

## **WATER RESOURCES ADVISORY BOARD MEETING**

**MEETING DATE: Monday, 20 June 2016**

**MEETING TIME: 7:30 p.m.**

**MEETING LOCATION: Municipal Services Center, 5050 E. Pearl St., Boulder, CO 80301**

### **Agenda Highlights:**

Bear Canyon Creek Flood Mitigation Study Open House 6 – 7:30 p.m.

1. Call to Order (7:30 p.m.)
2. Approval of May 16, 2016 Meeting Minutes (7:31 p.m.)
3. \*Public Comment (7:35 p.m.)
4. Information Item – Bear Canyon Creek Flood Mitigation Study (7:45 p.m.)
5. \*Public hearing and consideration of a recommendation regarding the 2017 Utilities (Water, Wastewater and Stormwater/ Flood Management) 6-year Capital Improvement Program (8:10 p.m.)
6. Information Item – Update on Rate Study and Background for July 2016 WRAB Discussion (8:30 p.m.)
7. Matters from Board (8:45 p.m.)
8. Matters from Staff (8:50 p.m.)
9. Discussion of Future Schedule (8:55 p.m.)
10. Adjournment (9:00 p.m.)

\* Public Comment Item

**Agenda item times are approximate.**

### **Information:**

- Please contact the WRAB Secretary email group at:  
[WRABSecretary@bouldercolorado.gov](mailto:WRABSecretary@bouldercolorado.gov)
- Packets are available on-line at: <http://www.bouldercolorado.gov> – [A to Z, Water Resources Advisory Board \(WRAB\)](#), Next Water Resources Advisory Board Meeting

**CITY OF BOULDER, COLORADO  
BOARDS AND COMMISSIONS MEETING MINUTES**

<b>Name of Board / Commission:</b> Water Resources Advisory Board	
<b>Date of Meeting:</b> 16 May 2016	
<b>Contact Information of Person Preparing Minutes:</b> Rene Lopez 303-413-7149	
<b>Board Members Present:</b> Mark Squillace, Lesley Smith, Mike Barnes, Kirk Vincent <b>Board Members Absent:</b> Dan Johnson	
<b>Staff Present:</b> Jeff Arthur, Director of Public Works for Utilities Greg Guibert, Chief Resilience Officer Joe Taddeucci, Water Resources Manager Douglas Sullivan, Acting Principal Engineer for Water, Wastewater and Stormwater Ken Baird, Utilities Financial Manager Annie Noble, Acting Principle Engineer for Flood and Greenways Pieter Beyer, Civil Engineer Christin Shepherd, Civil Engineer Ward Bauscher, Engineering Project Manager Russ Sands, Water Sustainability and Outreach Supervisor Brett Linenfelser, Water Quality & Environmental Services Manager Candace Owen, Stormwater Quality Engineer Chris Douville, Wastewater Treatment Manager Rene Lopez, Board Secretary	
<b>Consultants Present:</b> None	
<b>Meeting Type:</b> Regular	
<b>Agenda Item 1 – Call to Order</b>	<b>[7:01 p.m.]</b>
<b>Agenda Item 2 – Approval of the 18 April 2016 Meeting Minutes</b> <span style="float: right;"><b>[7:03 p.m.]</b></span>	
Motion to approve minutes from 18 April 2016 as amended. <b>Moved by:</b> Smith <b>Seconded by:</b> Barnes <b>Vote:</b> 4:0	
<b>Agenda Item 3– Public Participation and Comment</b>	<b>[7:05 p.m.]</b>
<b>Public Comment:</b> Elizabeth Black	
<ul style="list-style-type: none"> <li>• Concerns with Fourmile Canyon Creek and GAC item</li> <li>• Cost benefit analysis grossly underestimate the benefits</li> <li>• The original 50 year flood channel improvements were changed to high hazard containment and flood proofing</li> <li>• Restore borrow ditches</li> </ul>	
<b>Agenda Item 4 - Information Item – City Resilience Strategy</b>	<b>[7:50 p.m.]</b>
<b>Presentation by Chief Resilience Officer, Greg Guibert</b>	
<b>Executive Summary from the Packet Materials:</b>	
<p>100 Resilient Cities (100RC) is a global network pioneered by the Rockefeller Foundation to help cities around the world become more resilient to the physical, social, and economic challenges that are a growing part of the 21st century. Boulder joined the network as part of its first wave in 2013 and through its participation, is committed to demonstrating leadership in resilience as well as take advantage of the resources and opportunities it presents. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks – floods, wildfires, violence, and other acute events – but also the stresses that weaken the fabric of a city on a day to day or cyclical basis, such as economic hardship or social inequality. By addressing both the shocks and the stresses in a holistic manner, a city becomes more able to respond to adverse events, and is better able to deliver basic functions in both good times and bad, to all populations.</p>	
<p>The 100RC program supports resilience building activities at the city level along four pathways:</p> <ul style="list-style-type: none"> <li>• Financial support for the creation of a new position in the government who will lead the effort, the Chief Resilience Officer (CRO)</li> <li>• Technical and logistical support for the development of a resilience strategy that will serve as the city’s roadmap to resilience activities and priorities</li> </ul>	

- Access to tools and specialized partnerships to help developed a sophisticated understanding the city’s risks, assets, weaknesses, and opportunities and how they interlink in unanticipated ways
- Inclusion into a network of 99 other cities from which best practices, innovation, and peer-to-peer learning can advance the practice of resilience globally.

The objective of the City Resilience Strategy is to provide a roadmap for building resilience in the city. The strategy should trigger action, investment, and support within city government and from outside groups. Rather than a static road map, the resilience strategy should be a living document to be continuously fine-tuned as priorities are addressed and initiatives get implemented.

**WRAB Discussion Included:**

- Discussions on resiliency as it relates to utilities and flood capacities
- Comments regarding resiliency with regard to utilities meaning redundancy of systems
- Comments that mountain roadways are not resilient
- Discussions about individual responsibility not government
- Comments on choosing an appropriate level of resiliency
- Discussions about working outside of the City of Boulder

**Agenda Item 5 –Public Hearing and Consideration of a Motion Recommending [7:10 p.m.] that City Council accept the Wastewater Collection System Master Plan**

Pieter Beyer presented this item.

**Executive Summary from the Packet Materials:**

The purpose of this agenda item is to request a Water Resources Advisory Board recommendation to City Council regarding acceptance of the 2016 Wastewater Collection System Master Plan (WWCSMP). The document replaces the existing 2009 WWCSMP. The 2016 WWCSMP was undertaken to revise the sanitary sewer system hydraulic model, to include recently acquired flow monitoring data, and to incorporate inspection information regarding flow diversion structures in the upstream collection system. The 2016 update also considers the collection system performance during and since the 2013 flooding. The 2016 WWCSMP is included as Attachment A. The 2016 WWCSMP recommendations include a total of 11 CIP projects – four high priority Tier 1 projects, and seven medium priority Tier 2 projects.

**WRAB Discussion Included:**

- Floods impacts provided additional funding for the wastewater master plan for monitoring
- Previous master plans data

**Public Comment:**

Carl Norby – Water flooding from the creeks into open man holes – the sewer system will block quickly. Wastewater and Stormwater are interrelated, Mr. Norby does not feel they are considered together. Creeks and trees are also a major contributor to sewer backups.

**The Water Resources Advisory Board makes a motion to recommend that City Council accept the 2016 Wastewater Collection System Master Plan including the identified project recommendations.**

**Moved by:** Smith **Seconded by:** Barnes

**Vote: 4:0**

**Agenda Item 6 – Public Hearing and Consideration of a Motion Recommending [7:32 p.m.] that City Council accept the Stormwater Collection System Master Plan**

Pieter Beyer presented this item.

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system. The 2016 update also considers the collection system performance during and since the 2013 flooding. The 2016 WWCSMP is included as Attachment A. The 2016 WWCSMP recommendations include a total of 11 CIP projects – four high priority Tier 1 projects, and seven medium priority Tier 2 projects.

**WRAB Discussion Included:**

- Level of service for the 100 year event
- Flash flooding and its impacts on planning
- Channels along Bear Creek have improved post flood

**Public Comment:**

Elizabeth Black

- Project at Violet and Broadway – happy to see that project a priority

Carl Norby

- Back-ups in neighborhoods was localized, due to various blockages in the neighborhoods. Sanitary sewer overflows can be a cheap way to prevent back-ups in homes. Ask that you consider the idea of recommending the idea of the overflow channels. 1,500 basements flooded with raw sewage during the floods.

**The Water Resources Advisory Board makes a motion to recommend that City Council accept the 2016 Wastewater Collection System Master Plan including the identified project recommendations.**

**Moved by:** Barnes **Seconded by:** Vincent

**Vote: 4:0**

**Agenda Item 7 – Information Item – Capital Improvements Program**

**[8:10 p.m.]**

Ken Baird presented this item.

**Executive Summary from the Packet Materials:**

As part of the city’s annual budget process, Utilities develops a six-year planning budget, this year for the time period of 2017 through 2022. The Water Resources Advisory Board (WRAB) role in this process is defined in the Boulder Revised Code: “. . . to review all environmental assessments and capital improvements conducted or proposed by the utilities division.” Utilities staff has formulated initial revenue and expenditure projections for each of the three utility funds through the year 2022. Within the budget process, City Council approves and appropriates funds only for the first year, 2017. WRAB will be asked to make a recommendation to City Council regarding the 2017-2022 CIP at its June meeting. The Planning Board will review the complete city CIP, including utilities, in July. City Council will discuss the CIP in August at a study session, and the overall budget is scheduled to be adopted by City Council in October. This packet contains the draft proposed 2017 Utilities Budget and 2017-2022 Utilities CIP. The fund financials (Attachment A) have been updated to reflect actual revenues and expenditures for 2015, and the revised budget for 2016. At this point 2015 financial information is unaudited and may have what are expected to be small adjustments. The operating budget development is in the early stages of development and may have further revisions. The draft proposed CIP spreadsheets for Water, Wastewater and Stormwater/Flood Management are included in Attachment B.

**WRAB Discussion Included:**

- Comments requesting additional study ways to generate revenue with our water resources
- Discussions regarding neighboring communities utilities
- Cater Lake pipeline discussions
- Comments on price increases for projections

**Agenda Item 8 - Matters from Board:**

**[8:35 p.m.]**

- Squillace
  - Rate Study
- Smith – GAC Representative
  - 2017-2022 Greenways Capital Improvement Program

○ Draft CEAP for Fourmile Canyon Creek Greenways Improvements from Upland Avenue to West of Broadway	
<b>Agenda Item 9 – Matters from Staff:</b>	<b>[8:59 p.m.]</b>
<ul style="list-style-type: none"> <li>• Council pulled water main break claims from agenda tomorrow</li> <li>• Proposal for a study session style meeting for Rate Study items in July</li> </ul>	
<b>Agenda Item 10 – Future Schedule</b>	<b>[9:10 p.m.]</b>
<ul style="list-style-type: none"> <li>• Bear Canyon creek mitigation study update for next month</li> <li>• CIP next month</li> </ul>	
<b>Adjournment</b>	<b>[9:10p.m.]</b>
There being no further business to come before the Board at this time, by motion regularly adopted, the meeting was adjourned at 9:10 p.m.	
<b>Motion to adjourn by: Smith Seconded by: Barnes</b>	
<b>Motion Passes 4:0</b>	
<b>Date, Time, and Location of Next Meeting:</b>	
The next WRAB meeting will be <b>Monday, June 20<sup>th</sup> 2016 at 7:00 p.m.</b> , at the <b>City's Municipal Services Center, 5050 East Pearl St., Boulder, CO 80301</b>	

APPROVED BY:

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Board Chair

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Date

ATTESTED BY:

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Board Secretary

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Date

*An audio recording of the full meeting for which these minutes are a summary, is available on the Water Resources Advisory Board web page.*

<https://bouldercolorado.gov/boards-commissions/water-resources-advisory-board-next-meeting-agenda-and-packet>

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APPROVED BY:

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Board Chair

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Date

ATTESTED BY:

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Board Secretary

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Date

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**CITY OF BOULDER  
WATER RESOURCES ADVISORY BOARD  
AGENDA ITEM**

**MEETING DATE: June 20, 2016**

**AGENDA TITLE:** Information Item - Update on the Bear Canyon Creek Flood Mitigation Plan

**PRESENTERS:**

Jeff Arthur, Director of Public Works for Utilities  
Annie Noble, Acting Principal Engineer for Flood and Greenways  
Ward Bauscher, Engineering Project Manager  
Christin Shepherd, Flood and Greenways Engineer

**EXECUTIVE SUMMARY:**

The purpose of this memorandum is to provide an update on the progress and current status of the Bear Canyon Creek Flood Mitigation Plan. Over time, flood improvements have been made at various locations along this drainageway, but the September 2013 flood highlighted areas of hydraulic limitation that prompted the public to request additional flood mitigation. Bear Canyon Creek was analyzed with several modeling techniques and mitigation opportunities were identified.

Staff has established several recommended improvements and is seeking input and feedback before completing a benefit cost analysis and finalizing the recommended alternative to be presented to the Water Resources Advisory Board (WRAB) in October of 2016. Pending acceptance of the mitigation plan and the plan's recommended alternative in October, staff will submit the final mitigation plan for acceptance by City Council. The study area for this mitigation plan is shown in **Attachment A**.

**BOARD AND PUBLIC FEEDBACK**

Information items providing status updates of the Bear Canyon Creek Mitigation Plan were submitted to WRAB in April and November of 2015. There have been three open houses for the Bear Canyon Creek Mitigation Plan held on July 1, April 27, and August 20 of 2015. An additional open house will be held prior to the WRAB meeting on June 20, 2016. Notification postcards were mailed to property owners in the study area, emails were sent to parents of children attending elementary schools in the study area, and a project web site has been developed to provide information (<https://bouldercolorado.gov/flood/bear-canyon-creek-flood-mitigation-project>).

Forty-eight comments have been received via the website comment tool to date. Generally, the public supported potential mitigation alternatives and sought their implementation. Other general themes that appeared are listed and addressed below:

<b>General Theme</b>	<b>Response</b>
Remove steel culvert at Ithaca Drive	Included in recommended alternative
Do not decrease traffic lanes on Table Mesa Drive	The recommended alternative increases capacity at the Lehigh Street and Harvard Lane culverts without altering the number of traffic lanes on Table Mesa Drive. This approach reduces flows in the roadway and would not increase vehicular congestion to and from Bear Creek Elementary School.
Increase capacity at Saint Andrew Church driveway	Included in recommended alternative
Do not remove habitat, vegetation and trees	Increased channel capacity can sometimes require removal of vegetation and trees, but it is also essential to the success of the recommended alternative. Every effort will be made to protect the natural habitat during design and construction of the recommended alternative.
Remove trees and vegetation	
Deepen the channel	
Provide a concrete lined channel	Concrete lined channels technically stabilize against erosion, but would not work to create natural streams and well-vegetated floodplains that are physically and biologically healthy. Concrete lined channels remove vegetation and habitat, increase flow velocity and can create negative impacts to property and habitat downstream.

