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BUFFALO NORTHWEST WATER SUPPLY LEVEL I STUDY EXECUTIVE SUMMARY

Prepared for:
Wyoming Water Development Commission

October 2011
BUFFALO NORTHWEST WATER SUPPLY
LEVEL I STUDY EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY
NORTHWEST WATER SUPPLY PROJECT LEVEL I STUDY

PURPOSE AND NEED

The City of Buffalo (City), Johnson County (County), Johnson County Airport (Airport), and the Wyoming Water Development Commission (WWDC), in conjunction with Western Water Consultants, Inc. (WWC) conducted the Buffalo Northwest Water Supply Level I Study. The project area (Figure 1) has insufficient water supply from wells with low yield and poor water quality. The goal of this project was to evaluate the feasibility of constructing a pipeline from the City’s water distribution system to the project area, located northwest of the City. A new transmission pipeline could provide City water to approximately 51 residences near Airport Road, the Airport, and areas of future residential and commercial development northwest of the City. This study examines the potential affects to the City’s existing water distribution system, identifies potential funding options, and presents a conceptual design. The results of this Level I Study will provide the City and County (project Sponsors) with the data and recommendations necessary to decide whether to initiate a process to construct the Northwest Water Supply Project.

SCOPE ALTERNATIVE

WWC understands that the area located east of Interstate-25 and south of Interstate-90 is an area identified by the City as a potential future development area. As a scope alternative, WWC performed additional hydraulic analyses and population growth/water demand projections in this area to identify the potential to develop these areas, and pros and cons of providing water service in this area.

POPULATION AND WATER DEMAND PROJECTIONS

Population projections were performed to estimate the future water demands for the City in the Northwest Water Supply Project area. The water demands developed for the project area were used for evaluating the effects of the Northwest Water Supply Project on the City’s distribution system. Comparison to the City’s water demands shows that the Northwest Water Supply Project (existing development only) will create a 4% increase in the City’s total water demand based on the 2010 water demands and use rates.
Figure 1. Northwest Water Supply Project Area

- Johnson County Airport
- Northwest Water Supply Project Area
- Buffalo City Limits
EXISTING INFRASTRUCTURE INVENTORY

Evaluation of the system was conducted and various component upgrades were identified. The recommended upgrades include a “bottleneck” in the 10-inch water main to the wastewater treatment plant and replacement of a concrete waterline from the South Tank to the Buffalo High School and Bus barn. The estimated costs associated with these upgrades are $1,110,000 and $448,847, respectively.

In addition, the City has identified three water mains planned for replacement in the next 20 years. These include: 1) a 6-inch cast iron waterline under Sunset Avenue for an estimated $299,817; 2) a 12-inch ductile iron waterline under West Gatchell for an estimated $233,574; and 3) a 12-inch ductile iron waterline under North Carrington for an estimated $376,085. All three water mains are nearing their life expectancy and are in need of replacement.

PROPOSED NORTHWEST WATER SUPPLY PROJECT OPTIONS

Multiple waterline alignments were analyzed for the Buffalo Northwest Water Supply Project and East Development Project. From this analysis, three options were selected for the Northwest Water Supply Project and two options for the East Development Project, for detailed hydraulic analysis and construction cost projections. A water storage tank located near the Johnson County Airport was also investigated. The alignment options and proposed storage tank location are shown on Figure 2.

Northwest Water Supply Project Option 1 Waterline

Option 1 for the Northwest Water Supply Project is a 12-inch PVC waterline connecting to the Eagle Summit subdivision water supply line and following an alignment across French Creek to Airport Road. This option requires a bypass waterline and pressure reducing valve (PRV) station between the connection point and the service connections in Eagle Summit. The estimated cost to construct the Northwest Water Supply Option 1 is $741,910.

Northwest Water Supply Project Option 2 Waterline

Option 2 for the Northwest Water Supply Project is a 12-inch waterline generally following the alignment of Airport Road. The proposed waterline would connect to the City’s existing infrastructure near North Main and North Buffalo Bypass and terminate
Figure 2. Northwest Water Supply Project and East Development Project Optional Alignments

- Northwest Water Supply Project Option 1 Waterline
- Northwest Water Supply Project Option 2 Waterline
- Bypass Waterline
- Storage Tank
- Eagle Summit PRV
- Airport Service Line
- Booster Pump
- Pump Station/PRV Station
- PRV
- East Development Option A Waterline
- East Development Option B Waterline
- AIRPORT ROAD
- NORTH MAIN ST.
- FRENCH CREEK ROAD
near the Airport in the same location as Option 1. Option 2 requires a booster pump station to provide adequate pressures to the Northwest Water Supply Project area. The estimated cost for the Northwest Water Supply Project Option 2 waterline is $1,084,035.

