction of certain features of the Project. Endangered Species considerations could require that some individual facilities be moved or not constructed, and it could require mitigation.

Current Section 7 consultation with the Fish and Wildlife Service over Reclamation's river maintenance work in the Middle Rio Grande Valley is expected to result in a jeopardy opinion. The overall climate in working with Endangered Species issues appears to be getting more restrictive. However, the Endangered Species effects from this Project are expected to be minor in comparison with river maintenance work in the main stem of the Rio Grande. Endangered Species issues related to this Project are expected to be fully resolved to allow construction to proceed.

6.2 National Historic Preservation Act. All facilities to be rehabilitated are in farmlands which have historically been cultivated. This means that these lands have been plowed, leveled, and otherwise disturbed. Proposed work in these farmlands is not anticipated to be a major issue during consultation with the State Historical Preservation Office (SHPO).

Some of the facilities, especially acequias, have been in place for hundreds of years. This will probably not hamper normal maintenance activities, such as cleaning and shaping, or adding turnouts or other structures. These normal maintenance activities have been happening since the acequias were first constructed. It is probable that the Pueblos, if not SHPO, will want these acequias to remain in use. These acequias can be rehabilitated rather than replaced with new facilities.

6.3 Clean Water Act.[22] Sections 401 and 404 of the Clean Water Act would impact the Project. Section 401 is regulated by the Environmental Protection Agency (EPA) except where Section 401 certification has been granted to various Pueblos. Section 401 regulates water quality concerns due to construction activities. Section 404 of the Clean Water Act is regulated by the Corps of Engineers. It regulates the placement of structures in waters of the United States and construction impacts on wetlands.

(1) Section 401. Normally, Section 401 water quality concerns due to construction activities can be addressed by modifying construction methods. Although this typically adds to the cost of a construction project, it is anticipated that Section 401 could not be used to stop construction in a river, especially if the work involves maintenance of an existing river diversion.

(2) Section 404. Section 404 would have minimal impact on the overall project, both due to placement of structures in waters of the United States or due to construction in wetlands. The requirement for a Section 404 is based on the construction work proposed. If a Section 404 permit is required for a specific item of work, it does not matter whether the funding comes from the federal government or from an Indian tribe. Neither does it matter what entity does the work,

whether public or private. Indian tribes are not exempt from complying with requirements of Section 404.

(a) *Construction in Waters of the United States.* Work done in acequias and drains are not considered "waters of the United States" and are not regulated under Section 404. Work done on diversion structures in the Rio Grande or its tributaries would not fall under Section 404 regulation, since existing irrigation facilities are exempt from Section 404 regulation.

If an existing diversion dam is in such poor condition that it should be replaced, this can be done without an individual Section 404 permit provided that the new diversion dam is rebuilt within 50 ft upstream or downstream of the current facility. In some cases, existing diversion dams are poorly sited--they try to force the diverted water to flow uphill. These dams may need to be moved more than 50 ft from the existing dam to improve diversion efficiency, and might require an individual Section 404 permit.

It might be desirable in some cases to replace several existing dams with one new dam and connect the distribution systems. This might prove unfeasible from a cultural resources perspective, as the Pueblo may desire to maintain the traditional diversion sites. If it is permitted by the Pueblo and clears any cultural resource hurdles, it would be viewed as a new dam and would require an individual Section 404 permit.

As any type of dam is viewed as detrimental to the riverine ecology, it can prove challenging to obtain an individual Section 404 permit for a new dam. However, any new diversion dams would be constructed in small tributaries which have no endangered species or valued native fish species. Some have no fish population at all. In small streams which have a cobble substrate and are in equilibrium with respect to aggradation and degradation, the issue of installing an immovable grade-control structure is not as critical as it is in a shifting sand-bed river. Designing dams which are more "fish-friendly", and which do not have to be permanent grade control structures can probably overcome most objections to construction of a new diversion dam. Examples would include the use of gabions and boulders in constructing a stair-stepped or W-weir dam which would still allow fish passage over or through the dam. These would be viewed as easier to modify or remove than a concrete structure, and would be more aesthetically pleasing.

Construction of a new storage dam on a tributary of the Rio Grande would require an individual Section 404 permit. Improvements or rehabilitation to existing reservoirs (i.e., Zia Lake) used to supplement acequia flows would be maintenance of an existing irrigation facility and would not require a Section 404 permit.

