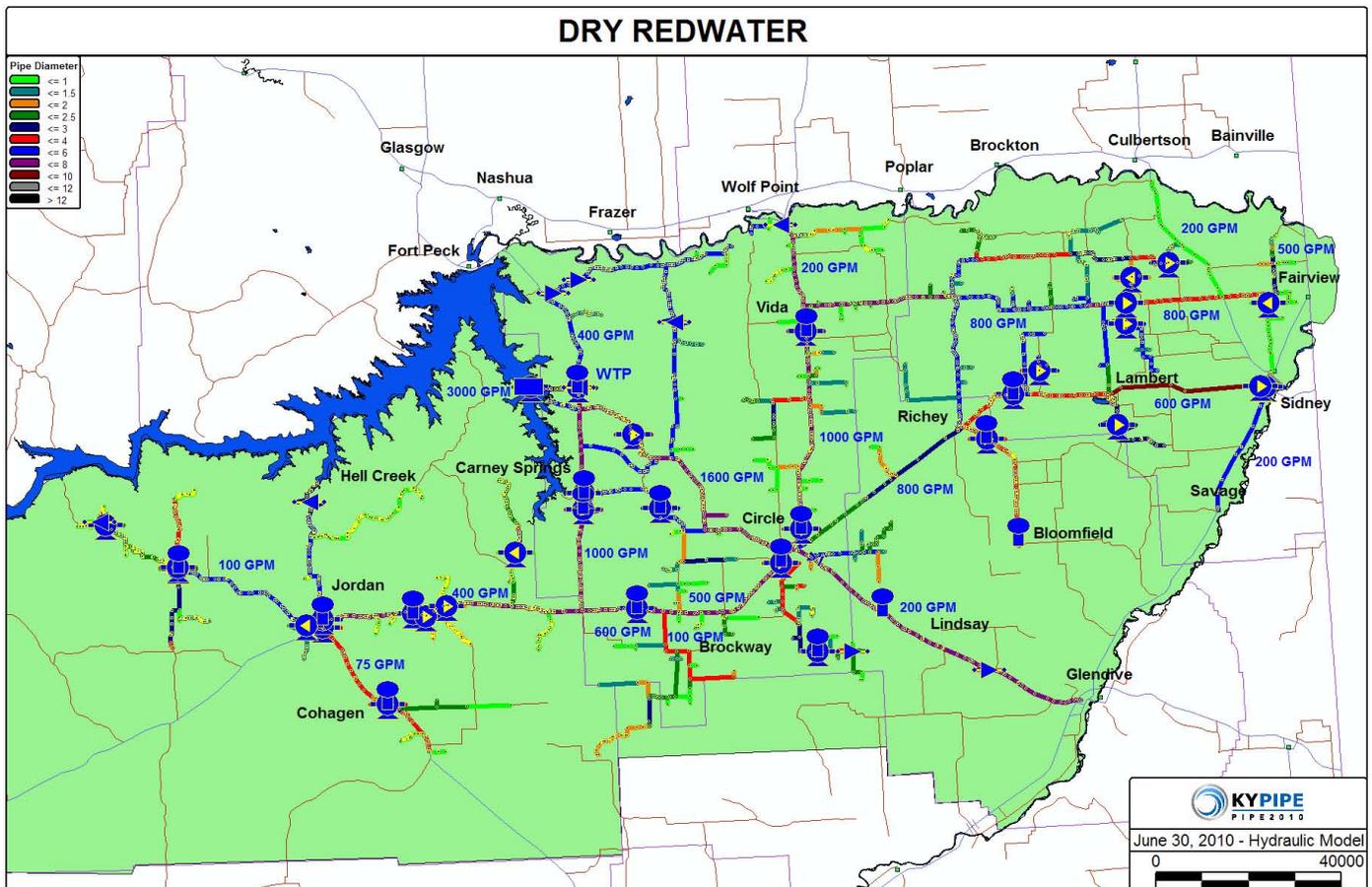


RECLAMATION

Managing Water in the West

Dry-Redwater Rural Water System Appraisal Report



Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Introduction and Background

On April 28, 2010, the Dry-Redwater Rural Water Authority (Authority) transmitted to Reclamation's Montana Area Office the Dry-Redwater Rural Water System (System) Appraisal Investigation with the intent that it would be considered and selected under Reclamation's Rural Water Program for a Feasibility Study. The objective of the System is to serve a population of about 15,000 people in a project area touching five counties in east-central Montana, which includes the towns of Circle, Richey, Jordan, and Fairview; the unincorporated town of Lambert; the water districts of Highland Park, Forrest Park, Spring Grove and Whispering Tree; and the rural users in the service area. A map of the area appears on the cover.

