EXECUTIVE SUMMARY

FOR THE

BURLINGTON WATER SUPPLY PROJECT LEVEL II

SUBMITTED TO:

Wyoming Water Development Commission
Herschler Building, Fourth Floor, West
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Cheyenne, Wyoming 82002

AND THE

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SUBMITTED BY:

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INTRODUCTION

This Executive Summary of the Final Technical Report for the Town of Burlington Water Supply Project Level II, provides information and recommendations pertinent to the recommended plan and cost opinions. The project was initiated by the town's concerns for wellhead protection. A complete feasibility (Level II) analysis of the wellhead protection and the entire Burlington water system was authorized by the Wyoming Water Development Commission (WWDC) in a June 5, 1996 contract with MSE-HKM, Inc. of Sheridan, Wyoming. For a complete report of the project details the reader should refer to the Final Technical Report.

Study Team


Project Location

The Town of Burlington is located in the Big Horn Basin three miles north of the Greybull River on State Highway 30 midway between Greybull and Cody, Wyoming on U.S. Highway 14/16/20. Burlington is in Big Horn County with its county seat at Basin, Wyoming.

The town is within the lower reaches of lands irrigated by the Greybull Valley Irrigation District on terraces of the Emblem Bench geographic area. Shallow alluvial groundwater is currently being utilized for municipal water supply for this rural town of about 200 residents. The town is experiencing growth which appears to be primarily related to the wave of people moving to small towns that offer the quality of life that is apparent at Burlington, Wyoming.

DESCRIPTION OF EXISTING SYSTEM

The Town of Burlington installed a new water supply and distribution system in 1986 and 1987. Prior to this date private wells and sewage septic systems were owned by each homeowner. When it became apparent that the septic systems were contaminating the shallow individual alluvial wells, the Town embarked on building a municipal systems. The Farmers Home Administration (FmHA) provided cooperative funding for two new wells (Burlington No. 1 and 2), piping distribution system, storage reservoir and all appurtenances and controls and a sewage collection and wastewater lagoon located to the east (down-gradient) from the Town. The two wells were located in alluvium which was influenced heavily by surface water irrigation canals and the wells went dry when irrigation water was discontinued in the winter of 1988. Two new wells (Burlington No. 3 and 4) were completed in 1988 southwest of Burlington in what appears to be a very competent alluvial water supply.

The existing municipal water system for the Town of Burlington, Wyoming consists of two alluvial wells, a sodium hypochlorination disinfection system at the well house, 7012-feet of 4-inch water main to the town, 1,140-feet of 2- and 3-inch mains, 14,660-feet of 6-inch distribution system throughout the town, 2,700-feet of 8-inch distribution mains around the Burlington School property and 5,190-feet of 8-inch main north from town to a 150,000 gallon storage tank on the Emblem Bench. Fire hydrants are installed throughout the town and a telemetry system was installed to regulate on/off pumping cycles based on storage reservoir levels. The telemetry system is currently out of service.
Alluvial Wells

Two alluvial wells with submersible pumps provide water on demand generally on an alternating basis. The wells are closely spaced and although the aquifer yields sufficient quantity to allow the wells to pump simultaneously, operating them together is not efficient due to the capacity of the 4-inch water main from the wells to town.

Well History—Burlington Well No. 3 (UW79233). The well was drilled for the Town in August 1988 and completed with pumping equipment November 9, 1988. Twelve feet of 12-inch surface casing was installed and cemented in place prior to drilling the lower part of the well. An air rotary rig equipped with a 6 5/8-inch tri-cone bit was used to drill to the total well depth of 48 feet; the Willwood Formation was encountered at 34.5 feet.

The well was drilled for the Town in August 1988 and completed with pumping equipment November 9, 1988. Twelve feet of 12-inch surface casing was installed and cemented in place prior to drilling the lower part of the well. An air rotary rig equipped with a 6 5/8-inch tri-cone bit was used to drill to the total well depth of 48 feet; the Willwood Formation was encountered at 34.5 feet.