(b) *Construction in Wetlands.* Section 404 also regulates construction impacts to wetlands. Dredging or filling of wetlands is not included in this Project, so no Section 404 permit is required for these activities.

In some cases, drains which are not maintained or which are used for conveyance of irrigation flows have resulted in high water tables and the creation of wetlands where there once were Indian farmlands. Improvements, including deepening of an existing man-made drain would

be considered maintenance of an existing irrigation structure. It would be covered under the exemption for maintenance of existing irrigation facilities and would not require a Section 404 permit. Changing system operation to decrease the flows in a man-made drain, such as rerouting excess flows to the river and away from the wetlands, are not a construction impact to wetlands and therefore are not regulated under Section 404, provided any rerouting structures are not built in wetlands.

Installation of subsurface pipe drainage systems in a wetlands where there are none existing would be construction of a new irrigation facility in a wetlands, as opposed to maintenance of an existing irrigation facility. This would require an individual Section 404 permit.

6.4 Executive Order No. 11990 on Protection of Wetlands (May 24, 1977, 42 F.R. 26961). Executive Order No. 11990 was issued "to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative"[23]. Portions of Executive Order No. 11990 which are important to this Project are as follows.

> Section 1. (a) Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for . . . providing Federally undertaken, financed, or assisted construction and improvements; and . . . conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.
>
> Section 2. (a) . . . each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors.[24]

As described in Section 6.3 above, three of this Project's anticipated activities affecting wetlands include (1) maintenance of existing drains through wetlands; (2) changes in systems operations to reroute excessive drain flows away from wetlands, and (3) construction of subsurface pipe drainage systems in wetlands.

Section 2 of Executive Order No. 11990 would not apply to maintenance of existing drains through wetlands or to rerouting of drain flows, since these activities do not involve new construction.

Section 2 would apply to construction of subsurface drainage systems in wetlands. Section 2 would not provide an outright prohibition on such construction, but would require that

there be no practicable alternative to the construction and that measures be taken to minimize harm to wetlands. Because the purpose of a subsurface drainage system is to drain the wetland to make it into productive agricultural land, it would be hard to "find measures to minimize harm to wetlands."

Section 1 of Executive Order No. 11990 might apply to all three types of anticipated activities affecting wetlands. Section 1 applies to "Federally undertaken, financed, or assisted construction and improvements", and not just new construction. The language of Section 1 leaves room for an agency to still be able to accomplish its objective, since it says that an agency "shall take action to minimize [not "prevent"] the destruction, loss or degradation of wetlands." [25] Although there will be ramifications to Reclamation's activities involving wetlands in this Project from Executive Order No. 11990, it should not totally prevent Reclamation from taking actions which involve wetlands.

6.5 Executive Order No. 11988 on Floodplain Management (May 24, 1977, 42 F.R. 26951). This Executive Order seeks to minimize construction of facilities, especially housing and other structures used for human habitation, in 100-year floodplains adjacent to waterways. Some of the irrigation facilities will be constructed in the 100-year floodplain of the adjacent rivers and streams, since this is where agriculture is practiced. Executive Order No. 11988 details procedures to be followed when construction must take place in a floodplain, most of which involve public notification as to the reasons why the construction must take place in the floodplain. This Executive Order, which will be addressed as part of the NEPA process, will not be an obstacle to construction of this Project.

6.6 National Pollutant Discharge Elimination System (NPDES). The NPDES program is regulated by EPA for storm water discharges associated with construction activities. This program requires a permit if construction activity results in disturbance of at least five acres, either at one location or several locations if they are part of a common plan.[26] A Pollution Prevention Plan needs to be prepared prior to any construction activities being performed onsite. The Pollution Prevention Plan addresses actions to prevent surface runoff from polluting waters of the United States. This program would not prevent accomplishment of the Project or add significantly to the overall cost.

6.7 Fish and Wildlife Coordination Act. This act requires federal agencies to consult with the U.S. Fish and Wildlife Service over activities involving bodies of water. Its purpose is to ensure no net loss of fish and wildlife habitat. Funds shall be transferred to the U.S. Fish and Wildlife Service from project appropriations to support their involvement and preparation of planning memos and report. Rehabilitation of existing dams, construction of new dams and storage facilities, and draining of wetlands would be important issues during this consultation.