### **BACKGROUND**

Since initial development, Bear Canyon Creek has undergone numerous improvements and continues to benefit from good maintenance within the improved reaches. The flooding of September 2013 brought to light some key issues which contributed to property damage and safety concerns. In general, problems stemmed from areas of hydraulic limitation where the creek experiences limited conveyance capabilities, debris blockage or lack of effective flow return zones. These points of hydraulic limitation are illustrated in **Attachment B** and are the main focus of this mitigation plan’s alternative analysis.

After the 2013 flood, the community expressed a strong desire for flood mitigation improvements along Bear Canyon Creek. AMEC Foster Wheeler (AMEC) was selected as the engineering consultant team to help develop flood mitigation alternatives and the

mitigation plan. In order to fully analyze flows and potential improvements in the area of Bear Canyon Creek, a complete model of the entire drainageway was needed.

During a major storm event, Bear Canyon Creek overtops at several major crossings, most notably Broadway and Baseline Road. Spills from these areas become hydraulically disconnected from the main channel, flow overland through streets and neighborhoods and then rejoin the floodplain downstream. It was determined that the city's current two-dimensional model (FLO-2D) approach would be used to define these major flow paths and spill flows. Traditionally, regulatory models are developed in HEC-RAS, which is a one dimensional model that analyzes flow only in the longitudinal direction and represents the terrain in a sequence of cross sections. In two dimensional models, such as FLO-2D, flows are allowed to move in both the longitudinal and lateral directions. FLO-2D utilizes the latest technology to measure and incorporate real-world topography that makes it ideal for identifying flow paths that split away from the main channel.

In general, the FLO-2D model confirmed regulatory model flood extents while identifying spill flows similar to what was observed during the September 2013 storm event. The FLO-2D model also confirmed the areas to focus efforts for the mitigation plan. Development of the HEC-RAS and FLO-2D models is outlined in **Attachment C**.

### **ANALYSIS**

Typically, flood mitigation plans are developed with the intent to adequately convey a 100-year storm event, consistent with the policies of the Boulder Valley Comprehensive Plan, the Comprehensive Flood and Stormwater Utility Master Plan and the Urban Drainage and Flood Control District (UDFCD) Drainage Criteria Manual. However, 100-year capacities for culverts and channels are not always economically feasible. Staff and AMEC analyzed alternatives based on a bookend approach, evaluating the least costly mitigation (maintenance) and the most costly (a capital improvement alternative selectively increasing culvert capacity at major intersections to accommodate the 100-year storm).

The maintenance alternative analyzed sediment and debris removal within all culverts, invasive species removal at various locations along the channel and improving culvert inlet/outlet conditions by grading and clearing. It did not include any structural modifications to the channel or increases in culvert capacity. The maintenance alternative would not convey the 100-year storm throughout the channel and key hydraulic limitation points and spill areas would remain.

Within the study reaches, a capital improvement alternative, which increased culvert and channel capacity to pass the 100-year storm event, was created and analyzed. It was discovered that the Baseline Road and Gilpin Drive culverts were the primary hydraulic limitation points for Bear Canyon Creek north of US 36. Improvements at these two culverts and surrounding channel area need to be combined with improvements in Reach 3A (between US 36 and Baseline Road) in order to provide a 100-year flood mitigation benefit.

The recommended alternative is a combination of the maintenance and capital improvement alternatives and includes sediment and debris removal, channel grading and increasing culvert capacity as described in the following table:

<b>Study Reach</b>	<b>Improvement Location</b>	<b>Recommendation</b>
Reach 1	Wildwood Road	Remove sediment in culvert, including gravel bars and vegetation blocking inlet and outlet
	Wildwood Road	Grade channel and widen floodplain downstream of culvert
	Ithaca Drive	Remove steel culvert and grade channel in conjunction with stormwater improvement project at Ithaca Drive
Reach 2A	Lehigh Street	Increase culvert size to 7.5ft x 28ft concrete box
	Lehigh Street	Increase channel capacity upstream and downstream of culvert
	Table Mesa Drive	Remove sediment in culverts at Ithaca Drive, Yale Road and Gillaspie Drive, including gravel bars and vegetation blocking inlet and outlet
	Stanford Avenue	Continue good maintenance
	Stanford Avenue	Increase channel capacity from Stanford Avenue to Harvard Lane
	Harvard Lane	Increase culvert size to (2) 7.5ft x 10ft concrete boxes
Reach 2B	Broadway	Increase culvert size to 8.6ft x 23ft concrete box
	Broadway	Sediment and debris removal from Broadway to Martin Drive
	Martin Drive	Continue good maintenance
Reach 3A	Moorhead Avenue	Continue good maintenance
	US 36	Reconfigure pedestrian separator wall in underpass and grade multi-use path and channel downstream to improve the inlet and outlet condition
	University of Colorado	Increase channel capacity in conjunction with CU Master Plan
	Saint Andrew Church	Replace culverts with 24ft wide driveway bridge
Reach 3B	Baseline Road	Increase culvert size to 7.5ft x 28ft concrete box
	Baseline Road	Increase channel capacity from Baseline Road to Gilpin Drive
	Gilpin Drive	Increase capacity and improve outlet condition

A map outlining the Recommended Alternative can be found in **Attachment D**.

**NEXT STEPS:**

Staff and AMEC will continue to prepare a draft mitigation plan. Next steps include:

- Gather input from the public and the WRAB about the recommended alternative.
- Create a benefit cost analysis (BCA) for all alternatives.
- Refine and prepare the mitigation plan.
- Present the mitigation plan to the WRAB for consideration in October, 2016.

- If recommended by WRAB, the mitigation plan will be presented to City Council for acceptance.
- Once accepted by City Council, recommended alternatives in the Bear Canyon Creek Mitigation Plan will be programmed as capital improvements for construction as funding is available.

**ATTACHMENTS**

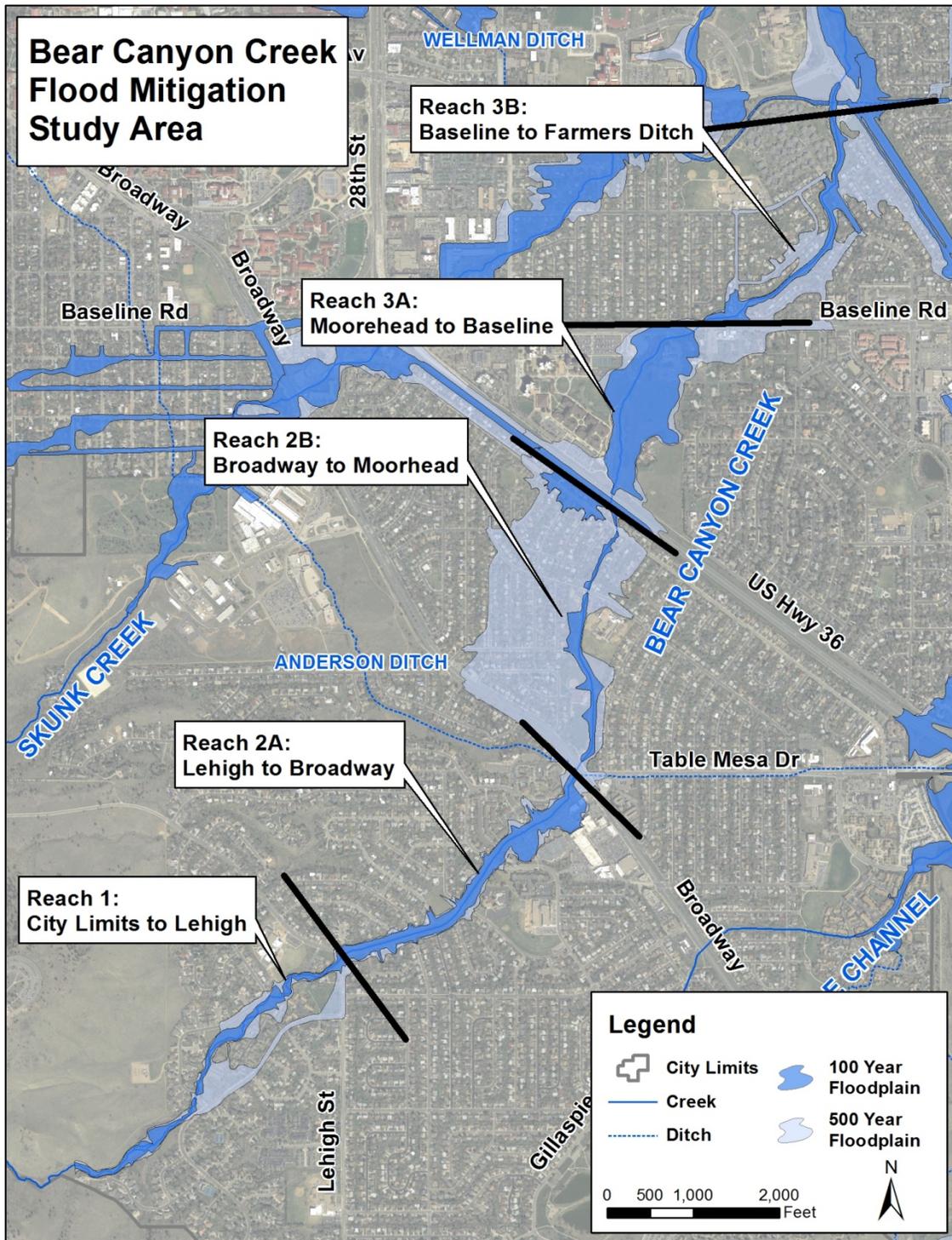
Attachment A: Study Area

Attachment B: Locations of Hydraulic Limitation

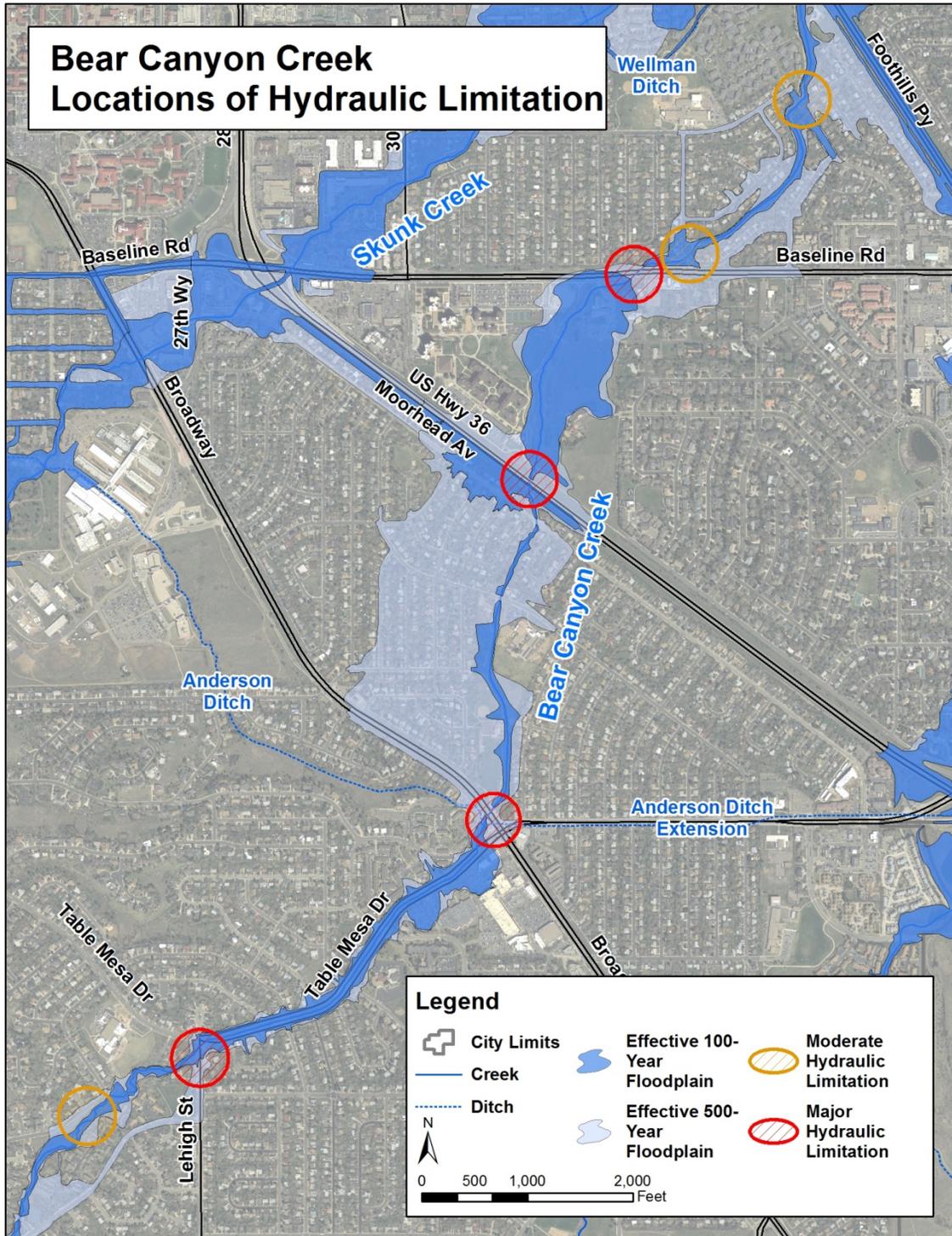
Attachment C: Development of Models

Attachment D: Recommended Alternative Figure

ATTACHMENT A: Study Area



### ATTACHMENT B: Locations of Hydraulic Limitation



## ATTACHMENT C: Development of Models

In April of 1985, a Flood Insurance Study (FIS) was conducted that produced detailed hydrologic and hydraulic information for the City of Boulder and its vicinity. In May of 1987, Greenhorne & O'Mara, Inc. developed a final Hydrologic Analysis Report that developed and delineated flood hazard areas for Bear Canyon Creek. These reports did not result in a complete hydraulic model for the entire stretch of Bear Canyon Creek (from City Limits to its confluence with Boulder Creek). Smaller hydraulic models had been developed for segments of Bear Canyon Creek, but did not seamlessly connect as one cohesive model. In order to fully analyze flows and potential improvements in the area of Bear Canyon Creek, a hydraulic model of the entire drainageway was needed.