Field inspection of the pump in Burlington Well No. 3 found that the bearings and check valve are in good condition. Pump impellers typically remain in good condition as long as the bearings are not damaged, and therefore were not inspected. The bottom of the pump intake was found at 36.5 feet below the top of the casing.

The pump motor was also inspected. The motor windings, thrust bearing, and top radial bearing were all in good condition. The motor cooling tube was corroded away, with the center of the tube missing entirely. However, this condition was not considered to be a problem because of the limited amount of drawdown caused by the current pumping rate, coupled with the pumping rate of approximately 80 gpm.

The pump column found in the well consisted of 3-inch nominal diameter steel and was observed to contain three holes in the joint of pipe immediately above the pump. In addition, the threads on the second joint of pipe were badly corroded. Due to the damage, the pump column was replaced with new 3-inch nominal diameter steel pump column when the pumping equipment was reinstalled in the well; the pump intake is now set at 36.9 feet.

Pumping tests were conducted at Burlington Well No. 3 as part of this study in order to compare the present day specific capacity of the well to that determined when the well was originally constructed and to determine aquifer characteristics need for wellhead protection area delineation. The permanent pumping equipment was removed from the well and replaced with a Hitachi 7.5 hp, 6-inch submersible pump with the intake set at 21 feet below the top of the casing.

Table 1 lists the aquifer characteristics calculated for the Burlington Well No. 3. Only one of the two town wells was tested because of the proximity of the wells to one another and the indications from the lithologic logs that the aquifer lithology changes very little across the 34.5 feet separating them. Aquifer performance testing determined that the aquifer developed by Wells Nos. 3 and 4 is semi-confined, with an apparent effective transmissivity of approximately 77,000 gpd/ft². Data collected at the observation...
well located 17.1 feet from Burlington Well No. 3 allowed calculation of a dimensionless storage coefficient, which was determined to be approximately 0.00065; this value falls within the range typically observed in semi-confined aquifers. Comparison of the step test results to the data collected during the 1988 well test indicates the specific capacity of the well has decreased since it was first tested.

### TABLE 1
SUMMARY OF PUMPING TEST ANALYSES
TOWN OF BURLINGTON WELL NO. 3

<table>
<thead>
<tr>
<th>TYPE OF TEST</th>
<th>WELL</th>
<th>RADIUS (Feet from Pumping Well)</th>
<th>METHOD OF ANALYSIS</th>
<th>STORAGE COEFFICIENT (dimension-less)</th>
<th>TRANS-MISSIVITY (gpd/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996 Pumping (drawdown)</td>
<td>Well No. 3 (pumped well)</td>
<td>0.33 ft</td>
<td>Cooper &amp; Jacob</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1996 Pumping (drawdown)</td>
<td>Observation Well</td>
<td>17.1 ft</td>
<td>Cooper &amp; Jacob</td>
<td>–</td>
<td>106,000</td>
</tr>
<tr>
<td>1996 Pumping (recovery)</td>
<td>Well No. 3 (pumped well)</td>
<td>0.33 ft</td>
<td>Cooper &amp; Jacob</td>
<td>0.00065</td>
<td>77,000</td>
</tr>
<tr>
<td>1996 Pumping (recovery)</td>
<td>Observation Well</td>
<td>17.1 ft</td>
<td>Cooper &amp; Jacob</td>
<td>0.00065</td>
<td>77,000</td>
</tr>
<tr>
<td>1988 Observation Well</td>
<td>17.1 ft</td>
<td>unknown</td>
<td>Cooper &amp; Jacob</td>
<td>0.0005*</td>
<td>46,300</td>
</tr>
</tbody>
</table>