Report

This Appraisal Report has been prepared by the Montana Area Office of the Bureau of Reclamation as required under Title I Section 103 of the Rural Water Supply Act of 2006 and the Interim final rule promulgated by the Secretary included in under the *Code of Federal Regulations* 43 CFR Part 404 published in the Federal Register on November 17, 2008.

The purpose of Reclamation's Appraisal Report is for the Regional Director in Billings, Montana, to determine whether it's appropriate to recommend that a Feasibility Study be conducted as described under Rules § 404.44 and § 404.45. This determination is based on information contained in the Dry-Redwater Regional Water Authority Appraisal Investigation dated April, 2010 (Investigation), and updated by an addendum.

In addition, this Appraisal Report provides a determination the Proposed Project is eligible to participate in Reclamation's Rural Water Program and the "Additional Required Content for Feasibility Studies," described in Section IV D. 3 of the Funding Opportunity Announcement (FOA) No. R10SF80458," have been addressed.

Authority

This Appraisal Report is being done under the authority of the Rural Water Supply Act (P.L. 109-451).

Project Objective

The Authority started the process of developing a regional water system in 2004 to serve areas of Garfield, McCone, Dawson, and Richland Counties. Since that time, local interest has been strong and the project area has expanded to serve parts of Prairie County as well. The proposed

project plans to serve a population of about 15,000 people in the project area, including the towns of Circle, Richey, Jordan, and Fairview; the unincorporated town of Lambert; the water districts of Highland Park, Forrest Park, Spring Grove, and Whispering Tree; and rural users in the service area. It examines opportunities of providing communities, unincorporated areas, and rural areas in east-central Montana with a present and future source of high quality water at a capacity sufficient to satisfy the regional demand.

Project Sponsors

The Authority was formed on December 12, 2005 and includes member entities from the towns of Jordan, Richey, Circle; McCone and Garfield counties; and the Dawson, Richland, McCone, and Garfield Conservation Districts. The Authority was created in accordance with Title 75, Chapter 6, Part 3 M.C.A. for the purpose of designing, funding, construction and operation of a Rural Water Project. Copies of documents forming the Authority are included in Appendix H (A) of the Appraisal Investigation.

Description of the Project Area

The 11,100-square mile, sparsely-populated, project area lies in east-central Montana (map). The dry continental climate there is characterized by short summers with cool to mild temperatures, and long cold winters with periods of extremely cold weather. The prairie landscape rolls to the horizon, banded by narrow riparian zones along streams. The Big Sheep Mountains, an island mountain chain, run southwest-northeast through the area. Grasslands form the main wildlife habitat. Deer and antelope are plentiful, with furbearers, game birds, and songbirds.

About 15,000 people live in the project area, which includes the towns of Circle, Richey, Jordan, and Fairview; the unincorporated town of Lambert; the water districts of Highland Park, Forrest Park, Spring Grove, and Whispering Tree; and rural areas. (Some of the people of the cities of Sidney and Glendive could be served by the project, too, which would put the population served at 21,800, but these two cities have existing water supply systems so they have decided not to participate.)

Widely-spaced farms dot the project area. Crops are mainly dry land, consisting of wheat, barley, and oats, although there are some alternate crops as well. Irrigated crops—mostly alfalfa and wheat—are grown on low-lying areas next to the Missouri. Livestock production within the project area consists of cattle, sheep, and pigs.

McCone County is experiencing interest in a coal mine and power plant at Nelson Creek, about 20 miles southeast of Circle. If developed, the county and town would experience some growth. Also, Keystone Pipeline, a major pipeline, is being proposed to cross McCone and Dawson counties. This will provide a short term population increase during construction and will add to

the tax base. The long term population impact would be the result of creating 10 to 20 new support service jobs.

Groundwater—from both deep and shallow aquifers—supplies water to rural residents and to residents of project area towns at present. The shallow water generally is limited in quantity and high in inorganic chemicals like sodium and sulfates. The deep wells are high in fluoride and sodium that require expensive treatment options in order to meet the Primary Drinking Water Standards for fluoride.

