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(http://wwdc.state.wy.us)
EXECUTIVE SUMMARY

RANCHESTER WATER SUPPLY

LEVEL II STUDY

Prepared for:

Wyoming Water Development Commission

Submitted by:

EnTech, Inc. Professional Engineers
Sheridan, Wyoming
in association with

Environmental Design Engineering

November, 2004
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1. INTRODUCTION AND PROJECT DESCRIPTION

EnTech, Inc. Professional Engineers of Sheridan, Wyoming (EnTech), in association with Environmental Design Engineering (EDE), also of Sheridan, performed a study for the Wyoming Water Development Commission (WWDC) dated November 2002 entitled Ranchester Level I Master Plan Study. This Level I study developed a master plan for the Town of Ranchester, Wyoming’s (Ranchester) public water system. Ranchester is located in north central Sheridan County near the junction of U.S. Highway 14 and Interstate 90, as shown in Figure 1. The findings of the Level I study, in broad terms, were that Ranchester’s water system is generally in good condition and is being well-run by Ranchester’s staff. However, in order to meet expected increases in population, improved fire flows, and increasingly stringent drinking water standards, it is necessary for certain improvements to be performed.

As a result of the recommendations provided in the Level I study, and in order to provide more specific technical and cost data on these recommendations, Ranchester requested that the WWDC recommend funding a Level II study to the 2003 Wyoming State Legislature. The Legislature ultimately authorized an expenditure of $75,000 for this purpose. In June 2003, a contract was signed between the WWDC and EnTech to perform the Level II study, for completion in November 2004.

As stipulated by the WWDC in its scope of work for the Level II study, EnTech is to analyze and provide recommendations on the following issues:

- Water Treatment Plant
  - Water Intake Alternatives
  - Taste and Odor Control Management
  - Disinfection Alternatives
- Distribution System Improvements
- Water Storage Concerns

In conjunction with the analyses and recommendations provided, EnTech’s scope to be performed as part of the Level II study is also to:

- provide concept level designs and cost estimates for any improvements that are recommended;
- identify any required permits required for construction of recommended improvements;
- prepare an economic analysis by providing an ability-to-pay study to assist in determining a fair and equitable financing plan for the preferred water-related improvements, including the associated cost per user and rate schedule; and
- prepare an Environmental Report which will provide sufficient information for state and federal funding agencies to prepare environmental documents required under the National Environmental Policy Act (NEPA), 42 U.S.C. 4321, for any proposed water-related improvements.

The 17-month time period between June of 2003 and November of 2004 for completion of the Level II study was mandated by the WWDC due to this state agency’s desires to have much of the work performed in the study contingent upon a determination of the ultimate yield of a well that the WWDC drilled immediately west of the Town of Dayton (Dayton). The 650-gpm yield was ultimately determined to not be sufficient to meet both Ranchester’s and Dayton’s long-term peak day demands without other water supply sources. Additionally, the cost to extend a transmission main from the Dayton well to Ranchester and still pursue other water supply sources was judged to be a cost-prohibitive means of meeting Ranchester’s needs. Therefore, at a meeting held in January 2004 with representatives of Ranchester and Dayton, the WWDC decided that Ranchester should look to water sources other than the Dayton well to meet its supply needs. This decision allowed the applicable portions of the Ranchester Level II study to proceed.
2. EVALUATION OF WATER SYSTEM COMPONENTS

2.1 PROJECTED WATER DEMANDS

In order to ensure that improvements recommended in this Level II study are properly sized, EnTech performed an update to the water demands that were projected as part of the Level I study. A review of water usage since the date of the 2002 Level I study was conducted. This review showed that there has been a decrease in the metered annual water production from the Ranchester WTP over the last two years. This trend is consistent with the findings in the Level I study, in which it was noted that the annual water use had peaked in 2001 at 67.55 million gallons and peak-day water use was at a maximum in 1999 with a measured amount of 688,000 gallons per day. These decreased values can be attributed to the fact that improvements to the WTP’s metering capabilities had been performed, and that a major leak had been repaired on the 12” transmission main extending to the water storage tank.