*assumed

**Well History - Burlington Well No. 4 (UW77827).** A well was drilled for the Town in August 1988 and completed with pumping equipment April 21, 1989. The well was constructed using casing and screen salvaged from either Well No. 1 or 2. Twelve feet of 12-inch surface casing was installed and cemented in place. The well was then drilled to a total depth of 48 feet using an air rotary rig equipped with a 6 5/8-inch tri-cone bit, penetrating alluvium to a depth of 36 feet and the Willwood Formation from 36 to 48 feet. Dismantling Well No. 4 was beyond the scope of work for this project. The salvaged pumping equipment installed in the well in April 1989 remains in use. It consists of a 7.5 hp Grundfos submersible pump (Grundfos Model No. 27-4) equipped with a 7.5 hp Franklin Electric submersible motor (Franklin Electric No. 2366016010). Although the pump from Well No. 4 was not removed from the well for inspection, its pumping rate and associated backpressure as well as its shut-off pressure were recorded for comparison to the pump specifications provided by the manufacturer. The pump is designed to perform most efficiently when the production rate is 125 to 150 gallons per minute (gpm) against approximately 140 to 160 feet of total dynamic head. The pump is currently pumped against 160 to 170 feet of total dynamic head, but only delivers 81 gpm against 169 feet of total dynamic head, rather than the 112 gpm predicted for a new pump against the same pressure. Even when new, the pump did not operate at the peak of the efficiency range; when new pumping equipment is required at some time in the future, the Town may wish to consider choosing a different pump model in order to minimize operating costs.

**Well House and Disinfection**

The well house contains a piping manifold from the two wells located outside of the well house. The manifold combines water from each well into one mainline. Corrosion is occurring on the exterior of the steel pipe manifold. General clean-up and painting is needed in the well house.
A sodium hypochlorinate disinfection system is housed in the well house. This system includes a tank which contains liquid hypochlorinate solution and an injector pump which is matched to the pump discharge. The chlorine injector pump requires manual adjustment and is based on chlorine residual measured with a HACH field kit at the Town Hall. At times during this study the chlorine odor in the well house was objectionable. An exhaust fan is manually operated.

The well house contains a telemetry system that is supposed to turn pumps on or off based on a water level altitude signal from the storage tank north of town. This system is not functioning.

Water Mains

The existing water mains in the Burlington system are primarily AWWA C900 PVC mains. The distribution system in the Town service area is a well-looped system of 6-inch mains except for the block around the school which is 8-inch in size. There is one block of 6-inch ductile iron pipe (DIP) installed near the store. DIP material was used due to contaminated soils from a previous underground storage tank leaking in the vicinity. The ductile iron pipe was reportedly wrapped in 8-mil polyethylene encasement for corrosive soils and oil resistant gaskets were used in joints. From the north end of town, an 8-inch PVC main extends to the tank. From the south end of town, a 4-inch PVC main extends to the wells. All of the existing mains are reportedly in good condition. This condition is aided by the fact that these mains were installed recently (1988) and that the soil at Burlington is reportedly more of a sandy soil which help reduce corrosion on underground metal pipe or fittings. The system appears to have a generally acceptable layout of isolation valves and fire hydrants.

The existing mains should serve as a good core system for future extensions, as the distribution system slowly grows inside the city limits and along the 8-inch main toward the tank. Future lines must be properly sized and looped in order to provide the necessary domestic and fire flows.

Storage Tank

The existing storage tank is located on the Emblem Bench approximately 1.25 miles north of town. This is an above-ground bolted steel tank manufactured by Peabody Tektank and installed in 1988. The tank is 30-feet high with a capacity of 150,000 gallons. An ice layer develops in the tank in the winter and although it does not cause serious problems, it does force the center pole to one side. Problems with the overflow freezing have not occurred in the past.

One concern relating to the location and size of the tank is stagnant water during the summer and low chlorine residuals. Due to its location on the far end of the system away from the wells, if the wells are operating they first go to meet demand in the system. Water is only pumped to the tank when the demand is less than the pump capacity. Water is not supplied from the tank except at times when the wells are not operating or when peak demands exceed the well production. This can create lower than desirable turnover in the tank which can lead to lower than desirable chlorine residuals. Chlorine samples taken on July 19, 1996 showed a chlorine residual near the base of the tank of 0.18 mg/l, which was the lowest point of five samples taken throughout the system.