The city and the Urban Drainage and Flood Control District (UDFCD) transferred all available modeling data to AMEC who developed a "Best Available Information" existing conditions model. UDFCD has informed the city that, when no complete model exists, a Best Available Information model is acceptable to use for planning and mitigation purposes.

While refining the Best Available Information model and comparing it to actual inundation areas from 2013, AMEC and city staff noted the need for further refinement in areas where spill flows occur. During a major storm event, overtopping of Bear Canyon Creek is present at several major crossings along this creek, most notably Broadway and Baseline Road. Spills from these areas become hydraulically disconnected from the main channel, flow overland through streets and neighborhoods and then rejoin the floodplain downstream. It was determined that the city's current two-dimensional model (FLO-2D) approach to define major flow paths and spill flows should be used. FLO-2D utilizes the latest technology to measure and incorporate real-world topography that makes it ideal for identifying flow paths that split away from the main channel.

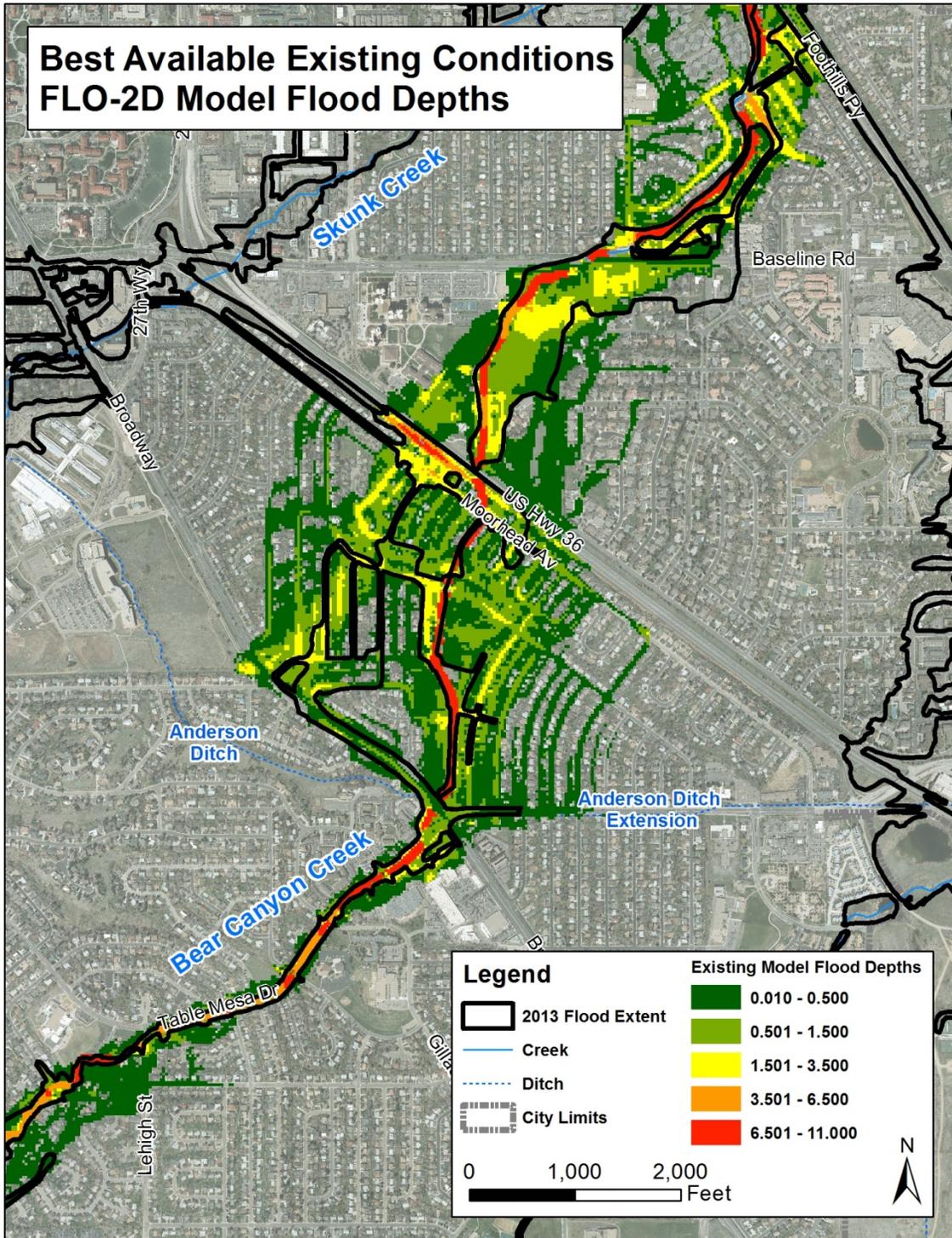
Flood mitigation master plans rely on sound hydrologic analysis and hydraulic modeling to identify and evaluate flood mitigation measures. The Greenhorne & O'Mara analysis applied hydrographs at design points along the drainageway itself, but the first iteration of FLO-2D output did not reflect spill flow paths observed during the September 2013 flood. Adjustments were made to two hydrological design points:

- **Design Point 402:** peak discharge for this design point (1,600cfs) was originally applied at the upstream limit of the Flood Insurance Study (FIS), which yielded highly conservative flows upstream of Lehigh. In the Best Available Information model, Design Point 402 was applied at Table Mesa Drive and Yale Road, assigning the corrected flow of 1,063cfs at the upstream limit.
- **Design Point 405:** peak discharge for this design point (540cfs) is applied near Moorhead Avenue along Bear Canyon Creek and represents of a 240-acre sub-basin near Baseline and Dartmouth. In the Best Available Information model, Design Point 405 was applied at the outlet of its sub-basin.

Staff also questioned whether flows from Skunk Creek, located north and west from Bear Canyon Creek, had any effect on Bear Canyon Creek flows. The effective 100-year flood

mapping for these two drainageways shows a branch of Skunk Creek that extends into Bear Canyon Creek along US 36 and Moorhead Avenue. The topography in this area, however, creates a high point between the two creeks, indicating that this connection arm is not caused by overflow of either drainageway. The flooding experienced in this area is most likely due to surface runoff from Design Point 405 (mentioned above), located near Dartmouth Avenue and indicated on the figure below. In addition, Bear Canyon Creek and Skunk Creek experience peak runoff events that occur approximately one hour apart.

In general, the FLO-2D model confirmed regulatory model flood extents while identifying spill flows similar to what was observed during the September 2013 storm event. The FLO-2D model also confirmed the areas to focus efforts for the mitigation plan.

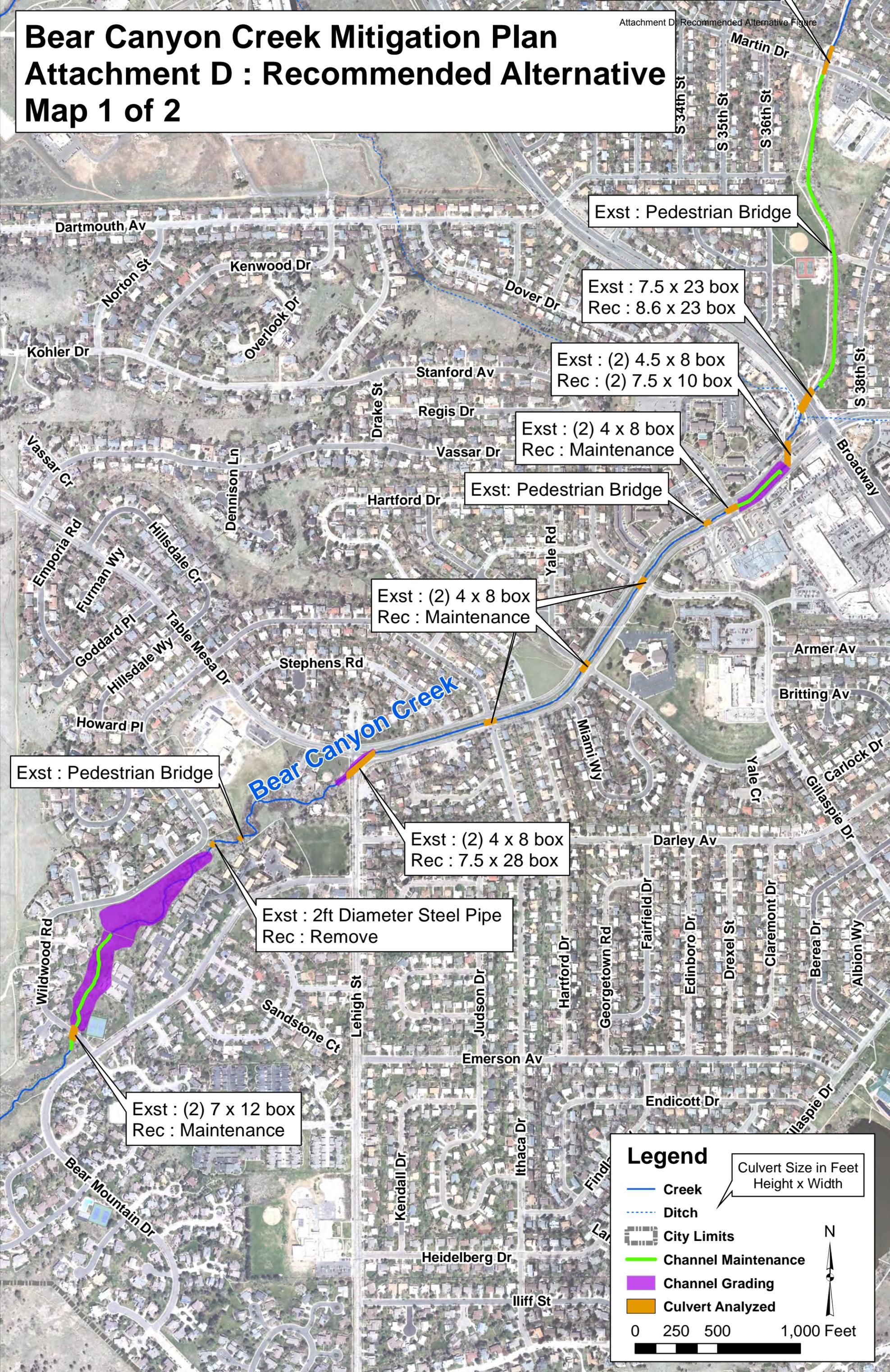


# Bear Canyon Creek Mitigation Plan

## Attachment D : Recommended Alternative

### Map 1 of 2

Attachment D Recommended Alternative Figure



Exst : Pedestrian Bridge

Exst : 7.5 x 23 box  
Rec : 8.6 x 23 box

Exst : (2) 4.5 x 8 box  
Rec : (2) 7.5 x 10 box

Exst : (2) 4 x 8 box  
Rec : Maintenance

Exst: Pedestrian Bridge

Exst : (2) 4 x 8 box  
Rec : Maintenance

Exst : Pedestrian Bridge

Exst : (2) 4 x 8 box  
Rec : 7.5 x 28 box

Exst : 2ft Diameter Steel Pipe  
Rec : Remove

Exst : (2) 7 x 12 box  
Rec : Maintenance

**Legend**

- Creek
- - - Ditch
- City Limits
- Channel Maintenance
- Channel Grading
- Culvert Analyzed

Culvert Size in Feet  
Height x Width

0 250 500 1,000 Feet

N

# Bear Canyon Creek Mitigation Plan Attachment D : Recommended Alternative Map 2 of 2



Exst : 20 x 7 box  
Rec : Remove

Exst : (2) 7 x 12 box  
Rec : 7.5 x 28 box

Exst : (2) 4 x 6 elliptical  
Rec : 24ft Bridge

Exst : Pedestrian Bridge

Exst : (2) 7 x 14 box  
Rec : Remove Pedestrian  
Separator Wall

Exst : 7.5 x 24 box  
Rec : Maintenance

Bike Path Underpass  
Rec : Maintenance

**Legend**

- Creek
- Ditch
- City Limits
- Channel Maintenance
- Channel Grading
- Culvert Analyzed

Culvert Size in Feet  
Height x Width

0 250 500 1,000 Feet

N

**CITY OF BOULDER**

**WATER RESOURCES ADVISORY BOARD  
AGENDA ITEM**

**MEETING DATE: June 20, 2016**

**AGENDA TITLE:** Public hearing and consideration of a recommendation regarding the 2017 Utilities (Water, Wastewater and Stormwater/ Flood Management) 6-year Capital Improvement Program (CIP)

**PRESENTERS:**

Jeff Arthur, Director of Public Works for Utilities

Ken Baird, Utilities Financial Manager

Douglas Sullivan, Acting Principal Engineer – Water, Wastewater, and Stormwater

Annie Noble, Acting Principal Engineer – Flood and Greenways

**EXECUTIVE SUMMARY:**

As part of the city’s annual budget process, Utilities staff develops a six-year planning budget, this year for the time period of 2017 through 2022. The Water Resources Advisory Board (WRAB) role in this process is defined in the Boulder Revised Code: “. . . to review all environmental assessments and capital improvements conducted or proposed by the utilities division.” Utilities staff has formulated revenue and expenditure projections for each of the three utility funds through the year 2022. Within the budget process council approves and appropriates funds only for the first year, 2017.

At the April 18 and May 16, 2016 WRAB meetings, staff presented the preliminary 2017 Utilities budget including the six-year capital improvement program. Since the May 16 meeting there have been no changes in projects in the proposed CIP.

This packet contains information concerning the Recommended 2017 Utilities Budget and the 2017-2022 Utilities CIP. The attached fund financials and CIP spreadsheets (**Attachment A** – Water Utility, **Attachment B** – Wastewater Utility and **Attachment C** -Stormwater / Flood Management Utility) reflect actual revenues and expenditures for 2015, updated revenue projections/rate increases for the planning period and updated CIP.

Staff requests a recommendation from the WRAB concerning the 2017 Utilities Budget including the 6-year Capital Improvement Program (CIP) and associated Monthly Utility Rates. Staff will submit the CIP to the Planning Board which will meet to discuss the citywide CIP and make a recommendation to City Council on July 28. City Council study sessions are scheduled for August 9, 2016 concerning the proposed city-wide 2017-2022 CIP and on September 13 and September 27 on the preliminary 2017 city-wide budget. City Council is scheduled to hold first and second readings on adoption of the budget on October 4 and October 18 respectively.

**STAFF RECOMMENDATION:**

Staff recommends that WRAB make the following motion related to the 2017-2022 CIP:

The Water Resources Advisory Board recommends approval of the 2017-2022 CIP for the Water, Wastewater, and Flood/Stormwater Utilities including proposed rate adjustments to support 2017 revenue increases of 8% in the water utility, 5% in the wastewater utility, and 8% in the stormwater and flood control utility.