Only minor growth has occurred within the town over the last two years, with only two building permits being issued. However, with recent Town Council approval and commencement of infrastructure construction of the 21-lot Stonebrook Meadows Addition on the eastern side of town, it is anticipated that growth in Ranchester will occur along the patterns discussed in the Level I study. Therefore, although metered water usage has shown a general decrease over the last two years, for conservative estimating purposes the following 2034 planning year water use projections are made. These projections are the same as those made in the Level I study for the planning year 2032. These planning year 2034 projections are portrayed in Table 1.

![Table 1](image)

**Table 1**

<table>
<thead>
<tr>
<th>Planning Year</th>
<th>Total Population Served</th>
<th>Annual Production (Million Gallons)</th>
<th>Average Daily Production (Gallons per Day)</th>
<th>Peak Day (Gallons per Day)</th>
<th>Peak Hour** (Gallons per Day)</th>
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</thead>
<tbody>
<tr>
<td>2034</td>
<td>857</td>
<td>96</td>
<td>282,000</td>
<td>740,000</td>
<td>1,095,000</td>
</tr>
</tbody>
</table>

*Based upon an assumed value of 1.5 times peak day*

2.2 WATER TREATMENT ISSUES

2.2.1 Water Intake

The *Ranchester Level I Master Plan Study* recommended that the intake for the WTP from the Tongue River should be relocated upstream of the Wolf Creek and Fivemile Creek confluences with the Tongue River, and that a simple infiltration gallery should be constructed at this new location. Despite these recommendations, Ranchester has decided to no longer pursue this alternative. Town personnel cite the following reasons why it may be more prudent to retain the intake’s present location.

- Continual improvement has been made over the last two years in the operation of the WTP. This improvement has been primarily attributable to establishment of more effective procedures, the purchase of certain new equipment, and a change in the type of polymer used. These procedures have also contributed to more effective management of the turbidity/organics loadings from the Tongue River raw water.
- The Level I Study recommended the addition of increased treated water storage capacity. Town personnel reasoned that if such additional treated water storage is provided, WTP operators will be better able to selectively treat raw water by halting diversions during high turbidity events, and instead rely upon the stored water to meet demands until the raw water improves in quality.
- There may not be sufficient funding available for such an intake relocation, given the community’s other water infrastructure needs.

In the spring of 2004, Ranchester and the WWDC revised the scope of the Ranchester Level II study to evaluate possible improvements at the existing intake location only instead of at an upstream location. Based upon this decision, a more detailed evaluation of three intake alternatives at the existing site was
conducted. All three alternatives would require placement of an infiltration gallery within or along the channel reach at the existing intake location. Evaluation of raw water suspended particle size distribution, channel and substrate characteristics, raw water turbidity vs. WTP settled water turbidity, current potassium permanganate contact times and dosages, and raw water turbidity and organics concentrations, as detailed above, revealed the following findings:

- **Suspended solids within the raw water contain a large component of silt and clay.** Given the sluggish channel reach and very minimal slope, these fine particles would likely not be effectively filtered by a simple infiltration gallery, and would amplify required backwash frequency of both a simple and a multiple screen infiltration gallery.
- **The deep channel reach and heavy aquatic vegetation along the sides of the channel at the existing intake location, coupled with the minimal channel slope, provide a less-than-optimal location for infiltration gallery placement and operation.**
- **Additional evaluation since the Level I study of the WTP sedimentation circuit prior to the filters has revealed that the existing flocculator and clarifier adequately reduce raw water turbidity.**

These findings led to the conclusion that implementation of an infiltration gallery at the existing location would provide little benefit to existing WTP operation.