The size of the tank appears to be adequate for a design fire flow of 750-gpm for 2 hours, 90,000 gallons would need to be in gravity storage to meet this fire requirement. This would leave 60,000 gallons additional storage for cycling through the day to meet peak hour demands, and for storage when the pumps are not operating. This quantity exceeds one average day. As the system expands, and the town wishes to increase the fire flow for the school and commercial areas, then the tank capacity will not be sufficient.
On November 22, 1996 the 150,000 gallon storage tank was drained and inspected by MSE-HKM, Inc., corrosion specialist William Spickelmire of Rustnot Corrosion Control Services, Inc., Boise, Idaho and City employee Larry Stanger. The outside of the tank appeared to be in good condition as did the roof. A small leak was noted (before draining) on the northwest edge of the tank. On the inside it was determined that a 1/2-inch diameter corrosion hole in the bottom and 4-inches in from the wall was providing the leakage. A fiberglass patch was placed in the hole to stop the leak.

The interior tank walls and ceiling were observed and the epoxy coating appeared to be in good condition with only minor rust stains visible. The wall and ceiling panel bolt heads were coated and rust was not visible. Wall bolt heads are in slotted channels.

The floor was constructed from pie-shaped steel panels with the nut end of the bolt on the inside. The bottom of the tank supposedly rests on a bed of sand saturated with diesel fuel. The tank is supported by a concrete ring foundation under the walls. The bottom panel nuts and bolts are rusting and rust spots were observed on the bottom panels where coating damage exists. Recoating of the tank bottom and spot coating on sides is recommended when weather conditions are favorable.

The center support column is not attached at the bottom to allow it to move up and down slightly as the tank shape changes with loading and temperature. Corrosion is occurring on the column. The area of the floor which supports the column base needs to be cleaned off, inspected and recoated. The movement of the column does not appear to be damaging the floor.

Based on the November 22, 1996 inspection it is recommended that the tank interior should be spot coated with a potable water tank epoxy with a complete coating of the bottom. It is recommended that a magnesium anode be installed to provide additional corrosion protection.

**Flows and Pressures**

With a tank overflow elevation of 4564.5-feet, the static pressure in the distribution system varies from 52 to 66 psi. This is a very good static pressure. Since the area within the town limits and the potential service area north and possibly south of town is relatively flat, the system will be able to serve the current and future service from this one pressure zone.

Due to the relatively small size of this system and the looping, peak hour domestic requirements are met with little drop in pressure. Pressure drops only becomes a concern during a fire flow situation. A fire flow of approximately 850 gpm is available at the school while keeping residual pressures above 20 psi. The only location with restrictions due to existing pipe size is the area along the 4-inch line south of town. This 4-inch line goes to the wells and is currently adequate for providing water supply from the wells to the distribution system. If the area south of town is ever to be served with fire flows, this line will need to be upgraded. Also, if increased production is desired from Well No. 3 and 4 or if additional wells are placed south of town to provide service for the growing community, the 4-inch line will be too small. A 6 or 8-inch line would then be needed to meet these additional flow requirements.