Fort Peck Reservoir and the Missouri River form the northern boundary of the project area. Fort Peck, a reservoir of the Pick-Sloan Missouri Basin Program, is operated by the U.S. Army Corps of Engineers for flood control, power generation, navigation, recreation, municipal and industrial water supply, and fish and wildlife benefits. Other small reservoirs can be found on intermittent water bodies, such as those on Redwater River, Nelson Creek, and others throughout the project area.

Agriculture constitutes the local economy throughout most of the service area, although the coal mine, power plant, and oil pipeline could bring industrial growth. According to the 2000 Census, median household income in the service area ranged from \$25,451 to \$32,110, considerably less than the \$33,024 for the state overall.

Description of the Proposed Alternative

The Proposed Alternative, estimated to cost about \$120 Million (in 2007 prices), consists of a raw water intake and water treatment facility at North Rock Creek in the Big Dry Arm of Fort Peck Reservoir and over 1,200 miles of pipeline, 18 storage tanks, and about 50 pump stations. The proposed treatment facility is designed to meet a peak day demand of 3,750,000 gallons, an annual use of 985,630,000 gallons (3,025 acre-feet).

The System will deliver water to existing public water supplies at points near existing storage tanks. It will be the existing public water supplier's responsibility to distribute the water to customers from the tank through their existing distribution system. The present water suppliers will be responsible for the continued maintenance and upkeep of their own distribution systems, either with existing staff or by using the maintenance staff of the Authority, whichever is more economical.

The pipeline distribution system will be constructed in a branch type layout. The system will be constructed of PVC pipe ranging in size from 2-inch to 20-inch. The pipe will be Class 160, Class 200, or Class 250, based on the necessary peak working pressure in each pipe. Valves will be placed at major junctions of the pipelines to provide for repairs without affecting service to other areas. Air release valves will also be necessary at high points in the lines to release trapped air. It is assumed that, due to variation of terrain in much of the project area, an air release valve will be required every 4-7 miles. Curb stops will be installed within 25 feet of the water users. The user will be responsible for installing piping from their curb stop to their residence. County roads, highway, railroad, and wetland crossings will be done by boring underneath these

structures or areas so that no disruption of traffic will occur. Paved roads and railroads will have a steel casing around the pipe, but gravel roads and wetlands will not.

Rural Water Program Eligibility

The project is eligible under Rule § 404.7. The Proposed Project is located in a Reclamation State and meets the definition of a Rural Water Supply Project (404.2). The project proposes to construct a new rural water supply infrastructure and facilities to serve a population of about 15,000 inhabitants, including dispersed home sites, rural areas with domestic, municipal, and industrial water, including incidental noncommercial livestock watering and noncommercial irrigation of vegetation.

The Authority, as a non-federal project sponsor, is eligible for the Rural Water Program under Rule § 404.6. They qualify under sub-item (a) as a state or political subdivision of the state, specifically a regional authority. The Authority was formed in 2005 and includes member towns and conservation districts in the service area. The Authority was created in accordance with Title 75, Chapter 6, Part 3 M.C.A. for the purpose of designing, funding, constructing, and operating a Rural Water Project. Copies of documents forming the Authority are included in Appendix H (A) of the Appraisal Investigation.

Eligibility to be reviewed under the Program

In addition to the program eligibility requirements above, Reclamation is required to determine if the Appraisal Investigation adequately addresses all of the items required in Reclamation's standards for conducting appraisal investigations. The Prioritization Criteria referred to in §404.13 will then be applied to determine whether the investigation is eligible to be reviewed under the program. Standards for appraisal investigations are found in Reclamation Manual Directives and Standards CMP 05-02.

As stated in CMP 05-02 Section 4, "Appraisal Studies. The responsible office will propose proceeding to feasibility based on the results of an appraisal study. Appraisal studies are brief preliminary investigations to determine the desirability of proceeding to a feasibility study. They use primarily existing data and information to identify plans for meeting current and projected needs and problems of the planning area. The appraisal study will identify at least one potential solution that requires Federal involvement or identify an array of options that have been screened and evaluated to substantiate potential Federal involvement."

Table 1 below summarizes our determination that the Prioritization Criteria has been adequately addressed and Reclamation can proceed to review the Appraisal Investigation. The Appraisal Study requirements included in the Directives and Standards will be addressed in the "Reclamation Findings" section of this report found below.

