

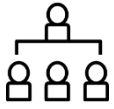
Water and Sewer Board

Regular Meeting

City Council Chambers – City Center South

1001 11th Avenue – Greeley, Colorado

November 20, 2024 at 2:00 p.m.



Regular meetings of the Water and Sewer Board are held **in person** on the 3rd Wednesday of each month in the City Council Chambers, 1001 11th Avenue, Greeley, Colorado.



Members of the public may attend and provide comment during public hearings.



Written comments may be submitted by US mail or dropped off at the Water and Sewer office located at 1001 11th Avenue, 2nd Floor, Greeley, CO 80631 or emailed to wsadmin@greeleygov.com. All written



comments must be received by 10:00 a.m. on the date of the meeting.

Meeting agendas and minutes are available on the City's meeting portal at <https://greeleyco.portal.civicclerk.com>

IMPORTANT – PLEASE NOTE

This meeting is scheduled as an **in-person session only**. If COVID, weather, or other conditions beyond the control of the City dictate, the meeting will be conducted virtually and notice will be posted on the City's CivicClerk meeting portal by 10:00 a.m. on the date of the meeting (<https://greeleyco.portal.civicclerk.com/>).

In the event it becomes necessary for a meeting to be held virtually, use the link below to join the meeting via Zoom. <https://greeleygov.zoom.us/j/81782466253>

For more information about this meeting or to request reasonable accommodations, contact the administrative team at 970-350-9801 or by email at wsadmin@greeleygov.com





Water & Sewer Board

November 20, 2024 at 2:00 PM

1001 11th Avenue, City Center South, Greeley, CO 80631

Agenda

1. Roll Call: _____ Chairman Harold Evans _____ Vice Chairman Mick Todd
 _____ Ms. Cheri Witt-Brown _____ Mr. Fred Otis
 _____ Mr. Joe Murphy _____ Mr. Tony Miller
 _____ Mr. Matt Anderson _____ Mayor John Gates
 _____ Mr. Raymond Lee _____ Ms. Tyra Litzau
2. Approval of Minutes
3. Approval of the Agenda
4. Welcome New Employees and Promotions
5. Cash in Lieu of Raw Water Study Dedication
6. November 2024 Water Supply Update
7. Wastewater Treatment Phase II Update
8. Local Initiative for Landscaping and Conservation (LILAC) Study
9. Legal Report
10. Director's Report
11. Such Other Business That May Be Brought Before the Board Added to This Agenda by Motion of the Board
12. Adjournment



If, to effectively and fully participate in this meeting, you require an auxiliary aid or other assistance related to a disability, please contact the Water and Sewer Department administrative staff at 970-350-9801 or wsadmin@greeleygov.com

**City of Greeley
Water and Sewer Board
Minutes of October 16, 2024, 2024
Regular Board Meeting**

Chairman Harold Evans called the Water and Sewer Board meeting to order at 2:03 p.m. on Wednesday, October 16, 2024.

1. Roll Call

The Clerk called the roll and those present included:

Board Members:

Chairman Harold Evans, Vice Chairman Mick Todd, Tony Miller, Matt Anderson, Joeseeph Murphy, Cheri Witt-Brown, Fred Otis, Finance Director Tyra Litzau, Deputy City Manager Rachel Flynn on behalf of City Manager Raymond Lee

Water and Sewer Department staff:

Director Sean Chambers, Deputy Director of Utility Finance and Customer Service Erik Dial, Chief Engineer Adam Prior, Deputy Director of W&S Operations and Maintenance Rebecca Andrus, Office Manager Gigi Allen, Administrative Assistant III Lisa Van Vorous, Utility Finance Manager Virgil Pierce, Water Resource Operations Manager Leah Hubbard, Water Conservation Manager Dena Egenhoff, Water Conservation Laborer Morgan Murphy, Water Resource Administrator II Sam Harshbarger, Source Water Supply Manager Cole Gustafson, Water Conservation Coordinator Ben Schaffer, Water and Sewer Intern Zac White, Asset Analyst Sophie White, Water and Sewer Asset Manager Patrick Turn, Civil Engineer IV Cort Nickel

Legal Counsel:

Supervising Senior Environmental and Water Resources Attorney Jerrae Swanson, Senior Environmental and Water Resources Attorney Dan Biwer, Environmental and Water Resources Attorney I Arthur Sayre, Counsel to Water & Sewer Board Attorney Carolyn Burr

Guests:

James Sutherland from Wingfoot, Council member Deb DeBoutez

2. Approval of Minutes

Ms. Witt-Brown made a motion, seconded by Mr. Otis to approve the September 2024 Water and Sewer Board meeting minutes. The motion carried 7-0.

3. Approval of Agenda

There were no changes to the Agenda.

4. Welcome New Employees and Promotions

Director of Water and Sewer Sean Chambers provided an introduction of new Water and Sewer Department employees starting this month.

5. Approval of Neff Lake Purchase and Sale Agreement

Sean Chambers presented background information on the proposed purchase of the Neff Lake Pipeline system, and how the Water and Sewer Staff with support from legal counsel previously negotiated a mutually agreed upon Term Sheet, dated June 13, 2023, that frames the proposed transactions whereby the City of Greeley, through its Water Enterprise, would purchase and acquire from Laramie River LLC the raw water pumping and delivery system known as the Neff Lake Pipeline, located within the growth boundary for the City of Greeley and Weld County, Colorado. The Neff Lake Pipeline is a raw water conveyance system that was constructed for the delivery of untreated river water originating in the Cache la Poudre or New Cache Irrigation Co. Ditch. The Neff Lake Pipeline configuration will allow the City's water utility to deliver reliable low-cost, non-potable water from the lower Poudre to non-potable systems throughout the City, further conserving existing water treatment and potable pipeline capacity for future growth. Furthermore, the use of the Neff Lake Pipeline allows the City to better use the right quality of water for their best uses. This helps the City to control the cost of water provided for supplies because the water sources on the lower Poudre River can be purchased for fractions of the cost compared to water rights that originate near the foothills that would be available for treatment at the City's water treatment facilities. Additionally, non-potable water does not require filtration or costly chemical addition for irrigation uses.

The Neff Lake Pipeline is well situated to address the City's long-range raw water transmission infrastructure requirements. As an existing system, the Neff Lake Pipeline can be acquired with reduced capital outlay and the use of excess water supplies as non-monetary compensation will further minimize impacts to water utility rate payers. With legal advice and support, Water & Sewer staff and Laramie River have negotiated a mutually agreeable Purchase and Sale Agreement (PSA) for certain physical infrastructure, appurtenances, easements and related rights that make up the Neff Lake Pipeline water system.

The PSA as drafted contains a number of key terms, including cash payment over time, secured by a promissory note, a ten-year water lease, and a ten-year lease-back of the Neff Lake Pipeline from Greeley back to Laramie River. Thus, Laramie River is compensated with a mix of cash payments over a ten-year period and non-monetary consideration in the form of a ten-year water lease and pipeline leaseback. In exchange, Laramie River will

convey to Greeley the Neff Lake Pipeline which includes the licenses, leases, easements and other agreements associated with the pump station and pipeline system

Vice Chairman Todd moved that the Board approve the Neff Lake Pipeline Purchase and Sale Agreement and delegate authority to the Director to (1) finalize the agreement and make any necessary amendments thereto, including but not limited to the terms and conditions of any exhibit, schedule or attachment thereto, the description of the assets, and extension of deadlines, provided the substantive terms of the agreement remain unchanged, and (2) to take all necessary and appropriate action to close on the transaction. Mr. Murphy seconded the motion. The motion carried 7-0.

6. Approval of Surface Use Rider to State Land Board Lease

Board member Otis recused himself for this presentation and left the room at 3:06 pm.

Cole Gustafson discussed that the State Land Board Water Well Drilling Project is starting up. This Surface Use Rider will be incorporated into the current 10-year Ground Water Production Lease between the City of Greeley and the Colorado State Land Board. Wingfoot Water Resources LLC assigned the lease to Greeley when the city closed on the Terry Ranch acquisition in 2021. The Surface Use Rider will allow Greeley to locate a maximum of two trailers for temporary occupancy for Lessee's staff or consultants for up to 12 months after being fully executed on State Land Board property.

Vice Chairman Todd moved that the Board approve the Surface Use Rider and delegate authority to the Director of Water and Sewer or his designee to enter into amendments to the Surface Use Rider or the Ground Water Production Lease, including but not limited to amendments that relate to the development, production, operation, and maintenance of the leased water and related infrastructure. Mr. Miller seconded the motion. The motion carried 6-0.

Board member Otis returned to the meeting at 3:14 pm.

7. Approval of Real Property Acquisition from Greeley Urban Renewal Authority

Dena Egenhoff, Morgan Murphy and Ben Schaffer left the meeting at 2:59 pm.

Sean Chambers presented how the Water & Sewer Dept. has been involved in conversations with the Greeley Urban Renewal Authority (GURA) over recent years regarding gravel pits and other property assets that GURA may consider liquidating. An opportunity to acquire a strategic property asset on Ash Street, just north of the Poudre River was identified. The property is of interest to the Water & Sewer Dept. and the Culture, Parks and Recreation Departments of the City, and the departments have agreed to split the purchase price and acquire the site for the purpose of siting future utility and trail access type uses. While the exact future uses are not yet

fully known, acquiring the site is important to preserving future opportunities on the site that has a strategic location just east of the city's wastewater treatment and reclamation facility.

The PSA provides for a diligence period, and an environmental assessment has been evaluated and found satisfactory. The PSA provides that W&S and CPRD split the purchase price and both entities have budgeted for the acquisition of this site. Review of record documents and other pre-closing diligence is ongoing.

The GURA Board unanimously approved the Purchase and Sale Agreement on Oct. 9, with the intent to divestment of the property known as the Toe Piece for the benefit of the City under its Water & Sewer and Culture, Parks and Recreation Departments.

Mr. Miller moved that the Board approve the enclosed Purchase and Sale Agreement with Greeley Urban Renewal Authority, and delegate authority to the Director of Water and Sewer or his designee to make minor amendments to the documents, including, but not limited to, corrections to property descriptions and contract extensions, and to undertake all necessary and appropriate action to close on the transaction. Vice Chairman Todd seconded the motion. The motion carried 7-0.

Cole Gustafson left the meeting at 3:06 pm.

8. Review and Recommend to Council Backflow Cross Connection Program Ordinance

Rebecca Andrus presented on Section 20-191 of the Greeley Municipal Code, which City Staff is recommending be revised to better conform to the revisions to 11.39 adopted by CDPHE in October 2023.

Vice Chairman Todd moved that the Board recommend City Council adopt revisions to the Municipal Code concerning the regulation of cross connections and backflow prevention in the form of the ordinance enclosed. Ms. Witt-Brown seconded the motion. The motion carried 7-0.

9. Bi-Annual CIP Report

Staff provided an update on some CIP projects that are in progress or completed since the last Bi-Annual CIP Report. The CIP projects discussed included:

- Terry Ranch Water pipeline construction project
- Non-potable expansion project with discussion Westgate non-potable pump station
- Suburban Ditch Non-Potable Supply
- Advanced Metering Infrastructure
- 20th St Transmission Line Break
- SCADA Master Plan
- Lead service line inventory and replacement project

- Distribution Water Main Replacement
- Bellvue WTP Rehab
- North Greeley Sewer Phase 2
- WTRF General Rehab

10. Multi Family Sewer PIF Update

Virgil Pierce presented to the Board that in 2024, the city implemented a new graduated fee structure for residential Water Plant Investment Fees (PIF) that accounted for varying impacts to the water system due to lot size. One of the issues identified when discussing these changes with the Water and Sewer Board was an inconsistency with how the Sewer PIF was being computed for multi-family housing structures in the city. Multi-family structures that have one sewer tap for the building pay a lower Sewer PIF than the aggregated units would if they were individually tapped. Raftelis, Greeley's rate and fee consultant, has completed an analysis of the sewer impact of some recent multi-family housing built in the city over the last four years. Their analysis supports a proposal to change the Sewer PIF computation for multi-family housing structures to be based on the number of dwelling units downstream from the water meter rather than the meter size.

The proposed change removes the financial disincentive to individually tap the housing units and is simple to compute:

The Sewer PIF for multi-family housing structures with 6 or fewer units downstream from the meter will be the number of dwelling units multiplied by 75% of the ¾" tap PIF from the regular PIF schedule; for multi-family housing structures with more than 6 units downstream from the meter it will be the number of dwelling units multiplied by 50% of the ¾" tap PIF from the regular PIF schedule. The Sewer PIF will be the same for individually tapped multi-family buildings and those with a single tap.

If the board is in favor of the change, it will be included in the 2025 Rate and Fee Resolution presented for the board's approval in December 2024.

Jerrae Swanson and Cort Nickel left the meeting at 4:08 pm.

11. Legal Report

Carolyn Burr, outside counsel for the Greeley Water & Sewer Board presented this month's Legal Report.

Based on Counsel and staff's review of the May 2024 Water Division 1 Resume, staff and water counsel recommend that the Water and Sewer Board authorize filing statements of opposition by the end of October 2024 to the following water court application:

Case No. 24CW3119: The Ogilvy Augmentation Company filed an application to add the 8th Street Gravel Pit as a well to its augmentation plan originally decreed in Case No. 03CW150. Out of priority depletions attributable to the 8th Street Pit occur in a reach on the Poudre where Greeley has numerous interests, including exchanges and return flow replacement obligations. We recommend that Greeley file a statement of opposition in this case to ensure that augmentation of the 8th Street Pit is sufficient to prevent injury to Greeley's water rights.

Mr. Murphy moved that the Board authorize filing a statement of opposition in Case Nos. 24CW3119 and for staff and legal counsel to seek resolution of issues raised by this case consistent with Water and Sewer Board Resolution No. 3, 2015. Mr. Otis seconded the motion. The motion passed 7-0.

Patrick Turn left the meeting at 4:34 pm.

12. Director's Report

The Director, Sean Chambers provided the Board with a summary update of some current activities and opportunities to participate in water community events and education.

13. Such Other Business That May Be Brought Before the Board Added to This Agenda by Motion of the Board

No other business was brought before the Board.

14. Adjournment

The meeting ended at 4:43 p.m.

Harold Evans, Chairman

Raymond Lee, Board Secretary



Water & Sewer Agenda Summary

November 20, 2024

Key Staff Contact: Sean Chambers, Water & Sewer Director

Title:

Welcome New Employees and Promotions

Summary:

Promotions: Leah Hubbard – Deputy Director of Water Resources
Roman Rhea – Equipment Operator II
Tonya Villareal – Utility Billing Supervisor

New Hires: Mona Rodriguez – Utility Locator
David Hernandez - Utility Locator
Eduardo Sguerra – Civil Engineer I
Rueben Guevara – Maintenance Technician I
Anthony Madaleno – Maintenance Technician I
Daniel Araiza – Maintenance Technician I
Adam Nunez - Maintenance Technician I
Kathryn James – Laborer – Wastewater Treatment and Reclamation Facility
Daniel O’Neil – Cross Connection Technician
Thomas Hall – Intern II – I and C
Ben Erickson – Meter Services Technician

Recommended Action:

Informational Only

Recommended Motion:

None

Attachments:

None



Water & Sewer Agenda Summary

November 20, 2024

Key Staff Contact: Erik Dial - Deputy Director of Utility Finance and Customer Service, Virgil Pierce - Utility Finance Manager

Title:

Cash in Lieu of Raw Water Study Dedication

Summary:

In July 2018, the Water and Sewer Board passed Resolution 4, 2018, which transitioned the Cash-in-Lieu (CIL) of Raw Water Dedication Fee away from the market price of Colorado-Big Thompson units to a blended fee based off the value of Greeley's water portfolio and its raw water storage. All development fees imposed by Greeley undergo period reviews and updates to ensure that the methodology used is still appropriate and reflects the service level needs of Greeley. The current CIL computation uses an estimated fair market value of the water rights in the City's water portfolio that are readily treatable and anticipated future expenditures for raw water infrastructure. Our current fee is at \$51,500.

Greeley Water contracted with WestWater Research to review Greeley's CIL model and methodology. WestWater modernized Greeley's model, proposed a modification to how the water resource portfolio value is calculated, and suggested changing to the buy-in approach for raw water storage infrastructure.

The proposed modifications result in an updated 2025 CIL fee of \$56,500 (rounded), which is similar to the current model's projected CIL fee. This fee will be included in the 2025 Rate Resolution for Board's consideration in December.

Recommended Action:

Informational Only

Recommended Motion:

None

Attachments:

1. Cash in Lieu or Raw Water Dedication Report
2. Greeley Cash In Lieu Fee Analysis & Recommendations_Final Report

Cash-In-Lieu Model Update

Greeley Water & Sewer Board
November 20, 2024

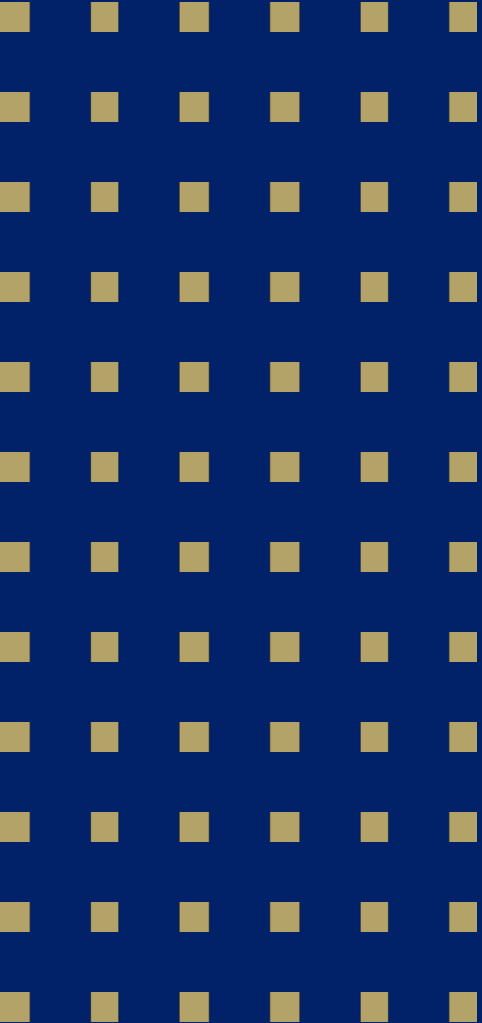


Agenda



1. Cash-In-Lieu (CIL) Background
2. Review of Current CIL Model
3. CIL Model Updates
4. Findings and Recommendations

Purpose: Inform the Water & Sewer Board of the updates to the CIL model and methodology.

