C I T Y O F B O U L D E R
WATER RESOURCES ADVISORY BOARD
INFORMATION ITEM

MEETING DATE: January 27, 2014

AGENDA TITLE: Informational Item –Water Utility Capital Improvement Program (CIP) Preview

PRESENTERS:
Jeff Arthur, Director of Public Works for Utilities
Robert Harberg, Principal Engineer-Utilities
Steve Buckbee, Engineering Project Manager
Kevin Clark, Engineering Project Manager

EXECUTIVE SUMMARY

This information item is intended to provide an update regarding Water Capital Improvement Program (CIP) issues ahead of the formal budget process by providing:

- Background information
- Flood update
- Project updates
- Schedule of key milestones

The formal CIP budget discussion will begin in April with a WRAB recommendation scheduled in June. Therefore, no formal action by the WRAB is requested at this time.

BACKGROUND

The Utilities Division's primary focus is to provide quality water services, as desired by the community, in a manner which emphasizes efficient management of fiscal and natural resources, and protects human and environmental health. Capital investment in infrastructure is core in carrying out the utilities' mission of delivering safe and reliable water to our customers and ensuring that water is available for fire protection.

In October 2011, the city developed a consolidated Water Utility Master Plan (WUMP) that addresses source water, water treatment, and the distribution system. The WUMP incorporates an evaluation of the treated and source water system conditions and recommendations for the next 20-year planning period.

The 6 year Water CIP relies on the WUMP for guidance along with evaluation of other issues identified during routine operation and inspection of the City's water system. Several issues have

been identified along with a preliminary identification of potential impacts to the CIP. Most of the changes are unrelated to the 2013 flood since the damages have already been repaired or are in the process of being repaired using money that was appropriated in 2013..

ANALYSIS

Distribution System Rehabilitation

The City of Boulder has been systematically replacing undersized and corroded water mains for a number of years. Most of the undersized mains that were providing water transmission have now been replaced with 6 and 8-inch pipe so the emphasis has shifted to replacing corroded and break prone pipes.

The Utilities Project Management staff is using a data based decision method to determine which pipes should be replaced. The data based decision method considers pipe age, material, break history, size, pressure, location, if a water dependent business is affected, difficulty of repair, and soil type as factors in determining which pipes to replace. Numeric values assigned to each factor are summed for each pipe segment to determine its rating. Those pipes with the highest totals are considered for replacement. The final decision on whether or not to replace a pipe segment still depends upon engineering judgment. Unique social and environmental factors that are not easily quantified must be taken into consideration in determining the pipes segments to renew. This tool continues to evolve and adapt each year.

With the passage of ballot question 2 D last November, Transportation has received a multi-million dollar budget increase to inspect, restore and rehabilitate transportation infrastructure through 2029. In order to replace problematic mains prior to roadway improvements, an annual increase of $1 million in the Water Utility budget for additional water main replacement is being considered.

Transmission System Inspection and Rehabilitation

Several leaks occurred on water transmission lines during 2013. Of note is the 26” main between Sunshine Hydroelectric Facility and 4th & Mapleton that carries about half of the City’s treated water on an annual basis. Another is an 18” line that connects 101 Pearl PRV station and Chautauqua Reservoir. After an inspection of the 26” main, money for rehabilitation/inspection of the upper 30” section of main between Betasso Water Treatment Facility and Sunshine Hydroelectric Facility has been re-prioritized to the lower 26” section. Additional CIP money is being considered for the problem 18” main and continued inspection of the upper 30” section of main between Betasso Water Treatment Facility and Sunshine Hydroelectric Facility.

Area II Annexation Infrastructure

Annexation of Boulder Valley Comprehensive Plan Area II properties that have been affected by the flood is being considered. Preliminary estimates of $5-$6 Million would allow construction of utilities necessary to serve the nearly 200 properties that are currently lacking City water and/or sanitary sewer service along with any needed transportation infrastructure upgrades. This funding is being considered for the years 2015 and 2016.

Treated Water Stranded Facilities

Gunbarrel water storage tank painting was scheduled for this year. An inspection of the tank this fall revealed steel corrosion issues inside the tank. An increase to the project scope and budget will be requested in 2014 to address the budget shortfall.

The above grade walls for Kohler water storage tank were replaced in 2013. As a result, funding for the roof replacement in 2015 and 2016 will likely be reduced.

Betasso Water Treatment Facility (BWTF)

Preliminary design for the BWTF capital improvement project will begin in mid 2014. Construction is scheduled to begin in 2016 and extend through 2017. Some problems to be addressed are:

- At flows in excess of 30 to 35 MGD, the pretreatment is inadequate to sustain effective treatment.
- During periods of high concentrations of color and total organic carbon in the source water, the filter run time is limited due to turbidity breakthrough.
- The residuals thickening, dewatering, and drying processes are insufficient to treat the dilute concentration of the solids.
- Replacement of assets at the end of their useful life.
- Increased chemical storage.
- A new backup generator and increased fuel storage.

Two studies were initiated to evaluate a couple of the major problems listed above. In 2012, Malcolm Pirnie/ARCADIS began working on the capacity issues encountered during spring runoff when color is high. Staff is currently working with the consultant, Brown & Caldwell, to follow through on the 2012 report recommendations and assist with pilot plant tests through mid 2014. The initial assessment has been completed and thickening technologies will be selected for pilot testing in 2014. The results and recommendations from these two studies will be used to help inform and develop the overall scope of the upcoming CIP project at the BWTF.

The schedule for the BWTF planning and improvements over the next year include completing the two studies in progress and selection of the Capital Improvement Project design consultant, along with refinement of the scope and cost. Some dates have been pushed back since the July 15, 2013 WRAB meeting. The timeline has been pushed back to accommodate possible reprioritization associated with the flood and effort and resources need to address flood repairs.