6.8 Other NEPA Considerations. NEPA compliance will also determine the Project's effect on traditional cultural properties and sacred sites, social and economic impacts, Indian trust assets, and environmental justice. In all these areas, the Project should have favorable impacts. Since agriculture is such an important part of Pueblo culture, enhancing irrigation facilities serves as a boost to an important cultural practice. As such, it will have favorable social impacts on Pueblo society. The Project should enhance the economic productivity of the Pueblos by making

agriculture more productive. It would also protect and improve the value of Indian trust lands. Environmental justice should not be an issue.

6.9. Environmental Compliance Summary and Cost. The major environmental issues are related to the construction of new diversion dams and storage facilities (if this is incorporated into the Project), the potential of destroying Flycatcher habitat, and changing the quantity and/or seasonal dynamics of Rio Grande flow by changing tributary flows. While these issues are important, it is anticipated that they will be fully resolved to maintain the integrity of environmental values and allow implementation of the Project. The outcome will result in overwhelming benefits to the cultural values, trust assets, and the social and economic well-being of the Pueblo societies.

The cost of environmental compliance depends largely on the type of NEPA document required, whether a categorical exemption, an environmental assessment (EA), or an environmental impact statement (EIS). Environmental compliance can either be done on the overall Project or it can be done separately on individual portions of the Project. Although the type of NEPA document required cannot be ascertained until the planning or design phase, it is anticipated that rehabilitation of existing lands and facilities will require an EA, and possibly an EIS. Construction of a new impoundment for storing water would definitely require an EIS. If it is decided to make construction of new storage facility part of the Project's scope of work, it is recommended that the environmental compliance for the storage facilities be done separately so as not to impede rehabilitation of existing lands.

The current average cost for an EIS in Reclamation is $3.3 million dollars. This figure can be used for a storage facility EIS. All environmental compliance associated with rehabilitation, including mitigation, would likely cost about 5% of the construction field cost. This total is for the five to ten year Project duration. Assuming a $100,000,000 authorization, the total cost for environmental compliance for rehabilitation is $5,000,000, rising by an additional $3,300,000 for each storage facility if included in the authorization.

7.0 COST ESTIMATE

Cost estimates are provided for both a Project feasibility study and for construction. It should be emphasized that these estimates were prepared with minimal tribal input. The BIA provided most of the information regarding what items of work need to be accomplished. The prioritization of work items would probably be somewhat different with tribal input.

Three different BIA agency offices provided most of the information from which the cost estimate was computed: Southern Pueblos Agency, Northern Pueblos Agency, and Laguna Pueblo Agency. Coordination with the each Pueblo to obtain information for this report varied by agency. The amount and reliability of information available for each Pueblo varied greatly. In general, more information was available for Pueblos under the Northern Pueblos Agency and Laguna Pueblo Agency than for Pueblos under the Southern Pueblos Agency. Appendix G gives more details of the information available for each Pueblo.

Reconnaissance field investigations, previously written reports, and information from Pueblo offices and BIA agency offices provided information used to assess the deficiencies of existing irrigation facilities. From this assessment, a cost estimate for both a feasibility study and construction were developed.

7.1 Feasibility Study Cost Estimate. A plan to carry out a feasibility study was developed. This plan included four elements: (1) design data collection, (2) conceptual design and construction cost estimate, (3) reports, reviews, and coordination, and (4) a contingency for unaccounted items. The end result of the feasibility study will be a plan for rehabilitation and betterment based on detailed field investigation, including soil assessments, engineering considerations, agricultural considerations, and Pueblo cultural and economic considerations. Designs will be carried through to the level of detail necessary to develop an adequate cost estimate of the items of work. Previous studies were used as a guide to identify the requirements for feasibility design study.

The feasibility study estimated cost is $3 million. Details of the feasibility study cost estimate are shown in Appendices G.

7.2 Construction Cost Estimate. An appraisal level capital cost estimate was prepared for two categories of work: (1) repair, rehabilitation, and necessary improvement; and (2) water conservation measures. Appendix H gives more information on the evaluation of irrigation facilities. No storage facilities are included in these estimates.

(1) Repair, rehabilitation, and needed improvement. Major components of the irrigation systems that should be repaired, rehabilitated, or improved to restore the system's function and reliability were identified. The evaluation and recommendation for repair were based on experience with similar facilities. Quantities and work items were based on previous projects of similar size. Although there are numerous options for repairing such facilities, only one design option was analyzed for each individual facility. The design option analyzed for each facility is typical for the type and size of structure being repaired. Analysis of different design options for each structure or facility is left to the feasibility and design phases.