The current design fire flow is 750 gpm. This flow is low for the school and commercial areas. If the goal is to increase the fire flow for these areas to the recommended 1,500 gpm, then the main from the gravity storage tank to the service area will also need to be increased. The design flows for the system are shown on Table 2.
POPULATION AND DESIGN CRITERIA

TABLE 2
BURLINGTON WATER SUPPLY PROJECT-LEVEL II
DESIGN CRITERIA

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>2016 (Design Year)</th>
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<tbody>
<tr>
<td>WATER USAGE</td>
<td></td>
</tr>
<tr>
<td>Average, per capita</td>
<td>190 gpd</td>
</tr>
<tr>
<td>Peak day, per capita</td>
<td>313 gpd</td>
</tr>
<tr>
<td>PEAKING FACTORS</td>
<td></td>
</tr>
<tr>
<td>Peak day/Average day</td>
<td>2.85</td>
</tr>
<tr>
<td>DESIGN FLOWS</td>
<td></td>
</tr>
<tr>
<td>Peak Day</td>
<td>51,000 gpd</td>
</tr>
<tr>
<td>Peak Hour</td>
<td>112,000 gpm</td>
</tr>
<tr>
<td>FIRE FLOWS</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>750 ppm</td>
</tr>
<tr>
<td>Residential Areas</td>
<td>750 ppm</td>
</tr>
<tr>
<td>School/Commercial Areas - Future</td>
<td>1,500 gpm</td>
</tr>
</tbody>
</table>

WELLHEAD PROTECTION PLAN

Overall the quality of water from Burlington's wells is good. No metals, inorganic chemical, volatile or semi-volatile chemical, or radionuclide concentrations approach MCLs. Nitrates have been detected in the water at concentrations ranging from 1.81 to 5.95 milligrams per liter (mg/L; variously reported as "NO₃ + NO₂, as N" and as "NO₃, as N"). This range of nitrate concentrations is below the MCL of 10 mg/L; however, the water system should monitor nitrate carefully to determine if the concentration is increasing through time or if there are seasonal variations. The two samples collected in 1996 had higher levels than earlier samples (5.95 mg/L in April sample and 5.36 mg/L in June sample). It is recommended that quarterly samples be collected for nitrates for two years to establish better baseline data and to help determine if the concentration is increasing or if these are seasonal fluctuations.

Total dissolved solids (TDS) constituted 568 parts per million (ppm) of the water sample collected August 8, 1988 from the test well located 17 feet west of Well No. 3 (Mclellan, 1988). The June 24, 1996 sample contained a TDS concentration of 499 mg/L. Although these TDS concentrations equal or exceed the EPA-recommended limit of 500 ppm, it is not a concern from the standpoint of human health; the EPA guideline is based on aesthetic considerations. It is not uncommon for Wyoming communities to use water with TDS between 500 and 1,000 ppm.

The EPA's two most recent Sanitary Surveys of the Town's water system conclude that while the system's two wells are well constructed, their shallow depths make them potentially vulnerable to contamination. The wells were given an internal agency scoring of 25 points. Scores above 40 points indicate potential for the surveyed well to be under the direct influence of surface water and indicate that more investigation is required. While the score of 25 points indicates that it is unlikely, in the view of the EPA, that the wells are under the direct influence of surface water, the EPA commented that vulnerability is increased by flood irrigation and application of agricultural chemicals to the surrounding farmland. The EPA also assessed the vulnerability of the Burlington water system to volatile organic compounds (VOC), giving the system a score of 31 points; systems which score below 50 points are considered to have low vulnerability. As a system considered to be fairly non-vulnerable, Burlington is not subject to the increased frequency of VOC monitoring required for high vulnerability systems.
As a matter of information, EPA Primary Drinking Water Standards pertain to a list of contaminants identified as potentially hazardous to human life if ingested in adequate amounts. The amounts of these contaminants considered safe for human consumption are identified as MCLs and are established by the EPA. Compliance with EPA drinking water standards for public water supplies is mandatory under state and federal law. Secondary Drinking Water Standards pertain to contaminant levels that, if above recommended concentrations, may cause water to be aesthetically unpleasant, distasteful, or odorous. Secondary standards are provided by the EPA strictly as recommended levels. No enforcement of the secondary standards is made by the EPA or the Wyoming Department of Environmental Quality.