- Spring Runoff Optimization Study - Late Summer 2014
- Preliminary Residuals Study (recommendations for pilot project) - Late 2013
- Selection of BWTF Capital Improvement Project design consultant – Summer 2014
- Revised cost estimate and WRAB check in on preliminary design direction - Winter 2014
- Final Residuals Study Report - Fall 2014

Boulder Reservoir Water Treatment Facility (BRWTF)
A backup power generation study is currently underway to determine the feasibility of providing for and contracting a temporary generator on site during emergencies or when treatment cannot be interrupted by a power outage. Plant electrical deficiencies were also found during and an electrical study in 2013 and will be addressed in 2014 with existing funding.

The proposed 2020 BRWTF bond projected is slated to address canal intake improvements, pretreatment improvements for taste and odor, increased chemical storage, standardized instrumentation, assets at the end of their useful life and permanent backup power facilities.

Wittemyer Ponds
In terms of the source water system components, the only city owned facility significantly impacted by the September 2013 flood was the Wittemyer Pond facility. The flood waters breached numerous embankment berms and significant repairs will be required to allow for storage and delivery of water through the system including repairs to the Howell Ditch component. The cost of the repairs is estimated to be about $125,000 and these will be completed in 2014. The repair work should be eligible for FEMA reimbursement.

Barker Dam Outlet
During the recent lower outlet gate test and inspection at Barker Dam (December 2013), it was discovered that pin-hole leakage though a corrosion nodule is occurring through the Gate No. 10 frame. This gate is the lowest outlet gate having the greatest hydraulic head pressure bearing upon it and is also the oldest gate which was not replaced in the 1947 Barker Dam Rehabilitation (i.e. this gate is 1907 vintage making it over 105 years old.). The gate will be inspected from the downstream side on a quarterly schedule (i.e. dewatered and inspected every 3 months) to monitor the overall leakage and track the progression of the corrosion pin-hole as applicable until a removable bulkhead can be designed and installed.

Additional budget is being considered to investigate and repair the newly discovered leak in the Gate No. 10 Gate Frame. Current budget estimates are $50,000 in 2015 for alternative bulkhead design and $100,000 in 2016 for installation of a removable bulkhead.

Kossler Dam
The city completed the Hazard Classification study for Kossler Dam and has confirmed that it has moved from a Low Hazard Dam to a High Hazard Dam due to development in the downstream inundation areas. In addition, a newly completed topographic survey has discovered that there is a backwater effect on the spillway hydraulic capacity caused by the county road being approximately 1 foot higher than the spillway crest. The city is updating the Kossler Dam Face Rehabilitation Project design drawings to reflect the additional freeboard allowance to meet dam safety requirements for a high hazard structure. Construction has been delayed from the originally scheduled fall 2013 completion to the winter of 2014/2015.

An additional $150,000 budget is being considered to complete the spillway study and update the planned Dam Rehabilitation design.

Albion Dam Outlet Repair

The Albion Dam outlet was plugged in the winter of 2012 due to concrete material falling off (i.e. concrete spalling) the upstream face of the dam above the trash rack and outlet pipe system. In 2013, divers successfully removed the concrete debris and placed a pipe stub to allow the outlet system to properly function until the reservoir can be drained for a more permanent repair. Unfortunately, the September 2013 flood event filled the reservoir to overflowing and thus the next phase of the repair was not implemented. An additional $150,000 budget is being considered for this repair work in 2014.

Silver Lake Dam Outlet Inspection

The State Engineer Office has requested the city to perform an inspection of Silver Lake Dam outlet. Since this is a very important source, the city does not want to drain the reservoir and lose valuable water supply storage in order to perform this inspection in the dry and will therefore schedule a diving consultant to perform the inspection of the upstream components with the reservoir at operational level. An additional $75,000 budget is being considered to perform this inspection in 2015.

Goose Lake Outlet Inspection

The State Engineer Office has requested the city to perform an inspection of Goose Lake Dam outlet. Since this reservoir is fairly small, the city can drain the reservoir with close coordination of supply and demand on the system in a typical year with proper planning. Once drained, the city can perform this inspection in the dry. An additional $20,000 budget is being considered to perform this inspection in 2015.

Lakewood Hydro

Reprioritization of repairs to the Lakewood Hydro turbine and generator system are being considered including moving the $100,000 currently budgeted in 2015 out to the year 2016. An additional budget augmentation of $30,000 in year 2016 is also being considered for more extensive part replacements.

Silver Lake Hydro

Due to ongoing repair requirements in keeping the Silver Lake Hydro bypass valve operational, $150,000 of funding in 2015 for a major rebuild of the valve is being considered.

Betasso Hydro

In 2013 the lower needle on the Betasso Turbine assembly was determined to be non-operational. An additional budget of $100,000 in year 2014 is being considered for immediate repairs to allow for a full range of operational flows and power generation. Considering the age of the unit scheduled refurbishment of the major mechanical items may be required by the year 2017. An additional budget of $250,000 is being considered in year 2017 for the major items.

NEXT STEPS

Budget Schedule

The current schedule of major budget milestones is provided below. Elements involving the WRAB are highlighted in bold italics.

WRAB Preliminary CIP Budget Discussion - April 21, 2014
Budget Guidelines to Departments - April 2014
WRAB Draft CIP Review - May 19, 2014
Proposed Budget Submittal to City Manager - May 2014
WRAB Recommendation on CIP/Budget - June 16, 2014
Departmental Budget Review by City Manager - May/June 2014
Planning Board Recommendation on CIP - August 2014
City Council Study Session on CIP - August 2014
City Council Study Session on Budget - September 2014
City Council Consideration/Adoption of Budget – October/November 2014