The repair and rehabilitation work consists of restoring deteriorated facilities to their original design and function, and to make them functionally reliable. Recommended improvement will be included only where necessary to make water delivery reliable or to reduce operational difficulties. Facilities requiring improvements are mostly diversion structures and the primary conveyance channels and structures. Among them are: replacing rock-and-brush diversion structures with more permanent and reliable structures; cleaning and reshaping earth ditches and storage ponds; repairing deteriorated concrete ditches and concrete diversion structures; replacing damaged gates and pipes; and installing safety features. Other rehabilitation work will correct operational difficulties.

Many of the repair, rehabilitation, and needed improvements will also result in significant water conservation. Those elements that are strictly for water conservation are discussed below.

(2) Water conservation. Water conservation measures are a very desirable addition to this

Project. They will be considered in areas where ground seepage losses are high. These areas will be determined during the feasibility study when soil data is collected. Water conservation measures include concrete lining of ditches, placing ditches in pipes, installation of water measurement structures, and possibly land leveling.

Without soil testing information, it is impossible to determine at this point how much of the water conservation measures are necessary for water conservation and how much are purely for convenience. For example, concrete lining of ditches can be an important water conservation measure. It can also be an issue of convenience, reducing maintenance effort even in areas not prone to high seepage losses. It is not possible at this stage of the investigation to determine how much of the requested concrete lining and piping is necessary for water conservation and how much is simply to reduce maintenance.

(3) Cost breakdown. The total construction cost for each item of work analyzed is the sum of the construction field cost and construction overhead cost. Unit costs were used to obtain the construction field cost, which in turn was used to obtain the construction overhead cost.

(a) *Unit Costs.* Unit prices are based on the Means Facilities Construction Cost Data, adjusted for locality. Unit costs were also compared to the Velarde Community Ditch Project, an on-going Bureau of Reclamation project in northern New Mexico which is very similar to the proposed Project.

(b) *Construction Field Costs.* Field costs for various items of work included in this study were prepared at the January 1999 price level, and are detailed on the cost estimate worksheets included in Appendix I.

Table 2 shows how the construction field cost was computed using a diversion structure as an example. First, the unit cost for concrete diversion structure is computed for materials and labor only. Then, 5% of the materials and labor cost is added for mobilization costs. The sum of the unit cost and mobilization cost is increased by 15% to account for unlisted items. This new total is then increased by another 20% for contingencies, which yields the construction field cost.

The mobilization cost is typically 5% of the contract cost. Unlisted items refers to items not yet considered at this pre-design stage. Contingencies covers payments to contractors for overruns on quantities, changes in site conditions, change orders, etc.

Table 2. Example computation of construction cost.

Item of Work	Diversion Structure, 1-ft length.
Materials and Labor	$ 1,000/ft
Mobilization (5% of Materials and Labor)	$ 50/ft
Sub Total	$ 1,050/ft
Unlisted items (15% of Materials, Labor, and Mobilization)	$ 158/ft
Contract Cost	$ 1,208/ft
Contingencies (25% of Contract Cost)	$ 302/ft
Construction Field Cost	$ 1,510/ft
Construction Overhead Cost (45% of Construction Field Cost)	$ 680/ft
Total Construction Cost	**$2,190/ft**

(c) *Construction Overhead Costs.* - The construction overhead cost used in this report is 45% of the construction field cost, and it consists of engineering costs, environmental compliance, and construction management costs. Table 2 shows how construction overhead costs are computed.

Engineering costs are for the preparation of final designs and specifications and would include additional collection of necessary design data and field exploration. It would be approximately 15% of the total project construction cost because this project will most likely be issued as smaller contracts.

Environmental compliance includes the cost of NEPA and mitigation, and is estimated as 5% of the construction field cost.

Construction management costs should be about 25% of the construction field costs, of which 5% will be for contract administration, 15% for construction inspection and support, and 5% for miscellaneous items. This estimate considers smaller size projects and contracts, and a three to four year duration for total work.

The construction management costs could fluctuate significantly depending on the amount of self-determination (638) contracts issued. The influence of a large number of 638 contracts (such as one per pueblo) is not included in the above percentages for construction management costs since the pueblos' interest in 638 contracting is not known at this point.

Table 3 lists estimated capital costs including improvements to the facilities of the Middle Rio Grande Conservancy District (MRGCD). Table 4 lists estimated capital costs excluding improvements to the facilities of the MRGCD. Northern Pueblos include Taos, Picuris, San Juan,

Santa Clara, San Ildefonso, Tesuque, Pojoaque, and Nambe. Southern Pueblos which are not part of MRGCD include Acoma, Laguna, Jemez, and Zia. Southern Pueblos which are part of MRGCD include Cochiti, Santo Domingo, San Felipe, Santa Ana, Sandia, and Isleta.