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Cash-In-Lieu Background

CIL Background

- Greeley had a “wet water first” dedication policy until 2018
 - CIL was only accepted for limited quantities without W&S Board approval
 - Growth was generally occurring on land with water supplies associated with it and C-BT readily available for dedication
 - 2003 Water Master Plan envisioned allowing cash-in-lieu after a Future Water Account was developed and those funds would be used to buy new water supplies and raw water storage



CIL Background

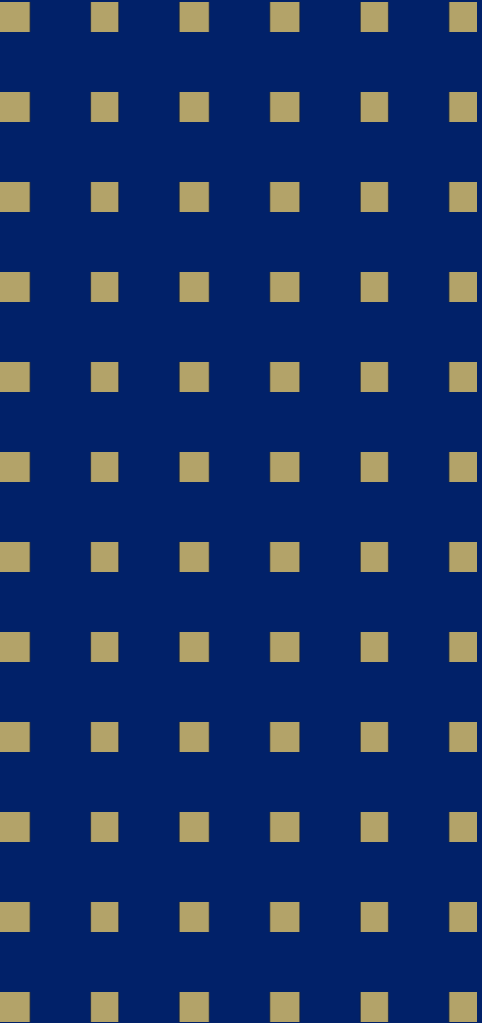


- Terry Ranch purchase changed the future
 - Greeley purchased with raw water credits for future development
- CIL revenue no longer needed to build an expanded Milton Seaman Reservoir
 - Limited CIL revenue in the future while raw water credits are available
- CIL price sets the ceiling for the raw water credit sales price

CIL Background



- Current CIL model was home grown and not easily managed
- Development fees should be reviewed periodically to review methodologies and update assumptions
- Wanted an updated model that was easy to update, defensible, and predictable
- Engaged with WestWater Research because of their knowledge of Northern Colorado water values and water economics

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CIL Model Review

Current Approach

City's current CIL model combined elements of buy-in and incremental cost approaches

Water Supply

- **Buy-In Cost** to the City's raw water portfolio
- Includes water sources that are changed, treatable, unallocated to priority development, and not held in leaseback
- Estimate of fair market value
- Current model result: \$48,340 per AF

Water Infrastructure

- **Incremental Cost** of building new raw water infrastructure
- Include future anticipated expenditures per AF of capacity
- Current model result: \$7,970 per AF

- 2025 modeled CIL: \$56,310/AF
- 2024 CIL: \$51,500/AF

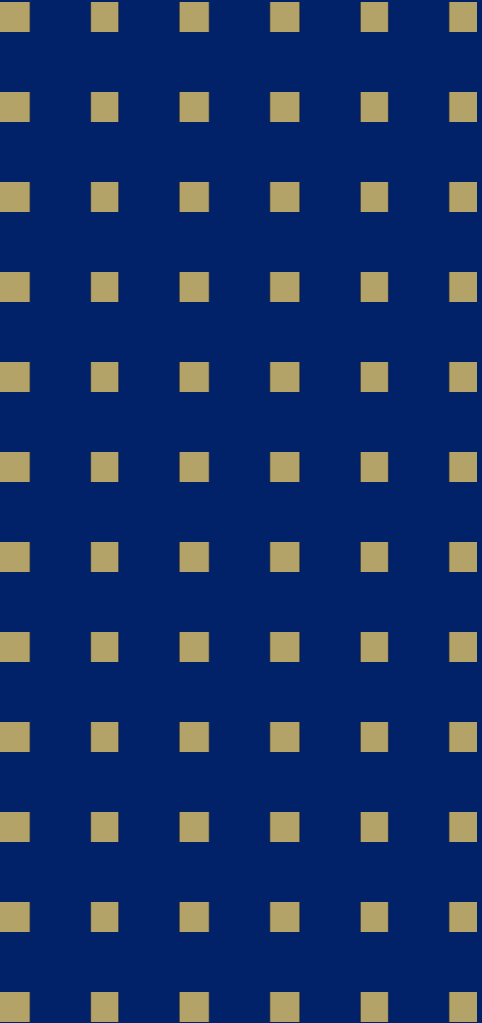
CIL Model Review

Findings

- Current model follows best practice (AWWA Manual of Water Supply Practices, M1)
- Current model meets the standard of “rough proportionality” (Krupp v. Breckenridge Sanitation, 2001)

Recommended Improvements

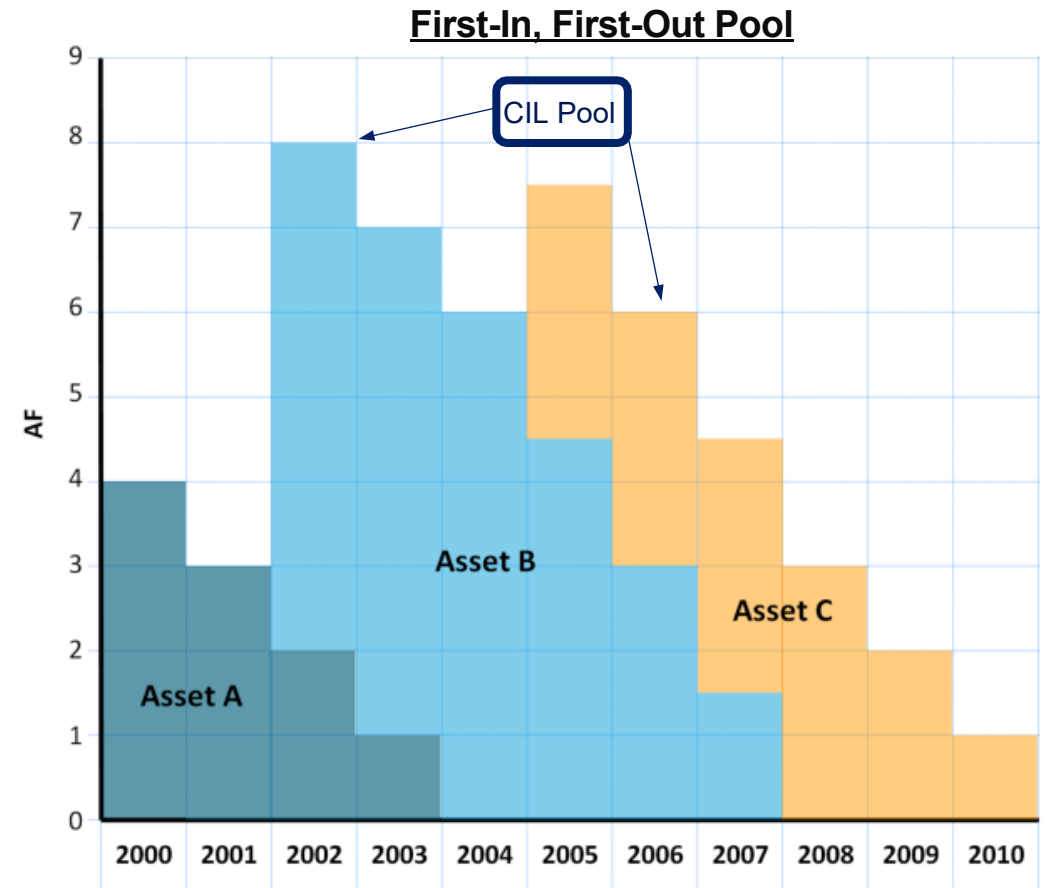
- Fee consistency and predictability
 - Excluding unchanged shares and shares in leaseback causes rapid CIL shifts when rights are change or lease term ends
 - Recommend allocating all potable water sources to CIL
- Cost recovery
 - Incorporate opportunity cost of tying up capital in water acquisitions
 - Recover costs at real (inflation adjusted) dollars
- Consistent yields
 - Firm yield recommended for both water and infrastructure
- Tracking Allocations
 - Allocation (i.e. “sale”) of CIL water should reduce volume available for future purchase

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CIL Model Update

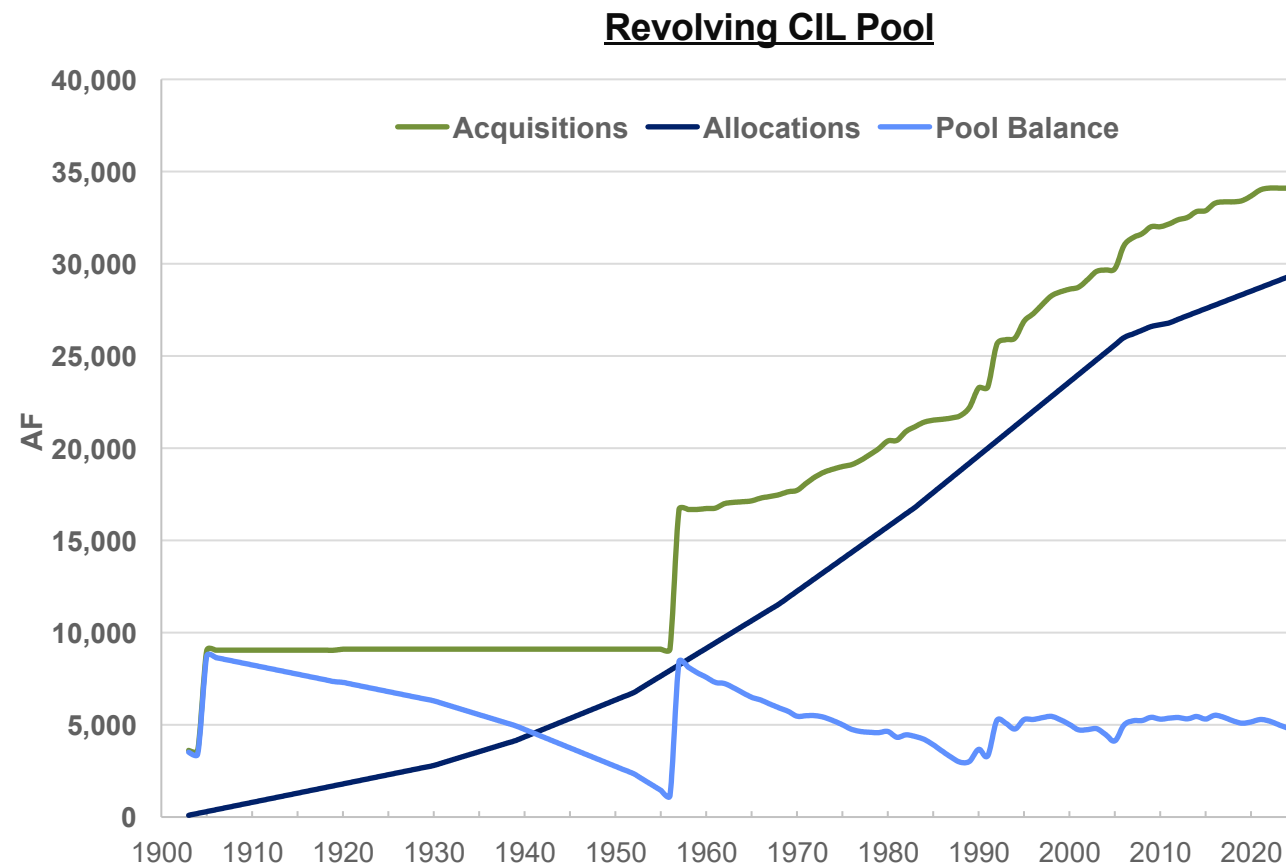
Methodology – Water Supply

- Variation of **buy-in approach** and similar method as current model
- **Revolving pool** of past water acquisitions, allocated to new development
- **First-in, first-out**: earliest acquisitions are allocated first
- **Price stability**
 - Older water purchases reduce CIL price because water values grow faster than real prices
 - New acquisitions added to unallocated pool and increase price
 - Price recovery split 50/50 between fair market value and present value of price paid



Results – Water Supply

- 732 acquisitions between 1903 (Poudre directs) and 2024 (WSSC)
- ~29,000 AF allocated through 2024
 - Allocated volume does not directly correspond to annual demand
- Currently allocating GLIC purchased in 2003
- 4,800 AF of unallocated firm yield
- Unallocated pool valued at \$224M or \$46,300 per AF



Methodology – Infrastructure

- Recommend transitioning to **buy-in approach** rather than incremental approach
- Include **all raw water infrastructure** for which cost not recouped in Plant Investment Fees
 - Windy Gap Firming, Overland Trails Ponds, Poudre Ponds, Star Pit, Terry Ranch (pipeline)
 - Older projects (HMR, Milton Seaman, etc.) have already been allocated
- **Firm yield** of infrastructure projects added to first-in, first-out pool
- Includes **all infrastructure expenditures** (debt service, permitting, engineering, legal, etc.)
- Cost and yield **amortized** over bond periods – provides fee stability

Terry Ranch Pipeline



Results – Infrastructure

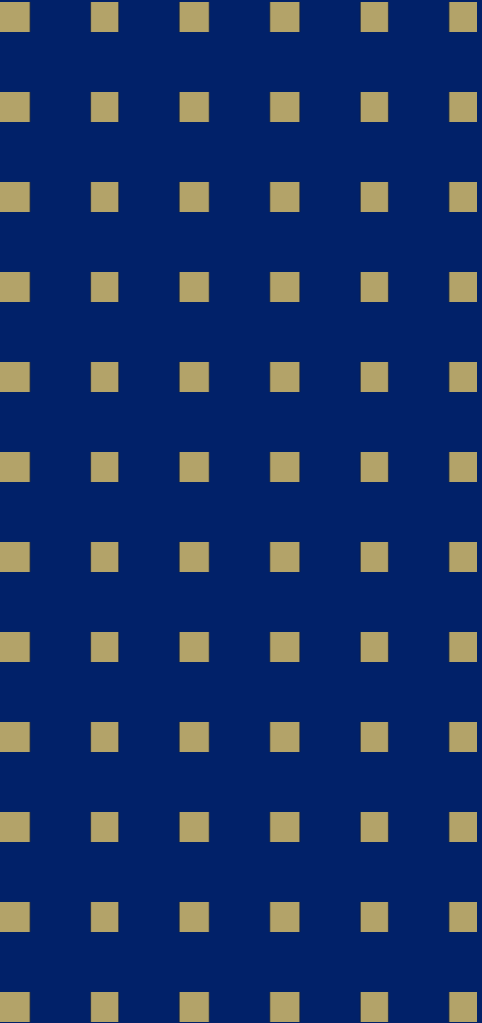
- \$50.1M of unallocated infrastructure expenses
- \$10,380 per AF

Infrastructure Component of CIL Model

Infrastructure Component	Expenditures to Date
Windy Gap Firming / Chimney Hollow Dam	\$14,864,584
Overland Trail Ponds	\$7,900,000
Poudre Ponds (1–2)	\$4,200,000
Poudre Ponds (Parcel B)	\$3,560,000
Star Pit	\$3,164,040
Terry Ranch Aquifer	\$16,428,470
Totals	\$50,117,094

Chimney Hollow Dam Construction



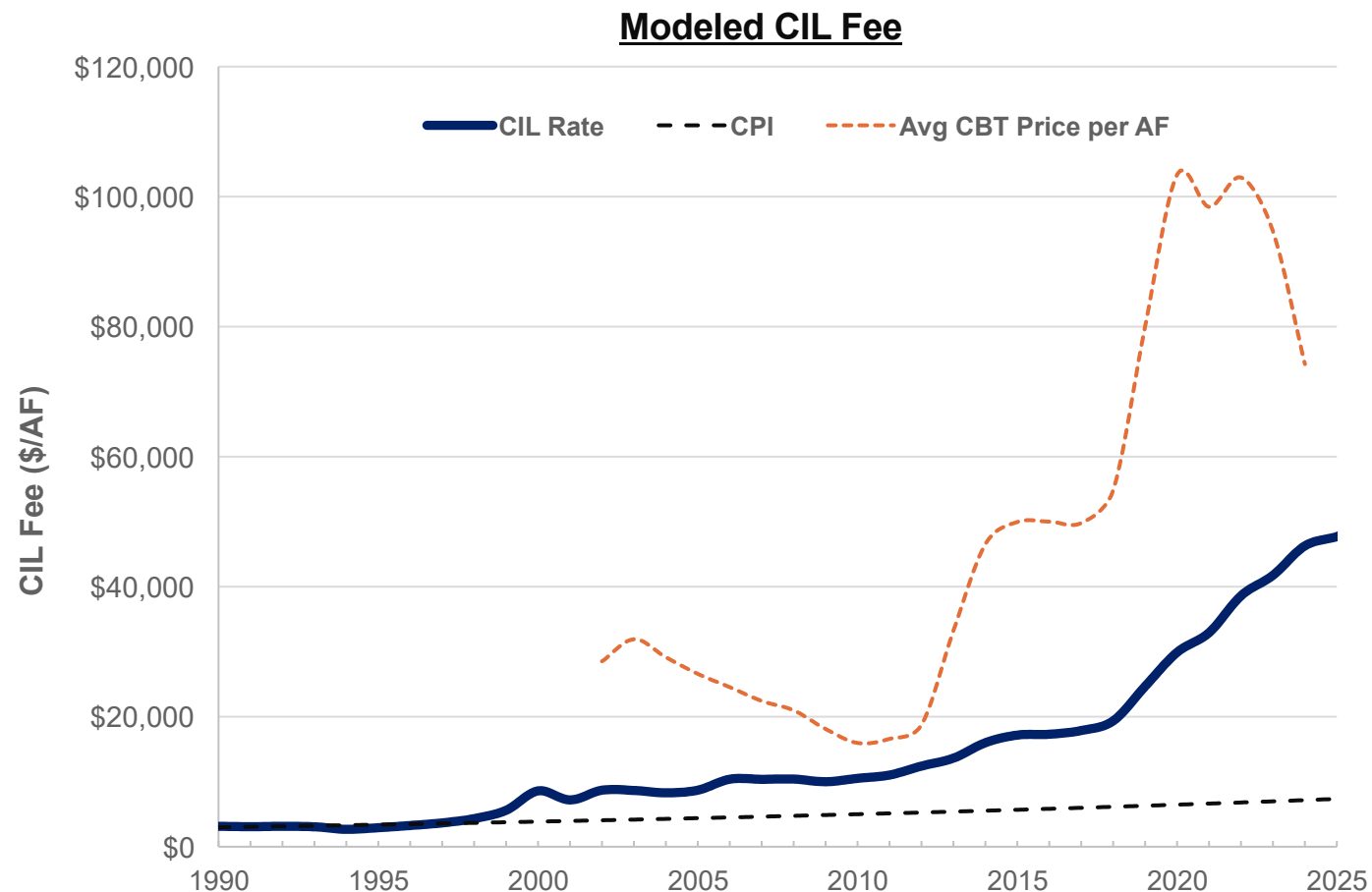
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Findings and Recommendations