Given that continued use of the existing wells is judged to be feasible, the first phase of ensuring that the water supply needs of Burlington residents continue to be met is protection of the water quality from Burlington Well Nos. 3 and 4. The most effective method of providing this protection is through a local wellhead protection plan. National and state programs, as discussed below, provide the framework and guidance for developing a local wellhead protection plan.

The 1986 amendments to the Safe Drinking Water Act (SDWA) established the Wellhead Protection (WHP) program. This legislation established a nation-wide program to encourage states to develop systematic and comprehensive programs within their jurisdictions to protect PWSs from contamination. The principal objective of this program is to prevent the contamination of groundwater resources that supply public drinking water. Wellhead protection is not restricted to the immediate area of the point of withdrawal; it includes the recharge area of the aquifer(s) that provide water to the well, wellfield, spring, or tunnel. The delineation of a Wellhead Protection Area (WHPA) is a major element in the development of a WHP program.

In 1995 the Wyoming Department of Environmental Quality, in conjunction with the EPA, began drafting a state WHP program. The State of Wyoming adaptation of the WHP program require that WHP plans for Wyoming water systems be composed of five elements:

- An introduction to the state-wide WHP program including a description of roles of state and federal agencies, local government entities, the public, commercial interests, and public water suppliers, with respect to the specific WHP plan.
- A WHP Delineation Report summarizing the technical approach to delineate 180-day, 1-year, and 5-year protection areas.
- A prioritized inventory of potential contamination sources developed for each delineated zone or management area surrounding a well, wellfield, spring or tunnel.
- An implementation and management plan for existing and future potential contaminant sources for each well, including financial assurance requirements.
- A contingency plan addressing water supply emergencies, rationing, remediation or treatment, and new source development if a water supply becomes degraded.

Additionally, new wells should be sited with due consideration of the foregoing WHP elements, to minimize the potential for contamination of the water supply. As part of this project, a WHP plan has been developed for the Town of Burlington.
FUTURE WELL CONSIDERATIONS

The second element phase of ensuring a continued safe water supply is to construct a well(s) in locations which are not susceptible to the same source of pollution that potentially threatens the current water supply. This goal can be achieved by drilling a well which develops water from a different aquifer, or by drilling a well hydraulically upgradient from potential contamination sources which could impact the existing wells. Three potential new sources of water were identified in this study:

- A new shallow well in the Sunshine Terrace Deposit on Emblem Bench (near the existing water tank).
- A Willwood Formation well on Emblem Bench or near the existing Well No. 3 and 4.
- A new alluvial well located west of the existing wells.

RECOMMENDED PLAN

DESCRIPTION

Wellhead Improvements. Recommendations include implementation of a well head protection plan (WHPP) developed during this Level II Study. The features of the WHPP that are recommended for Level III are:

1. Purchase approximately five acres of land adjacent to the existing wells and enclose with a 6-foot chain link fence and a wire security overhang.
2. Construct four monitor wells in the recharge area. (Locations shown on Figure 1)
3. Prepare final conservation easements for wellhead protection area.
4. Prepare signs to be posted in the WHP area and assist the town with public education.

During the Level III implementation it is recommended that an ordinance be prepared to describe the allowed uses and operations within the 5 acre town property surrounding the wells. All potential contaminants that currently exist need to be removed and restrictions should be put on activities which could cause future contamination. For example, the existing septic system should be removed or at least it should be pumped out, contaminated soil should be removed and automobiles and debris should be removed from the yard and shop building. Restrictions should be placed on the storage of fuel, oil, pesticides, herbicides and other polluting type materials. Mechanical repair activities should be prohibited. The building and yard could be used for storage of non-polluting materials such as lumber, steel, parts, valves, fittings, pipe or other similar materials. Future town councils and employees need to be aware by ordinance that the wellhead property was purchased for wellhead protection.

Manifold House and Well Improvements. Proposed improvements include the installation of new pumps and pump column in existing alluvial Wells No. 3 and 4. Pump capacities will be increased to a combined capacity of 200 gpm as compared to 113 gpm from the two existing pumps. The normal operation would be to run one pump at 100 gpm and alternate the use. Water levels in the storage tank would be the controlling mechanism.