Table 3. Estimated capital costs for repair, rehabilitation, and water conservation, including improvements to facilities of the Middle Rio Grande Conservancy District.

Pueblo Grouping	Repair and Rehabilitation	Water Conservation Measures	Total, Repair and Rehabilitation + Water Conservation
Northern Pueblos	$37,688,000	$18,495,000	$56,183,000
Non-MRGCD Southern Pueblos	$18,972,000	$17,609,000	$36,581,000
Southern Pueblos, Including MRGCD Facilities	$17,461,000	$103,320,000	$120,781,000
Items for All Pueblos	$938,000	$0	$938,000
Total, All Pueblos, Including MRGCD Facilities	$75,059,000	$139,424,000	$214,483,000

Table 4. Estimated capital costs for repair, rehabilitation, and water conservation, excluding improvements to facilities of the Middle Rio Grande Conservancy District.

Pueblo Grouping	Repair and Rehabilitation	Water Conservation Measures	Total, Repair and Rehabilitation + Water Conservation
Northern Pueblos	$37,688,000	$18,495,000	$56,183,000
Non-MRGCD Southern Pueblos	$18,972,000	$17,609,000	$36,581,000
Southern Pueblos, Excluding MRGCD Facilities	$6,914,000	$103,320,000	$110,234,000
Items for All Pueblos	$938,000	$0	$938,000
Total, All Pueblos, Excluding MRGCD Facilities	$64,512,000	$139,424,000	$203,936,000

It is recommended that all of the repair and rehabilitation and part of the water conservation measures be authorized for funding. An authorization of $80 to $100 million would cover all necessary repair and rehabilitation and the most important of the water conservation measures. It should be noted that many of the repair and rehabilitation measures will also result in water conservation, so there should still be significant water conservation taking place. It is important to consult with the pueblos on this matter, especially if the amount has to be reduced

for political purposes. It is likely that the Pueblos would be grateful even for a lesser amount, as it would improve the situation significantly.

It is also important to remember that the cost estimate can change somewhat during the feasibility study.

8.0 ACCOMPLISHMENT ISSUES/MANPOWER

Assuming this Project goes forward and is put into Reclamation's Albuquerque Area Office (AAO) budget, issues of manpower and accomplishment at the area office will have to be addressed. Unless additional staff is hired, the AAO would be unable to begin this Project until after completion of the Velarde Community Ditch Project, which is scheduled for Fiscal Year 2001. Depending on the time frame required for completion of the Project, more staff may need to be added to the AAO. This would include the work for planning, design, environmental compliance, and construction, and would include both work done by the AAO and work sent to other Reclamation offices or contracted out but overseen by the AAO. Should other large Projects be undertaken by the AAO at the same time, such as reconstruction of the Low Flow Conveyance Channel, staff requirements would need to be addressed.

9.0 FOOTNOTES

[1]Personal conversation, Art Maestas, Albuquerque District, U.S. Army Corp of Engineers.

[2]Personal conversation, Cliff Sanchez, Indian Coordinator, Los Lunas Office, Natural Resources Conservation Service. There is a lot of sensitivity on the part of the NRCS regarding this Project. They are concerned it could lead to further NRCS budget cuts because Congress would feel that Reclamation is doing work once done by NRCS. Although this is not true, there should be coordination with NRCS to emphasize the complementary roles that can be played by the two agencies on this Project.

[3]Clark, Ira G. (1987). Water In New Mexico: A History of Its Management and Use. University of New Mexico Press, Albuquerque, NM, pp. 3-8.

[4]Wozniak, Frank (1987) Irrigation in the Rio Grande Valley, New Mexico: A Study of the Development of Irrigation Systems Before 1945. Prepared for the New Mexico Historic Preservation Division, Santa Fe, New Mexico under an intergovernmental agreement with the Bureau of Reclamation, Southwest Regional Office, Amarillo, Texas, Contract # BOR-87-1, July 15, 1987, pp. 1-15 .

[5]Clark (1987) p. 6.

[6]Clark (1987) p. 6.

[7]"Espejo, Antonio de", Encyclopedia Americana, International Edition. Grolier Inc., Danbury, CT. Volume 10, p. 582.