**FISCAL IMPACTS:**

The following percentage increases in additional revenue from the monthly utility fees are currently being recommended by Utilities staff for 2017 to fund the preliminary Utilities budget and capital improvements program. These increases are consistent with projections provided during the budget process in 2015.

Water	8%
Wastewater	5%
Stormwater/ Flood Management	8%

**BOARD FEEDBACK:**

The preliminary 2017 Utilities budget and 2017-2022 CIP were presented to the WRAB on April 18 and May 16, 2016. The Board provided comments as documented in the meeting minutes including discussion of rates, key projects, and questions regarding alternative sources of revenue.

**PUBLIC FEEDBACK:**

Board input and a public hearing is scheduled for this meeting.

**BACKGROUND:**

The Utilities Division provides 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. Each of the city’s three utilities (water, wastewater and stormwater/flood management) is a separate enterprise fund established to finance and account for the acquisition, operation and maintenance of each utility’s facilities and services while maintaining designated reserves and meeting debt service requirements.

Revenues generated from monthly utility bills are the largest revenue source for each utility. Other significant sources of funds include development fees (plant investment fees), hydroelectric revenues, funding from the Urban Drainage and Flood Control District (UDFCD) and interest earnings.

The majority of the utilities expenditures are for rehabilitating and improving the capital infrastructure either through the capital improvements program (cash financed) or through annual debt payments for revenue bonds that have been issued to fund capital improvements.

**ANALYSIS:**

The preliminary draft 2017 budget provided with this memorandum reflects the following billed revenue increases: 8% Water, 5% Wastewater, and 8% Stormwater/Flood Management. The following table summarizes the 2016 adopted, the 2017 proposed, and 2018 and 2019 projected increases.

Table 1 – Proposed Rate Increases

	2016	<b>2017</b>	2018	2019
Water	8%	<b>8%</b>	8%	7%
Wastewater	5%	<b>5%</b>	6%	6%
Stormwater/Flood Management	4%	<b>8%</b>	8%	8%

**Single Family Residential Customer Bill Impact**

The proposed preliminary 2017 revenue increases (8%-5%-8%) would increase a typical residential customer’s monthly utility bill by \$5.90 or an increase of \$70.80 annually. Table 2 provides a breakdown of the potential increases by utility, and Table 3 shows commercial customer impacts.

Table 2 – Sample Residential Monthly Bill Impacts

	Monthly Bill 2016 Rates	Monthly Bill 2017 Rates	Monthly Difference
Water	\$39.57	\$42.73	\$3.16
Wastewater	\$31.75	\$33.37	\$1.62
Stormwater/ Flood Mgmt	\$14.00	\$15.12	\$1.12
<b>Total</b>	<b>\$85.32</b>	<b>\$91.22</b>	<b>\$5.90</b>

Table 3 – Sample Commercial Monthly Bill Impacts

CUSTOMER	Combined Monthly Bill 2016 Rates	Combined Monthly Bill 2017 Rates	Monthly Difference
Hotel	\$5,091	\$5,419	\$328
Grocery Store	\$10,543	\$11,261	\$718
Large Format Retailer	\$3,307	\$3,546	\$239
Pearl Street Retail	\$157	\$167	\$10
Industrial/Institutional	\$59,461	\$63,672	\$4,211
Downtown Restaurant	\$160	\$170	\$10
Downtown Restaurant/Brewery	\$999	\$1,059	\$61

Impact of Rate Changes

The impact of a 1% increase in revenue varies substantially across the three funds:

Table 4–Rate Impact	1%	2%	3%
Water	\$250,000	\$500,000	\$750,000
Wastewater	\$200,000	\$400,000	\$600,000
Stormwater / Flood Mgmt	\$100,000	\$200,000	\$300,000

Additional information about other customer classes and cost comparisons will be provided as part of the staff presentation. As a point of reference, \$100,000 provides for debt service coverage on a bond of approximately \$1,000,000.

Rate Inflation Comparisons

It can be helpful to understand the City’s proposed rate increases in the context of historical rate increases and relative to utilities in the Front Range and nationally. Attachment D shows the history of rate increases in the three utilities since 1990, and also the average rate increase for the whole period and by decade. In the water utility, the rate by decade has declined to where the average for this decade is 4% (including the 2017 proposed increases). Between 2010 and 2013, relatively low rate increases were adopted primarily due to citywide budget pressures felt because of the last economic downturn.

A comparison of the Boulder and Front Range average water/wastewater bill history is included in attachment E. This graph reflects an increasing gap between 2010 and 2014, and then the gap was narrowed due to the 30% Wastewater increase in 2015, but Boulder’s Water and Wastewater annual bill of \$860 remains below the Front Range average of \$940.

A broader comparison graph is found in Attachment F which shows cost changes since 2007 in different indexed utilities. Since 2007 the national index for Water and Sewer has increased at around 6% annually and Boulder has increased nearly 5%.

**NEXT STEPS:**

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

Milestone	Date
<b><i>WRAB Recommendation on CIP/Budget</i></b>	<b><i>June 22, 2015</i></b>
Planning Board CIP Hearing	July 28, 2016
City Council Study Session on Budget (CIP)	Aug. 9, 2016
City Council Study Session on Budget	Sept. 13, 2016
City Council Study Session on Budget (if needed)	Sept. 27, 2016
City Council Consideration/Adoption of Budget	Oct. 4 and Oct. 18, 2016

**Attachments:**

- A:** Water - Fund Financial and Capital Improvement Program
- B:** Wastewater - Fund Financial and Capital Improvement Program
- C:** Stormwater/ Flood Management - Fund Financial and Capital Improvement Program
- D:** Boulder Rate Increase History
- E:** Water and Wastewater Bill Comparison History
- F:** Consumer Price Index Comparison



Attachment A

**RECOMMENDED  
CITY OF BOULDER  
2017 FUND FINANCIAL**

	A	B	D	F	H	J	L	N	P	R
1	<b>WATER UTILITY</b>									
3										
5			<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
6			<b>Actual</b>	<b>Revised</b>	<b>Recommended</b>	<b>Projected</b>	<b>Projected</b>	<b>Projected</b>	<b>Projected</b>	<b>Projected</b>
47	Debt-									
48	BRWTP 1996 Revenue Bond; Refunding in 2006		857,708	858,531	-	-	-	-	-	-
49	Refunding of the 1999 and 2000 Revenue Bonds		2,522,054	2,517,388	2,524,233	2,524,650	1,375,102	-	-	-
50	Lakewood 2001 Rev Bond; Refunded in 2012		2,065,733	2,065,950	2,065,333	2,072,083	2,080,817	2,081,367	2,088,883	-
51	Projected Bond-Betasso WTP Improvements		-	1,090,143	2,259,081	2,260,181	2,255,681	2,260,681	2,259,981	2,258,681
52	Projected Bond-NCWCD Conveyance Line		-	-	-	3,356,023	3,356,023	3,356,023	3,356,023	3,356,023
53	Projected Bond - Barker Dam		-	-	-	-	-	793,773	793,773	793,773
55	<b>TOTAL DEBT SERVICE</b>		<b>\$5,445,495</b>	<b>6,532,012</b>	<b>6,848,647</b>	<b>10,212,937</b>	<b>9,067,623</b>	<b>8,491,845</b>	<b>\$8,498,661</b>	<b>\$6,408,478</b>
56										
57	Transfers -									
58	Cost Allocation		1,080,393	1,248,290	1,533,813	1,687,194	1,855,914	2,041,505	2,245,656	2,470,221
59	Planning & Development Services		218,941	225,509	267,989	276,029	284,310	292,839	301,624	310,673
61	<b>TOTAL TRANSFERS OUT</b>		<b>\$1,299,334</b>	<b>\$1,473,799</b>	<b>\$1,801,802</b>	<b>\$1,963,223</b>	<b>\$2,140,223</b>	<b>\$2,334,344</b>	<b>\$2,547,280</b>	<b>\$2,780,894</b>
62										
63										
64	Capital		9,414,942	\$10,313,251	9,330,215	3,707,880	11,718,449	12,513,715	14,365,392	15,628,528
65										
66	Projected Bond - Betasso WTP IMP		-	\$35,000,000	-	-	-	-	-	-
68	Projected Bond - NCWCD Conveyance & Distributions M		-	-	-	\$35,326,562	-	-	-	-
70	Projected Bond - Barker Dam/Boulder Reservoir WTP		-	-	-	-	-	\$8,355,509	-	-
72	Projected Bond - Issuance Costs		-	\$350,000	-	\$350,000	-	\$100,000	-	-
73	Encumbrances, Carryover and Adjustments to Base		-	5,627,577	-	-	-	-	-	-
74										
75	<b>Total Uses of Funds</b>		<b>\$ 31,789,220</b>	<b>\$75,793,508</b>	<b>\$34,463,728</b>	<b>\$66,777,861</b>	<b>\$ 38,319,209</b>	<b>\$47,711,114</b>	<b>\$ 41,872,505</b>	<b>\$ 41,769,908</b>
76										
77	Sick/Vacation Accrual Adjustment		\$ -	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
78										
79	<b>Ending Fund Balance Before Reserves</b>		<b>\$ 38,793,330</b>	<b>\$ 29,709,371</b>	<b>\$ 27,769,214</b>	<b>\$ 31,335,815</b>	<b>\$ 29,875,557</b>	<b>\$ 29,636,657</b>	<b>\$ 29,244,607</b>	<b>\$ 30,859,688</b>
80										
81	<b>Reserves</b>									
82	Bond Reserve		\$ 3,034,796	\$ 3,034,796	\$ 2,181,429	\$ 2,181,429	\$ 2,181,429	\$ 1,600,100	\$ 1,600,100	\$ 1,600,100
83	Lakewood Pipeline Remediation Reserve		15,218,434	15,837,309	16,582,687	17,468,028	18,055,455	18,978,041	19,923,957	20,427,803
84	FEMA Deobligation Reserve		87,951	87,951	87,951	87,951	87,951	87,951	87,951	87,951
85	Sick/Vacation/Bonus Reserve		530,852	546,778	563,181	580,076	597,479	615,403	633,865	652,881
86	Pay Period 27 Reserve		235,109	265,109	295,109	-	-	-	-	-
87	Operating Reserve		4,232,196	4,492,667	4,571,217	4,295,120	4,383,284	4,562,511	4,752,113	4,933,225
88	Capital Reserve		2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
89	<b>Total Reserves</b>		<b>\$ 25,339,337</b>	<b>\$ 26,264,609</b>	<b>\$ 26,281,573</b>	<b>\$ 26,612,605</b>	<b>\$ 27,305,598</b>	<b>\$ 27,844,006</b>	<b>\$ 28,997,987</b>	<b>\$ 29,701,961</b>
90										
91	<b>Ending Fund Balance After Reserves</b>		<b>\$ 13,453,993</b>	<b>\$ 3,444,762</b>	<b>\$ 1,487,641</b>	<b>\$ 4,723,209</b>	<b>\$ 2,569,960</b>	<b>\$ 1,792,651</b>	<b>\$ 246,621</b>	<b>\$ 1,157,727</b>
92										
93	<b>Note:</b>									
94	Operating reserve levels are based on industry standards and are maintained for revenue bonds, revenue fluctuations (weather and water usage impacts) and the capital intensive nature of the utility.									