Updated CIL Model

CIL Fee

- Modeled fee: **\$56,680 per AF**
- \$200 more than fee estimated from current model
- 10.6% annual appreciation (2020-2024)
- Low annual variability compared to C-BT

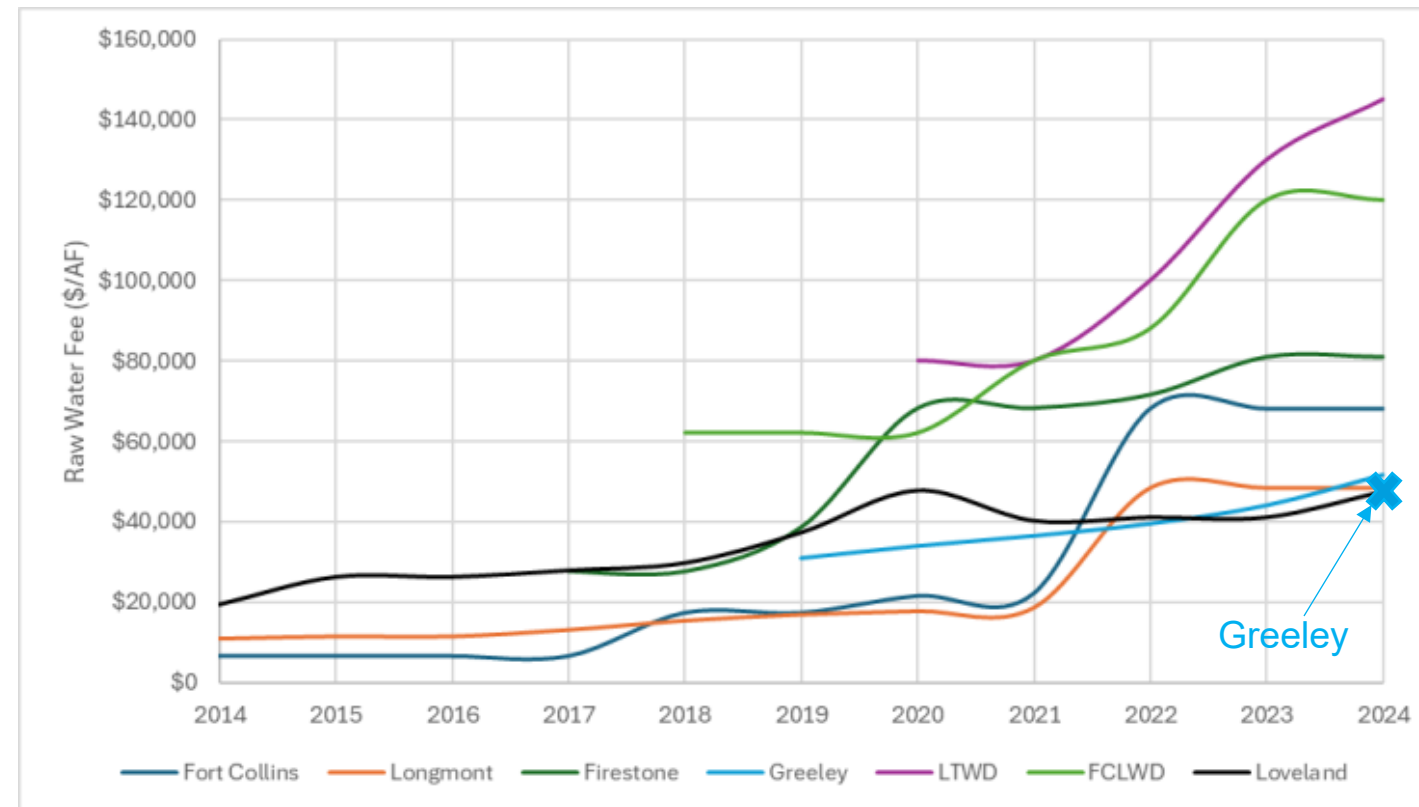


Updated CIL Model

Advantages

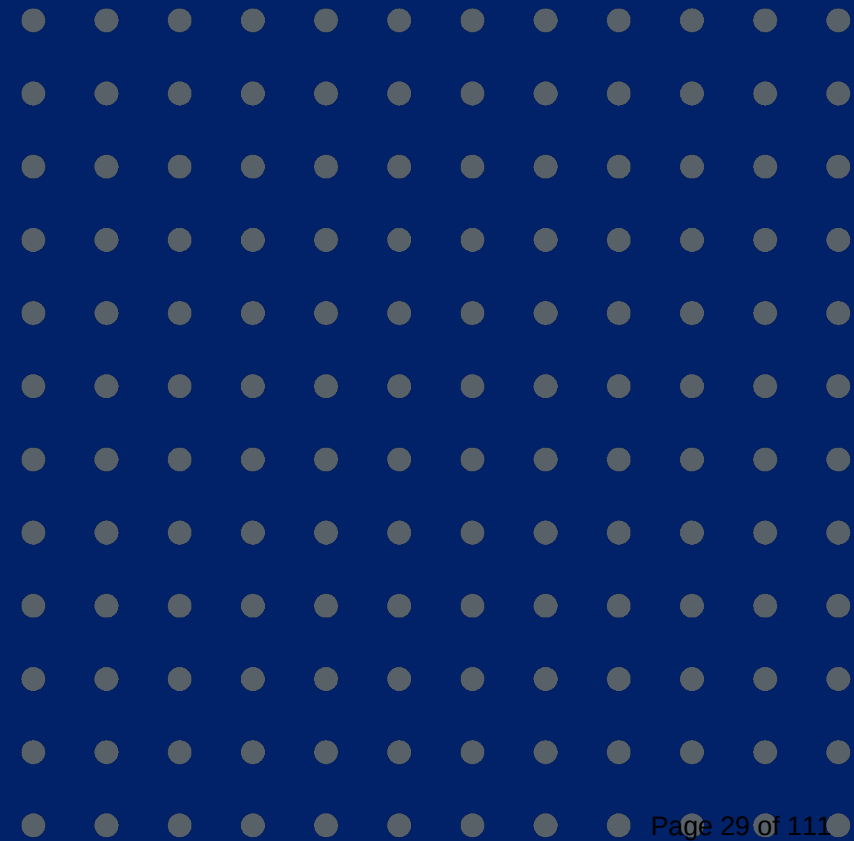
- **Defensible** – method satisfies industry best practices
- **Predictable** – prices swings are moderated by first-in, first-out pool
- **Competitive** – CIL rate is competitive with peer utilities
- **Financially sustainable** – all past expenditures are recovered in real dollars

Regional CIL Comparison*



*Caution should be taken in comparing CIL as water supply requirements and yields vary between among Colorado utilities

Thank you



City of Greeley Cash-In-Lieu Fee Review

***Review of Current Raw Water Cash-In-Lieu Fee Model and Recommendations,
Alternative Model Development, and Updated Water Asset Portfolio Values***

Prepared for

City of Greeley
Water & Sewer Department
1001 11th Ave, 2nd Floor
Greeley, CO 80631



By

WestWater Research, LLC
205 S Meldrum St
Fort Collins, CO 80521



September 30, 2024

Executive Summary

The City of Greeley (“Greeley” or the “City”) annually establishes a Cash-in-Lieu of water right fee (“CIL fee” or “CIL”) paid to receive new water connections. WestWater Research, LLC (“WestWater”) conducted a comprehensive review of Greeley’s current CIL fee determination model to evaluate its effectiveness and recommend updates to ensure consistency with best practices and financial sustainability. As part of its review, WestWater rebuilt the City’s CIL model and updated the valuation of their raw water assets.

Review of the City’s Current CIL Model

The City’s current CIL fee determination model follows a combined approach—incorporating elements of both the *buy-in* and *incremental cost* approaches—whereby developers buy into the City’s water rights holdings and incur an incremental cost for infrastructure. WestWater finds the City’s current method to be consistent with the *principle of proportionality*, meaning the CIL fee charged to a development is proportional to the demand on the City’s water supply. The current model calculates the CIL fee as the sum of two components:

1. **Water supply component** stated as the average value per acre-foot (“AF”) of the wet water assets held by the City that meet the CIL criteria, which includes assets that are regulatorily changed for municipal use, currently treatable, unallocated to prior development, and not currently held in a leaseback or re-rent. If the purchase price is known, this value is escalated to the current year at a fixed rate of 8.5%, otherwise an estimation of the current fair market value (“FMV”) is used in its stead. The yield per share used is the 50-year average. The current model returns a water supply CIL of \$48,340/AF.
2. **Water infrastructure component** calculated as the total price paid for the infrastructure divided by the AF of total capacity associated with the infrastructure. There are two primary infrastructure components included: Windy Gap and the Overland Ponds. The current model returns a storage infrastructure CIL of \$7,969/AF.

The total CIL fee, rounded to the nearest \$500, is \$56,500/AF. WestWater’s review of the current CIL model found there were several potential upgrades, a selection of which are discussed here, accompanied by WestWater’s recommendations.

Leaseback & Re-Rent as Exclusionary Criteria: Were a large lease to end, its addition to the portfolio could affect the CIL fee determination. WestWater recommends dropping this exclusion for CIL determination, as in the long-term these assets can be allocated to new development.

Tracking of Allocated Volume/Assets: The City emphasized that it is difficult to determine which water has already been allocated. WestWater recommends the City assumes that the earliest water acquisitions are the first allocated and to sequentially account from that point forward.

Assignment of Current Value: The assignment of current value employs multiple techniques, and the fixed-rate adjustment methodology may not track fluctuating market conditions. WestWater recommends adjusting past purchase prices by an appropriate index or based on past similar transactions.

Yields (AF per Share or Unit): WestWater recommends using consistent water right yield definitions and that firm yield be used as the basis for allocating water for residential development. This is also a more consistent baseline for determining price per AF.

Calculation of Average Unit Price: Average unit values used in final CIL calculation are not volume-weighted. The straight average used can return a result that is not truly representative of portfolio expenditures. WestWater recommends that the average unit price be volume-weighted.

Treatment of Infrastructure Costs: The model does not consider past raw water infrastructure costs, and cost allocation based on storage capacity is inconsistent with water right yield. WestWater recommends the infrastructure component be based on firm yield and past expenditures should be included and adjusted to real dollars. We recommend only accrued expenses be considered.

Refined CIL Methodology & Model

WestWater pursued a ground-up approach and developed a wholly new model, the *First-In, First-Out Pooled Price Paid* (“FF3P”) model. The FF3P methodology is a variation of the buy-in approach and maintains primary methodologies of Greeley’s current CIL fee setting method. Unlike Greeley’s current methods, the FF3P model incorporates temporal features to account for effective depletions when water is allocated to development. The total CIL fee is calculated as the value of the CIL Pool divided by the AF of firm yield attributable to those assets. The assets in the CIL Pool include water supply assets and a selection of water infrastructure assets.

FF3P Model – Water Supply Component of CIL Fee

The basic volumetric premise of the FF3P model is that annual allocations from the CIL Pool are deducted exclusively from the earliest purchased asset remaining in the pool (i.e., “first-in first-out”). When that asset is fully depleted (i.e., all AF allocated to development) it is removed from the CIL Pool and allocations are deducted from the next earliest purchased pool asset. The CIL Pool is comprised of all eligible assets that have been acquired but not yet depleted. In practice, CIL pool additions, depletions, and pricing are determined late in each year. As such, the CIL calculated each year serves as the CIL *applied* the next year.

Two additional elements incorporated into the FF3P framework are a feature to recover the cost of capital to the City in acquiring an asset years before its allocation and a feature to balance the recovery of past expenditures with future cost expectations. The capital cost recovery feature draws on historical bond data to compound past purchases to their present cost-of-capital-adjusted price paid. The second feature is a weighting of the cost-of-capital-adjusted price paid with current FMV of the water asset, as replacing a depleted CIL Pool asset will generally be more expensive, in real dollars, than the initial purchase.

FF3P Model – Storage Infrastructure Component of CIL Fee

The infrastructure expenditure added to the CIL Pool value for the FF3P model is the summation of expenses incurred by the City through the current year for a selection of water infrastructure. Included is the raw water storage and delivery infrastructure for raw water management that is not already considered in the PIF. Infrastructure that does not directly deliver water to the City’s treatment plant but supports potable water through provision of return flows (e.g., gravel pits) is also included. Rather than capacity, the model includes the infrastructure impact on asset yields in the CIL Pool AF.

FF3P Model Run, Results, & Conclusions

The FF3P model was run using Greeley-specific inputs provided by the City, the updated current FMVs for included assets, and various assumptions that were determined with input from the City.

- **Assets Included:** All potable assets that were acquired by way of a purchase, annexation, exchange, or not defined. Dedications are excluded.
- **Yield:** Firm yield is used in the run, though the model accommodates alternative yield bases.
- **Allocation Pattern:** Annual allocations are calibrated using two bookends: 27,000 AF for 2012 demand and projected 2030 demand of 30,420 AF. Pre-2012 allocations roughly track population.

- **Bond Yields & Price Weighting:** The bond yield pattern used is set to *average* yield and the weighting ratio of cost-of-capital-adjusted price paid-to-current fair market value is set to 50/50.

The FF3P model incorporates temporal elements, updated data treatments, logic-based calculations, and an accessible interface. Most importantly, it facilitates the determination of a CIL that is:

- **Defensible:** The model draws on two acceptable and economically sound fee-determination philosophies: cost recovery and current replacement value. It satisfies M1 Manual standards.
- **Consistent & Predictable:** The framework ensures that the bulk of CIL Pool assets are the same for any multi-year stretch and they are valued in part based on price paid, meaning that severe market price swings are moderated. The allowance of leasebacks/re-rents means that the expiration of a major lease will not require a recalculation and potential swing in value.
- **Competitive:** By incrementally drawing on past water purchases, the FF3P methodology passes forward the cost savings achieved by buying water in advance of growth. The model allows the City to balance cost recovery and future price expectations.
- **Financially Sustainable:** The CIL fee determined by the model recovers past water expenditures in real dollars, including the compounded cost of capital. The market value weighting adjustment ensures the City can incrementally replace allocated supplies and finance infrastructure at real costs.
- **Easily Managed & Updated:** The FF3P model was built macro-free in Microsoft Excel to support Greeley staff accessibility. Input databases have been cleaned, updated, and streamlined from the original version.

Using the FF3P model, WestWater determined a 2024 CIL fee of \$56,678 per AF.

As part of the model update, WestWater updated the value of the City's water asset portfolio. The total value of the water assets investigated is estimated at \$3.42 billion as of June 2024.

Acronyms & Abbreviations

Acronym or Abbreviation	Description
3/8ths	Greeley's ownership of 3/8ths of the water rights of the GIC
7-L	Seven Lakes Reservoir Company
AF	Acre-Foot or Acre-Feet of water
CBT	Colorado-Big Thompson Project
CCAPP	Cost-of-Capital-Adjusted Price Paid
CIL Fee or CIL	Cash-In-Lieu Fee
City	City of Greeley, Colorado
CLPRC	Cache La Poudre Reservoir Company
CPI	U.S. Bureau of Labor Statistics Consumer Price Index
Directs	Senior Poudre River direct decree yields
EOY	End of Year
FF3P	First-In First-Out Pooled Price Paid CIL Determination Model
FMV	Fair Market Value
GIC	Greeley Irrigation Company
G-L	Greeley-Loveland
GLIC	Greeley-Loveland Irrigation Company
HMR	High Mountain Reservoirs
L&W IRRIG	Larimer & Weld Irrigation Company
L&W RES	Larimer & Weld Reservoir Company
LL	Lake Loveland
NCLPIC	New Cache La Poudre Irrigation Company
NPIC-CBT	North Poudre Irrigation Company-Colorado Big Thompson
OM&R	Operations, Maintenance, and Replacement
PIF	Plant Investment Fee
PV	Present Value
TUNNEL	Laramie-Poudre Tunnel
TypeCompany	Water asset of a certain type and/or managing company—generally a ditch company. This language convention is used in the current CIL model and carried into the FF3P model.
WG	Windy Gap
WRCC	Windsor Reservoir and Canal Company shares
WSSC	Water Supply and Storage Company

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1 Background & Purpose

The City of Greeley (“Greeley” or the “City”) requires the dedication of raw water and a plant investment fee (“PIF”) from developers as a condition of receiving a new water connection. The raw water dedication can be made in certain water rights that the city can treat at its treatment plants and deliver. The City also accepts a Cash-in-Lieu of Raw Water payment (“CIL fee” or “CIL”). The CIL fee enables new developments to utilize the City’s existing raw water rights as its raw water source. The CIL fee is updated annually at a minimum and a new CIL fee is published within the Rate and Fee Resolution each year.

The City contracted WestWater Research, LLC (“WestWater”) to conduct a review of the City’s water rights valuations, accounting, and cost recovery as they are applied to the calculation of the annual CIL fee. This report provides a review of the City’s current CIL fee methodology and calculation, presents a set of recommendations for improvement, and develops an alternative CIL determination methodology and model. An updated valuation of the City’s raw water assets is provided in **Appendix A** to this report.

2 Review & Evaluation of Current CIL Model

WestWater evaluated Greeley’s CIL fee through three lenses: methodological, computational, and proportional. The methodological lens evaluates the City’s CIL fee in light of established industry guidelines and Colorado Revised Statute 29-20-104.5. The computational lens evaluates the City’s CIL fee calculations through an independent verification of the City’s calculations, including inputs and assumptions. The proportional lens evaluates whether the CIL fee meets the “rough proportionality” test. The following sections discuss Greeley’s current CIL through each of these lenses.

2.1 Overview of System Development Charge Derivation Approaches

2.1.1 Generally Accepted Approaches

There are many accepted practices and methodologies for development of a cost-based system development charge like the CIL fee. The American Water Works Association’s (AWWA) Manual of Water Supply Practices, M1 (M1 Manual) describes three basic, common approaches for calculation of fees like the CIL: the buy-in approach, the incremental cost approach, and a combined approach.¹ In summary:

- The **buy-in approach** is based on the value of the existing water system. This approach is often used where the system’s capacity is sufficient to serve existing customers and reasonably anticipated growth. The resulting fee is equivalent to acquiring a unit of capacity within the system.
- The **incremental cost approach** is centered around the cost of expanding the existing water system to serve future customers. This approach is often used when the existing system has limited or no capacity for new development and new or incremental capacity is required to serve new development. The resulting fee is representative of the per-unit cost of future capacity.
- The **combined approach** is exactly as it sounds, acknowledging that new customers will use a combination of existing and future system capacities. This approach is best used where some capacity is available in one part of the existing system, but new or incremental capacity is required in another part of the system to serve new development.

¹ <https://store.awwa.org/M1-Principles-of-Water-Rates-Fees-and-Charges-Seventh-Edition>

2.1.2 Greeley's Current Approach

The City's current approach is best described as the **combined approach**. Greeley's current fee calculation includes a buy-in approach to water rights and an incremental cost approach for infrastructure. The model considers the market value of existing water rights and the cost of planned future raw water infrastructure.