Some other improvements recommended at the well house include interior painting and repair of the existing telemetry system. (It is unknown at this point whether the existing telemetry system can be repaired, but it is assumed that it is repairable.) An hour meter in the well house will be used to determine which pump should operate and tank water levels via telemetry will determine the pump on/off sequence. The exact configuration and direction of underground piping leaving the manifold house is unknown and will need to be exposed during construction.
Gas Chlorine System. A gas chlorine system is recommended to be installed at the manifold house to replace the existing system. A new chlorine house will be constructed outside of the existing manifold house. Required safety equipment and ventilation will be included.

Chlorine gas will be injected into the existing pipeline reducer on the pressure side of the check valve. This point is close to the existing spigot and will not allow accurate sampling of chlorine at that point. It is recommended that a sampling station be installed on the pipeline outside of the manifold house.

Transmission Pipeline. The primary goal for the Burlington water system improvements is to construct a transmission pipeline from the existing Well No. 3 and 4 directly to the 150,000 gallon storage tank. The proposed 8-inch transmission pipeline is 15,500 feet in length including an 8-inch cross connection to the existing 8-inch main located along the north city limit line. Water chlorinated at the wellhead would be pumped directly to storage and then returned to town via the existing 8-inch water main located along Highway No. 30. By having a direct link from the wells to storage, ample chlorine contact time is provided and there will be continuous water turn over in the tank. Previous icing problems in the tank during winter months should be eliminated. In the future, when a Willwood Formation well is constructed it could be located at the existing wellhead or at the storage reservoir. The storage tank will also serve as a blending chamber for mixing water supplies.

As a secondary benefit, the proposed 8-inch transmission water line will also give Burlington full fire protection providing 1,500 gpm in town for about 2 hours if both well pumps are operating or about 1.7 hours if both pumps are out of service. A closed valve would have to be opened to allow full fire flow from the tank via both 8-inch transmission pipelines. (Normally the valve would be closed to prevent water from short circuiting directly from the wells to the town distribution system.) To provide looping on the west edge of Burlington, it is recommended that a 6-inch water main be installed for 2,600 feet parallel and in the same trench as the proposed 8-inch transmission main. An additional 850-feet of 6-inch water main is also recommended north of the Burlington school. A schematic drawing of the pipeline details is shown on Figures 1 and 2.

Storage Tank Improvements. Recommended improvements at the existing 150,000 gallon storage tank include additions to yard piping and interior coating of the tank.

The new 8-inch transmission line from Well No. 3 and 4 will be installed to discharge into the tank. Yard piping will be designed and valved so that water can be directed to bypass the tank and a drain will be installed. The storage tank interior will be sandblasted on the interior bottom and the bottom 3-feet of the shell or walls and will be recoated with an epoxy finish acceptable by AWWA standards for potable tank coating. Some cleaning and spot coating will also be completed in a few locations in the upper portions of the tank and on the entire center post of the tank.
Cost Opinion

The total opinion of cost for the Recommended Plan is provided in the following Table 3.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT COST</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
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<td>Design and Specifications</td>
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<td>$55,800</td>
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<td>Permitting and Mitigation</td>
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<td>$5,000</td>
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<tr>
<td>Legal Fees</td>
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<td>$6,000</td>
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<tr>
<td>Acquisition of Access and ROW</td>
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<td>$45,000</td>
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<td><strong>Cost of Project Components:</strong></td>
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<tr>
<td>Pipeline: 8&quot; - 15,500'; 6&quot; - 3,650'</td>
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<td>$481,100</td>
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<tr>
<td>2 - 100 gpm Pumps</td>
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<tr>
<td>Storage Reservoir Recoating</td>
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<td>Gas Chlorination System w/Well House Improvements</td>
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<td>Park Irrigation Wells</td>
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<td></td>
<td>$613,500</td>
</tr>
<tr>
<td>Contingency (subtotal x 15%)</td>
<td></td>
<td>$92,000</td>
</tr>
<tr>
<td><strong>Construction Total</strong></td>
<td></td>
<td>$705,500</td>
</tr>
<tr>
<td><strong>PROJECT TOTAL COST</strong></td>
<td></td>
<td>$817,300</td>
</tr>
</tbody>
</table>