Attachment A - RECOMMENDED WATER CIP

A: Water - Fund Financial and Capital Improvement Program

	A	L	M	N	O	P	Q
1	CITY OF BOULDER						
2	RECOMMENDED 2017-2022 CAPITAL IMPROVEMENT PROGRAM						
3	WATER UTILITY FUND						
4							
5							
6		2017	2018	2019	2020	2021	2022
7	PROJECT NAME	RECOMMENDED	PROJECTED	PROJECTED	PROJECTED	PROJECTED	PROJECTED
8							
9	<b>Treated Water Pressure Reducing and Hydroelectric Facilities</b>						
13	Sunshine Hydro/PRV Facility	\$271,875	\$0	\$0	\$0	\$0	\$0
14	Pearl Street Hydro/PRV Facility	\$0	\$24,333	\$243,331	\$0	\$0	\$0
15	<b>Subtotal - Treated Water PRV and Hydro</b>	<b>\$271,875</b>	<b>\$24,333</b>	<b>\$243,331</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
16							
17	<b>Water Treatment Facilities</b>						
18	Equipment Replacement	\$127,000	\$100,000	\$100,000	\$100,000	\$50,000	\$52,000
21	Bond Issuance Costs	\$0	\$350,000	\$0	\$100,000	\$0	\$0
22	Boulder Reservoir WTF	\$200,000	\$200,000	\$0	\$600,000	\$0	\$0
24	<b>Subtotal - Water Treatment Facilities</b>	<b>\$327,000</b>	<b>\$650,000</b>	<b>\$100,000</b>	<b>\$800,000</b>	<b>\$50,000</b>	<b>\$52,000</b>
25							
31							
32	<b>Treated Water Storage Tanks</b>						
36	Devil's Thumb Storage Tank	\$0	\$0	\$0	\$0	\$0	\$1,486,874
38	Chautauqua Storage Tank	\$0	\$0	\$0	\$0	\$0	\$0
39	Betasso Storage Tank	\$292,465	\$0	\$0	\$0	\$0	\$0
41	<b>Subtotal - Treated Water Storage Tanks</b>	<b>\$292,465</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,486,874</b>
42							
43	<b>Treated Water Distribution System</b>						
46	Waterline Replacement	\$3,487,078	\$3,626,562	\$3,771,624	\$3,922,489	\$4,079,389	\$4,242,564
47	<b>Subtotal - Treated Water Distribution System</b>	<b>\$3,487,078</b>	<b>\$3,626,562</b>	<b>\$3,771,624</b>	<b>\$3,922,489</b>	<b>\$4,079,389</b>	<b>\$4,242,564</b>
48							
49	<b>Treated Water Transmission System</b>						
53	Zone 1 Transmission Pipes	\$0	\$0	\$0	\$626,601	\$651,665	\$677,732
54	Zone 2 Transmission Pipes	\$0	\$0	\$0	\$909,016	\$945,377	\$983,192
55	Zone 3 Transmission Pipes	\$0	\$0	0	\$467,460	\$486,158	\$505,605
56	<b>Subtotal - Treated Water Transmission System</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,003,077</b>	<b>\$2,083,200</b>	<b>\$2,166,528</b>
57							
58	<b>Source Water Transmission System</b>						
59	Lakewood Pipeline	\$0	\$0	\$316,330	\$0	\$0	\$0
62	<b>Subtotal - Source Water Transmission System</b>	<b>\$0</b>	<b>\$0</b>	<b>\$316,330</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
63							
64	<b>Barker Water System</b>						
65	Barker Gravity Pipeline Repair	\$1,559,811	\$1,622,204	\$1,687,092	\$2,083,559	\$2,166,901	\$2,253,577
66	Barker-Kossler Penstock Repair	\$116,986	\$0	\$0	\$0	\$0	\$0
67	Barker Dam Outlet	\$175,000	\$0	\$835,551	\$0	\$0	\$0
68	Barker Dam Outlet - Bond Proceeds	\$0	\$0	\$0	\$8,355,509	\$0	\$0
69	Barker Dam and Reservoir	\$50,000	\$0	\$0	\$0	\$0	\$0
75	Kossler Dam	\$0	\$0	\$0	\$0	\$0	\$100,000
76	<b>Subtotal - Barker Water System</b>	<b>\$1,901,797</b>	<b>\$1,622,204</b>	<b>\$2,522,643</b>	<b>\$10,439,067</b>	<b>\$2,166,901</b>	<b>\$2,353,577</b>
77							
78	<b>Raw Water Storage Reservoirs</b>						
79	Albion Dam	\$0	\$341,636	\$3,416,361	\$0	\$0	\$0
80	Silver Lake Dam	\$0	\$100,000	\$0	\$0	\$0	\$0
81	Island Lake Dam	\$0	\$50,000	\$0	\$0	\$0	\$0
83	Green Lake 2 Dam	\$0	\$0	\$0	\$0	\$0	\$4,867,726
84	Green Lake 2 Dam	\$0	\$0	\$0	\$75,000	\$486,773	\$0
86	Goose Lake Dam	\$0	\$75,000	\$0	\$0	\$0	\$0
87	Boulder Reservoir	\$0	\$0	\$0	\$118,434	\$0	\$0
88	Lakewood Dam	\$0	\$124,707	\$0	\$0	\$0	\$0
89	Skyscraper Dam	\$0	\$0	\$0	\$0	\$171,071	\$0
90	Wittemyer Ponds	\$0	\$0	\$100,000	\$492,685	\$4,926,849	\$0
91	<b>Subtotal - Raw Water Storage Reservoirs</b>	<b>\$0</b>	<b>\$691,343</b>	<b>\$3,516,361</b>	<b>\$686,119</b>	<b>\$5,584,692</b>	<b>\$4,867,726</b>
92							
93	<b>Other Raw Water Facilities</b>						
94	Farmer's Ditch	\$0	\$0	\$108,160	\$0	\$0	\$0
95	Anderson Ditch	\$0	\$0	\$0	\$0	\$0	\$0
96	Source Water Facilities Rehab Program	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
97	Watershed Improvements	\$0	\$0	\$0	\$100,000	\$0	\$0
104	NCWCD Conveyance - Carter Lake Pipeline	\$2,150,000	\$0	\$0	\$0	\$0	\$0
105	NCWCD Conveyance/Waterline replacement - Bond Proceeds	\$0	\$31,700,000	\$0	\$0	\$0	\$0
106	<b>Subtotal - Other Raw Water Facilities</b>	<b>\$2,300,000</b>	<b>\$31,850,000</b>	<b>\$258,160</b>	<b>\$250,000</b>	<b>\$150,000</b>	<b>\$150,000</b>
107							
108	<b>Source Water Pressure Reducing, Pumping and Hydroelectric</b>						
109	Lakewood Hydroelectric/PRV	\$0	\$0	\$300,000	\$0	\$0	\$0
110	Silver Lake Hydroelectric/PRV	\$50,000	\$0	\$200,000	\$0	\$0	\$0
112	Hydroelectric Facilities Rehabilitation Program	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
113	Betasso Hydroelectric / Pressure Reducing Facility	\$400,000	\$480,000	\$0	\$0	\$0	\$0
114	Barker Dam Hydroelectric	\$0	\$0	\$0	\$0	\$0	\$50,000
116	Boulder Canyon Hydroelectric	\$0	\$90,000	\$0	\$0	\$0	\$0
119	Carter Lake Hydroelectric	\$0	\$50,000	\$250,000	\$0	\$0	\$0
120	Carter Lake Hydro	\$0	\$0	\$0	\$2,500,000	\$0	\$0
121	Source Water Pressure Reducing, Pumping and Hydroelectric F	\$0	\$0	\$0	\$193,472	\$201,210	\$209,259
122	<b>Subtotal - Source Water PRV, Pumping and Hydro</b>	<b>\$500,000</b>	<b>\$670,000</b>	<b>\$800,000</b>	<b>\$2,743,472</b>	<b>\$251,210</b>	<b>\$309,259</b>
123							
128	<b>Water System Monitoring and Metering</b>						
130	Water System Security/Quality Improvements	\$150,000	\$150,000	\$90,000	\$0	\$0	\$0
131	Source Water Monitoring and Protection	\$100,000	\$100,000	\$100,000	\$0	\$0	\$0
136	Utility Billing Computer System	\$0	\$0	\$0	\$125,000	\$0	\$0
137	<b>Subtotal - Water System Monitoring and Metering</b>	<b>\$250,000</b>	<b>\$250,000</b>	<b>\$190,000</b>	<b>\$125,000</b>	<b>\$0</b>	<b>\$0</b>
138							
139	<b>TOTAL CAPITAL USES OF FUNDS</b>	<b>\$9,330,215</b>	<b>\$39,384,442</b>	<b>\$11,718,449</b>	<b>\$20,969,224</b>	<b>\$14,365,392</b>	<b>\$15,628,528</b>





## Attachment B

## B: Wastewater - Fund Financial and Capital Improvement Program

	A	L	M	N	O	P	Q
1	<b>CITY OF BOULDER</b>						
2	<b>RECOMMENDED 2017 - 2022 CAPITAL IMPROVEMENT PROGRAM</b>						
3	<b>WASTEWATER UTILITY FUND</b>						
4							
5							
6		<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
7	<b>PROJECT NAME</b>	<b>RECOMMENDED</b>	<b>PROJECTED</b>	<b>PROJECTED</b>	<b>PROJECTED</b>	<b>PROJECTED</b>	<b>PROJECTED</b>
8							
9	<b>Wastewater Treatment</b>						
10	WWTF Pumps	\$0	\$0	\$150,000	\$0	\$0	\$150,000
11	WWTF Permit Improvements	\$0	\$862,500	\$1,725,000	\$0	\$136,857	\$0
12	WWTF Nutrient Management Grant						
13	WWTF Permit Improvements - Proj. Bond	\$0	\$0	\$0	\$17,250,000	\$0	\$0
14	WWTF Laboratory	\$0	\$0	\$0	\$0	\$0	\$0
15	WWTF Headworks	\$0	\$0	\$0	\$0	\$0	\$0
16	WWTF Instrumentation/Control	\$0	\$0	\$1,265,319	\$0	\$0	\$0
17	WWTF Electrical	\$1,400,000	\$210,000	\$0	\$0	\$0	\$0
18	WWTF Activated Sludge	\$0	\$0	\$189,798	\$0	\$0	\$0
19	WWTF Primary Clarifiers	\$0	\$0	\$900,000	\$9,000,000	\$1,350,000	\$0
20	WWTF Secondary Clarifiers	\$0	\$0	\$0	\$0	\$0	\$0
21	WWTF UV Disinfection	\$0	\$0	\$0	\$0	\$0	\$0
22	WWTF Rehabilitation	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000
23	Biosolids Processing & Dewatering	\$0	\$0	\$0	\$0	\$0	\$0
24	WWTF Cogeneration	\$400,000	\$0	\$0	\$184,481	\$0	\$0
25	WWTF Digester Complex	\$0	\$0	\$200,000	\$2,000,000	\$0	\$0
26	September 2013 Flood Disaster Recovery	\$0	\$0	\$0	\$0	\$0	\$0
27	WWTF Sediment Removal - FEMA Grant						
28	WWTF Digester Cleaning	\$0	\$0	\$0	\$136,857	\$0	\$0
29	Bond Issuance Costs	\$0	\$125,000	\$0	\$125,000	\$0	\$0
30	<b>Subtotal - Wastewater Treatment Plant</b>	<b>\$2,050,000</b>	<b>\$1,447,500</b>	<b>\$4,680,117</b>	<b>\$28,946,338</b>	<b>\$1,736,857</b>	<b>\$400,000</b>
31							
35							
36	<b>Wastewater System Monitoring and Metering</b>						
39	Utility Billing Computer System	\$0	\$0	\$0	\$65,000	\$0	\$0
40	<b>Subtotal - Monitoring and Metering</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$65,000</b>	<b>\$0</b>	<b>\$0</b>
41							
42	<b>Collection and Conveyance System Rehabilitation</b>						
43	Collection System Monitoring	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
44	Condition Assessment Program	\$0	\$648,960	\$674,918	\$701,915	\$729,992	\$759,191
45	Sanitary Sewer Rehabilitation	\$1,743,539	\$2,983,139	\$3,102,465	\$3,226,563	\$3,355,626	\$3,489,851
48	Sanitary Sewer Manhole Rehabilitation	\$224,973	\$233,972	\$243,331	\$253,064	\$657,966	\$684,285
50	Main Interceptor Realignment	\$0	\$10,059,920	\$0	\$0	\$0	\$0
51	Lower Goose Creek Trunk Sewer Replacement	\$4,000,000	\$0	\$0	\$0	\$0	\$0
52	Foothills & Baseline Trunk Sewer Replacement	\$0	\$3,497,000	\$0	\$0	\$0	\$0
53	Arapahoe Trunk Sewer Replacement	\$0	\$0	\$0	\$0	\$0	\$0
54	<b>Subtotal - Sewer System Rehabilitation</b>	<b>\$6,118,512</b>	<b>\$17,572,991</b>	<b>\$4,170,714</b>	<b>\$4,331,542</b>	<b>\$4,893,584</b>	<b>\$5,083,327</b>
59							
60	<b>TOTAL CAPITAL USES OF FUNDS</b>	<b>\$8,168,512</b>	<b>\$19,020,491</b>	<b>\$8,850,831</b>	<b>\$33,342,880</b>	<b>\$6,630,441</b>	<b>\$5,483,327</b>