- Water rights component: Greeley has a significant portfolio of raw water rights, and the CIL fee effectively purchases capacity within the existing portfolio for use in new development. The City does not need to expand its water rights holdings to serve existing customers but does require new water acquisition to meet long-range anticipated growth demands. The current model generally assigns current market values to water rights.² The current approach does not account for the future cost of water acquisition.
- Infrastructure component: The current model includes the costs of select future raw water infrastructure.

As discussed below, the water rights component of the current model represents the bulk of the CIL fee, so while the current model uses the combined approach, the majority of fees are generated from the buy-in approach.

Colorado Revised Statute (CRS) 20-29-104.5 defines an impact fee and provides the authority for local government to impose an impact fee or similar charge to fund capital expenses required to serve new development provided that individual landowners are not required to provide any sort of site-specific dedication or improvement to meet the same purposes as the impact fee. Since the City does not require a dedication of raw water in addition to paying the CIL fee, which can be classified as a form of impact fee, Greeley's current practices appear to be in accordance with CRS 20-29-104.5.³

2.2 Principle of Proportionality

The "rough proportionality" test is a legal test that has been applied by Colorado courts in decisions on similar fees, such as *Krupp v. Breckenridge Sanitation* (2001). Rough proportionality means that the fees assessed to an individual property are roughly consistent with that property's expected impact on the water system. WestWater evaluated the City's CIL fee for proportionality. The City charges a different fee depending on the size and type of property, as reported in **Table 1**, below.⁴

Table 1: Greeley's CIL Calculation per Development Class

Development Class	Lot Size	Dedication or Equivalent CIL Requirement
Residential	≤ 4 Units	3 acre-feet (AF) per acre
Residential	> 4 Units	(service demand*CIL \$/AF) + (landscape irrigation demand*CIL \$/AF)
Nonresidential	n/a	(service demand*CIL \$/AF) + (landscape irrigation demand*CIL \$/AF)
Large parcel single-family	≥ 0.5 acre	1.5 AF

Service demand and landscape irrigation demand are the primary factors considered in calculation of the CIL fee. These factors vary with the size and type of development. **Table 2** provides average service

² WestWater recommends updates to the method for assigning market values. See Section 3 of this report.

³ WestWater is not a law firm, thus its understanding of the law is based on practical experience rather than a legal education and background.

⁴ Published in Greeley's Code of Ordinances, sections 20-255 and 20-256.

demands in Greeley per development type and **Table 3** provides dedication requirements per expected landscape irrigation water use.⁵

Table 2: Greeley Average Service Demand by Development Type

Category	Units*	Average Unit Use (Gal/Unit/Year)
Auto service and repair	SF	12
Childcare	SF	47
Church	SF	4.5
Grocery store	SF	20
Gas station without car wash	SF	93
Hospital	SF	21
Hotel/motel	Room	30,300
Medical office	SF	25
Office	SF	14
Recreation with pool	SF	122
Recreation without pool	SF	25
Residential (greater than 4 units)	Unit	35,500
Restaurant (outdoor seating areas 50%)	SF	188
Retail	SF	16
School	SF	11
Warehouse	SF	5
Industrial and other commercial	<i>Determined on case-by-case basis</i>	

*SF = Square feet of gross floor space within the building area.

Table 3: Greeley Landscape Water Use Dedication Requirements

Water Use	Dedication Requirement
High (>14 gals/sf annual use)	3 AF/acre
Medium (10—14 gal/sf annual use)	2.33 AF/acre
Low (<10 gals/sf annual use)	1.67 AF/acre
No irrigation	No raw water requirement for landscape

Since the CIL fee charged per type of development is based on the amount of water expected to be used for any new development, it is thus proportional to the amount of water demand on the City's water supply. WestWater finds the City's method to be consistent with the rough proportionality expected for fees like the CIL fee. WestWater did not independently review the water requirements and assumptions in **Tables 1–3** and assumes that the City's requirements and determinations in each case are reasonable.

2.3 Best Practices & Guidance from the City

Generally accepted best practices for the determination of a CIL fee are discussed below.

- **Consistent & Predictable:** Annual changes to a CIL fee should be incremental—approximating a continuous function rather than a severe step function. This can be accomplished through the

⁵ Both tables are published in Greeley's Code of Ordinances, Section 20-254.

amortization of significant one-time capital expenditures and ensuring the fee calculation is structured to accommodate and moderate severe swings in water market pricing. The model should be beta tested with extreme, but possible, scenarios to determine its suitability if such a scenario comes to pass. The logic behind the calculation should be clear and defensible.

- **Financially Sustainable:** In the simplest terms, all CIL-covered water asset expenditures should be at a minimum recovered in real (i.e., adjusted for inflation) dollars. Additionally, some portion of debt service related to a water asset acquisition should be recovered through the CIL.

From an economic standpoint, opportunity cost might be considered. There is an opportunity cost to the City in tying up significant capital in water acquisitions. This opportunity cost can be recovered by an approximation of the City's cost of capital for the duration of an asset's holding. At a minimum, opportunity cost can be approximated by the interest-earning potential of the capital tied up in the water asset.

The City provided additional guidance on staff's preferences in the CIL fee determination.

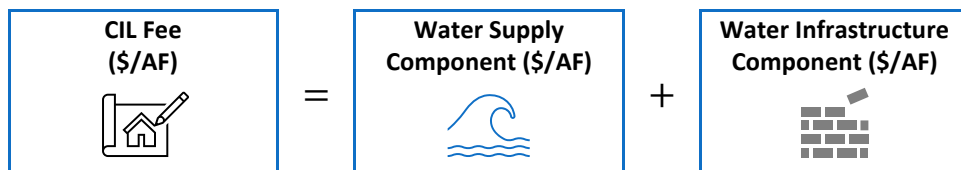
- The fee should be competitive with regional municipal peers.
- The model should ensure that the City is ahead of the need for new growth/demand.
- The City prefers that the CIL is consistent with the PIF in the sense that it should focus on cost recovery and less so on the consideration of future costs.
- The model should be consistent, easily updated, and accessible.
- The model can be linked to the Water Acquisition Decision Tool ("WADT") in the future.

2.4 Criteria, Data Treatment, & Calculation of Current CIL

The current CIL is a function of the water assets chosen for inclusion and the treatment and valuation of those assets. This section first summarizes the CIL calculation and then discusses the criteria for asset inclusion and the data treatments performed for the inputs to that calculation.

2.4.1 Calculation of Current Total CIL

There are two primary components to the total CIL: the water supply component and the water infrastructure component. Each is calculated on a per-AF basis and the sum of the two comprises the total CIL fee.



2.4.2 Calculation of Current Water Supply CIL

In general terms, the calculation of the current CIL for water supply is the average value per AF of the wet water assets held by the City that meet the CIL criteria. In this calculation, the numerator calculates the total value of shares for all eligible TypeCompanies, multiplying the number of shares by the dollar value per share. The denominator calculates the total water yield from these shares, multiplying the number of shares by the average yield (in acre-feet per share). The result is the water supply component of the CIL fee expressed in dollars per acre-foot.

Under this calculation, the major drivers of the resulting CIL are:

- Determination of which assets, or portions of assets, to be included (inclusion criteria).
- Calculation of unit value for each asset.
- Yield calculations for conversion of asset shares to AF.

The data treatment and assumptions applied for these three primary variables have a significant impact on the resulting CIL. The determination of these inputs under the current CIL methodology is discussed in the following sections.

Note that a majority of Greeley's water assets are shares of stock in mutual ditch companies and the calculations described above allocate yield by the per share yield of such shares. Greeley also owns water assets not organized as ditch company shares (e.g. senior direct rights). In such cases, full yield of the assets is used. A description of the various assets utilized in the CIL model are found in the **Appendix A** to this report.

2.4.2.1 Criteria for Inclusion of Water Assets in Calculation of Current Water Supply CIL

The criteria for inclusion of water assets, or portions of certain assets, in the calculation of the current CIL is that they are wet water, changed, currently treatable, unallocated and not currently in a leaseback or re-rent. These criteria are discussed in additional detail below.

- **Wet Water** – Shares that are for “wet” water as opposed to ditch run rights (identified as “run” in the model).
- **Changed** – Shares changed for municipal use.
- **Currently Treatable** – Identified as changed Greeley-Loveland Irrigation Company (“GLIC”) shares, Water Supply and Storage Company (“WSSC”) shares that are not in leaseback, Colorado-Big Thompson units (“CBT”), Windy Gap Project units (“WG”), Laramie-Poudre Tunnel supplies (“Tunnel”), and Senior Poudre River Direct decree yields (“Directs”).
- **Unallocated** – Portion of the asset not allocated to Greeley.
- **Not in leaseback or re-rent** – leaseback indicates an asset that is being leased back to the entity from whom the City acquired the asset for a period. Re-rent is an asset that was once in leaseback, but the lease has expired, and water is in year-to-year rental with lessee.

In the current model, 401 acquisitions (line items in the database for any asset in any year) meet these criteria out of the 731 total acquisition line items reported in the database. The total allocable volume associated with these 401 acquisitions is 5,728 AF (based on the 50-year average yield assumptions). The TypeCompanies represented include GLIC, CBT, WG, Tunnel, WSSC, and the CBT component of North Poudre Irrigation Company shares (“NPIC-CBT”). GLIC includes three sources – GLIC shares (“G-L”), Lake Loveland shares (“LL”), and Seven Lakes shares (“7-L”). The count of acquisition line items satisfying the inclusion criteria by TypeCompany is reported in **Table 4**.

2.4.2.2 Valuation & Data Treatment for Assets Included in Current Water Supply CIL

The calculation of current value follows a hierarchy in the current CIL model. If the purchase price is known, this value is escalated to the current year and used as current value. If the purchase price is not known, an estimation of the fair market value (“FMV”) is used, which is referred to in the model as “replacement cost.” These treatments are discussed in more detail below.

1. **Escalated Purchase Price** – If the asset purchase price is known, the model escalates this price from the year of purchase to the current year at a fixed rate of 8.5%.
2. **Fair Market Value (replacement cost)** – If the purchase price is not known, the model substitutes the estimated current FMV in its place. These estimates are based on recent market activity and often provided through a contract with WestWater.

Of the 401 acquisition line items that satisfy the inclusion criteria, 30 have a recorded price paid while the remaining 371 are based on a FMV estimate (see **Table 4**).

Table 4. Acquisitions Satisfying Current CIL Model Inclusion Criteria by TypeCompany & Value Basis

System	TypeCompany	Acquisition Line Items	Value based on Recorded Price Paid	Valued based on Current FMV
GLIC	G-L	174	5	169
GLIC	LL	77	2	75
GLIC	7-L	40	1	39
Northern	CBT	102	20	82
Laramie	Tunnel	1	1	0
WSSC	WSSC	6	1	5
Northern	NPIC-CBT	1	0	1
Totals		401	30	371

2.4.2.3 Yield per Share or Unit used in Current Water Supply CIL

Predominantly throughout the current model, the yields used for converting water asset shares to AF is stated as “average yield” with at least one instance of this being specified as the “50-year yield per share” and at least one instance of this being stated as “firm yield.” Correspondence with the City confirmed that the intention throughout the model is that the yield be based on what they have determined to be the 50-year average yield per share, although in some cases it appears a more conservative firm yield is applied.

Yields are developed/updated for each TypeCompany. The derived yield for each TypeCompany is assigned to all acquisition line items of that TypeCompany regardless of acquisition date. The yields used in the current CIL model are reported below in **Table 5**.

Table 5. Yields used in Current Water Supply CIL Model

System	TypeCompany	Average Yield per Share (AF/Share)*
GLIC	G-L	6.1
GLIC	LL	24.8
GLIC	7-L	7.3
Northern	CBT	0.7
Laramie	Tunnel	16.0
WSSC	WSSC	70.0
Northern	NPIC-CBT	2.6

*Stated as 50-year average yield in the current CIL model.

2.4.2.4 Current Model Water Supply CIL Calculation

The specific calculation of the water supply CIL is as follows:

- **Average Unit Value:** The average unit value by TypeCompany is calculated based on the value assigned (either escalated price paid or FMV) to each acquisition line item meeting the inclusion criteria.
- **Sum of Shares:** the shares of each acquisition line item meeting the inclusion criteria are summed by TypeCompany.
- **Sum of AF:** *Sum of Shares* is converted to total AF by TypeCompany using the 50-year average yield.
- **Water Supply Value:** *Average Unit Value* is multiplied by total shares to return total water supply value by TypeCompany.
- **Total CIL AF:** *Sum of AF* is summed across TypeCompanies to yield total AF for the CIL calculation.
- **Total Value:** *Water Supply Value* is summed across TypeCompanies to yield total value of the water supply for the CIL calculation.
- **Water Supply CIL:** *Total Value* is divided by *Total CIL AF* to return the water supply CIL (\$/AF).

Table 6 shows the inputs and calculations used in computing the City's current water supply CIL, which is figured at **\$48,340/AF**.

Table 6. Determination of Water Supply Component of CIL using Current CIL Model

TypeCompany	Shares Satisfying Inclusion Criteria	Yield (AF/Share)	AF Satisfying Inclusion Criteria	Average Unit Value (\$/AF)	Total Value (\$M)
G-L	30.58	6.1	186.56	\$20,568	\$3.84
LL	1.50	24.8	37.20	\$7,533	\$0.28
7-L	4.50	7.3	32.85	\$10,790	\$0.35
CBT	5,139.00	0.7	3,597.30	\$45,732	\$164.51
Tunnel	75.00	16.0	1,200.00	\$54,281	\$65.14
WSSC	6.63	70.0	463.75	\$51,028	\$23.66
NPIC-CBT	90.00	2.6	234.00	\$86,538	\$20.25
Totals			5,751.66		\$278.03
Calculation of Current Water Supply CIL (\$278.03M / 5,752 AF)				\$48,340/AF	

2.4.3 Calculation of Current Water Storage Infrastructure CIL

The calculation of the current CIL for water storage infrastructure can be generally stated as the total price paid for the infrastructure divided by the AF of total capacity associated with the infrastructure. In the calculation performed in the City's current model the numerator sums up the total costs incurred by the City for all storage infrastructure components while the denominator sums up the total storage capacity in AF, of those infrastructure components. The result is the water storage infrastructure component of the CIL expressed in dollars per AF.

Greeley includes two primary infrastructure components in their CIL calculation for potable water storage: Windy Gap and the Overland Ponds. Milton Seaman was originally included in this calculation but was removed due to the City no longer pursuing its expansion. Windy Gap is still being built out, and there are 10 ponds as part of the Overland Ponds which have been gradually converted from gravel pits to municipal

storage since 2002. The inputs used in the current CIL model for potable water storage are reported in **Table 7**. As shown in the table, the storage infrastructure component of the total CIL is **\$7,969/AF**.

Table 7. Infrastructure Complement & Inputs used in Current Storage CIL Model

Infrastructure Component	Total Cost	Capacity	Unit Cost (\$/AF)
Windy Gap*	\$67,877,592	9,189	\$7,387
Overland Ponds†	\$19,270,000	1,747	\$11,030
Totals	\$87,147,592	10,936	\$7,969

*Windy Gap costs include construction expenses plus pre-construction expenditures.

†Expenses includes gravel pit acquisitions and various development activities since 2012; does not include any amount of historical O&M expenditures

The sum of the water supply component (\$48,340) and the infrastructure component (\$7,969) returns a CIL fee of \$56,309/AF, as determined by the City's current CIL model, which is rounded to the nearest \$500 to **\$56,500/AF**.

3 Recommendations for Current CIL Model

WestWater's review of the current CIL model found there were several potential and realized deficiencies. These can broadly be categorized into structural issues and data issues, though certain items fall across the two categories.

3.1 Issues & Recommendations

This section describes the identified issues in detail and follows with recommendations for improvement.

3.1.1 Leaseback & Re-Rent as Exclusionary Criteria

Issue

Leasebacks and re-rents are, by their nature, impermanent. Additionally, correspondence with the City indicates that they are generally leased out at a steep discount to agriculture relative to their municipal market value. Furthermore, were a large lease to end, its addition to the CIL portfolio could affect the CIL fee determination.

Recommendation

WestWater recommends that leaseback/re-rent be removed as exclusionary criteria for determination of the CIL. These assets are not permanently allocated and in the long-term can be allocated to new development. They remain as part of the permanent portfolio and should therefore be included in the CIL basis.

3.1.2 Tracking of Allocated Volume/Assets

Issue

The City emphasized that it is difficult to determine which water has already been allocated, regardless of whether it is in a long-term lease.

Recommendation

Assume that the earliest acquired water assets are the first to be allocated and sequentially account from that point forward.

3.1.3 Assignment of Current Value

Issues

The assignment of “current value” (the water asset value ultimately used in the CIL fee determination) is inconsistent.

- Notably, the current model employs a mix of adjusted purchase price and current FMV, which can be drastically different for the same water asset type.
- Acquisitions with a recorded purchase price are adjusted using a fixed escalation factor of 8.5%. This might reflect the price escalation of certain assets for certain periods but lacks the flexibility to adjust with the market and general inflation. Using a fixed escalation factor means that its selection can have a significant effect on the fee outcome.
- Incomplete purchase price data for assets with a recorded purchase price history.

Recommendations

- Update the acquisition dataset in conjunction with other records to identify prices paid for purchased assets. This is critical data input for a cost recovery-based CIL model.
- Rather than escalating past purchase price by a fixed rate, these prices should be escalated by an appropriate index or based on past transactions of the same or similar type. This added flexibility will allow the prices to move with the market and prevent or moderate potential extreme divergence from the water market.

3.1.4 Yields (AF per Share or Unit)

Issue

Yields are stated variously throughout the model as average, firm, and 50-year average yields. Based on the “Inputs” worksheet and discussions with the City, the 50-year average yields are the yield values most commonly used throughout.

Recommendation

The model should use a consistent yield methodology. WestWater recommends that a firm yield be used as the basis for allocating water for residential development. This is also a more consistent baseline for determining price per AF.

3.1.5 Calculation of Average Unit Price

Issue

Average unit values used in final CIL calculation are not volume-weighted (i.e., a straight average is used—see **Table 6** and accompanying language). This can be problematic if separate acquisitions of a common asset were made in larger or smaller volumes, which might have had an impact on unit value. For example, if a large volume of an asset was purchased at a relative discount, this lesser unit value will be included in the straight average unit price calculation with equal weight to higher unit values. However, the larger volume of the asset is included in the total volume for the TypeCompany. When multiplying the straight average by the total volume, the total value yielded will be greater than the sum of all the individual asset values.

Recommendation

The average unit price should be weighted, which is done by dividing the sum product of the asset volumes and unit values by the sum of the asset volumes.

3.1.6 Inconsistent/Overridden Formulas

Issue

The model includes inconsistent and/or overridden formulas and disparate treatment of inputs, seemingly due to layering of updates by different City staff over the years since original model build.