### 2.2.2 Taste-and-Odor Control Management

Potassium permanganate is currently used in the Ranchester WTP to break down organics in the raw water, thereby providing taste-and-odor control as well as minimizing the formation of disinfection byproducts in the clearwell. The potassium permanganate works well to control taste and odor for the majority of the time. However, Ranchester continues to receive a few complaints each year relating to taste and odor of the finished water, usually during high raw water turbidity events.

Although an occasional complaint is registered, the existing WTP taste-and-odor and disinfection systems produce treated water that meets existing and pending standards. The Level I study recommended bench-scale investigations for taste-and-odor control using hydrogen peroxide or powder activated carbon (PAC).

Bench scale tests were conducted as part of the Level II study using both hydrogen peroxide and PAC to treat raw water. However, neither the hydrogen peroxide nor the PAC bench tests for treatment of the raw water organics provided a definitive answer as to whether these options would effectively treat for taste-and-odor concerns in the WTP raw water. No reduction of organics in the raw water was observed from either method when dosing in excess of amounts typically used in drinking water treatment taste-and-odor-control applications.

Hydrogen peroxide and PAC do not appear to provide for any more effective or efficient reduction in organics than the current method employed of potassium permanganate injection. Both hydrogen peroxide and PAC are as expensive in chemical costs, and both require additional capital costs to implement. In addition, both have potentially detrimental effects to the equipment or the efficiency of the sedimentation circuit. The minimal number of complaints received by Ranchester relating to taste-and-odor concerns does not appear to justify the additional capital and operating expenditures that would be required to implement alternatives that may not necessarily improve the current situation.

### 2.2.3 Disinfection System

Ranchester currently utilizes a gas chlorination disinfection system. The system is functioning adequately and safely. Its overall operating cost is relatively low, and no changes to the system and existing components other than routine maintenance are expected or required in order to continue to meet present and future needs. Furthermore, based upon water quality sampling results, continued use of this disinfection system with no changes should allow finished water to meet the regulatory requirements enacted within the Disinfection/Disinfectants Bypass Rule and the Long Term 1 Enhanced Surface Water Treatment Rule as promulgated by the U.S. Environmental Protection Agency.
Although the existing gas chlorination disinfection system is functioning adequately and within existing and likely future standards, an investigation was conducted as part of the Level II study of other possible means of disinfection which may potentially be safer than chlorine gas or may become more appropriate as a direct result of intake modifications. Two possible alternative disinfection systems briefly discussed in the Level I study were sodium hypochlorite and ultraviolet light. The Level II study’s findings indicated that existing safety procedures and equipment used to operate the gas chlorination system, coupled with the potential additional costs required to install and operate either of the two alternative systems, make it unreasonableness to implement either sodium hypochlorite or ultraviolet light as a replacement for the existing system.

2.2.4 Emergency Power Generation at WTP Site

As part of the Level II study, EnTech contracted with West Plains Engineering of Rapid City, South Dakota (WPE) to provide preliminary designs and costs for an alternative power source for the Ranchester WTP. Such an alternative power source is required by the Wyoming Department of Environmental Quality (WDEQ) whenever treated water storage “floating on the distribution system” is less than the maximum daily demand. With treated water storage currently being 500,000 gallons and the current maximum daily demand above this amount, either additional storage or an alternative power source is required. If an alternative power source is the selected option, WPE recommended that this power source be in the form of an engine-driven, standby electric generator, similar to the initial recommendation made in the Level I study. WPE further recommended the following electrical-related improvements:

- A new service-entrance-rated automatic transfer switch should be installed, such that when utility power is lost, the entire facility is served from the generator. In this case, the transfer switch must be service-entrance rated, since it must also function as a service disconnect.
- The existing main electrical distribution panel should be removed and replaced with new components.
- The existing service voltage at the WTP should be converted to 480/277 volt, 3-phase, 4-wire, grounded wye. This latter configuration is a much more common service voltage. It is also safer because the neutral conductor is isolated from the phase conductors and is grounded.