**Northwest Water Supply Project Option 3 Waterline**

Option 3 for the Northwest Water Supply Project is a combination of both Option 1 and Option 2 with two connection points. This option does not require the Option 2 pump station along Airport Road. However, Option 3 will require a PRV station in lieu of the pump station on Airport Road. Without the installation of a pump station this option does not allow for water to flow in a counterclockwise-direction and is therefore limited by a single-point of supply. The Northwest Water Supply Option 3 waterline estimated cost is $1,520,712.

Because Option 3 is restricted to a single-point of supply, this option could be improved with the installation of the pump station proposed in Option 2 to create a “looped” system. The Northwest Water Supply Option 3 with pump station has an estimated additional cost of $482,425 more than the estimated Option 3 waterline cost of $1,520,712 for a total of $2,002,597. Alternatively, the system could be upgraded with a water supply tank.

**Water Supply Tank**

As an optional system upgrade, a water storage tank is proposed at the system highpoint. The tank would provide constant pressure, fire flow protection, and redundant water supplies, which would obviate the need for the Option 3 pump station. The estimated costs for a 500,000-gallon or a 1,000,000-gallon storage tank are $785,287 and $1,563,296, respectively.

**East Development Option A Waterline**

The first option (Option A) for water supply to the East Development area incorporates the Northwest Water Supply Project Option 3 and assumes construction of Option A after or simultaneously with Option 3. In Option A a single 12-inch PVC waterline would supply the East Development area. The East Development Option A estimated cost is $675,772.

**East Development Option B Waterline**

A second option (Option B) for a water supply line to the East Development area assumes no development of the Northwest Water Supply Project. This option would require that multiple lines be installed to provide the required design capacity and pressures to the transmission line crossing beneath Interstate-25. This option includes
two 8" supply waterlines and one 12" supply waterline. The East Development Option B estimated cost is $1,115,075.

PRIORITIZATION AND RECOMMENDATIONS

The nonstructural and structural recommendations discussed in the Northwest Water Supply Project Level I Study have been prioritized for consideration.

Nonstructural Recommendations

Recommendations for improvements to the City’s operation of the water distribution system have been made in various Chapters of the Northwest Water Supply Project Study, and are as follows:

- It is recommended that City Ordinance Section 10A-2 Design Flow be updated to standards more representative of actual usage (500 gallons per day per capita for maximum design flow).
- A recommendation is provided in the report for an alternate investment for the City’s Water Accounts that are currently earning a very low interest rate.
- It is recommended that the City update and improve its WaterCAD model to address several core inaccuracies.

Structural Replacement Recommendations

The prioritization criteria for the structural replacement recommendations are based on a Ranking Criteria Equation (RCE). The higher the RCE value the higher the improvement priority.

\[
RCE = \text{Lifespan Adjustment} \times \text{Volume Index} \times \text{Cost Variables}
\]

The prioritization determined for the structural replacement recommendations is 1) the concrete waterline (RCE=254), 2) North Carrington (RCE=80), 3) Sunset Avenue (RCE=75), and 4) West Gatchell (RCE=57).

Structural Improvement Recommendations

Two separate areas were identified for recommended structural improvements to the City’s water supply/distribution system: 1) the Northwest Water Supply Project, and 2) the East Development Area.

The recommended options were determined based on a modified Ranking Criteria Method. Because each option proposes new infrastructure, the variable applied for aging is neglected. The prioritizations determined for the Northwest Water Supply Project are 1) Option 2 (RCE=8.5), 2) Option 3 (RCE=6.8), 3) Option 1 (RCE=5.9), and
4) Option 3 with pump station (RCE=5.2). Although the Option 2 waterline has the highest RCE value, the Option 3 waterline would result in future cost savings to the City of approximately $439,300 during the East Development project. By subtracting the future cost savings from the initial cost of Option 3 the final RCE for Option 3 would be 9.9. Therefore, the recommended option for the Northwest Water Supply Project is Option 3.

The RCE was not used for the East Development options for two reasons: 1) both waterlines fix the current bottleneck problem under I-25, and 2) both options supply the entire East Development area. Therefore, the only ranking criteria used for the East Development is the construction cost.