Recommendation

Model should be fully cleaned and debugged, or alternatively rebuilt. In such an update, the model should be reorganized, streamlined, and include clear instruction/labeling to prevent overriding of important formulas. Consider locking certain cells to maintain functional integrity.

3.1.7 Water Asset Selection

Issue

The model includes or excludes certain water supply assets inconsistent with the inclusion criteria or a clearly stated rationale.

Recommendation

The model should include a clear and defensible process for water asset selection in the CIL calculation. WestWater recommends including additional assets currently excluded in the existing model, as discussed above. Any instance of an exception to the specified inclusion criteria should be clearly documented to alert and prevent other/future users of the model from modifying the item's treatment. Consider adding a comments/modifications field in the model to document such cases. Oftentimes Excel notes are not easily seen on large database spreadsheets, as they require hovering over a specific cell. Many of these instances have been explained by City staff or modified with their consultation.

3.1.8 Treatment of Infrastructure Costs

Issue

The model lacks a consistent and defensible treatment of past and future infrastructure costs. There is no consideration of past raw water infrastructure costs and no clear indication that past expenditures are being adjusted to current dollars. Lastly, the unit cost derived is based on capacity, which can have various shortcomings. Notably, some infrastructure might have significant capacity that is rarely used, while other infrastructure might be consistently near full capacity. In such a case the costs assigned would be grossly misaligned with attributable benefits.

Recommendations

WestWater recommends that the infrastructure component be based on the firm yield the infrastructure adds to the Greeley water supply system. This would better align the benefits and costs of the components and maintain consistency with the water right component of the CIL model. Any past infrastructure expenditures should be adjusted to real dollars using an appropriate index, like the ENR Construction Cost Index. Lifecycle costing of the infrastructure would necessarily ensure cost recovery over the service life of the component and might be considered.

Our final infrastructure recommendation is that only actual and accrued expenditures be considered. The inclusion of future costs is inconsistent with the water rights component of the CIL model and inconsistent with current PIF determination. That is, WestWater recommends converting to a true buy-in method.

3.2 Overall Recommendation & Next Steps

Rather than making aesthetic adjustments to the existing model, which as noted has some structural and data computation deficiencies, WestWater pursued a ground-up approach and developed a wholly new model. This model is described in detail and demonstrated in Section 4.

4 First-In, First-Out Pooled Price Paid (FF3P) CIL Model

WestWater developed a conceptual framework for a revolving pool buy-in-based model and presented a proof-of-concept to City staff. Upon receipt of approval to develop the model further, with Greeley-specific inputs, WestWater began the development of the *First-In, First-Out Pooled Price Paid* (“FF3P”) model. The model infrastructure and dashboard were built out by WestWater and Greeley-specific inputs and assumptions were derived in collaboration with City staff.

The FF3P methodology is a variation of the buy-in approach that incorporates temporal features to explicitly account for two oft-overlooked elements in the development of CIL fees:

- **Past water right acquisitions can be leveraged to maintain competitiveness** – Municipalities often have an existing stock of water rights (henceforth referred to as the CIL Pool), some of which were purchased decades ago at real prices much lower than their current FMV. This pool can be drawn on to keep prices competitive while ensuring full cost recovery.
- **Water rights are effectively depleted when fully allocated to development** – Water allocations to new development are drawing from the aforementioned stock, whether rigorously accounted for or not. An accurate accounting would find that developers decades ago were allocated water acquired by the City in that decade and those immediately preceding. Likewise, new development is implicitly being allocated water acquired by the City in this decade and those immediately preceding.

To provide sufficient understanding of the final FF3P model, this section begins with analysis of a simplified hypothetical FF3P model (“Model 1”) that applies these two foundational concepts using three hypothetical water assets (assets A, B, and C). Model 1 is then built upon to incorporate additional FF3P features and to accommodate the complexities of the City’s water rights portfolio.

Note that for the purposes of brevity all mentions of “CIL” throughout sections 4.1 and 4.2 refer specifically to the water supply component of the total CIL fee. The water infrastructure component is discussed in Section 4.3.

4.1 Basic Concepts for Volume & Pricing – Model 1

4.1.1 Determination of Asset Allocations & CIL Pool

The basic volumetric premise of the FF3P model is that annual allocations from the CIL Pool are deducted exclusively from the earliest purchased asset remaining in the pool (i.e., “first-in first-out”). When that asset is fully depleted (i.e., allocations deducted from that asset equal the asset’s total AF acquired) it is removed from the CIL Pool. Allocations are then deducted from the next earliest purchased asset (now the earliest purchased asset remaining) in the pool. The CIL Pool is comprised of all eligible assets that have been acquired but not yet fully allocated. For the purposes of this report a “depleted” asset refers to one that has been fully allocated to development.

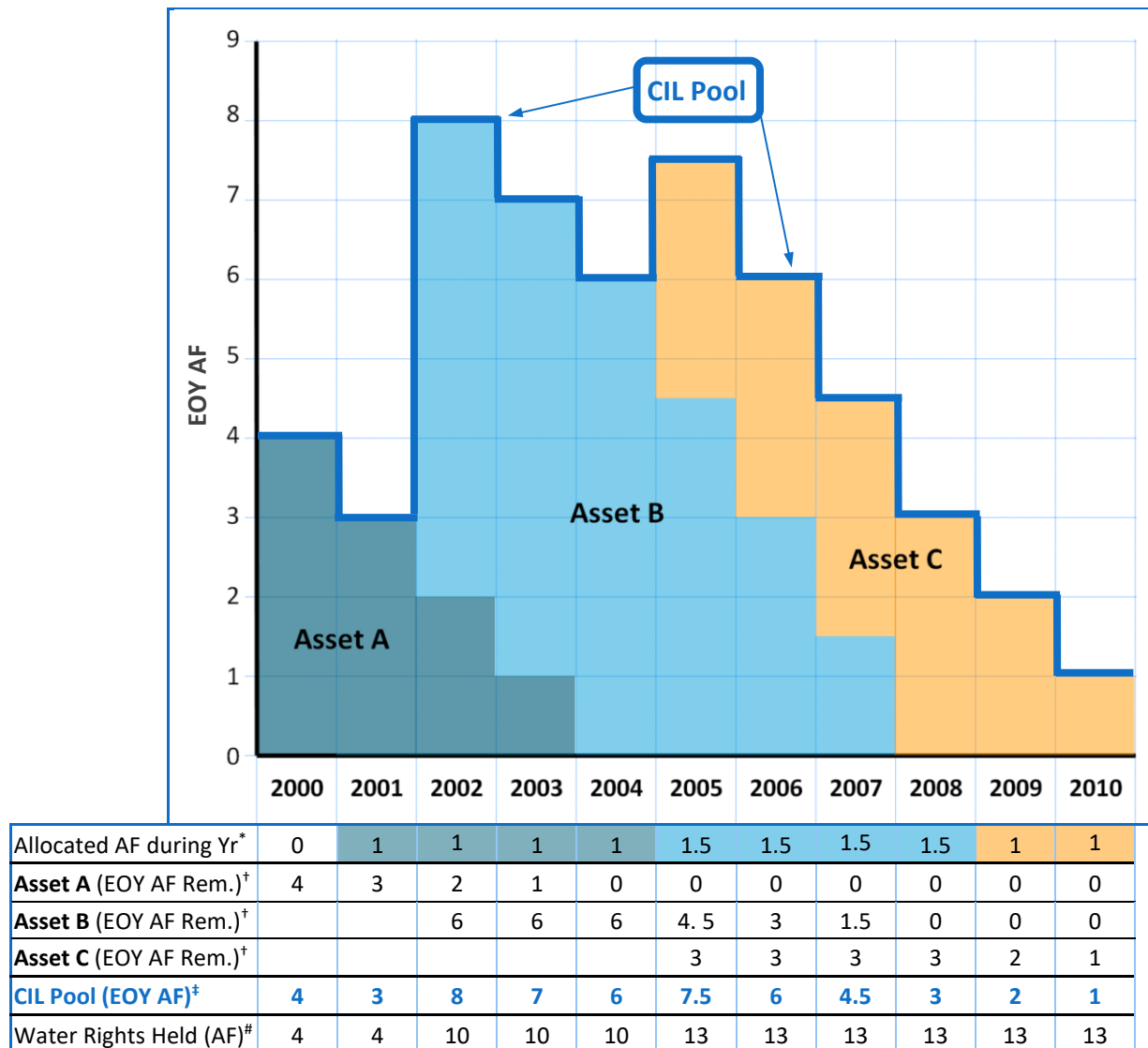
The CIL Pool quantification is an end-of-year (EOY) calculation. That is, the pool for a given year accounts the EOY AF remaining (i.e., unallocated) for each asset. Therefore, if an asset enters a year undepleted, but is depleted sometime during that year, it is not represented in that year’s CIL Pool calculation.

Figure 1 provides a simplified illustration of the FF3P concept applied to the Model 1 three-asset scenario. Note that the colored columns in the figure represent the EOY AF remaining for each asset in the column

year. An asset can therefore be allocated in a year where the figure indicates zero volume—necessarily the year it is fully depleted.

Asset A is the earliest acquired asset and is reduced exclusively from the CIL Pool until it is fully depleted. Asset A is a 4-AF asset acquired in 2000. It is first allocated in 2001 (1 AF) and the final allocation from is 1 AF in 2004. Allocations are not made from Asset B until 2005—once Asset A has been fully depleted—despite being acquired in 2002. Note that it has been included in the CIL Pool at its full acquired volume (6 AF) from 2002–2004. Asset B is fully depleted sometime during 2008, when its final 1.5 AF are allocated. Asset C is a 3-AF asset acquired in 2005. Note that its contribution to the CIL Pool remains at three AF per year until allocations are made from it beginning in 2009, after Asset B has been fully depleted.

Figure 1. Simplified Illustration of Model 1 with Three Assets



*Color coding indicates the asset from which allocations are made in a given year.

†End-of-year AF remaining for the given asset. This is its contribution to the CIL Pool.

‡End-of-year AF in the CIL Pool. This is the sum of the AF remaining across acquired assets that haven't been depleted.

#The pooling and allocation of assets is an accounting exercise. A "depleted" asset is still owned at its acquired volume.

4.1.2 Determination of CIL Fee under Model 1

The CIL fee calculated by Model 1 is a function of the inflation-adjusted purchase price for each asset remaining in the CIL Pool and the CIL Pool AF, as expressed by **eq. (1)**.

CIL pool additions, depletions, and pricing are determined at a designated point in time each year—ideally in the third or fourth quarter. As such, the CIL determined in a given year serves as the CIL for the following year. Therefore, while all calculations are performed in year t , the CIL fee is assigned the subscript $t + 1$, indicating the upcoming year. For example, the CIL fee calculated based on the CIL pool asset prices, additions, and depletions in 2024 (year t) is the CIL fee applied for 2025 (year $t + 1$).

$$CIL_{M1,t+1} = \frac{AdjVal_{Pool,t}}{AF_{Pool,t}} \quad (1)$$

$$AdjVal_{Pool,t} = (AdjPr_{A,t} \times RemAF_{A,t}) + (AdjPr_{B,t} \times RemAF_{B,t}) + (AdjPr_{C,t} \times RemAF_{C,t}) \quad (2)$$

$$AF_{Pool,t} = RemAF_{A,t} + RemAF_{B,t} + RemAF_{C,t} \quad (3)$$

Where:

$CIL_{M1,t+1}$ = CIL fee applied in year $t + 1$ as determined by Model 1

$AdjVal_{Pool,t}$ = Inflation-adjusted total value of the CIL Pool in year t

$AF_{Pool,t}$ = Total CIL pool in year t , in AF. Equal to the sum of remaining AF for all assets.

$AdjPr_{A,t}$ = Inflation-adjusted unit price of asset A in year t . Likewise for assets B and C .

$RemAF_{A,t}$ = Remaining (i.e., unallocated) AF of asset A in year t . Likewise for assets B and C .

Table 8 applies **eq. (1)** to provide an example of annual CIL calculations based on the acquisition dates, volumes, and allocations of the three assets depicted in **Figure 1**. Inflation is assumed to be 3% annually for this example and is reflected in the adjusted prices.

Table 8. Example Calculation of CIL Pool & CIL Fee by Year applying Model 1 to Three Assets

Asset	Variable*	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
A	$RemAF_A$	4	3	2	1	0	0	0	0	0	0	0
	$AdjPr_A$	\$5.00	\$5.15	\$5.30	\$5.46	\$5.63	\$5.80	\$5.97	\$6.15	\$6.33	\$6.52	\$6.72
B	$RemAF_B$			6	6	6	4.5	3	1.5	0	0	0
	$AdjPr_B$			\$7.00	\$7.21	\$7.43	\$7.65	\$7.88	\$8.11	\$8.36	\$8.61	\$8.87
C	$RemAF_C$						3	3	3	3	2	1
	$AdjPr_C$						\$9.00	\$9.27	\$9.55	\$9.83	\$10.13	\$10.43
CIL Pool	AF_{Pool}	4	3	8	7	6	7.5	6	4.5	3	2	1
Pool Value	$AdjVal_{Pool}/AF_{Pool}$	\$20.00	\$15.45	\$52.61	\$48.72	\$44.56	\$61.42	\$51.45	\$40.82	\$29.50	\$20.26	\$10.43
CIL Fee†	\$/AF (see eq. (1))	\$5.00	\$5.15	\$6.58	\$6.96	\$7.43	\$8.19	\$8.57	\$9.07	\$9.83	\$10.13	\$10.43
Year Applied	$t + 1$	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011

*Recall that $AdjPr$ is the inflation-adjusted price for the asset. All prices escalated at 3% annually.

†CIL fee determined for the upcoming year ($t + 1$)

Bold AF and price indicate the AF and purchase price in year of acquisition.

4.2 FF3P Framework – Building on Model 1

There are two additional cost recovery and budgeting elements not captured by Model 1.

1. **Recovering the cost of capital for past water acquisitions** – The City incurs an opportunity cost to tie up the capital expended on a water asset acquisition that might not be allocated for many years in the future. It is advantageous for the City to have this capability, as it accommodates increasing the CIL Pool when an asset can be purchased at a low price, regardless of near-term demand expectations. However, this opportunity cost is a real cost incurred by the City, best approximated as the cost of capital (generally prevailing bonding rates in the case of a municipality) and should be recovered.

The FF3P model therefore incorporates a capital cost recovery feature to ensure full cost recovery. Note that bond yields are market driven and implicitly account for inflation expectations (i.e., a potential bond purchaser will make a selection based on a yield they consider high enough to meet or exceed inflation through maturity). The cost-of-capital value adjustment therefore implicitly accounts for inflation and no independent inflation adjustment is made to avoid double counting. The metric is referred to throughout as the cost-of-capital-adjusted price paid (“CCAPP”).

2. **Balancing recovery of past expenses and future cost expectations** – Replacing a depleted CIL Pool asset will generally be more expensive, in real dollars, than the initial purchase of the asset. By application of Model 1 the City recovers past expenditures in real dollars by basing the CIL fee on inflation-adjusted purchase price. However, this cost recovery will necessarily lag water asset expenditures, perhaps by a decade or more. This also leaves the City ill-prepared to finance future water asset acquisitions, which will generally be purchased at a higher unit price than those recently depleted. The FF3P model therefore incorporates a feature to weight the CIL Pool value by a user-defined ratio between the CCAPP and current FMV.

The FF3P model calculates the CIL fee by determining the total value of water assets in the pool and dividing that by the total remaining AF of water in the pool. The value of each asset is influenced by both its current fair market value and an opportunity cost adjustment. The incorporation of the above-listed elements into the CIL calculation are expressed by **Eq. (4)–(6)**.

$$CIL_{FF3P,t+1} = \frac{TotVal_{Pool,t}}{AF_{Pool,t}} \quad (4)$$

$$TotVal_{Pool,t} = \text{Sum of: } [CCAPP_t \times k + FMV_t \times (k - 1) \times RemAF_t] \text{ for all pool assets} \quad (5)$$

$$AF_{Pool,t} = \text{Sum of: } RemAF_t \text{ for all pool assets} \quad (6)$$

Where:

$CIL_{FF3P,t+1}$ = CIL fee applied in year $t + 1$ determined by FF3P model

$TotVal_{Pool,t}$ = The total value of the CIL Pool, weighted for cost of capital and current FMV, in year t

$AF_{Pool,t}$ = Total CIL pool in year t , in AF

$CCAPP_t$ = Opportunity cost-adjusted unit price of a pool asset in year t , in \$/AF

k = Factor applied to $CCAPP_t$ for weighting of $TotVal_{Pool,t}$

FMV_t = FMV of a pool asset in year t , in \$/AF

$RemAF_t$ = Remaining (i.e., unallocated) AF of a pool asset in year t

4.2.1 Inclusion Criteria for Water Acquisitions

Based on WestWater's familiarity with the City's water holdings and market area, and in conjunction with guidance from the City, it was determined that acquisitions to be included in the model are those that are wet water and treatable (i.e., potable). A major difference from the current CIL model is the FF3P model does not exclude acquisitions that are in leaseback or re-rent. Their inclusion in the FF3P model is due to the fact that they have not been permanently allocated and leaseback/re-rent water is available for allocation in the long-term. Primarily non-potable assets are excluded including shares of the New Cache La Poudre Irrigation Company ("NCLPIC"), Cache La Poudre Reservoir Company ("CLPRC"), shares of the Greeley Irrigation Company ("GIC"), and Greeley's ownership of 3/8ths of the water rights of the GIC ("3/8ths")

In the FF3P model, 601 acquisitions line items meet these criteria out of the 731 total acquisition line items reported in the database. The total allocable volume associated with these 601 acquisitions is 34,108 AF (based on firm yield assumptions). The TypeCompanies represented include Poudre River Directs, G-L, LL, 7-L, CBT, WG, TUNNEL, WSSC, shares of Larimer & Weld Irrigation Company ("L&W IRRIG"), Windsor Reservoir and Canal Company shares ("WRCC"), shares of Larimer & Weld Reservoir Company ("L&W RES"), and NPIC-CBT.

4.2.2 Aggregation of Acquisitions into Assets

4.2.2.1 Aggregation Basis & Asset ID Naming Convention

In order to simplify the ordering and data treatment of the City's water holdings the FF3P model aggregates acquisitions into "assets," categorized by TypeCompany and year acquired. That is to say that all acquisitions of a given TypeCompany in the same year are aggregated into a single asset. Henceforth, the term *asset* is used in this context. For tracking purposes, each asset is assigned a six-digit asset ID based on the TypeCompany and acquisition year. This naming convention, and the TypeCompanies included for potential user selection in the FF3P model, are shown in **Table 9**. Applying this aggregation technique reduces the data handling requirement from the 601 acquisition line items meeting the inclusion criteria to 183 assets.