2.3 DISTRIBUTION SYSTEM IMPROVEMENTS

As part of the Level II study, an analysis was performed of the recommended Level I study distribution system improvements. This analysis confirmed that the upgrades recommended in the first study should still be installed. Also as recommended in the Level I study, the distribution system improvements should be performed in two phases. Phase 1 distribution system improvements would replace a deteriorating glued-joint PVC main and upgrade the system to meet residential fire flows (i.e., 1000 gallons per minute (gpm) @ 20 pounds per square inch (psi) residual pressure). Phase 2 distribution system improvements would provide for commercial fire flows (i.e., 2500 gpm @ 20 psi residual pressure) along Historic U.S. Highway 14.

In response to this confirmation, and due to the new CW Patterson South Subdivision currently being developed, Town personnel embarked upon the in-house construction of certain distribution system improvements in October 2004. Those improvements were some of those recommended in the Level I study, and they included the following:

- A new 8” main along the south side of the Patterson Subdivision and the north side of the CW Patterson South Subdivision. This main will eventually replace a portion of the glue-jointed main on the south side of Patterson Subdivision.
- A 10” main along the north side of Historic U.S. Highway 14 in front of the Buckhorn Grocery and the Tongue River Family Restaurant.
- A 10” main along Hardin Street from 2nd Avenue West to 3rd Avenue West.
This Level II study assumes that these improvements will soon be completed by Town personnel, and, as such, they have been included within the updated distribution system model. The remaining Phase 1 distribution system improvements still to be completed are outlined below:

- Replace the remaining portions of the glued-jointed main on the south side of Patterson Subdivision. The new main should be 8”.
- Loop the existing 4” main located in the alley behind the Ranchester Town Hall with the 6” main which ends at the intersection of Coffeen Street and Historic U.S. Highway 14. The new main should be 8”.
- Replace the existing 4” asbestos cement (AC) main extending along the south side of State Highway 345, beginning at a point approximately 300 feet east of Coffeen Street to the end of the current main. The new main should be 8”.

The recommended Phase 2 distribution system improvements, which would provide for commercial fire flows (i.e., 2500 gpm @ 20 psi residual pressure) along Historic U.S. Highway 14, include the following:

- Extend a new 8” and 10” main along the north side of Historic U.S. Highway 14 from Weare Street to the Tongue River Middle School (excepting the 10” main being installed by Town personnel in October 2004 in front of the Buckhorn Grocery and the Tongue River Family Restaurant).
- Loop the dead-end 6” main at the north end of 3rd Avenue West with the 10” main located at the intersection of Hardin Street and 2nd Avenue West. The new main should be 10”.
- Extend the 8” main to be located in Trail Drive (once the Five Mile Subdivision is developed) to the north, looping it with an existing 8” main that exists in the northwest area of the Wondra Subdivision. This looping main should be 8”.
- Extend the existing 6” main located in “H” Street to the south, looping it with a future 8” main that is expected to be extended to the south by future developers along Wolf Creek County Road. This looping main should be 8”.

A Phase 2 distribution system improvement discussed in the Level I study was an extension of a 10” main beneath Historic U.S. Highway 14, connecting it to a proposed new 10” main along the north side of Historic U.S. Highway 14. This component was installed by Ranchester town personnel in the early spring of 2004 and has therefore been eliminated from further planning.

2.4 TREATED WATER STORAGE

As part of the Level I study, the need for additional treated water storage was discussed. This additional storage was deemed necessary for the following reasons.

- The amount of reserve capacity available in the event of a major equipment failure at the Ranchester WTP is insufficient according to Ranchester personnel.
- Having just one tank within the system inhibits the ability of Ranchester to perform periodic maintenance on the existing tank.

Additional treated water storage also provides a tremendous benefit in the event of an extended fire event. The amount of recommended additional storage as determined in the Level I study was 300,000 gallons. However, Town personnel requested that a 500,000 gallon tank be recommended in the Level II study to provide for additional storage. If this larger capacity was provided, it would offset the need for the following other system improvements:

- Improvements to the current intake system, because operators could rely upon existing treated water storage for longer periods of time when raw water turbidity levels in the Tongue River are unsuitable for cost-effective water treatment; and
- Emergency power generation at the WTP, because operators could rely upon existing treated water storage for periods when extended power outages occur.