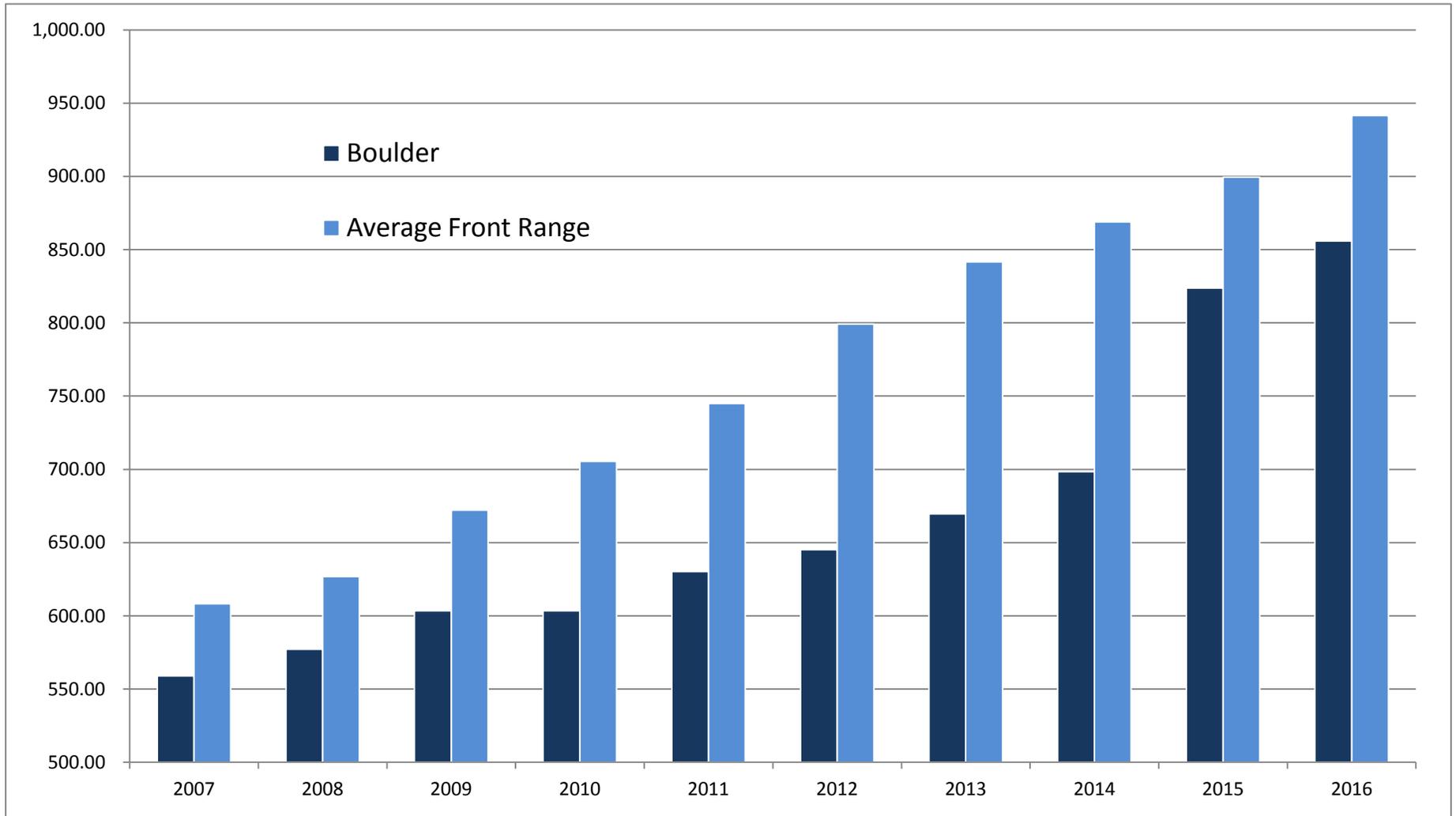


	A	J	K	L	M	N	O	
1								
2		<b>CITY OF BOULDER</b>						
3		<b>RECOMMENDED 2017-2022 CAPITAL IMPROVEMENT PROGRAM</b>						
4		<b>STORMWATER AND FLOOD MANAGEMENT UTILITY FUND</b>						
5								
6		<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	
7	<b>PROJECT NAME</b>	<b>RECOMMENDED</b>	<b>PROJECTED</b>	<b>PROJECTED</b>	<b>PROJECTED</b>	<b>PROJECTED</b>	<b>PROJECTED</b>	
8								
9	<b>Major Drainageways</b>							
10	Elmer's Twomile Creek	\$0	\$0	\$0	\$0	\$0	\$0	
11	Goose Creek	\$0	\$0	\$1,500,000	\$1,250,000	\$500,000	\$800,000	
12	South Boulder Creek	\$750,000	\$0	\$0	\$0	\$0	\$0	
13	South Boulder Creek - Bond Proceeds	\$0	\$25,000,000	\$0	\$0	\$0	\$0	
14	Bond Issuance Costs	\$0	\$325,000	\$0	\$0	\$0	\$0	
15	Skunk Canyon Creek	\$200,000	\$500,000	\$0	\$0	\$0	\$0	
16	Sunshine Creek	\$0	\$0	\$0	\$0	\$0	\$0	
17	Twomile Canyon Creek	\$100,000	\$500,000	\$0	\$0	\$0	\$0	
18	Bluebell Canyon Creek - King's Gulch	\$0	\$0	\$0	\$0	\$0	\$0	
19	Viele Channel	\$0	\$0	\$0	\$0	\$0	\$0	
20	Four Mile Canyon Creek	\$0	\$0	\$0	\$0	\$0	\$0	
21	Four Mile Canyon Creek - Upland to Violet	\$3,000,000	\$2,000,000	\$0	\$0	\$0	\$0	
22	Four Mile Canyon Creek - 19th to 22nd - Bond	\$0	\$0	\$0	\$0	\$0	\$0	
23	Bear Canyon Creek	\$0	\$0	\$0	\$0	\$0	\$0	
24	Gregory Canyon Creek	\$0	\$500,000	\$0	\$0	\$0	\$0	
25	Boulder Creek	\$0	\$1,250,000	\$0	\$0	\$0	\$0	
31	Bond Issuance Costs	\$0	\$0	\$0	\$0	\$0	\$0	
32	Preflood Acquisition	\$550,000	\$600,000	\$633,000	\$660,000	\$684,285	\$711,656	
33	Greenways Program Transfer	\$97,500	\$97,500	\$97,500	97,500	97,500	138,773	
34	<b>Subtotal - Major Drainageway Improvements</b>	<b>\$4,697,500</b>	<b>\$30,772,500</b>	<b>\$2,230,500</b>	<b>\$2,007,500</b>	<b>\$1,281,785</b>	<b>\$1,650,429</b>	
35								
36	<b>Miscellaneous</b>							
42	Utility Billing Computer System	\$0	\$0	\$0	\$65,000	\$0	\$0	
43	<b>Subtotal - Miscellaneous Drainage Improvements</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$65,000</b>	<b>\$0</b>	<b>\$0</b>	
44								
45	<b>Stormwater Management</b>							
46	2007 Master Plan - Upper Goose Creek	\$0	\$0	\$0	\$0	\$0	\$0	
52	2016 Master Plan - Middle Boulder Creek - 2	\$0	\$0	\$0	\$0	\$3,862,873	\$0	
53	2016 Master Plan - Wonderland Creek - 1	\$0	\$0	\$0	\$0	\$386,896	\$0	
54	2016 Master Plan - Bear Canyon Creek - 5	\$0	\$0	\$0	\$0	\$324,846	\$0	
59	Local Drainage Improvements	\$759,283	\$789,655	\$821,241	\$854,090	\$986,949	\$1,026,427	
60	Stormwater Quality Improvements	\$169,000	\$175,500	\$182,500	\$190,000	\$197,390	\$205,285	
61	Storm Sewer Rehabilitation	\$281,200	\$292,500	\$304,000	\$632,700	\$657,966	\$684,285	
62	Transportation Coordination	\$337,500	\$351,000	\$365,000	\$633,000	\$657,966	\$684,285	
63	<b>Subtotal - Localized Drainage Improvements</b>	<b>\$1,546,983</b>	<b>\$1,608,655</b>	<b>\$1,672,741</b>	<b>\$2,309,790</b>	<b>\$7,074,885</b>	<b>\$2,600,281</b>	
64								
65	<b>TOTAL CAPITAL USES OF FUNDS</b>	<b>\$6,244,483</b>	<b>\$32,381,155</b>	<b>\$3,903,241</b>	<b>\$4,382,290</b>	<b>\$8,356,670</b>	<b>\$4,250,710</b>	

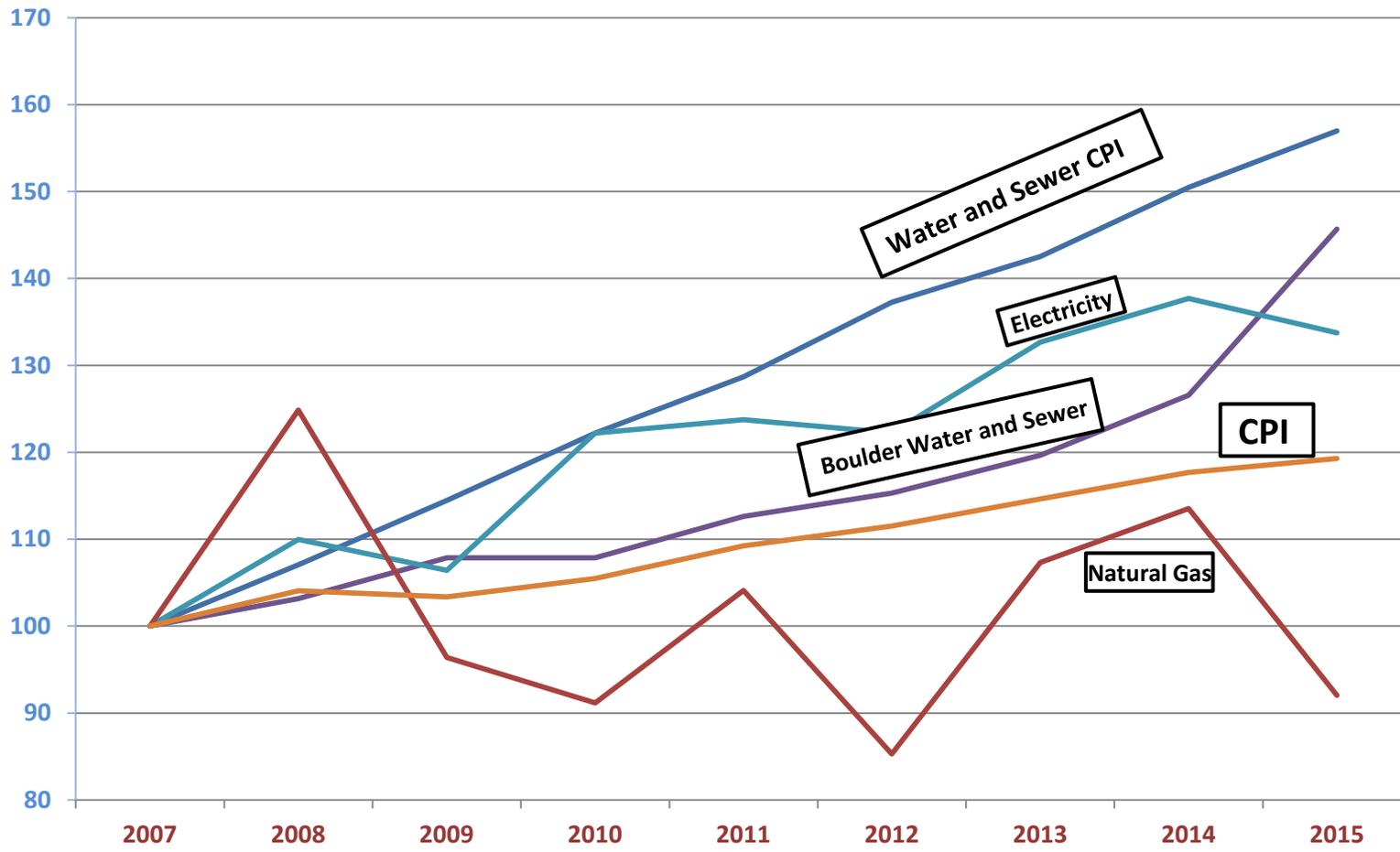
### CITY OF BOULDER RATE INCREASE HISTORY

Year	Water Increase	Wastewater Increase	Stormwater Increase
1990	0%	12%	34%
1991	0%	0%	0%
1992	11%	14%	0%
1993	14%	12%	0%
1994	0%	12%	9%
1995	5%	10%	0%
1996	6%	6%	6%
1997	13%	4%	5%
1998	8%	9%	0%
1999	5%	4%	6%
2000	3%	3%	3%
2001	10%	6%	4%
2002	9%	12%	8%
2003	3%	12%	6%
2004	0%	6%	3%
2005	3%	20%	3%
2006	3%	20%	3%
2007	4%	6%	3%
2008	4%	3%	3%
2009	8%	5%	3%
2010	0%	0%	0%
2011	3%	3%	0%
2012	3%	3%	3%
2013	3%	5%	3%
2014	4%	5%	3%
2015	5%	30%	75%
2016	8%	5%	4%
2017	8%	5%	8%
<b>Decade Averages</b>			
1990's	6%	8%	6%
2000's	5%	9%	4%
2010's	4%	7%	12%
1990-2017	5%	8%	7%

# Annual Water/ Wastewater Bill Comparison



### Consumer Price Index Comparison (local is Denver-Boulder-Greeley)



- Boulder - Water Sewer
- Electric Local CPI
- CPI Local
- CPI - Water Sewer
- Natural Gas Local CPI

**CITY OF BOULDER  
WATER RESOURCES ADVISORY BOARD  
INFORMATION ITEM**

**MEETING DATE: June 20, 2016**

**AGENDA TITLE:** Information Item – Update on Rate Study and Background for July 2016 WRAB Discussion

**PRESENTER/S:**

Jeff Arthur, Director of Public Works for Utilities  
Ken Baird, Utilities Financial Manager  
Eric M. Ameigh, Public Works Project Coordinator

**I. PURPOSE**

The purpose of this memo is to provide the board with information relevant to its upcoming July 2016 meeting on the Utility Rate Study. The July meeting will focus on the findings from the first phase of the Rate Study and staff will seek WRAB feedback on potential directions for updating the rate structures in the water, wastewater, and stormwater/flood management utilities.

**II. BACKGROUND**

In late 2014, Utilities Division staff met with customers to better understand the impacts of utility rate increases approved by council in fall 2014. Many customers indicated they did not understand utility rate structures and/or had questions and concerns about the calculation of the charges on their utility bills.

The Utilities Division periodically reviews its rate setting methodology to assure that utility rates are meeting community goals and are aligned with fee-based principles. These findings led staff to propose an evaluation of the rate structure and associated calculations for water, wastewater, and stormwater/flood management utilities as part of the 2015 work plan. As a first step, a public engagement process was implemented to solicit broader feedback across all customer classes. The initial public engagement process took place in April and May 2015 and consisted of three open houses and an online survey. More than 26,000 postcards were mailed to utilities customers to notify them about the engagement opportunities.

In June 2015, staff presented to WRAB the results of the public engagement process, as well as options for the Utility Rate Study's guiding principles and its areas of study. Guiding principles are high-level goals and speak to what the rate structures should be designed to accomplish. The public engagement process did not indicate a strong need or desire to change the five existing guiding principles for the water rate structure. WRAB recommended that the guiding principles should apply not only to water but also to the other two utilities. In addition, it was determined that the stormwater/flood management utility should have a guiding principle specifically encouraging development that minimizes stormwater impacts. These discussions resulted in

recommended guiding principles and their application across the three utilities, as shown in the following table.

<b>Principle</b>	<b>Water Utility</b>	<b>Wastewater Utility</b>	<b>Stormwater/Flood Management Utility</b>
<b>Discourage wasteful use, while promoting all justified types and amounts of use.</b>	<b>X</b>		
<b>Be effective in yielding total revenue requirements.</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Provide revenue stability and predictability for the utilities.</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Fairly allocate the total cost of service across customer classes to attain equity.</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Be dynamic and proactive to address changing supply and demand conditions, as well as the city’s sustainability and resilience goals.</b>	<b>X</b>		
<b>Encourage low-impact development to decrease stormwater impacts.</b>			<b>X</b>

Based on WRAB feedback and guidance related to guiding principles and areas of study, staff developed a scope of work for the analysis phase of the project. The scope of work informed a request for consultant proposals (RFP) which was issued in early November 2015. Staff received four complete proposals and selected Denver-based Raftelis Financial Consultants (RFC) to assist with the project.

The project is roughly divided into three phases, as follows:

*Phase 1 – Investigation and Assessment (February – June)*

RFC will assist the staff in comprehensively understanding what is happening within the rate structures and the pros and cons of the current systems. The consultant team and staff will present these preliminary findings to WRAB at the July meeting. WRAB’s feedback will help determine which identified issues require a new approach within the rate structures.

*Phase 2 – Analysis of Potential Alternatives (July – September)*

Based on WRAB feedback at the July meeting, and staff direction, RFC will develop and analyze options to address issues identified in the first phase. Alternatives will be developed and tested across all three utilities and all customer classes and bill impacts will be calculated. Staff and RFC will present the results of the options analysis at the September meeting and offer draft recommendations as appropriate. Depending on the results of this phase, staff may update council within the context of the 2017 budget process and, if feasible, any simple and/or non-controversial changes may be recommended for adoption in the budget.

*Phase 3 – Recommendations (October – December)*

Based on the results of the second phase and WRAB discussion in September, staff and RFC will refine the analysis and draft recommendations and present a final report for WRAB's acceptance and recommendation to council.

### **III. NEXT STEPS**

Staff and RFC will present preliminary findings and seek WRAB feedback at the July18 meeting.

### **ATTACHMENTS**

- A – Water Budget Rules
- B – Rate Structure Informational Handouts
- C – 2016 Rates and Fees

RULE ESTABLISHING THE METHODOLOGY TO BE UTILIZED IN DETERMINING THE MONTHLY WATER BUDGET FOR THE COMPONENT OF THE MONTHLY WATER USER CHARGES KNOWN AS THE TREATED WATER QUANTITY CHARGE, AND FOR DETERMINING THE MONTHLY WASTEWATER USER CHARGES.

AMENDED – EFFECTIVE AUGUST 1, 2009

**1. Authority.**

These rules are issued pursuant to Section 11-1-3, “Rules and Regulations,” B.R.C. 1981 to implement the provisions of Sections 11-1-44, “Water User Charges,” 4-20-25(b), “Monthly Water Service Charges – Treated Water Quantity Charges,” B.R.C. 1981, and 4-2-28, “Monthly Wastewater User Charges,” B.R.C. 1981.