Table 9. TypeCompanies for Model Selection, Asset ID Assignment, & Firm Yield

TypeCompany	2-Digit Code	Yr of 1 st Acquisition	Asset ID for 1 st Acq. Yr	Firm Yield (AF/Share)
DIRECTS	DI	1903	DI-1903	1.0
G-L	GL	1920	GL-1920	6.1
7-L	7L	1920	7L-1920	7.3
CBT	CB	1957	CB-1957	0.5
LL	LL	1962	LL-1962	19.6
WG	WG	1975	WG-1975	0.0
TUNNEL	TU	2006	TU-2006	10.7
WSSC	WS	2006	WS-2006	52.4
L&W IRRIG	LI	2012	LI-2012	5.7
WRCC	WR	2012	WR-2012	15.9
L&W Res	LR	2013	LR-2013	7.2
NPIC-CBT	NP	2014	NP-2014	1.6
NCLPIC*	NC	2014	NC-2014	5.8
CLPRC*	CL	2014	CL-2014	1.3
5/8ths*	F8	1905	F8-1905	10.3
3/8ths*	T8	1862	T8-1862	1.0

*Not considered potable but are included for model selection at the City's request.

4.2.2.2 Determination of AF & Unit Price by Asset

In general terms, the AF assigned to an asset is the sum of the acquired AF of its constituent acquisitions while the nominal unit price assigned to an asset is the volume-weighted average unit price paid of all constituent acquisitions.

As a simple example, let's consider the City's purchase of CBT units in 1970. The City entered two transactions for CBT that year:

1. A May 1970 purchase of 110 units for \$29,150. Applying a firm yield of 0.5 AF/unit, this represents an acquisition of 55 AF at a unit price of \$530/AF.
2. An October 1970 purchase of 50 units for \$13,750. Applying a firm yield of 0.5 AF/unit, this represents an acquisition of 25 AF at a unit price of \$550/AF.

Following the naming convention described above, these two transactions are aggregated into a single asset named CB-1970. The AF assigned to the asset is the sum of the firm yields for the acquisitions, which is 80 AF. The volume-weighted average unit price for this asset is calculated as the total acquisition cost divided by the total AF acquired. The total acquisition cost is \$42,900 (the sum of the two transaction costs). Dividing \$42,900 by 80 returns a volume-weighted unit price of \$536/AF—the nominal unit price assigned to asset CB-1970. Note that this calculation returns a different result than a simple average of the two transaction unit prices, which results in a price of \$540/AF.

4.2.3 Calculation of the CIL Pool

As demonstrated with Model 1, the CIL Pool is a relatively simple concept. However, when expanding the number of assets from three to nearly 200, accounting becomes much more complicated and a well-constructed framework for handling the assets is imperative. The following naming conventions are used within the FF3P model to identify the CIL Pool status of a given asset in a given year and to ensure accurate computation of each asset's AF contribution to the pool.

An acquired asset can assume one of three primary CIL Pool statuses in a given year:

1. *NoUseAF* – Asset acquired in the current or past years but has not seen any allocations
2. *PartUseAF* – Asset acquired in a past year that has seen some allocations, but not depleted
3. *DeplAF* – Asset acquired in a past year that has been fully depleted

While *NoUseAF* and *DeplAF* statuses speak for themselves, the *PartUseAF* requires additional explanation. There are three subtypes of *PartUseAF*:

1. *PartUseAF1* – Asset first allocated in the current year and depleted in a future year
2. *PartUseAF2* – Asset first allocated in a previous year and depleted in a future year
3. *PartUseAF3* – Asset first allocated in a previous year and depleted in the current year

The CIL Pool is calculated annually based on the AF remaining of included assets. Therefore, any asset in *DeplAF* status is excluded from the pool calculation. Likewise, any asset in *PartUseAF3* status is excluded from the pool, as it is fully depleted by the time of the annual CIL Pool calculation. The CIL Pool is therefore comprised of assets assuming the status: *NoUseAF*, *PartUseAF1*, or *PartUseAF2*. **Table 10** provides the status criteria for CIL Pool constituents and the calculation used to determine AF of the asset remaining in a given year, which is its contribution to the CIL Pool.

Table 10. CIL Pool Component Asset Descriptions

Status	Criteria*	AF Remaining (CIL Pool contribution) [†]
NoUseAF	$\text{AcqYr} \leq \text{CurrYr} < 1^{\text{st}}\text{UseYr}$	AcqAF
PartUseAF1	$1^{\text{st}}\text{UseYr} = \text{CurrYr} < \text{DeplYr}$	$\text{AcqAF} - 1^{\text{st}}\text{UseYrAF}$
PartUseAF2	$1^{\text{st}}\text{UseYr} < \text{CurrYr} < \text{DeplYr}$	$\text{AcqAF} - \{1^{\text{st}}\text{UseYrAF} + \text{Sum: } (\text{AllocAF}_{1^{\text{st}}\text{UseYr} \rightarrow \text{CurrYr}})\}$

* AcqYr = year of acquisition; CurrYr = current year; 1stUseYr = year of 1st allocation; DeplYr = year fully depleted

[†] AcqAF = AF originally acquired; 1stUseYrAF = AF allocated in 1stUseYr

4.3 Storage Infrastructure Component of FF3P

The FF3P model incorporates the infrastructure yield and cost component into the total CIL Pool value and then a combined CIL fee is calculated by dividing this combined total value by CIL Pool firm yield. Note that this is a different approach than the current CIL model, which derives an independent unit value for infrastructure to be added to the water supply component to return the final CIL fee (see Section 2.4.1). The infrastructure expenditure added to the CIL Pool value for the FF3P model can be generally described as the summation of expenses incurred by the City through the current year for a selection of water infrastructure.

4.3.1 Selection Criteria for Water Infrastructure Inclusion

The selection of infrastructure for inclusion is, broadly, the raw water storage and delivery infrastructure for raw water management (*i.e.*, management and delivery of raw water to Greeley's two water treatment plants) that is not already considered in the PIF. Non-potable water infrastructure is excluded from the current model setup, but a toggle allows for this to be considered in the CIL determination. Infrastructure that does not directly deliver water to the City's treatment plant but supports potable water through provision of return flows (*e.g.*, gravel pits) is included in the current model. The City identified water storage infrastructure expenditures that are not currently being captured by other means (such as a PIF) and should therefore be recovered through the CIL.

4.3.2 Incorporation of Infrastructure Costs

Consistent with the buy-in approach, included costs are all expenditures for selected infrastructure incurred through the current year. Examples of such expenditures include permitting costs, legal costs, preconstruction costs, investigatory costs, loan initiation costs, and debt service, among other categories. Future planned infrastructure costs are excluded under this approach, as this would not be consistent with the buy-in principle. Rather, future costs will be rolled into the CIL after those outlays are incurred. Greeley is sole owner or party to various multi-year projects (e.g., Poudre Ponds, Overland Pits) and these expenditures will therefore be spread over many years.

4.3.3 Consideration of Infrastructure Yield Impacts

Out of recognition that the infrastructure complement supports the stated firm yields of the water supply assets, the FF3P model does not incorporate storage capacity into the CIL calculation. Rather, as infrastructure is built out, the impact it has on asset yields will be reflected in the CIL Pool AF, which is based on firm yield and ultimately impacting the CIL fee determination. City staff provided inputs for asset yield and operations impacts associated with specific infrastructure.

4.3.4 Infrastructure Complement Evaluated for FF3P Model

The City provided expenditures and yield impact data where possible for the infrastructure satisfying the selection criteria. Yield and cost data for High Mountain Reservoirs (“HMR”), including Milton Seaman Reservoir, were omitted. The age of HMRs and its insignificant impact on system firm yield mean that their presence in the model would likely have little impact on the CIL results.⁶ **Table 11** reports the infrastructure complement, expenditures to date, and impact on yield. The City is continuing its data collection efforts and certain items are subject to change, or be filled in if blank, at a future date.

Table 11. Infrastructure Complement & Inputs used in FF3P Model

Infrastructure Component	Expenditures to Date	Yield Impact
Windy Gap Firming / Chimney Hollow Dam	\$14,864,584	4,900
Overland Trail Ponds	\$7,900,000	1,363
Poudre Ponds (1–2)	\$4,200,000	725
Poudre Ponds (Parcel B)	\$3,560,000	614
Star Pit	\$3,164,040	546
Terry Ranch Aquifer	\$16,428,470	501
Totals	\$50,117,094	8,649

4.4 FF3P Modeling Results & Comparisons

The FF3P model was run using Greeley-specific inputs provided by the City, the updated current FMVs for included assets (provided in **Appendix A** to this report), and various assumptions that were determined with input from the City—all of which are discussed below.

⁶ A majority of HMR yield is not currently decreed for municipal use.

4.4.1 Modeling Inputs & Assumptions

Primary assumptions include the selection on assets for inclusion, how the component acquisitions were made (i.e., two different acquisitions from the same TypeCompany in the same year might have been acquired by different means, such as a dedication, a purchase, or an annexation). Further assumptions include the water allocation pattern and the weighting ratio of CCAPP to FMV.

4.4.1.1 Selection of Assets, Yield Basis, & Allocation Pattern

As shown in **Figure 2**, the current model run was conducted for all potable assets (note that the non-potable assets are not checked for inclusion). The assets included are comprised of acquisitions that came by way of a purchase, an annexation, an exchange, or not defined. Acquisitions by way of dedication are excluded because their yield was allocated to specific development and not generally, per guidance from the City. Note the box in the upper right corner of the figure indicating the number of assets selected based on the inputs chosen and the total AF associated with those assets. The model responds to these selections by querying the *Acquisitions Database* which provides the raw data needed to return the aggregated assets.

The yield selection is firm yield. An alternative option is to run the model based on average yield, which can be selected in the dropdown. WestWater collaborated with City staff to update the firm yield for each asset considered in the FF3P model. The updated yields have been incorporated into the model and are presented in **Table 9** above.

The allocation pattern selected is 27k2012, which is a calibration based on two bookends:

- An estimate of 27,000 AF of demand in 2012, considered a peak use year due to dry conditions.⁷ This value serves as a proxy for allocated firm yield through 2012.
- A projected 30,420 AF of total demand in 2030 based on the midpoint forecast reported in the City's 2023 *Integrated Water Resources Plan*.⁸ This value serves as a proxy for projected allocated firm yield through 2030.

Interpolating between these endpoints returns an annual allocation rate of about 190 AF per year. This calculation estimates that approximately 29,280 AF have been allocated as of Q1 2024. Years prior to 2012 are assigned to roughly track population change. **Figure 4** provides a graphical illustration of the allocation pattern (denoted as variable *CumAllocAF*).

⁷ This is based on a review of consumption by year, subtracting provision to Evans, Windsor, and Milliken, and adjusting for conveyance losses between raw water sources, the treatment plant, and the distribution system.

⁸ https://greeleygov.com/docs/default-source/water/water-plans/iwrrp_report_final-reduced.pdf

Figure 2. Primary Inputs Selection for FF3P Model

Allocable Asset Summary								Yield Select (AF/Sh)*		Selected assets: 183	
Satisfying Acq. Type								WW Firm est. **		TotAF Selec. Ass.: 34,107.9	
TypeCompany	Src	Potable	Asset Ct	1st Acq	Include	Price?	YieldUsed	2024TotAF	Acquisition Type		
DIRECTS	DI	Y	4	1903	☒	Y	1.0	9,216.0	Acquired	Incl.	
G-L	GL	Y	47	1920	☒	Y	6.1	5,170.2	PURCH	☒	
7-L	7L	Y	31	1920	☒	Y	7.3	1,575.6	DED	☐	
CBT	CB	Y	39	1957	☒	Y	0.5	11,261.0	ANNEX	☒	
LL	LL	Y	35	1962	☒	Y	19.6	2,940.0	EXCH	☒	
WG	WG	Y	1	1975	☒	Y	0.1	4.9	N/A	☒	
TUNNEL	TU	Y	1	2006	☒	Y	10.7	800.3			
WSSC	WS	Y	13	2006	☒	Y	52.4	2,432.2	Allocation Pattern		
L&W IRRIG	LI	Y	4	2012	☒	Y	5.7	91.2	Option	Choose	
WRCC	WR	Y	6	2012	☒	Y	15.9	429.3	Random	☐	
L&W Res	LR	Y	1	2013	☒	Y	7.2	57.6	Growth	☐	
NPIC-CBT	NP	Y	1	2014	☒	Y	1.6	129.6	27k2012	☒	
NCLPIC	NC	N	6	2014	☐	N	5.8	553.9	23k2012	☐	
CLPRC	CL	N	6	2014	☐	N	1.3	112.5		☐	
5/8ths	F8	N	16	1905	☐	N	10.3	816.9		☐	
3/8ths	T8	N	1	1862	☐	N	1.0	3,215.0		☐	

4.4.1.2 Selection of Bond Yields & Price Weighting

Additional selections include bond yield and input of the weighting ratio of FMV to CCAPP (see **Figure 3**). The bond yield is used to determine the rate at which the water supply purchase price will appreciate over the years since acquisition to recoup the cost of capital. This model run has it set to *average*—*low* and *high* are also options. This draws on a 30-year municipal bond yield dataset that spans 1959–2024.

The two values comprising the weighting ratio of FMV to CCAPP will always sum to 100%. The user inputs the factor for present value of price paid (*PV Pr Paid*) and the FMV factor recalculates to ensure a total weight of 100%.

Figure 3. Bond Yield & Price Weighting

Bond Yield	
Avg	
Weighting for Past Expenses vs. Future Expectations	
PV Pr Paid	FMV
50%	50%

4.4.1.3 Inputs & Calculations for Asset Prices Used

The CCAPP for a given asset is calculated as price paid in the year of purchase compounded to the year of CIL calculation at the average of prevailing municipal bond rates. If price paid is unknown for an asset it is approximated based on transactions of the same or similar assets in the same year. WestWater has assigned a purchase price, or best proxy, to all assets in the model. As long as the City inputs the purchase price for future acquisitions the pricing dataset within the FF3P model will remain complete.

The FMV for a given asset is the fair market value in the year of CIL determination. WestWater updated the FMV estimates for all TypeCompanies considered in the FF3P model to a June 2024 price level. The updated valuation results and applied methodologies are presented in **Appendix A** to this report.

4.4.2 Volumetric Outputs & Asset Accounting based on Described Model Run

This section highlights some of the model outputs and asset accounting performed pursuant to the inputs and assumptions described in Section 4.4.1. The cumulative acquired AF (*CumAcqAF*), cumulative allocated AF (*CumAllocAF*), and CIL Pool (*CILPoolAF*) are depicted for the years 1900–2025 in **Figure 4**. Detailed volumetric inputs and outputs for the five-year period 2020–2024 are shown in **Table 12**. The far-right columns show the number of assets with allocations (*AssetsUsed*), the number of assets depleted (*DeplThisYr*), and the number of assets acquired but have yet to see any allocations (*NoUseCt*) in each year. Note that the number of assets used is generally one greater than the number depleted, as the final asset used in a year will carry over to the next year as *PartUse1*.

Figure 4. Modeled Acquisitions, Allocations, & CIL Pool, 1900–2025

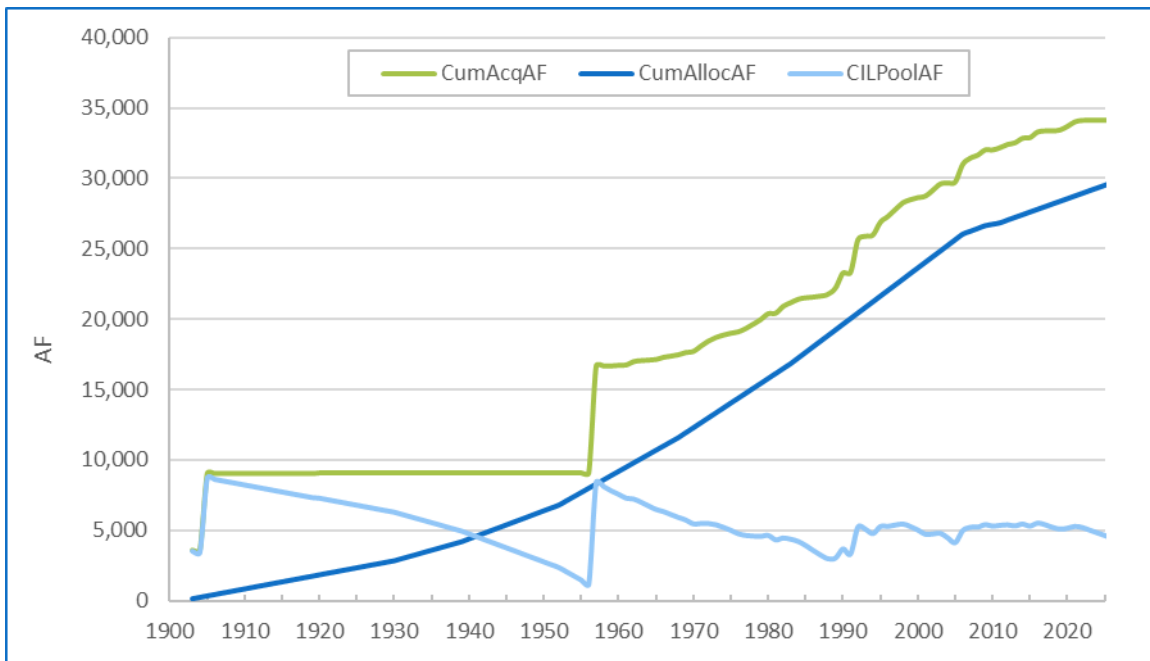


Table 12. Volumetric Outputs for 2020–2024 based on Described Model Run

Year	AcqAF	CumAcqAF	AllocAF	CumAllocAF	UnallocAF	AssetsUsed	DeplThisYr	NoUseCt
2020	256.0	33,679.9	190.0	28,520.0	5,159.9	6	5	51
2021	323.1	34,003.1	190.0	28,710.0	5,293.1	4	3	49
2022	104.8	34,107.9	190.0	28,900.0	5,207.9	4	3	47
2023	0.0	34,107.9	190.0	29,090.0	5,017.9	2	1	46
2024	0.0	34,107.9	190.0	29,280.0	4,827.9	2	1	45

Table 13 reports the asset accounting for the years 2020–2024 under the described modeling conditions. Recall that *PartUse1* is an asset that sees its first allocations in the current year and is depleted in a future year, while *PartUse3* is an asset that saw its first allocations in a previous year and is depleted in the current year. Note that asset *LL-2002* shifts from *PartUse1* to *PartUse3* across the years 2023–2024, meaning it was partially allocated in 2023 and fully depleted in 2024.

The *Pool Src Composition* column lists the two-digit TypeCompany code for all assets that are represented in the CIL Pool that year. In a given year there are generally far too many individual assets in the pool to

report out (the count varies from 46–52 across this period). Rather, the TypeCompany is reported to provide some insight as to the pool source. The *AvgAcqYr* column reports the average age of the CIL Pool (based on acquisition date), which is weighted by each asset's AF contribution to the pool. For the period 2020–2024, the average age of the pool spans 2008–2011, or about 13 years preceding.