Two locations were considered for tank placement in the Level I study. The first location was directly adjacent to the existing tank on the hill north of Ranchester. The second location was to the west of...
Ranchester, which is the general direction of projected future growth for Ranchester. The Level II study determined that the first location (i.e., the existing 500,000-gallon tank site) remains the recommended site.

The dimensions of a new tank at the existing site would be approximately 24 feet high, with a diameter of approximately 60 feet. This new tank would be at both the same floor and overflow elevations as the existing tank in order to maximize both tanks’ hydraulic functionality.

3. RECOMMENDED IMPROVEMENTS

The previous section provided information on various improvements that should be considered for the Ranchester water system. Recommendations on these alternative improvements are provided below.

3.1 WATER TREATMENT PLANT IMPROVEMENTS

3.1.1 Intake Alternatives

With the decision by Ranchester town personnel to remove intake locations other than at the WTP site from consideration in the implementation of the improvement alternatives, a more detailed evaluation of three intake alternatives at the WTP site has been conducted. The three alternatives are:
- 1) a simple infiltration gallery,
- 2) a multiple screen infiltration gallery, or
- 3) a simple infiltration gallery with a contact basin.

All three alternatives would require placement of an infiltration gallery within or along the channel reach at the existing intake location.

Given the marginal anticipated benefit to be derived by constructing any of these onsite intake alternatives, and due to the current operation of the WTP which succeeds in addressing the raw water quality of the Tongue River source, discussions were held with Ranchester town personnel in August 2004. These discussions indicated a consensus by Ranchester town personnel that monies allocated for water-related improvements could be better spent for other water system improvements than implementing intake alternatives at this time. Therefore, the recommendation for implementation of an intake alternative is to take no action at this time.

3.1.2 Taste-and-odor Control Alternatives

Bench-scale testing provided as part of this study indicated that no reduction in organic concentrations is likely to be achieved by implementing either of the alternative taste-and-odor control techniques evaluated, those being hydrogen peroxide and PAC. Additionally, because there is no cost benefit to be achieved by implementing either of these alternatives, the recommendation for implementation of an alternative taste-and-control technique is to take no action at this time.

3.1.3 Disinfection Alternatives

An analysis of two alternative disinfection methods other than the gas chlorination system currently employed, namely sodium hypochlorite and ultraviolet light, revealed that there are limited benefits to be gained by implementing either of these two alternative methods. Additionally, it has been determined that neither of these two alternative methods can provide cost savings over the current gas chlorination system. Therefore, the recommendation for implementation of an alternative disinfection system is to take no action at this time.
3.2 DISTRIBUTION SYSTEM IMPROVEMENTS

Section 2.3 discussed proposed distribution system improvements to alleviate problems with Ranchester’s distribution system, as well as distribution system improvements embarked upon by Town personnel in October 2004. Based upon updated modeling of the Ranchester distribution system, it is recommended that Ranchester construct the following distribution system improvements:

- **Phase 1 Distribution System Improvements**
  - Patterson Subdivision Main to Replace Glued-jointed PVC Main
  - Distribution System Piping to Achieve Residential Fire Flows throughout Ranchester
    - Town Hall Looping Main Across Historic U.S. Highway 14 to Coffeen Street
    - Replace 4” AC Main South of Highway 345 and East of Coffeen Street
- **Phase 2 Distribution System Improvements to Attain Commercial Fire Flows Along Historic U.S. Highway 14.**

Because of the high additional capital cost to attain commercial fire flows along Historic U.S. Highway 14 (i.e., Phase 2 distribution system improvements) when compared to the capital cost to attain residential fire flows (i.e., Phase 1 distribution system improvements), and due to the other costs expected to be incurred to implement other recommendations contained within this study, Ranchester may choose to postpone the Phase 2 improvements until a later time.