Table 1: Summary of Prioritization Criteria (404.13)

Priority	Citation	Applicant Statements
Urgent Need:	Rule § 404.13 (a) FOA V.A.2.1	Based upon preliminary review of the water quality in the wells of rural users in the proposed service area, the majority of them do not have access to a quality of water needed for a healthy existence. All communities and rural users in the area use wells and several must treat their water because of high levels of fluoride which is a health hazard and a regulated contaminant, as well as high levels of sodium and dissolved solids. The reverse osmosis systems used to remove the fluoride are all more than 11 years old and the membranes are reaching the end of their useful life. The Addendum to the Appraisal Investigation outlines more than 100 violations in the past year in the existing public water supply systems. The town of Fairview has violated the disinfection by-product rule twice in the past 13 years.
(a) Water Supply	Rule § 404.13 (a) FOA V.A.2.1	Rural residents in the project area currently obtain their water from private wells drilled into shallow aquifers, gravel pockets, or deep confined aquifers, and report many quantity and quality problems. Some rural residents are hauling water either because their well water is undrinkable or there is not sufficient quantity to be usable.
(b) Violations of Drinking Water Standards	Rule § 404.13 (a) FOA V.A.2.1	A serious shortage of qualified operators for the complex reverse osmosis water plants will lead to even more violations that are occurring on a regular basis. The Addendum to the Appraisal Investigation outlines more than 100 violations in the past year in the existing public water supply systems. The town of Fairview has violated the disinfection by-product rule twice in the past 13 years. Sampling of water quality from wells in the area indicates violations of EPA standards for fluoride in several wells, including those used by the towns of Circle and Richey and the Lambert County Water District. Table 2.1.3.2 in the Appraisal Investigation indicates that Secondary Standards for inorganic contaminants are significantly exceeded for sulfate, sodium, and total dissolved solids in most wells.
(c) Inadequacies in Infrastructure	FOA V.A.2.1	All communities in the area currently treat their groundwater, except for the town of Jordan which uses chlorine gas water disinfection. The town of Circle is served by two wells and a reverse osmosis treatment facility with a peak day capacity of 250,000 gallons. Circle's deep wells have a history of failing due to bacteria fouling the well screens. Existing water lines range in age from 50 years to less than 10 years. The town has replaced each of its two wells twice in the past 15 years. The potential for failure in the next 5-10 years is high. The town of Richey is served by two wells and a reverse osmosis treatment

		<p>facility producing up to 35 gpm. The Lambert County Water and Sewer District is served by two wells and a nano-filtration system producing up to 35 gpm. The town of Fairview uses an iron and manganese removal facility. No facilities exist to distribute water outside these communities, and people rely on individual wells of poor quality and limited quantity or haul water from distant communities. Except for water well and treatment plants which would be replaced by the Proposed Project, the existing community facilities are not identified as needing new infrastructure to utilize project water. State programs have been used in the past for community system improvements.</p>
Regional or Watershed Perspective	FOA V.A.2.2 Rule § 404.13 (b)	<p>The proposed service area includes parts of five large Montana counties servicing up to 15,000 people when built out. It fills a large gap of eastern Montana, south of the Missouri River and North of the Yellowstone River. The region to the north of the Proposed Project will be served by the Fort Peck/Dry-Prairie Rural Water System presently under construction by Reclamation.</p>
Financial Need	Rule § 404.13 (c) FOA V.A.2.4	<p>Financial need is discussed in Section 2.1.6 in the Appraisal Investigation and states that the median household income ranges from a low of \$25,450/yr in Prairie County to a high of \$32,110/yr in Richland County, with an average of \$28,920 and a mean of \$29,718/yr. (The median household income Poverty Rate is considered \$26,451/yr or less, and the Intermediate Rate is from \$26,452 to \$33,065/yr).</p>
Unique Qualifications	Rule § 404.13 (d) FOA V.A.2.4	<p>The project sponsors are proposing that this project be funded and constructed under Reclamation's Rural Water program. The Proposed Project will serve a vast arid region in one of Reclamation's 17 western states and is similar in scope to a rural water project just north of the proposed service area that was planned, designed, and is being constructed with Reclamation technical oversight and funding.</p>
Applicable Legal Requirements	Rule § 404.13 (e) FOA V.A.2.4	<p>The Proposed Project will help assure the towns of Jordan, Cirde, Richey, Fairview, and the Lambert County Water District with a quality water supply that will meet Safe Drinking Water Standards established by the EPA. The three communities are in constant jeopardy that their membrane filtration/reverse osmosis system may malfunction or fail, and their water will be in violation of the SDWS. Fairview's high organic load in its water will continue to violate the disinfection by-product rule.</p>
Indian Water Supply	Rule § 404.13 (f) FOA V.A.2.3	<p>There are trust allotted Indian lands within the service area that belong to members or heirs of the Turtle Mountain Band of Chippewa Indians (Tribe). The Tribe's reservation, in the north central/eastern part of North Dakota near the Canadian border, consists of</p>