**2. Purpose and Applicability.**

The monthly water user charges set forth in Section 4-20-25, B.R.C. 1981, identify two components for the monthly charges that are billed to consumers. Section 4-20-25(a), B.R.C. 1981, sets forth the treated water monthly service charge which is a fixed amount based on the meter size. Section 4-20-25(b) sets forth the treated water quantity charges which vary depending on use. Beginning in January 2007, the treated water quantity charge portion of water bills were calculated using a water budget block rate structure such that the price of water increases as more water is used, particularly when the amount of water used exceeds the customer’s water budget. The increasing price is necessary not only to promote water conservation, but also is related to the additional marginal cost associated with water development and water conservation. Effective August 1, 2009, water budget methodology enhancements have been made to multifamily, commercial/industrial/institutional, and metered irrigation accounts.

The purpose of this rule is to establish a methodology that shall be utilized to determine the monthly water budget for the treated water quantity charge, and for determining the monthly wastewater user charges. This rule establishes a system whereby the revenue produced will meet the treated water quantity charge portion of the revenue requirements for the water utility. This rule does not include or apply to the treated water monthly service charges set forth at Section 4-20-25(a), B.R.C. 1981.

It is also the purpose of this rule to establish a rate structure that will promote water conservation and the efficient use of water, support community goals, reflect the value of water, send a price signal to customers who waste water, and avoid the costs of new water development and expanded water treatment.

**3. Definitions and Abbreviations.**

“AMU” means average monthly use.

“AWC” means the average monthly water consumption as reflected on a customer’s bill from December through March.

“CII” means Commercial/Industrial/Institutional.

“ET” means evapotranspiration (also, see ET Rate).

“ET rate” means the amount of water (in inches) a lawn will use on any specific day through the natural processes of surface evaporation and plant transpiration (loss of water through the leaves). The historic monthly ET rate is specifically defined in the following chart:

<b>Historic Monthly ET Rate</b>		
Month	ET (inches)	Share of Annual Outdoor Allocation
January	0.00	0%
February	0.00	0%
March	0.40	1%
April	2.72	7%
May	5.10	14%
June	7.52	20%
July	7.60	20%
August	6.67	18%
September	4.43	12%
October	2.92	7%
November	0.32	1%
December	0.00	0%
<b>Total</b>	<b>37.68</b>	<b>100%</b>

“GPSF” means gallons per square foot.

“HMU” means historical monthly use.

“Irrigable area” means the area (in square feet) that a customer is required to maintain pursuant to Title 6, Title 8 and Title 9, B.R.C. 1981, is not covered by a hard surface (such as a roof, driveway, patio or sidewalk) and that may require some outdoor watering. Right-of-way may be included as part of a customer’s irrigable area but the city’s geographical information system (“GIS system”) may not automatically include city right-of-way. Customers may seek inclusion of right-of-way pursuant to paragraph 7 below.

“Kgal” means thousand gallons.

“Monthly water budget” means the amount of water allocated to the water utility customer to meet that customer’s anticipated water needs for the month. The monthly water budget shall be the sum of the indoor and/or outdoor allocation for each water utility customer. The allocation

shall be based on reasonable and necessary indoor and/or outdoor use, water conservation, and other relevant factors associated with water use in the city.

“Public ROW” means public right-of-way.

#### **4. Block Rate Structure for Treated Water Quantity Charges.**

The block rate structure established in Section 4-20-25(b)(1), B.R.C. 1981, is utilized in conjunction with the monthly water budget in order to determine the bill for each customer on a monthly basis. The monthly water budget represents the amount of water allocated to a customer to meet the anticipated watering needs for the month. Customers are billed for the amount of water they use each month, not for their budgeted amount of water. The amount billed per Kgal increases as customers use more water. (See table below.)

	Block Rate (per Kgal)	Rate (per Kgal)	Block Size (% of water budget)
<b>Block 1</b>	Each Block Rate will be as reflected in Section 4-20-25 (b)(1), B.R.C. 1981	$\frac{3}{4}$ Base Rate	0 – 60%
<b>Block 2</b>		Base Rate	61 – 100%
<b>Block 3</b>		2 x Base Rate	101 – 150%
<b>Block 4</b>		3 x Base Rate	151 – 200%
<b>Block 5</b>		5 x Base Rate	Greater than 200%

Some customers have a “looped” water system in which multiple water meters are used in an effort to increase reliability and to provide redundancy to their water system. In these “looped” water systems, water meter accounts will be combined for budgeting and billing purposes.

#### **5. Customer Classes.**

This rule establishes four different customer classes: single-family residential, multifamily residential, CII and metered irrigation. CII will have four sub-customer classes: 1) CII AMU (default option); 2) CII HMU; 3) CII indoor/outdoor, and 4) CII efficiency standard. The method used to calculate the water budget for each of these classes and sub-customer classes is described below. The bills for all customer classes utilize the customer’s water budget amount which is then applied to the block rates to determine the monthly water bill.

##### **a. Single-Family Residential**

The single-family residential customer’s budget shall consist of indoor and outdoor allocations for water. The indoor allocation for each customer with a household size of up to four people shall be set at 7,000 gallons per month. The outdoor allocation shall be based on customer-specific irrigable area as determined by the city’s GIS system. This system maps and calculates areas within defined property boundaries and hard surface boundaries. The total annual outdoor allocation shall be based on the following application rates:

- For the first 5,000 square feet of irrigable area: 15 gpsf
- For the next 9,000 square feet of irrigable area: 12 gpsf
- For irrigable area in excess of 14,000 square feet: 10 gpsf.

In order to reflect varying seasonal outdoor monthly watering requirements, the total annual allocation of water for irrigable area shall be distributed to each month based upon that month's annual outdoor amount as described by the historic monthly ET rate.

Customers are able to base their budget on an amount less than their total irrigable area.

Single-family residential customers may seek water budget adjustments pursuant to paragraph 7 below.

#### **b. Multifamily Residential**

The multifamily residential customer's budget shall consist of indoor and outdoor allocations. The indoor allocation for each residential dwelling unit shall be set at 4,000 gallons per month. The outdoor allocation shall be based on customer-specific irrigable area as determined by the city's GIS system and a total annual application rate of 15 gpsf. In order to reflect varying seasonal outdoor monthly watering requirements, the total annual allocation of water for irrigable area shall be distributed to each month based upon that month's annual outdoor amount as described by the historic monthly ET rate.

Customers are able to base their budget on an amount less than their total irrigable area and will be allocated 15 gpsf for the total amount of the reduced area.

Multifamily residential customers may seek water budget adjustments pursuant to paragraph 7 below.

#### **c. Commercial/Industrial/Institutional (Non-residential)**

##### **1. CII Customer Budgets - Existing**

- 1) CII AMU customer budgets shall be based on 100% of historical AMU for the 12-month period in 2005. This AMU amount will be fixed as the monthly budget until another AMU period is defined. Customers may apply for a CII AMU adjustment (see paragraph 7 below) based on actual water usage in years subsequent to 2005. CII AMU (2005) is the default methodology unless customers apply for a water budget adjustment by selecting one of the other options listed below. AMU will result in monthly wastewater charges based on all water used which could include water used for irrigation. Customers may choose a different CII option only one time per year.

- 2) CII HMU customer budgets shall be based on the most recent three-year historical average for water use for each month and recalculated every year. January three-year historical average would become the January water budget, February three-year historical average would become the February water budget, etc. HMU will result in monthly wastewater charges based on all water used, which could include water used for irrigation.
- 3) CII indoor/outdoor customer budgets shall be based on an indoor allocation as determined by the customer's most recent average winter consumption (AWC) and an outdoor allocation based on the irrigable area (including public ROW), using an application rate of 15 GPSF and apportioned monthly using the historical monthly ET rate. Public ROW will automatically be included in the irrigable area for CII indoor/outdoor customers. CII indoor/outdoor customers will be billed wastewater charges on actual water used or indoor budget allocation (AWC) whichever is lower, for the billing period. A customer may not select the CII indoor/outdoor option if there is not any irrigable area (therefore, no outdoor allocation) associated with the account.
- 4) CII efficiency standard customer budgets shall be determined by a specific review of the customer's indoor and outdoor uses based on reasonable and documented efficiency standards as determined in the methodology described in paragraph 6 below. CII efficiency standard customers will be billed wastewater charges on actual water used or indoor budget allocation, whichever is lower, for the billing period.

## 2. CII PIF Custom Customer Budgets - New or Redevelopment

- 1) New or existing CII customers who are placing an increased demand on the city's water system must determine the appropriate meter size and select an annual budget. These customers will use the CII Plant Investment Fee (PIF) custom annual budget which is based on 25, 50 or 85 percent of the AWC for a specified meter size (see table below). The CII PIF customer may then select how this annual water budget is distributed throughout the twelve months. This annual budget distribution may be specified by the CII PIF customer once per year.

TABLE: Annual Water Budget Based on AWC (gallons)

Meter Size	25% AWC	50% AWC	85% AWC
3/4"	N/A	30,000	165,000
1"	42,000	108,000	503,000
1-1/2"	99,000	228,000	924,000
2"	183,000	483,000	1,941,000

- 2) Mixed-use properties water budget will be calculated based on a combination of the amount they have purchased based on the meter size for the CII portion of the building, and the number of dwelling units and bedrooms for the multifamily portion of the building, as described in these rules.
- 3) New CII customers that have water meter(s) larger than 2" will be allocated an efficiency standard custom budget as indicated in paragraph 6 below.
- 4) CII customers may seek water budget adjustments pursuant to paragraph 7 below.

#### **d. Metered Irrigation**

Metered irrigation customer budgets shall be based on customer-specific irrigable area as determined by the city's GIS system, and an annual application rate of 15 gpf. The budget shall change each month based upon that month's share of annual outdoor allocation described by the historic ET rates, except that metered irrigation accounts will be given an additional 1% of their annual outdoor watering budget for each month in December, January and February. The purpose of this additional 1% is to establish a monthly water budget that is greater than zero and allows for some limited outdoor watering. Public ROW will automatically be included and added to the irrigable area for all metered irrigation accounts.

Customers are able to base their budget on an amount less than their total irrigable area and will be allocated 15 gpf for the total amount of the reduced area.

Metered irrigation customers may seek water budget adjustments pursuant to paragraph 7 below.

#### **6. Standards and Practices Regarding Water Audits for CII Customers That Request the Efficiency Standard Water Budget Option.**

The CII efficiency standard water budget option is intended to provide a customer-specific water budget (indoor allocation and outdoor allocation) that is determined by a specific review of the customer's indoor and outdoor uses, needs and facilities, by a Colorado registered professional engineer with a focus on various components, including without limitation:

- industrial or production processes,
- bathroom and locker rooms,
- kitchen and food preparation areas,
- cooling and heating facilities,
- humidity control, and
- aquatics or pool needs.

The purpose of the customer-specific review is to develop a monthly indoor water allocation based on reasonable and documented efficiency standards and, if needed, a monthly outdoor allocation. If a customer has any irrigable area that is not included in a separate metered irrigation-only account, the irrigable area size should be included for use in the CII Efficiency Standard option. The monthly outdoor allocation shall be based on the irrigable area (including public ROW), an application rate of 15 GPSF and apportioned monthly using the historical monthly ET rate. Because plant materials, irrigation systems components, weather, soil conditions, etc, are not needed in determining the outdoor allocation, it is not necessary to have a landscape architect or a certified landscape irrigation auditor involved in the audit unless there is an indoor garden or horticulture need.

The indoor water audit and evaluation shall consider the following, if applicable:

- The City is a partner with the EPA WaterSense program and information is available on the EPA WaterSense web site. Standards related to high-efficiency plumbing fixtures will be used for the audit. For example, while a 1.6 gallon/flush toilet is today's regulated standard, a high-efficiency toilet, as promoted by WaterSense, uses 1.28 gallon/flush or less and should be used in the audit and development of the indoor budget allocation.
- Data for high-efficient, front loading clothes washers.
- Recycle and reuse process water.
- Limited or no humidification: requires documented need for equipment or medical reasons.
- Use of automatic on/off sensors on faucets in restrooms in larger facilities.
- High-efficiency dishwashers in kitchen areas, especially in restaurants and catering facilities.
- Use of a cover in facilities that have large, open vessels of water.
- Efficient operation of cooling towers.
- Sanitation and cleaning practices in office buildings. Use of high-efficient plumbing fixtures and appliances. Use of sensor activated or timed faucets.
- Use of plumbing fixtures, dishwashers and ice machines in restaurants. Servers offering a glass of water on request, but not as an automatic service. Use sensor activated or timed faucets. Reduce water in food preparation activities.
- Efficiencies for cooling water, food preparation, boilers and chillers in supermarkets.
- Plumbing fixtures, laundry facilities and ice machines in hotels and motels. Request guests to reuse their towels and linens to reduce laundry needs.
- Efficiencies in cafeteria food preparation, plumbing fixtures, restrooms and locker rooms in schools.

The report shall include a recommendation for each month's indoor water budget allocation, based on the audit and evaluation. In addition, effective June 1, 2008, the wastewater charge for a customer who uses the CII efficiency standard water budget option will be based on each accounts indoor water budget allocation or actual water used, whichever is lower, for the billing period. If an account does not have an outdoor water budget allocation, wastewater charges will be based on actual water used as measured by the water meter.

Requests by CII customers for a water budget adjustment application requesting use of the efficiency standard water budget option, shall include a report prepared by a Colorado registered professional engineer which documents and describes the evaluation and audit, including a recommendation for the CII efficiency standard monthly water budget. The city manager or his/her delegate will review and approve, revise or deny the water budget adjustment request prior to its implementation and use. A fee will be charged to review the CII efficiency standard water budget option request and its associated report pursuant to Section 4-20-43(c)(7) B.R.C. 1981, which establishes a technical document review fee for a miscellaneous plan review.

## **7. Water Budget Adjustments.**

Water budget adjustments may be granted by the city manager or his/her delegate to insure that the needs of the water utility customer are reasonably balanced against the purposes for this rule in paragraph 2 above. The city manager or his/her delegate may consider the following:

- Number of people in household (more than four people may receive 1,000 gallons per month per person) (single family accounts only and is renewable on an annual basis)
- Irrigable area square footage (landscaping area)
- Irrigable area of public ROW that customers are required to care for and maintain
- Number of dwelling units (multifamily accounts only)
- Number of bedrooms in a dwelling unit (multifamily accounts only). Dwelling units that have more than two bedrooms may receive an additional 1,000 gallons per month, but the total indoor allocation per dwelling unit may not exceed 7,000 gallons per month, which is the equivalent of five bedrooms..
- Average Monthly Use (CII accounts only)
- Historical Monthly Use (CII accounts only)
- Indoor/Outdoor (CII accounts only)
- Efficiency Standard (CII accounts only)
- Licensed in-home childcare or eldercare facility
- Other (medical needs, etc.).
- Monthly budget allocation (CII PIF Custom accounts only)\*

Customers shall submit a water budget adjustment application in order to have their request considered by the city manager or his/her delegate. Information contained on the application may be subject to an audit and, if necessary, additional documentation may be required in order to substantiate the requested adjustment. This information is outlined on the water budget adjustment application.