3.3 TREATED WATER STORAGE

Additional treated water storage capacity would provide the following immediate benefits to Ranchester:

- The amount of treated water reserve capacity available for immediate use by Ranchester customers during an extended power outage, major equipment failure, or major fire event can be increased.
- Having an additional treated water storage tank would allow Ranchester to perform periodic maintenance on the existing tank that is approximately 25 years old.
- By having additional treated water storage available, improvements to the existing intake could be postponed or even eliminated, because operators could rely upon existing storage for longer periods of time when raw water turbidity levels in the Tongue River are unsuitable for cost-effective water treatment.
- By having additional treated water storage available, the need for an emergency generator at the WTP would be eliminated, because operators could rely upon the additional treated water storage made available for periods when extended power outages occur.

For the reasons cited above, it is recommended that Ranchester move forward with construction of an additional 500,000 gallon, aboveground steel water tank at the site of Ranchester’s existing storage tank north of the town limits.

3.4 EMERGENCY POWER GENERATION

In light of the above recommendation to construct a 500,000 gallon treated water storage tank, the total volume of treated water storage “floating on the distribution system” would be 1,000,000 gallons once constructed. This volume is greater than Ranchester’s estimated Year 2034 peak day usage of 740,000 gallons. Therefore, there would be no need for an alternative power source at the WTP in order to meet WDEQ requirements, and it is recommended that one not be installed.

Section 2.2.4 also discussed additional WTP recommendations relating to certain electrical service improvements. Ranchester has decided to complete these electrical system improvements at the WTP using in-house personnel.
3.5 LISTING OF RECOMMENDED IMPROVEMENTS

Based upon the recommendations in this section, Table 2 is a summary listing the recommended improvements for Ranchester and their associated estimated costs. These improvements are also depicted in Figure 2.

Table 2
Summary of Recommended Improvements

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>Cost Estimate</th>
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<tbody>
<tr>
<td>1</td>
<td>Distribution System Improvements</td>
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<tr>
<td></td>
<td>Patterson Subdivision Main to Replace Glued-jointed PVC Main</td>
<td>$115,616</td>
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<tr>
<td></td>
<td>Distribution System Piping to Achieve Residential Fire Flows throughout</td>
<td></td>
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<td></td>
<td>Ranchester</td>
<td></td>
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<tr>
<td></td>
<td>Town Hall Looping Main Across Historic U.S. 14 to Coffeen</td>
<td>$185,274</td>
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<td>Street</td>
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<td></td>
<td>Replace 4&quot; AC Main along Highway 345</td>
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<td></td>
<td>Additional 500,000 Gallon Steel Water Storage Tank</td>
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<td><strong>Total Phase 1 Recommended Improvements</strong></td>
<td><strong>$1,025,785</strong></td>
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<td>2</td>
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<td></td>
<td>to Attain Commercial Fire Flows along Historic U.S. Highway 14</td>
<td>$762,445</td>
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<td><strong>Total Phase 2 Recommended Improvements</strong></td>
<td><strong>$762,445</strong></td>
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4. ABILITY TO PAY ANALYSIS AND FINANCING PLAN

Potential funding sources available to Ranchester include:
- WWDC,
- Rural Utilities Service (RUS),
- State Loan and Investment Board (SLIB),
- WDEQ State Revolving Loan Fund, and
- Wyoming Business Council (Community Development Block Grant).

Of these various funding sources, the WWDC, RUS, and SLIB appear to have the greatest utility to match Ranchester’s $350,000 of capital facilities tax (CFT), which was approved by the voters of Sheridan County in 2003 for water-related improvements.