**Proposed Water Storage Tank Recommendations**

As specified by WDEQ Rules and Regulations Chapter 12, Section 13, a tank shall be sized such that it will provide clearwell and system storage capacity equal to 25% of the design maximum daily demand, plus added fire storage based on recommendations established by the State Fire Marshall. Under these assumptions, the required capacity of the water storage tank is 384,250 gallons. The 500,000-gallon storage tank would provide adequate storage for the proposed development areas in the Northwest Water Supply Project area.

**WATER SYSTEM FINANCING**

Many financing programs are available to the City for the various projects that are currently being considered. The Northwest Water Supply Project has five grant programs and five loan programs available to it. Table 3 contains a summary of these available grant and loan programs.

**City of Buffalo Water System Revenue and Costs**

The City’s 2011 projected water budget has a projected surplus of $255,250, which is based on the past five years. The budget surplus includes $35,000 of projected water tap fees and $120,000 earmarked for water debt bonus payments. The City currently holds two water loans (Drinking Water state Revolving Fund and WWDC) for a total of $11,272,000 and two water accounts (the Water Debt Reserve Account and the Operation and Maintenance Account) with a total amount of $4,398,000.

**City of Buffalo Adjusted Water Accounts**

The City’s Water Accounts are currently earning very low interest rates. The Wyoming State Treasurers’ Asset Reserve (WYO-STAR) program was investigated as an alternate investment option that would result in higher yields than are currently being...
Table 3. Funding Sources Summary

<table>
<thead>
<tr>
<th>Funding Program</th>
<th>Administration</th>
<th>Maximum Grant %</th>
<th>Typical Grant %</th>
<th>Loan Interest Rate</th>
<th>Origination Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWDC</td>
<td>WWDC</td>
<td>75%</td>
<td>67%</td>
<td>4.0%</td>
<td>--</td>
</tr>
<tr>
<td>Wyoming Drinking Water State Revolving Fund</td>
<td>WDEQ</td>
<td>--</td>
<td>--</td>
<td>2.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Mineral Royalty Grant Program</td>
<td>SLIB</td>
<td>75%</td>
<td>50%</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Joint Powers Act Loans</td>
<td>SLIB</td>
<td>--</td>
<td>--</td>
<td>5.17%</td>
<td>1.0%</td>
</tr>
<tr>
<td>USDAs</td>
<td>USDA</td>
<td>75%</td>
<td>25%</td>
<td>3.75%</td>
<td>--</td>
</tr>
<tr>
<td>Wyoming Community Development Block Grant Program</td>
<td>Wyoming Business Council</td>
<td>$500,000</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Business Ready Community Grant and Loan Program</td>
<td>Wyoming Business Council</td>
<td>$1,000,000</td>
<td>--</td>
<td>Zero to low</td>
<td>--</td>
</tr>
<tr>
<td>Grant/Loan/Cost Sharing Agreement</td>
<td>Johnson County</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

realized in the City’s Water Accounts. The average interest rate for WYO-STAR program over the last four years was 1.922%, which is significantly greater than the 0.21% interest being earned by the City’s Water Accounts currently.

Costs of Major Repairs in Next Twenty Years

Major construction projects planned for the City will require an estimated yearly payment of $146,270. The interest received from the City Water Reserve/Operation Accounts does not produce the funds necessary to pay for major repairs or projects that will be required over the next 20 years. This deficit has several solutions such as: higher earning water accounts, utilizing earmarked hydroelectric revenue, or apply for funding assistance.

Northwest Water Supply Project Costs

The estimated life-cycle cost for operation, maintenance, and overhead of the recommended Northwest Water Supply Project Option 3 is $2,071,700. This estimate is based on the assumption of a 50-yr. project lifespan.

Four options exist for WWDC funding of the Northwest Water Supply Project, which are shown in Table 4. In all funding options, a loan interest rate of 4% and a loan term of 30 years were assumed for repayment of the Northwest Water Supply Project construction cost. These values can be compared to the projected annual water rates ($43,680) and total water tap fees ($260,000) from the existing development in the project area. Water tap fees will likely not contribute directly to the Northwest Water
Supply Project water debt. However, these will likely be used to retire other water related debt (i.e., the water treatment plant therefore they are shown as reference).