Finally, the two far-right columns of **Table 13** identify the largest asset (by AF) represented in the CIL Pool and the percent of total pool AF it comprises. For all five years shown, the largest asset is *TU-2006*, or the Larimer-Poudre Tunnel acquisition made in 2006. It is notable that this single asset constitutes over 15% of pool volume when there is approximately 50 total assets in the pool for those years.

Table 13. Asset Accounting & Identification Outputs for 2020–2024 based on Described Model Run

Year	PartUse1	PartUse2	PartUse3	Pool Src Composition	PoolAssetCt	AvgAcqYr	1stLgAsset	1stLg%
2020	GL-2000		CB-1999	GL LL 7L CB TU WS LI WR LR NP	52	2008	TU-2006	16%
2021	LL-2001		GL-2000	LL 7L CB GL TU WS LI WR LR NP	50	2010	TU-2006	15%
2022	GL-2002		LL-2001	GL LL 7L CB TU WS LI WR LR NP	48	2010	TU-2006	15%
2023	LL-2002		GL-2002	LL 7L GL CB TU WS LI WR LR NP	47	2010	TU-2006	16%
2024	7L-2003		LL-2002	7L GL LL CB TU WS LI WR LR NP	46	2011	TU-2006	17%

4.4.3 Financial Metrics & CIL Results based on Described Model Run

Table 14 reports the primary financial outputs and estimated CIL fee for the CIL calculation period 2020–2024 based on the modeling run described in the previous sections. Recall that this CIL calculation period corresponds with a CIL application period of 2021–2025. Dividing *CIL Pool Value* by *CIL Pool AF* returns the water supply-based CIL fee portion (\$46,297/AF in 2024). This is provided to facilitate comparison with the City's current CIL model water supply CIL component, which was last estimated at \$48,340/AF (see **Table 6** on page 7). The final CIL fee is calculated as the total costs for recovery (sum of *CIL Pool Value* and *Infrastructure Expense*) divided by the CIL Pool AF, which returns a value of **\$56,678/AF** for 2024, which would be applied in 2025.

As shown in **Table 14**, the CIL fee calculated for 2020 is \$37,912/AF, or nearly \$20,000/AF less than the 2024-calculated CIL. This change represents a 10.6% compound annual growth rate (CAGR) for the five-year period. Note that the *Total Costs for Recovery* grew at an 8.8% CAGR for the same period, indicating that a portion of the fee escalation over that time is due to the decreasing CIL Pool over the period (the CIL Pool saw a growth rate of -1.6% from 2020–2024).

Table 14. Modeling Results & CIL Fee Estimates, 2020–2024

Year Calc.	Year Applied	CIL Pool (AF)	CIL Pool Value	Water Supply-based CIL (\$/AF)	Infrastructure Expense*	Total Costs for Recovery	CIL Fee (\$/AF)
<i>Label>></i>		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
<i>Calc.>></i>		--	--	<i>B / A</i>	--	<i>B + D</i>	<i>E / A</i>
2020	2021	5,160	\$154,390,063	\$29,921	\$41,231,500	\$195,621,563	\$37,912
2021	2022	5,293	\$174,405,048	\$32,950	\$43,293,000	\$217,698,048	\$41,129
2022	2023	5,208	\$201,121,368	\$38,619	\$45,457,700	\$246,579,068	\$47,347
2023	2024	5,018	\$209,598,167	\$41,770	\$47,730,600	\$257,328,767	\$51,282
2024	2025	4,828	\$223,515,584	\$46,297	\$50,117,100	\$273,632,684	\$56,678
CAGR (2020–2024)>>			9.7%	11.5%	5.0%	8.8%	10.6%

*Infrastructure Expense for pre-2024 years is not known. The 2024 value is deflated at an annual rate of 5% for 2020–2023.

4.4.4 Comparison of Water Supply Component Results to Alternative Treatments & Methods

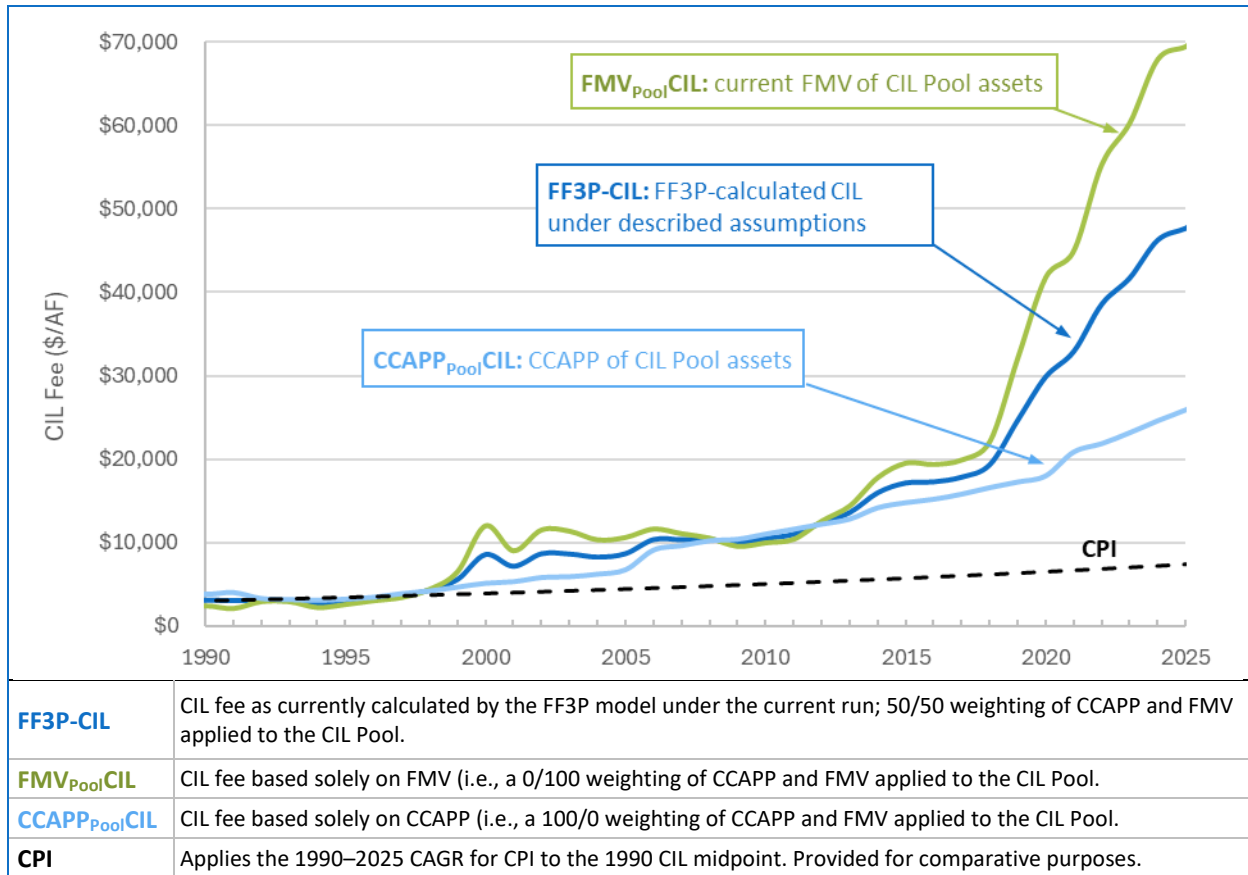
For purposes of clarity, the term “base model run” refers to the water supply component of the FF3P model run described in the preceding sections and for which results are presented in column C of **Table 14**. The base model run is denoted by the variable *FF3P-CIL* in the figures and related body text of this section.

4.4.4.1 Impact of the CCAPP-to-FMV Ratio

To demonstrate the impact of the CCAPP-to-FMV weighting feature of the FF3P model (depicted in **Figure 3**) the model was run based on the same assets and assumptions as the base model run but varying the CCAPP-to-FMV ratio from the base model run setting of 50/50 to 100/0 (fee calculation based solely on CCAPP) and 0/100 (fee calculation based solely on FMV).

Figure 5 shows a comparison of the 100/0 variant (*CCAPP_{Pool}CIL*), the 0/100 variant (*FMV_{Pool}CIL*), and the base model run (*FF3P-CIL*). As expected, *FF3P-CIL* occupies a consistent midpoint between the two alternatives due to the 50/50 weighting applied. Interestingly, all three CILs track CPI quite closely from 1990–1999 and consistently track one another until about 2012 when there is a divergence driven by FMV water price increases.

Figure 5. Comparison of Different CIL Calculations based on Assets in CIL Pool, 1990–2025

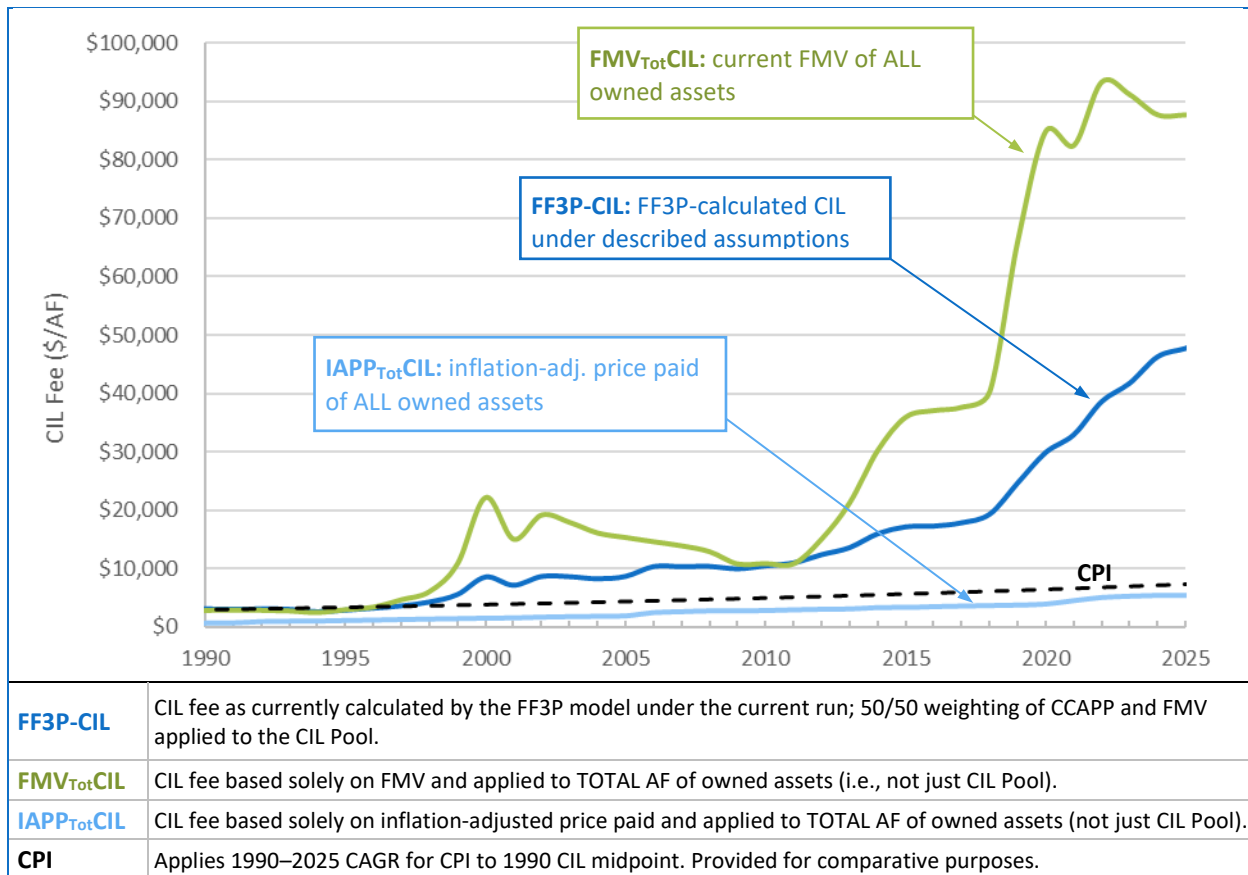


4.4.4.2 Comparison of FF3P Base Model Run to Alternative CIL Fee Calculations

To provide a comparison of the FF3P methodology to alternative CIL determination methods two CILs were developed using a different allocation methodology and price treatments. The first comparative variant (FMV_{TotCIL}) is calculated based solely on FMV and applied to *total* AF of owned assets (i.e., not just the CIL Pool). This is akin to a method used by many municipalities, wherein their CIL is determined by dividing the current FMV of their entire portfolio by the total firm AF held in the portfolio—returning a result in the \$100,000/AF range in recent years. The second comparative variant ($IAPP_{TotCIL}$) is calculated based solely on inflation-adjusted price paid and applied to *total* AF of owned assets (not just the CIL Pool). This represents the cost in real dollars to recover past expenditures for all water assets ever purchased. Other than these distinctions, the comparative variants are based on the same initial assets and assumptions as the base model run ($FF3P-CIL$).

Figure 6 illustrates the CIL fee movement of the two variants and the base model run for the period 1990–2025. $IAPP_{TotCIL}$ is inflation-adjusted by the CPI, so it is not surprising that it closely tracks CPI across the date range. It is also not surprising that $IAPP_{TotCIL}$ is consistently much lower than either FMV_{TotCIL} or $FF3P-CIL$, as water values have consistently escalated at a higher rate than inflation since 1990. Therefore an inflation adjustment to the oldest assets will not approach the current FMV. Because the FF3P model allocates these oldest assets and removes them from the CIL Pool, it avoids such an extreme divergence from current FMV. Note that FMV_{TotCIL} shows the most erratic behavior over the analysis period, as it is fully subject to the whims of the water markets.

Figure 6. Comparison of Different CIL Calculations based on Total Assets Owned, 1990–2025



4.5 Discussion & Conclusions

The unique temporal elements, updated data treatments, logic-based calculations, and accessible interface of the FF3P model accommodates the determination of a CIL that is:

- **Defensible:** The generally accepted approaches for CIL fee development are bounded by those methods based on cost recovery (low end) and those based on current replacement value (high end), both of which are acceptable and economically sound. The FF3P model borrows from both philosophies and satisfies M1 Manual standards.
- **Consistent & Predictable:** The first-in first-out foundation of the model ensures that the bulk of the CIL Pool assets are the same for any multi-year stretch, and that these assets are valued in part based on price paid means that severe market price swings are significantly moderated.

As shown in **Figure 6**, the FF3P model returns a result that tracks the overall market, but with a stabilizing lag. Municipalities with their CIL pegged to the current FMV of a specific water asset or bundle of assets would have seen their fee decrease over the period 2000–2010, while the FF3P-modeled CIL shows steady positive growth over the same period. Likewise, those municipalities would have seen explosive CIL escalation for the period 2012–2023 (18% CAGR), while the FF3P CIL demonstrates stable and less severe escalation over those years.

The exclusion of leasebacks and re-rents as allocable supply criteria means that the expiration of a major lease will not necessitate a CIL recalculation and potential swing in value. Lastly, the accounting component of the FF3P allows City staff to easily monitor the acquisitions-to-allocations ratio, an early indicator of potential future shortage. This accommodates deliberate and better-informed purchase decisions, keeping the CIL fee predictable over the long term.

- **Competitive:** By incrementally drawing on past water purchases, the FF3P methodology passes forward the cost savings Greeley has achieved by buying water in advance of growth. The model consistently returns a discounted rate relative to the FMV of like assets and accommodates adjustments to the CCAPP-to-FMV ratio, allowing the City to identify its preferred balance between cost recovery and future price expectations.
- **Financially Sustainable:** The proposed methodology recovers all past water expenditures in real dollars, including the compounded cost of capital. Under the current model settings, the CIL returns a result that ensures the City can incrementally replace allocated supplies at higher real costs. In short, the model ensures financial sustainability.
- **Easily Managed & Updated:** The FF3P model was built in Microsoft Excel with the deliberate exclusion of any macros to maximize accessibility compatibility. The dashboard is laid out in a simplified manner that allows for easy troubleshooting and the ability to trace the model's logic. The *Acquisitions Database* is the heart of the model and has been cleaned, updated, and streamlined from the original version shared by the City. This database accommodates the addition of new acquisitions with a clearly identified inputs field. Once a new acquisition is input, the model automatically aggregates it into a corresponding asset, or creates a new asset if it is the first of that TypeCompany that year. The worksheets housing FMV, bond yields, and various indices are clearly marked and designed to accommodate periodic updates.

The FF3P model run using up-to-date inputs and City-informed assumptions returns a 2025 CIL fee of **\$56,678/AF**. This is within \$200/AF of the \$56,500/AF CIL determined by the City's current model. WestWater therefore concludes that the City's currently proposed CIL fee of \$56,500/AF is justified and does not need adjustment.

Appendices

Appendix A. *Water Asset Portfolio Values*





Water & Sewer Agenda Summary

November 20, 2024

Key Staff Contact: Alex Tennant - Water Resource Administrator III

Title:

November 2024 Water Supply Update

Summary:

Staff will provide a presentation and memorandum to the W&S Director on current water supply, 2024 weather summary, 2024 agricultural water rental summary, and the drought forecast through the end of the year.