		<p>slightly over two townships of land (a little more than 33,000 acres). Like most reservations, Turtle Mountain was allotted; however, Tribal membership exceeded the allotment acreage, so additional lands were needed to fulfill allotting to all individual members. These lands came from available public domain lands outside the reservation and in other states. There were 979 off-reservation public domain allotments originally created for individual Tribal members in Montana and 178 in North Dakota. Many of the original allotments had been patented in fee or sold before 1930, but today several hundred remain and are held in trust status for the allottees or their heirs. Below are locations within in the project known to contain trust Turtle Mountain public domain allotments, which may be served by the project.</p> <p>S29,T25N,R45E, NE4 S30,T25N,R45E,LOTS 1,2: E2NW4 S35, T25N,R44E,SE4 S20,T25N,R45E,NW4 S31,T25N,R45E,NE4 S33,T25N,R44E,NE4 S22,T25N,R44E,SW</p>
Program Overlap	Rule § 404.13 (g) FOA V.A.2.5	Programs in Montana have been established to assist rural communities develop rural water systems in cooperation with Federal programs. Redamation's Rural Water Program is the only source of comprehensive funding sufficient to fully fund planning and construction of the entire project. A Federally authorized project under the Rural Water Supply Act will allow the non-federal sponsor to access the Treasure State Endowment Regional Water fund to finance part of the non-federal share. Should individual community systems need improvements, state and other programs are available to provide such assistance.
State and Local Priorities	Rule § 404.13 (h) FOA V.A.2.6	The Authority cites numerous endorsements from state, county, and municipal entities and has been the recipient of state grants totaling \$404,000 funding various parts of the Appraisal Investigation.
Innovation	Rule § 404.13 (i) FOA IV.D.2 b. (3)	While the Authority is proposing what Redamation considers a traditional Rural Water System, they are including aspects that are innovative for the region to take advantage of an economy of scale. The treatment plant will be located centrally in the service area and OM&R duties will be centralized with one entity for the region. Innovative renewable energy sources will be considered at the Feasibility level to provide power to remote sites, eliminating the need for miles of costly electric transmission lines.
Other	Rule § 404.13 (j)	

Reclamation's Determination Whether It Is Appropriate to Recommend Continuing to a Feasibility Study

Below are the criteria contained in Rule Section § 404.44 that will be applied to determine whether at least one of the alternatives identified is appropriate for further analysis through a Feasibility Study or whether the investigation should be terminated without conducting a feasibility study.

Reasonable range:

A reasonable range of alternatives (structural or nonstructural) has been formulated and evaluated (Rule § 404.44 [a]).

The Appraisal Investigation evaluates the Preferred Alternative in detail and describes in lesser detail other alternatives that were considered. In addition to the Preferred Alternative, use of groundwater and other surface supplies were considered but ruled out as a reliable supply due to limited volume, poor water quality, or inadequate water depth during all reasonable lake levels. Water supplied from the Missouri River, including an alternative to purchase water from the town of Culbertson, were evaluated and determined not to be economical compared to the Preferred Alternative. Various locations for a water intake and treatment plant along Fort Peck Reservoir were identified with the proposed site being chosen with concurrence from the Corps of Engineers and the U.S. Fish and Wildlife Service.

Alternatives were developed and evaluated using existing data and information for meeting current and projected needs and problems of the service area. The range of alternatives included in the Appraisal Investigation is sufficient to meet the intent of an Appraisal Study as defined in CMP 05-02. It is anticipated that additional alternatives and variations of alternatives will be identified during a Feasibility Study and public scoping process.