Table 3 portrays a possible funding scenario for the costs associated with the Phase 1 improvements, allocating costs between possible WWDC, RUS and SLIB grants, an RUS loan, and CFT monies. As discussed previously, $350,000 of capital facilities tax monies have been allocated for use by Ranchester for water system improvements, and these funds will be available to Ranchester by the end of 2004. The WWDC and 2005 Wyoming State Legislature could conceivably authorize Level III (design and construction) funding, which would be available in early summer of 2005. RUS grant funds are shown to be at 30% of the project cost, which is the maximum percentage currently available per RUS representatives. These funds should be requested as soon as possible to match the timing of the WWDC monies. Finally, an application could be made in the spring of 2005 for SLIB consideration at its June 2005 meeting. If all applications are successful in securing funding, all necessary monies for the Phase 1 improvements would be in place.

Because Table 3 shows no use of RUS loan monies, no additional debt service – hence, no user water rate increase - is required of the Ranchester citizenry. Instead, the local share of the Phase 1 improvements is being borne totally by the $350,000 of capital facilities tax earmarked for water system improvements.
Table 3
Possible Funding Scenario for Phase 1 Improvements

<table>
<thead>
<tr>
<th>Description</th>
<th>WWDC Grant</th>
<th>SLIB Grant</th>
<th>RUS Grant</th>
<th>CFT</th>
<th>RUS Loan</th>
<th>Total Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patterson Subdivision Main Replacement</td>
<td>$0</td>
<td>$0</td>
<td>$57,808</td>
<td>$57,808</td>
<td>$0</td>
<td>$115,616</td>
</tr>
<tr>
<td>Distribution System Piping to Achieve Residential Fire Flows</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Town Hall Looping Main Across Historic U.S. 14 to</td>
<td>$0</td>
<td>$0</td>
<td>$92,637</td>
<td>$92,637</td>
<td>$0</td>
<td>$185,274</td>
</tr>
<tr>
<td>Replace 4” AC Main along Highway 345</td>
<td>$0</td>
<td>$55,287</td>
<td>$0</td>
<td>$42,871</td>
<td>$0</td>
<td>$98,158</td>
</tr>
<tr>
<td>Additional 500,000 Gallon Storage Tank at Existing Tank Site</td>
<td>$313,369</td>
<td>$0</td>
<td>$156,684</td>
<td>$156,684</td>
<td>$0</td>
<td>$626,737</td>
</tr>
<tr>
<td>Totals for Phase 1 Improvements</td>
<td>$313,369</td>
<td>$55,287</td>
<td>$307,129</td>
<td>$350,000</td>
<td>$0</td>
<td>$1,025,785</td>
</tr>
</tbody>
</table>

Percentage Share of Phase 1 Improvements: 30.5% 5.4% 29.9% 34.1% 0.0% 100.0%

Table 4 depicts a generic funding scenario for the Phase 2 improvements. Because these improvements may not to be constructed immediately, future funding from the currently available sources is not guaranteed. Table 4 assumes that an RUS loan would be a funding source. The RUS loan would be repaid via revenues that would be derived from an increase in user fees. Based upon a loan at 4 3/4% interest and a term of 30 years on an amount of $152,488, the annual debt service would be $9,639.

Table 4
Possible Funding Scenario for Phase 2 Improvements

<table>
<thead>
<tr>
<th>Description</th>
<th>WWDC Grant</th>
<th>SLIB Grant</th>
<th>RUS Grant</th>
<th>RUS Loan</th>
<th>Total Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution System Piping to Achieve Commercial Fire Flows along Historic U.S. 14</td>
<td>$310,742</td>
<td>$70,481</td>
<td>$228,734</td>
<td>$152,488</td>
<td>$762,445</td>
</tr>
<tr>
<td>Totals for Phase 2 Improvements</td>
<td>$310,742</td>
<td>$70,481</td>
<td>$228,734</td>
<td>$152,488</td>
<td>$762,445</td>
</tr>
</tbody>
</table>

Percentage Share of Phase 2 Improvements: 40.8% 9.2% 30.0% 20.0% 100.0%

Table 5 portrays additional amounts that would be due from Ranchester water customers via user charges in order to fund annual debt service if the prospective Phase 2 improvements are performed at this time. Assuming that current income and expenses are essentially the same at the present time, a user rate increase would be necessary to fund these Phase 2 improvements. This table shows that the amount of the rate increase would depend upon whether the increase is based upon the number of equivalent dwelling units (EDUs) or number of actual taps.