Table 4. Northwest Water Supply Project WWDC Funding Scenarios

<table>
<thead>
<tr>
<th>Funding Scenario</th>
<th>Required Annual Loan Payment (30-years)</th>
<th>Required Annual O&amp;M Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>67% Grant; 33% Loan</td>
<td>$29,020</td>
<td>$12,937</td>
</tr>
<tr>
<td>0% Grant; 100% Loan</td>
<td>$87,940</td>
<td>$12,937</td>
</tr>
<tr>
<td>67% Grant; 33% Loan and Projected Water Tap Fees</td>
<td>$13,990</td>
<td>$12,937</td>
</tr>
<tr>
<td>0% Grant; 100% Loan and Projected Water Tap Fees</td>
<td>$72,910</td>
<td>$12,937</td>
</tr>
</tbody>
</table>

City of Buffalo Adjusted Water Rates

The traditional funding for major repairs/projects is from the interest earned on an O&M account. Currently the City is $39,790 short per year in required funds to cover the projected major repairs over the next twenty years. Although the City is short of the required funds for major repairs several solutions exist for this situation such as: 1) utilize the hydroelectric revenue ($120,000) that is earmarked for water debt bonus payments; 2) invest the City’s Water Accounts in a higher earning account; and 3) apply for funding assistance for the distribution system waterline replacements.

As part of the construction of the Northwest Water Supply Project, additional funding may be required through water rate increases by the City. A WWDC 33% loan/67% grant scenario for the recommended Option 3, will not require the City to raise its water rates. However, 100% loan/0% grant scenario will require the City to raise its water rates by approximately 4.6% to make the annual loan payments.

Northwest Water Supply Project Debt Retirement

The debt retirement schedule for the Northwest Water Supply Project Option 3 is shown in Table 10 assuming a 67% grant/33% loan scenario from WWDC. The payment plan associated with this debt retirement schedule includes the projected revenue to the City from water rates in the Northwest Water Supply Project Area only. Please note the total of the operation and maintenance and loan annual payments is less than the projected water rates of $43,680. Therefore, the estimated annual payment includes a bonus payment to the loan principal equal to the difference.

Water System Financing Recommendations

As is shown by previous tables, the WWDC 67% grant/33% loan option would allow the Northwest Water Supply Project to be a self-supporting entity. Also the loan for the
Northwest Water Supply Project would be paid in full in 30 years, which allows the City to generate revenue for the final 20 years of the life of the project. As such, the recommended funding option for the Northwest Water Supply Project is the WWDC 67% grant and 33% loan. If interest is expressed by the Sponsors to construct the proposed water storage tank and East Development waterline in conjunction with the Northwest Water Supply Project waterline, WWDC would be the recommended funding agency.

Table 10.  Debt Retirement Schedule for Northwest Water Supply Project

<table>
<thead>
<tr>
<th>Year</th>
<th>Balance</th>
<th>Interest</th>
<th>O&amp;M and Administrative Fees</th>
<th>City Payment</th>
<th>NW Water Projected Revenue</th>
<th>Total Annual Payment (O&amp;M and Loan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$ (501,835)</td>
<td>$ (20,073)</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 41,957</td>
</tr>
<tr>
<td>2020</td>
<td>$ (453,377)</td>
<td>$ (18,135)</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 41,957</td>
</tr>
<tr>
<td>2025</td>
<td>$ (394,421)</td>
<td>$ (15,777)</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 41,957</td>
</tr>
<tr>
<td>2030</td>
<td>$ (322,692)</td>
<td>$ (12,908)</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 41,957</td>
</tr>
<tr>
<td>2035</td>
<td>$ (235,422)</td>
<td>$ (9,417)</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 41,957</td>
</tr>
<tr>
<td>2040</td>
<td>$ (129,246)</td>
<td>$ (5,170)</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 41,957</td>
</tr>
<tr>
<td>2045</td>
<td>$ (65)</td>
<td>$ (3)</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 41,957</td>
</tr>
<tr>
<td>2050</td>
<td>$ 152,675</td>
<td>$ 73</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 12,937</td>
</tr>
<tr>
<td>2055</td>
<td>$ 309,076</td>
<td>$ 74</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 12,937</td>
</tr>
<tr>
<td>2060</td>
<td>$ 467,443</td>
<td>$ 75</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 12,937</td>
</tr>
<tr>
<td>2065</td>
<td>$ 627,799</td>
<td>$ 76</td>
<td>$ (12,937)</td>
<td>$ -</td>
<td>$ 43,680</td>
<td>$ 12,937</td>
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</table>