Funding Options

The Recommended Plan can only be implemented if a favorable funding mechanism can be assembled and the town can afford repayment of capital improvements and operation and maintenance cost. These costs are typically funded locally from utility rates.

Funding recommended for the capital improvements for the Recommended Plan are outline in Table 4 and a recommended water rate schedule for the Town of Burlington is shown on Table 5.
TO STORAGE TANK,
SEE FIGURE 26
FOR YARD PIPING

NOTE:
ALL SERVICE TAPS TO BE
CONNECTED TO 6" WATER LINE

NORMALLY CLOSED

2600' OF
6" PIPE

SECTION
DUAL WATER LINE (TYP)
NOT TO SCALE

TO MANIFOLD HOUSE,
SEE FIGURE 24
FOR YARD PIPING

BURLINGTON LEVEL II STUDY
PROPOSED TRANSMISSION & DISTRIBUTION
SYSTEM IMPROVEMENTS
**TABLE 4**
**BURLINGTON WATER SUPPLY PROJECTS**
**RECOMMENDED PLAN**
**FUNDING OPTION**

<table>
<thead>
<tr>
<th>FEDERAL:</th>
<th>Grant (Rural Utility Service-RUS)</th>
<th>$400,000.00</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loan @ 5¼% for 30 yrs. from RUS</td>
<td>$ 50,000.00</td>
</tr>
<tr>
<td>STATE:</td>
<td>Grant (Wyoming Water Development Commission-WWDC)</td>
<td>$360,000.00</td>
</tr>
<tr>
<td>TOWN:</td>
<td>Burlington Water Reserve Account</td>
<td>$ 7,300.00</td>
</tr>
</tbody>
</table>

**TOTAL FUNDING**

$817,300.00

**LOAN REPAYMENT:**
- $50,000.00 @ 5¼% for 30 yrs. from RUS: Annual Payment $3,300.00
- Burlington H.S. Base Rate Increase @ $72 per Month: $864.00

Number residential taps = 82
Cost per equivalent tap per year $29.71
Cost per equivalent tap per month $2.48

**RECOMMENDED BASE RATE INCREASE (per residential tap) =** $3.00/MO.
**RECOMMENDED BASE RATE INCREASE (per high school) =** $72.00/MO.

**Future Rate Structure**

**TABLE 5**
**BURLINGTON WATER SUPPLY PROJECT-LEVEL II**
**TOWN OF BURLINGTON WATER RATES**
**PROPOSED FOR 1997**

<table>
<thead>
<tr>
<th>TYPE OF RATE</th>
<th>NUMBER OF EQUIVALENT TAPS</th>
<th>1996 WATER RATES</th>
<th>1997 WATER RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MONTHLY BASE RATE</td>
<td>MONTHLY USE RATE</td>
</tr>
<tr>
<td>Residential (includes commercial users)</td>
<td>82</td>
<td>$15.00</td>
<td>$2.50/1,000 gal.</td>
</tr>
<tr>
<td>School</td>
<td>1</td>
<td>$150.00</td>
<td>$1.50/1,000 gal. (over 150,000 gal.)</td>
</tr>
<tr>
<td>Empty Loss</td>
<td>0</td>
<td>$5.00</td>
<td>--</td>
</tr>
<tr>
<td>Vacant/Hookups</td>
<td>0</td>
<td>$8.00</td>
<td>--</td>
</tr>
</tbody>
</table>

*Equivalent taps are the number of ¾-inch taps that are hydraulically equivalent to users tap.*