Table 5
User Charge Increases Required to Implement Phase 2 Improvements using RUS Loan

<table>
<thead>
<tr>
<th>Project to be Implemented</th>
<th>Annual Debt Service</th>
<th>Annual Increase per EDU (based upon 397 EDUs)</th>
<th>Monthly Increase per EDU</th>
<th>Annual Increase per tap (based upon 302 taps)</th>
<th>Monthly Increase per tap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2 Distribution System Improvements to Achieve Commercial Fire Flows along Historic US Highway 14</td>
<td>$9,639</td>
<td>$24.28</td>
<td>$2.02</td>
<td>$31.92</td>
<td>$2.66</td>
</tr>
</tbody>
</table>

Ranchester’s current monthly rates became effective in January 2004. For a typical monthly use of 12,500 gallons per month, the rate increase that became effective at that time meant that the monthly water billing for a single unit residential became $26.90, which is an additional $9.00 per month over previous rates, or 50% increase.
As depicted in Table 3, Ranchester can fund all proposed Phase 1 improvements utilizing WWDC, SLIB and RUS grants, as well as CFT monies authorized for water system improvements. Because debt financing will not be required for these Phase 1 improvements, Ranchester will not need to increase user rates for this purpose. However, in order to also fund Phase 2 improvements at this time (which would construct distribution system improvements necessary to increase fire flows along Historic U.S. Highway 14), an additional user rate increase in the amount of approximately 10% would be necessary.

5. **PATH FORWARD**

Based upon the above summary, the following items provide for a path forward for Ranchester.

1. Decide if Ranchester wants to implement solely Phase 1 improvements (which will require no rate increase if grant funds can be secured) or both Phase 1 and Phase 2 improvements. Phase 2 improvements will require a water rate increase in order to fund the debt required to finance the improvements.

2. Immediately approach the WWDC for a Level III grant for the amount of $313,369 to fund design and construction of WWDC-eligible Phase 1 project components, and an additional $310,742 if Phase 2 project components are also to be constructed at this time. The total amount to be requested from WWDC if both phases are to be constructed would be $624,111.

3. Immediately approach RUS for grant monies totaling $307,129 to fund design and construction of the Phase 1 project components, and an additional $228,734 if Phase 2 project components are also to be constructed at this time. The total amount to be requested from RUS if both phases are to be constructed would be $535,863.

4. If Ranchester desires to pursue construction of Phase 2 project components at this time, immediately approach RUS for loan monies totaling $152,488 to fund design and construction of these Phase 2 components.

5. Support SLIB staff efforts to have municipalities obtain a one-time appropriation from the 2005 Wyoming State Legislature for various infrastructure improvements.

6. Immediately approach the SLIB for a mineral royalty grant for the amount of $55,287 to fund design and construction of Phase 1 project components, and an additional $70,481 if Phase 2 project components are also to be constructed at this time. The total amount to be requested from SLIB if both phases are to be constructed would be $125,768.

7. Once the necessary funding has been procured, and sometime after July 1, 2005, award an engineering contract for designing the desired project improvements.

8. Secure necessary permits from the following agencies:
   - WDEQ,
   - Wyoming Department of Transportation,
   - Sheridan County, and
   - State of Wyoming Department of Fire Prevention and Electrical Safety.

9. After procurement of the above-listed permits, award construction contracts to allow for construction of the selected improvements. This work could conceivably commence in the late fall of 2005, with completion contemplated by the summer of 2006.

10. If Phase 2 improvements are to be constructed, implement the necessary rate increase to fund debt service.