At least one viable alternative

The recommendation for further study of one or more alternatives is clearly supported by the analysis in the appraisal investigation (Rule § 404.44 [b])

The Proposed Project is estimated to cost about \$120 million. A detailed materials quantity list for the project was developed to which estimated unit prices were applied. Costs for various classes and ratings of pipe materials were obtained from various suppliers. Costs for installation were obtained from contractors experienced in the field of rural water pipelines and from

industry publications. Additional escalation factors were added to arrive at the final construction cost, which will be discussed in more detail later in this report.

An independent appraisal level estimate was prepared by staff from Reclamation's Technical Service Center in Denver, and identified a half dozen items that potentially represent a significant increase in project costs listed below in italics.

- 1) *Pipeline unit prices may be low and could increase the Total Construction Cost by approximately \$15.9 million.*
- 2) *Unit prices for the water treatment plant may be low and could increase the Total Construction Cost by approximately \$1.5 million.*
- 3) *Escalation should be considered and added as appropriate and could increase the Total Construction Cost by \$7.4 to \$23.2 million.*
- 4) *The State of Montana gross receipts tax should be considered and added as appropriate which could increase the Total Construction Cost by approximately \$1.2 million.*
- 5) *Design contingencies should be increased from 10% to 15% which could increase the Total Construction Cost by approximately \$6 million.*
- 6) *Construction contingencies should be increased from 20% to 25% which could increase the Total Construction Cost by approximately \$6 million.*

Combined these estimated additional costs add up to around \$45 to \$50 million, or about 40 % of the estimated Total Construction Cost of project. It should be noted that about half of the additional cost is attributed to escalation, otherwise known as interest during construction. This is a very real problem for rural water projects which may take decades to complete. However, Congress has traditionally recognized and addressed this issue by incorporating indexing provisions in the project authorization.

Another large piece of the additional costs are for contingency items where industry practices and Reclamation practices traditionally differ. Reclamation contingency costs will be applied should the project continue to Feasibility.

The Authority's estimate includes a 5% allowance for procurement strategies, which may be reasonable assuming the contract is a Request for Proposal and not a sealed bid. This item is not typically included in a Reclamation estimate and adds about \$6 million to the Total Construction Cost.

Pipe bedding requirements for rural water projects tend to be lower than typically required for other types of construction, which may address the cost discrepancy between the Authority and Reclamation's Technical Service Center cost estimates.

Conclusion: The Authority appears to have developed a fundamentally sound design and cost estimate for their Proposed Project. Discrepancies remain between the Authority and Reclamation regarding how escalating factors will be applied to the project to arrive at an Appraisal level estimated Total Construction Cost. Should the project move forward to feasibility, these discrepancies will be addressed.

Criteria for Each Alternative Considered:

As stated in section 404.44 3. (c), Reclamation is asked to determine for each alternative considered in the Appraisal Investigation whether the alternative:

(1) Identifies viable water supplies and water rights sufficient to supply the proposed project area; –

The Appraisal Investigation identifies the Fort Peck Reservoir/Missouri River as a water source for their Proposed Project. The water supply at this location is abundant and can be acquired through several options including: a new state water permit, a contract with the Corps of Engineers for water stored in Fort Peck Reservoir, a contract with the Fort Peck Tribe for use of their water right, or a contract with Reclamation for water stored upstream in one of several reservoirs. Other practicable water sources were identified, including surface water from the Missouri and Yellowstone rivers. Groundwater supplies, lower quality water, and non-potable water were ruled out as a reliable supply due to limited volume and poor water quality.

(2) Has a positive effect on public health and safety; –

The Proposed Project will provide residents with a reliable supply of water of considerably higher quality than that presently used in the project area. It will also end the reliance on several reverse osmosis facilities and the concern that they might fail, leaving these communities with no safe water supply. The supply of qualified operations to supervise the various water treatment facilities in the area is very low. A central treatment and distribution operation and maintenance staff will open up a larger pool of qualified operators willing to work in a relatively remote region.

(3) Will meet present and future water demands; –

The System is intended to provide water to meet the needs of the present and estimated future population of 15,000. The project would allow growth in portions of the service area. There are two large potential expansion areas, north and east Richland County and west Glendive area in Dawson County. Due to time and budget constraints these areas were not included in the Proposed Project. Should the project proceed to a Feasibility Study, the possibility of including these areas should be investigated and might improve the overall economic and financial feasibility of the project.