\*Customers who have a PIF budget must submit their budget change request to Planning & Development Services for approval.

When reviewing the water budget adjustment application, the city manager or his/her delegate may consider the following information:

- Completeness of required documentation submitted with the Application
- Authenticity of supporting documents

- Duration of household size or medical need
- Historic water usage information for property
- Correct errors or changed circumstances
- Other factors relevant to making a determination, provided that the needs of the water utility customer are balanced against the purposes for this rule in paragraph 2 above.

Water budgets will not be adjusted to accommodate:

- Pools, spas, or hot tubs
- In-home businesses or hobbies that use an increased amount of water
- Gardens (gardens are included in the initial calculation of irrigable area and will not be the basis for additional water budget adjustments).

### **8. Water Budget Calculation Example – Single-Family Residential.**

The single family residential water budget is the sum of an indoor and outdoor allocation. The indoor allocation is 7,000 gallons per month.

The outdoor allocation is based on customer-specific irrigable area as provided by the city's geographical information system. This allocation changes monthly based on seasonal watering needs. The annual outdoor allocation is calculated as follows:

- The first 5,000 square feet of irrigable area is allocated 15 gallons of water per square foot (gpsf)
- The next 9,000 square feet of irrigable area is allocated 12 gpsf
- All excess irrigable area gets 10 gpsf.

A customer with 14,400 square feet of irrigable area would have the following annual outdoor allocation:

<b>Irrigable Area (square feet)</b>	<b>Gallons per Square Foot</b>	<b>Total Gallons</b>
5,000	15	75,000
9,000	12	108,000
400	10	4,000
<b>Annual Outdoor Allocation</b>		<b>187,000</b>

The annual outdoor allocation is distributed throughout the year to meet changing monthly seasonal outdoor watering needs. The table below shows the percentages by month that will be applied to the annual outdoor allocation. These percentages were derived from historic ET data (as displayed in paragraph 3, above).

<b>Historic ET Rate</b>	
<b>Month</b>	<b>Share of Annual Outdoor Allocation</b>
January	0%
February	0%
March	1%
April	7%
May	14%
June	20%
July	20%
August	18%
September	12%
October	7%
November	1%
December	0%
<b>Total</b>	<b>100%</b>

A customer with an annual outdoor allocation of 187,000 gallons would receive 20% (37,400 gallons) in June. This number will be rounded up to the nearest 1,000 gallon; therefore, this customer would receive 38,000 gallons in June.

In June, this customer's monthly water budget would be 45,000 gallons: the sum of the indoor allocation (7,000 gallons) plus the outdoor allocation (38,000 gallons) 45,000 gallons.

If this customer used 70,000 gallons in June (budget is 45,000 gallons), the water usage would be billed as follows:

<b>Rate Block</b>	<b>% of Budget</b>	<b>Gallons per Rate Block</b>	<b>Billed Water Usage (gallons)</b>
Block 1	0-60% of budget	0 – 27,000	27,000
Block 2	61-100% of budget	27,001 – 45,000	18,000
Block 3	101-150% of budget	45,001 – 68,000	23,000
Block 4	151-200% of budget	68,001 – 90,000	2,000
Block 5	over 201% of budget	Over 90,000	0

The customer's monthly bill uses the volume of water used in each rate block multiplied by the rate (\$) for each billing block to determine the treated water quantity charge component of the monthly water bill.



# Water Budgets

## Single Family Residential

Residential water budgets consist of two parts: an indoor allocation and an outdoor allocation. The indoor allocation is set at 7,000 gallons per month (for four people). Customers with larger families can apply to get an additional 1,000 gallons a month for each additional person in the home. As customers use more water in relation to their water budgets, consumption moves up into higher “blocks” as outlined below.

Block	Quantity Charge (per 1,000 gal)	2015 Rates (per 1,000 gal)	Gallons billed in each Block
Block 1	¾ x Base Rate	\$ 2.55	0 to 60% of total monthly water budget
Block 2	Base Rate	\$ 3.40	61-100% of total monthly water budget
Block 3	2 x Base Rate	\$ 6.80	101-150% of total monthly water budget
Block 4	3 x Base Rate	\$10.20	151-200% of total monthly water budget
Block 5	5 x Base Rate	\$17.00	> 200% of total monthly water budget

The outdoor allocation is based on customer-specific irrigable area as provided by the city’s geographic information system (GIS) and changes monthly using historic evapotranspiration (ET) rates which correlate with seasonal watering needs. The annual outdoor allocation is calculated as follows:

- The first 5,000 square feet of irrigable area gets 15 gallons of water per square foot (gpsf).
- The next 9,000 square feet of irrigable area gets 12 gpsf.
- All irrigable area in excess of 14,000 square feet gets 10 gpsf.

Customers also pay a fixed service charge based on meter size. The service charge is based on the size of the water meter, which varies based on the amount of water required at the location. For example, most single family residential dwellings have a ¾ inch meter. Commercial or industrial facilities may have a larger meter size depending on their water need.

Monthly Outdoor Allocation Distribution	
Month	Percent of Annual Outdoor Allocation
January	0%
February	0%
March	1%
April	7%
May	14%
June	20%
July	20%
August	18%
September	12%
October	7%
November	1%
December	0%
<b>Total</b>	<b>100%</b>

Service Charges		
Meter Size (Inches)	Inside City	Outside City
¾	\$9.67	\$14.51
1	\$16.27	\$24.40
1 ½	\$35.04	\$52.27
2	\$61.38	\$92.08
3	\$136.54	\$204.81
4	\$241.76	\$362.63
6	\$542.52	\$813.78
8	\$963.56	\$1,445.34





# Water Budgets Multifamily Residential

Residential water budgets consist of two parts: an indoor allocation and an outdoor allocation. Multifamily residential accounts have a monthly indoor allocation of 4,000 gallons per dwelling unit. If an apartment has more than two bedrooms, an additional 1,000 gallons of water per bedroom can be requested for up to three additional bedrooms for a maximum of 7,000 gallons per living unit per month. As customers use more water in relation to their water budgets, consumption moves up into higher “blocks” as outlined below.

Block	Quantity Charge (per 1,000 gal)	2015 Rates (per 1,000 gal)	Gallons billed in each Block
Block 1	¾ x Base Rate	\$ 2.55	0 to 60% of total monthly water budget
Block 2	Base Rate	\$ 3.40	61-100% of total monthly water budget
Block 3	2 x Base Rate	\$ 6.80	101-150% of total monthly water budget
Block 4	3 x Base Rate	\$10.20	151-200% of total monthly water budget
Block 5	5 x Base Rate	\$17.00	> 200% of total monthly water budget

The outdoor allocation is based on customer-specific irrigable area as provided by the city’s geographic information system (GIS) and changes monthly using historic evapotranspiration (ET) rates which correlate with seasonal watering needs. All irrigable area gets 15 gallons of water per square foot.

Customers also pay a fixed service charge based on meter size. The service charge is based on the size of the water meter, which varies based on the amount of water required at the location. For example, most single family residential dwellings have a ¾ inch meter. Commercial or industrial facilities may have a larger meter size depending on their water need.

Monthly Outdoor Allocation Distribution	
Month	Percent of Annual Outdoor Allocation
January	0%
February	0%
March	1%
April	7%
May	14%
June	20%
July	20%
August	18%
September	12%
October	7%
November	1%
December	0%
<b>Total</b>	<b>100%</b>

Service Charges		
Meter Size (Inches)	Inside City	Outside City
¾	\$9.67	\$14.51
1	\$16.27	\$24.40
1 ½	\$35.04	\$52.27
2	\$61.38	\$92.08
3	\$136.54	\$204.81
4	\$241.76	\$362.63
6	\$542.52	\$813.78
8	\$963.56	\$1,445.34





# Water Budgets Commercial/Industrial/Institutional (CII)

CII customers can choose from four different water budget options.

**The four budget options are:**

- **Average Monthly Use (AMU)** - This is the default option. The AMU budget is calculated using the historical average of 12 consecutive months of water use for that account, so that every month's water budget is the same. Customers can now apply to change the timeframe used for the 12-month average. (The default timeframe is January through December 2005.) If you feel that the AMU used in calculating your water budget is incorrect, you can apply for an adjustment. Please provide information explaining the reason for an adjustment along with a new estimated AMU. This information will be used in conjunction with historical water usage in reviewing the adjustment application. Budget adjustments for AMU do not expire.
- **Historical Monthly Use (HMU)** - The HMU budget is calculated using a rolling three-month average for each individual month. For example, the average of the past three Januarys' use would be next year's January budget.
- **Indoor/Outdoor** - The Indoor/Outdoor budget is similar to the single-family budget in that it is comprised of both an indoor water allocation and an outdoor water allocation. The indoor allocation is based on the most recent Average Winter Consumption (AWC), which is the average water use for that account for December through March. The outdoor allocation is calculated based on irrigable area, including right of way, and seasonal watering needs.
- **Efficiency-Standard** - This option allows for a specific customized water budget. The customer must hire a professional engineer to evaluate and recommend a personalized indoor budget, which then must be reviewed and approved by the city. The customer will be charged a fee for the city review.

As customers use more water in relation to their water budgets, consumption moves up into higher "blocks" as outlined below.

Block	Quantity Charge (per 1,000 gal)	2015 Rates (per 1,000 gal)	Gallons billed in each Block
Block 1	¾ x Base Rate	\$ 2.55	0 to 60% of total monthly water budget
Block 2	Base Rate	\$ 3.40	61-100% of total monthly water budget
Block 3	2 x Base Rate	\$ 6.80	101-150% of total monthly water budget
Block 4	3 x Base Rate	\$10.20	151-200% of total monthly water budget
Block 5	5 x Base Rate	\$17.00	> 200% of total monthly water budget

Customers also pay a fixed service charge based on meter size.





# Wastewater Charges

Wastewater charges are based on the quantity of indoor water use and a monthly service charge. The quantity charge is based on Average Winter Consumption (AWC) of water, which is defined as the average monthly amount of water used during the winter months of December through March. Each month the wastewater quantity charge is billed based on your AWC or actual water use, whichever is less.

Quantity charges are based on the following rate per 1,000 gallons of wastewater.

Inside City	Outside City
\$5.76	\$8.64

Service charges are based on water meter size, which varies based on the amount of water required at the location. For example, most single family residential dwellings have a  $\frac{3}{4}$  inch meter. Commercial or industrial facilities may have a larger meter size depending on their water need.

Meter Size (Inches)	Inside City	Outside City
$\frac{3}{4}$	\$1.43	\$2.15
1	\$2.51	\$3.76
1 $\frac{1}{2}$	\$5.73	\$8.60
2	\$10.10	\$15.15
3	\$22.71	\$34.07
4	\$40.42	\$60.63
6	\$90.94	\$136.40
8	\$161.67	\$242.50





# Stormwater & Flood Management Fees

The single family residential fee varies on the basis of parcel size as follows.

Parcel Size	Monthly Fee
0- 15,000 square feet	\$13.46
15,000-30,000 square feet	\$16.82
30,000 or more square feet	\$20.20

The fees for all properties that are not single family residential are individually calculated. The formula is constructed to be in proportion to the base rate assessed to single-family dwellings. The fee is equal to the following.

$$\frac{(\text{Total Site Area in square feet})(\text{Runoff Coefficient})(\text{Base Rate})}{(7,000 \text{ square feet})(0.43)}$$

A property's runoff coefficient, for the purposes of the fee, is equal to the following:

$$\frac{(\text{Total Impervious Area in square feet})(0.9) + (\text{Total Pervious Area in square feet})(0.2)}{\text{Total Area}}$$

For example, a commercial property with a total area of 40,000 square feet, of which 20,000 square feet are impervious and 20,000 square feet are pervious, would have a runoff coefficient of 0.55 and would pay \$98.38 per month, calculated as follows:

$$\frac{(40,000 \text{ square feet})(0.55)(\$13.46)}{(7,000 \text{ square feet})(0.43)} = \$98.38$$

The 0.55 runoff coefficient in the above example is calculated as follows:

$$\frac{(20,000 \text{ sq. feet impervious area})(0.9) + (20,000 \text{ sq. feet pervious area})(0.2)}{(40,000 \text{ square feet total area})} = 0.55$$



**City of Boulder**  
**2016 Monthly Utility Charges and Water Service Fees**

**Monthly Water Charges**

**Service Charges**

Meter Size	Inside City	Outside City
3/4"	\$10.44	\$15.67
1"	\$17.57	\$26.36
1 1/2"	\$37.84	\$56.76
2"	\$66.29	\$99.44
3"	\$147.46	\$221.19
4"	\$261.10	\$391.65
6"	\$585.92	\$878.88
8"	\$1,040.64	\$1,560.97

**Bulk Water & Metered Hydrant Rate**

\$8.00 per 1000 gallons

**Quantity Charges/ 1000 gallons**

Block 1	\$2.76	Water usage up to 60% of monthly water budget
Block 2	\$3.68	Water usage between 61-100% of monthly water budget
Block 3	\$7.36	Water usage over monthly water budget up to 150% of monthly water budget
Block 4	\$11.04	Water usage between 150-200% of monthly water budget
Block 5	\$18.40	Water usage over 200% monthly water budget

**Miscellaneous Charges**

To terminate water service	\$33.00
To mail water service termination notice	\$14.00
To remove water meter	\$63.00
To reset water meter	\$55.00
To resume water service	\$31.00
To resume water service after 3:00 p.m., weekends or holidays	\$61.00
Special meter read	\$39.00
To test meter and meter tests accurate	\$50.00
To purchase water monitor	\$110.00

**Monthly Wastewater Charges**

**Service Charges**

Meter Size	Inside City	Outside City
3/4"	\$1.50	\$2.25
1"	\$2.64	\$3.95
1 1/2"	\$6.02	\$9.02
2"	\$10.61	\$15.91
3"	\$23.85	\$35.77
4"	\$42.44	\$63.66
6"	\$95.49	\$143.23
8"	\$169.75	\$254.63

**Quantity Charges/ 1000 Gallons**

Inside City	Outside City
\$6.05	\$9.07

**Monthly Stormwater and Flood Management Charges**

Owners of single family dwellings within the city limits will pay the following stormwater charges:

<b>Size of Parcel</b>	
up to 15,000 sq. ft.	\$14.00
15,000 to 30,000 sq.ft.	\$17.49
30,000 sq. ft. and up	\$21.01

The fee for all non-single family dwellings is individually calculated.