(4) Provides environmental benefits, including source water protection;–

The Proposed Project will serve the region using treated surface water from Fort Peck Reservoir. The project anticipates using about 3,000 acre-feet annually, a minor amount compared to the annual flow of the Missouri River, which ranges from about 5,000 to over 13,000 cubic-feet/second. Wetlands will be avoided if possible and impacts will be mitigated if needed. Plans for the raw water intake and screens will be thoroughly evaluated to minimize potential environmental concerns and compliance with the National Environmental Policy Act (NEPA) will be required.

As reliance on wells will diminish, there will be less opportunity for contamination of groundwater sources. Also, as several reverse osmosis facilities are closed, contaminants from reject water will be eliminated. Water will be provided for livestock at specifically designated locations, reducing impacts to the limited natural water sources and benefiting wildlife.

The NEPA compliance for these types of projects is typically programmatic in nature, meaning we don't know the exact pipeline alignments, or other matters. To deal with these unknowns, we will provide the sponsor with a list of minimization measures that has been developed for other rural water projects.

The Appraisal Investigation contains no mention of fish entrainment protection at the water intake. With the abundance of species of concern and possible pallid sturgeon depending on the intake location, this will need to be addressed during the Feasibility Study. Similarly additional evaluation of endangered species that may be present in the area will be required as well as protection of sage grouse habitat and timing of construction activities.

In the final NEPA document, the sponsor should be aware that a *Cumulative Impact Analysis* will need to include the coal fired electric generation plant, which will likely result in increased water temperatures. At this time, the proposed electric generation will use what is called a dry system that minimizes the use of water for cooling. Also, there is no mention of climate change, which will need to be addressed in the Feasibility Study, along with other risks and uncertainties.

(5) Applies a regional or watershed approach; –

The proposed service area includes parts of five large Montana counties servicing up to 15,000 people when built out. It fills a large gap of eastern Montana, south of the Missouri River and North of the Yellowstone River. The region to the north of the Proposed Project will be served by the Fort Peck/Dry-Prairie Rural Water System presently under construction by Reclamation.

(6) Implements an integrated water resources management approach; –

The Authority is proposing a rural water system that takes advantage of an economy of scale by utilizing one modern water treatment plant that will be located centrally in the service area to optimize supply and manage demand for the region. Water will be distributed to meet the demands of participating communities at prices established by the Authority (comprised of community representatives). OM & R duties will be centralized into one entity for the region, and the ability to attract qualified operators is enhanced by the project.

(7) Enhances water management flexibility, including providing for local control and encouraging participation in water banking and markets; –

The Proposed Project provides a reliable supply of water to local communities and provides additional storage tanks, allowing greater water management options and flexibility. Individual communities will be responsible for operations within their communities or become affiliated with a regional water distribution maintenance entity. We do not envision that water banking and markets will have a role in this project.

(8) Promotes long term protection of water supplies;–

As reliance on wells will diminish, there will be less opportunity for contamination of groundwater sources. Also, as several reverse osmosis facilities are closed, contaminants from reject water will be eliminated. Appropriate protections will be identified and required should the project move on to Feasibility Study. The water supply at this location is abundant and can be acquired through several options including: a new state water permit; a contract with the Corps of Engineers for water stored in Fort Peck Reservoir; a contract with the Fort Peck Tribe for use of their water right; or, a contract with Reclamation for water stored upstream in one of

several reservoirs. Plans for a raw water intake and screens will be thoroughly evaluated to minimize potential environmental concerns and compliance with NEPA will be required.

(9) Includes preliminary cost estimates that are reasonable and supported; –

The Proposed Project is estimated to cost about \$120 million. A detailed materials quantity list for the project was developed to which estimated unit prices were applied. The cost estimate appears reasonable and are appropriate for an appraisal level of investigation.

Reclamation's review of the cost estimates estimated additional costs of around \$45 to \$50 million, or about 40% of the estimated Total Construction Cost of the project. It should be noted that about half of the additional cost is attributed to escalation, otherwise known as *interest during construction*. This is a very real problem for rural water projects which may take decades to complete. However, Congress has traditionally recognized and addressed this issue by incorporating indexing provisions in the project authorization.

The Authority appears to have developed a fundamentally sound design and cost estimate for their Proposed Project. Discrepancies remain between the Authority and Reclamation regarding how escalating factors will be applied to the project to arrive at an appraisal level estimated Total Construction Cost. Should the project move forward to feasibility, these discrepancies will be addressed.

(10) Is cost-effective and generates national net economic benefits as required under the Principles and Guidelines; –

Each alternative provides similar water supply outputs/benefits in terms of water quality and supply availability, except for the No Action Alternative (Future Without-the-Project Condition) which wouldn't meet area water needs. Alternatives A and B in the Appraisal Investigation have potentially better water quality as measured by turbidity. Alternatives A and B may also be somewhat more reliable. The evaluation of costs indicates that Alternative B, the Preferred Alternative, has the lowest present value of construction and OM&R costs over a 40 year project period. Therefore, the analysis indicates the Preferred Alternative (Alternative B) is the most cost effective means of meeting water supply needs. The project would provide benefits to the region through improved water quality, improved supply reliability, including reduced water hauling, and a potential increase in economic productivity.

(11) For each alternative proposed for further evaluation is a feasibility study, whether the project sponsor has the capability to pay 100 percent of the costs associated with the operation and maintenance, and replacement (OM&R) of the facilities constructed or developed; –

The updated annual OM&R cost of the Preferred Alternative is estimated to be \$1,280,000. This cost was compared to OM&R costs for similar projects compiled by the Reclamation's Dakotas Area Office and was found to be consistent with those projects.

The simple average median household income in the study area was estimated to be \$29,718. Applying the Environmental Protection Agency's water affordability threshold of 2.5% of median income to the study area results in an affordability threshold of \$742.95 annually, or \$61.91 per month. The current cost of water in the study area ranges from \$31.13 to \$45.30 per month. Assuming these current costs would remain as part of water distribution costs, approximately \$16.61 to \$30.78 of payments is available before the affordability threshold is

reached. Assuming a 15,000 service population and an average household size of 2.5 people, the cost of OM&R would be about \$210 per year, or \$17.50 per month. This is within the affordability threshold, and some affordability appears to remain for payment towards capital costs.

(12) *Other factors that Reclamation deems appropriate.*
See “Other Investigation Requirements” below.

Other Investigation Requirements

Other investigation requirements be addressed in this program as provided for in Rule § 404.44 12 and outlined in the Funding Opportunity Agreement (FOA) Section IV.D.1.

Reclamation’s findings for these other requirements are summarized in Table 2.

Table 2: Reclamation’s Findings for Other Investigation Requirements

Requirements	Citation	Reclamation’s Findings
Minimize or Reduce Energy Use	FOA IV.D.1(1)	(1) This program will: (a) Eliminate three reverse osmosis treatment facilities and their high energy use (b) Incorporate equipment or system components with higher energy efficiency (c) Utilize solar/wind energy to power remote monitoring sites.
Minimize or Reduce Water Consumption	FOA IV.D.1(2)	Encourage reduced water demand (e.g. through water metering and volumetric pricing) Eliminate the 25 to 30% of raw water rejected during the reverse osmosis process.
Use Renewable Energy	FOA IV.D.1(2)	Consider where practical the use of renewable energy to power remote system equipment.
Provide Environmental Benefits	FOA IV.D.1(3)	Wasting of water due to flushing of wells and waterlines because of well water quality will be greatly reduced.
Reduce Impacts to Critical Habitat for Federally-listed Threatened or Endangered Species	FOA IV.D.1(3)	The project will implement measures to avoid any impacts to critical habitats and provide mitigation in the event impacts cannot be avoided.
Provides Innovative Technologies	FOA IV.D.1(4)	Due to the remote location of many project facilities, innovative technologies will be investigated in the Feasibility Study to provide renewable power for some system processes. At the feasibility level, advanced treatment

		technologies will also be evaluated for project suitability.
Provides Creative Administrative or Cooperative Solutions. Rule §404.13 (i)	FOA IV.D.1(4)	Administration of the Proposed Project will be centralized to take advantage of economy of scale. The Proposed Project is being promoted through a cooperative effort of towns, conservation districts, water district, and counties in the service area.

Reclamation's Findings

It is the finding of this evaluation that it is appropriate to proceed to a Feasibility Study based on review of the Appraisal Investigation and supporting material submitted by the Authority and application of the criteria set forth in § 404.44 as discussed above. As discussed in this Appraisal Report, specific issues will need to be addressed during the Feasibility Study.