Recommended Action:

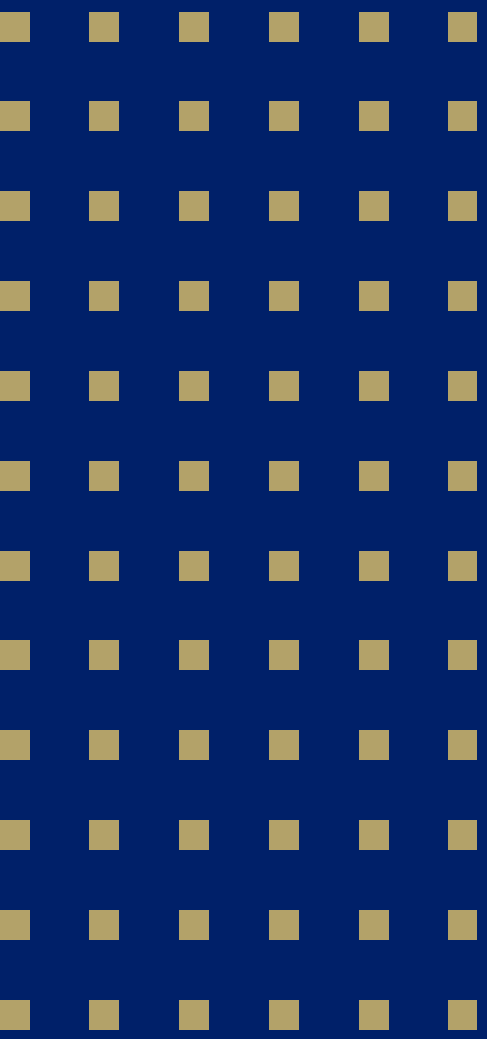
Informational Only

Recommended Motion:

None

Attachments:

1. Water Supply Update
2. November 2024 Water Supply Update



2024 November Water Supply Update

November 20, 2024

Presented by:

Alex Tennant, Water Resources Administrator III

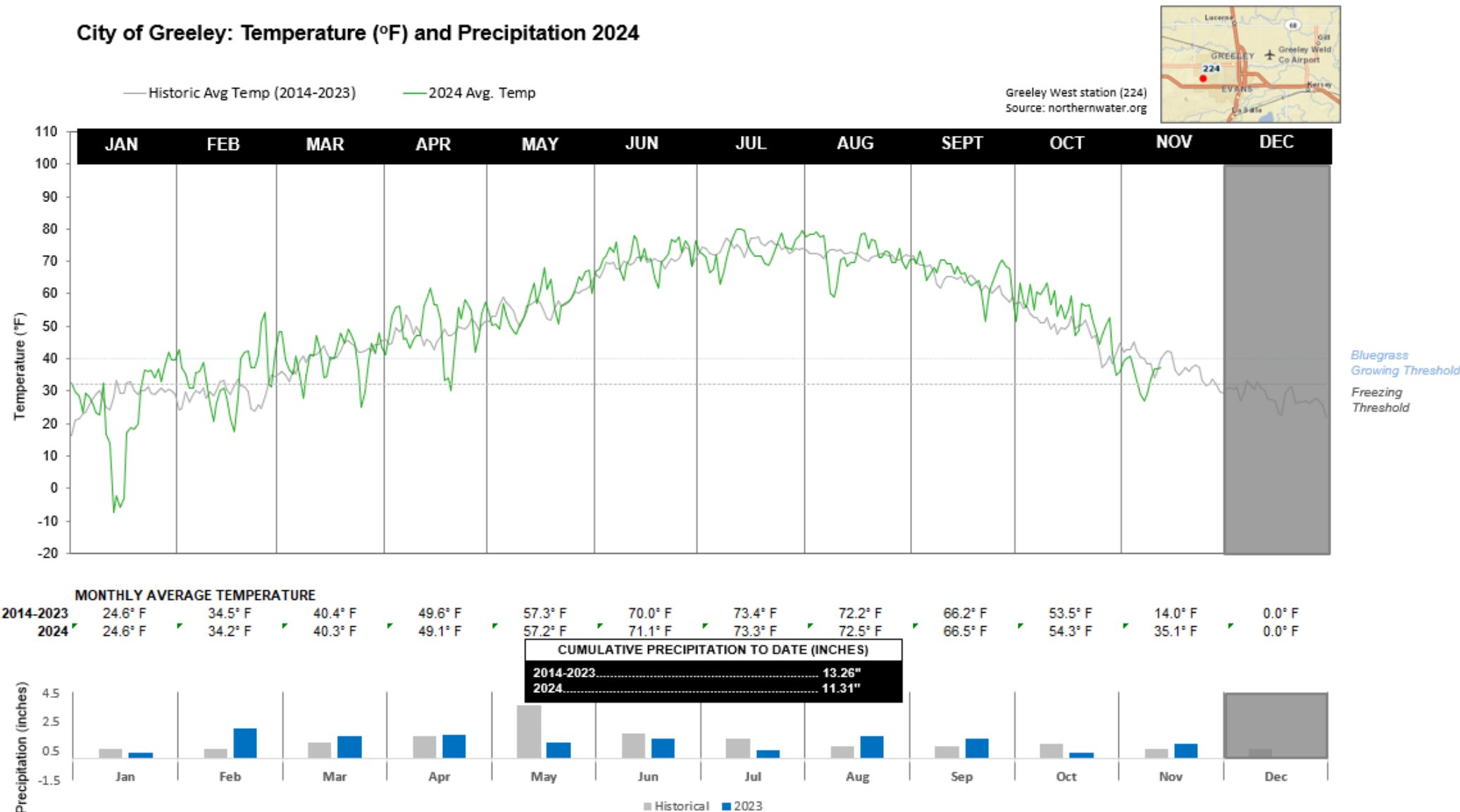
Ag Water Rental Summary

• C-BT	7,460	AF
• GLIC	5,391	AF
• WSSC	517	AF
• NPIC	187	AF
• HMR	4,300	AF
• Leasebacks		
◦ WSSC	1,808	AF
◦ GLIC	9,655	AF
◦ L&W	614	AF
◦ New Cache	488	AF
Total	30,420	AF

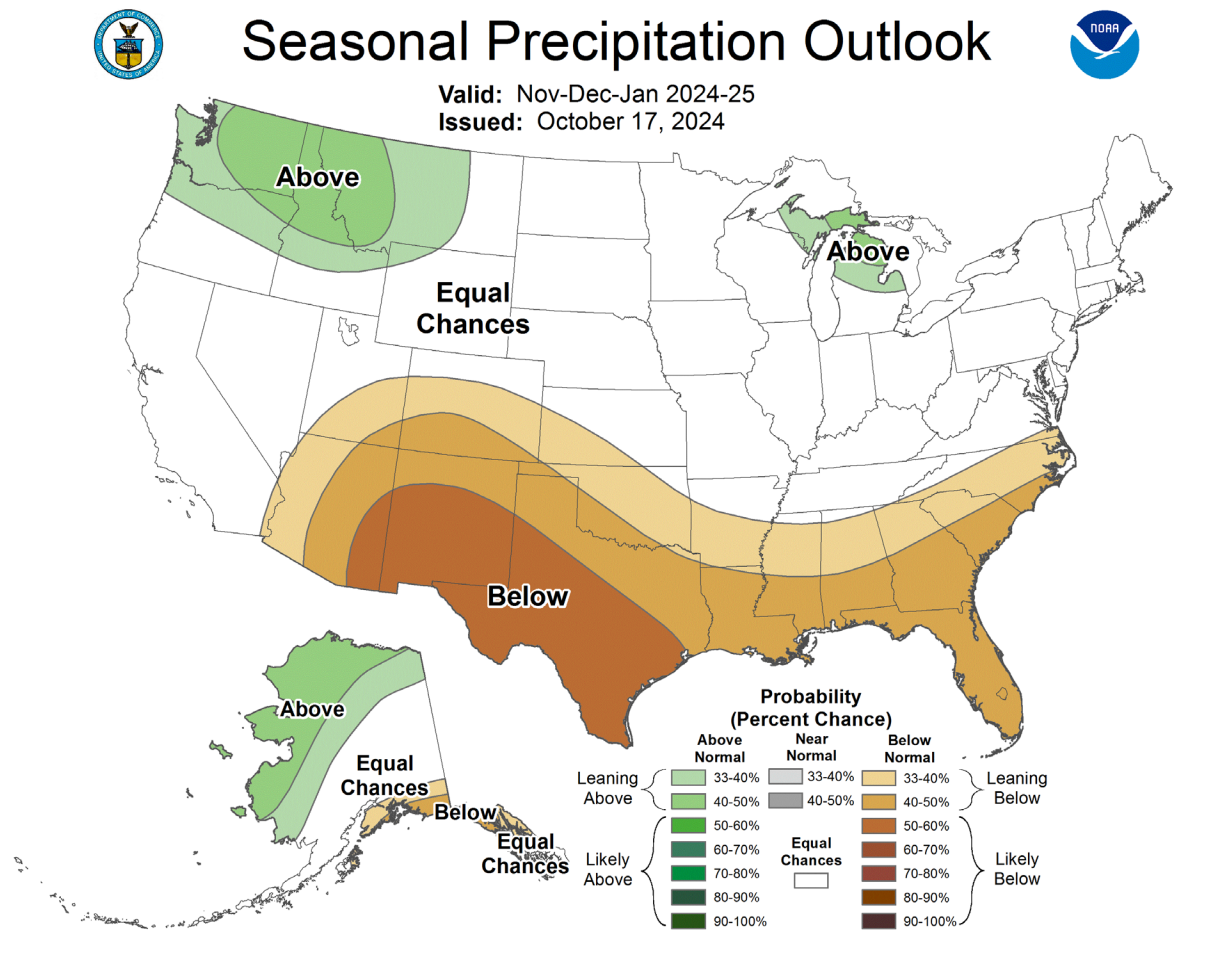
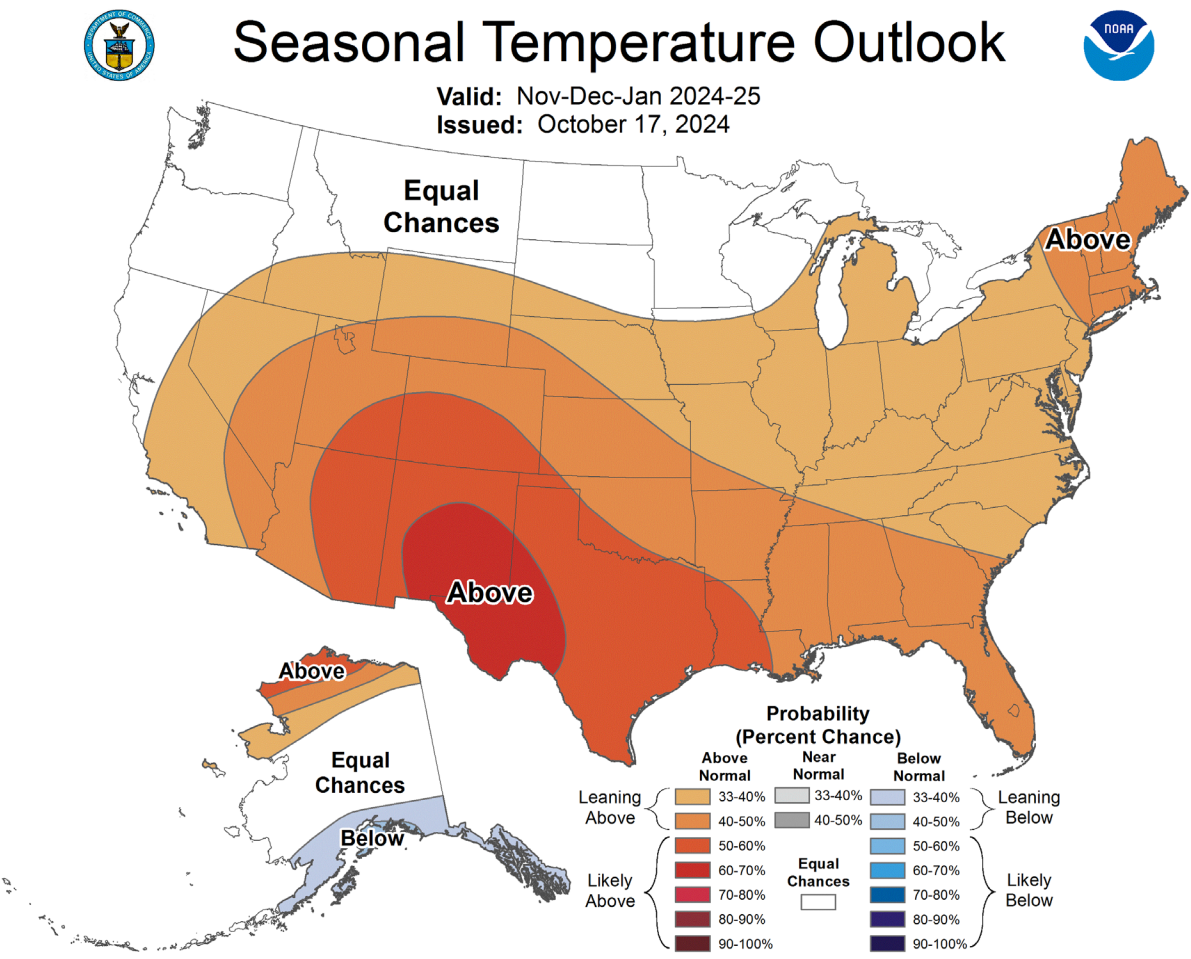


Temperature and Precipitation

City of Greeley: Temperature (°F) and Precipitation 2024



Temperature and Precipitation Outlook

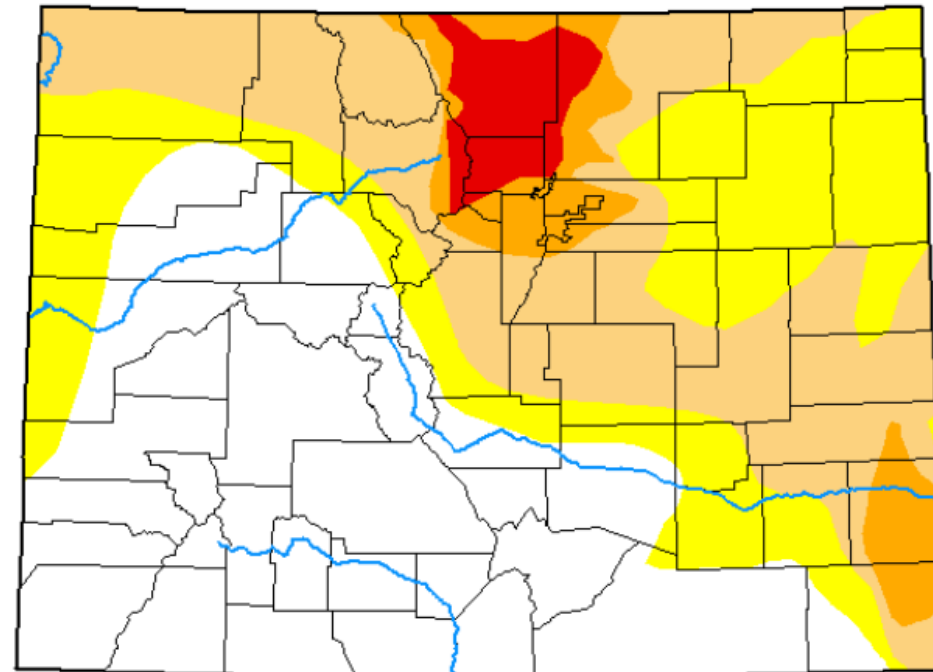


Drought Conditions



U.S. Drought Monitor Colorado

November 5, 2024
(Released Thursday, Nov. 7, 2024)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	42.17	57.83	33.67	8.74	3.26	0.00
Last Week 10-29-2024	39.87	60.13	34.93	9.89	3.26	0.00
3 Months Ago 08-06-2024	33.97	66.03	12.60	1.86	0.14	0.00
Start of Calendar Year 01-02-2024	34.65	65.35	29.59	8.85	2.05	0.00
Start of Water Year 10-01-2024	48.27	51.73	24.40	4.62	0.00	0.00
One Year Ago 11-07-2023	54.26	45.74	26.78	6.48	0.00	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Brian Fuchs
National Drought Mitigation Center

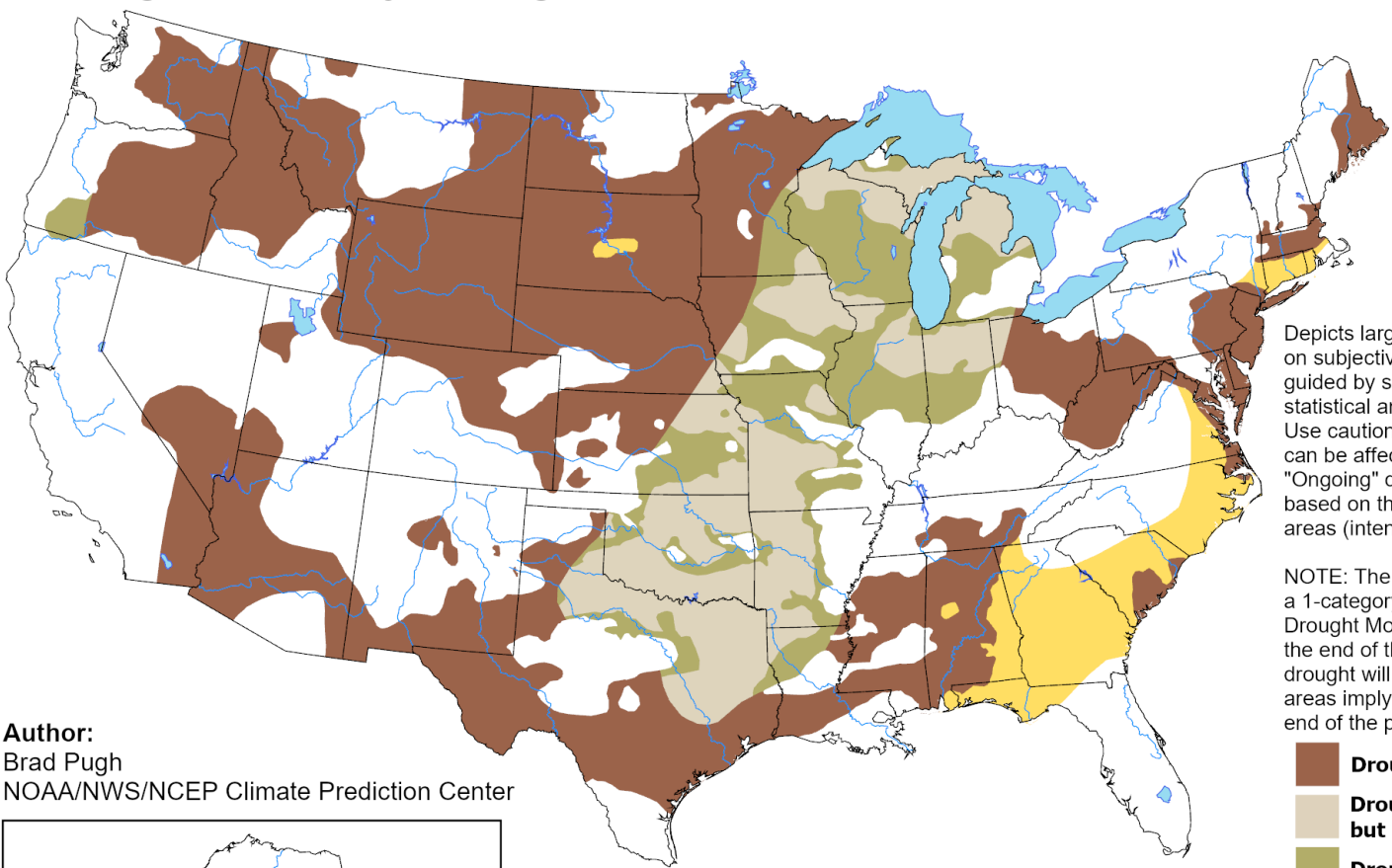


droughtmonitor.unl.edu

Drought Outlook

U.S. Monthly Drought Outlook Drought Tendency During the Valid Period

Valid for November 2024
Released October 31, 2024

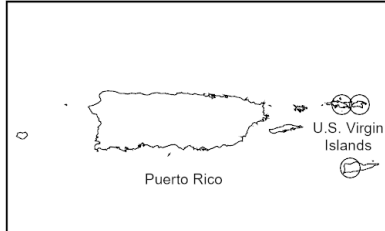
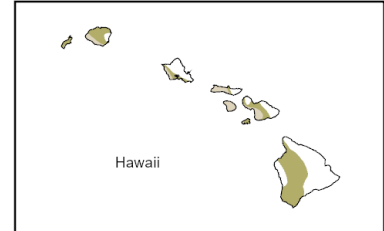


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

- Drought persists
- Drought remains, but improves
- Drought removal likely
- Drought development likely
- No drought

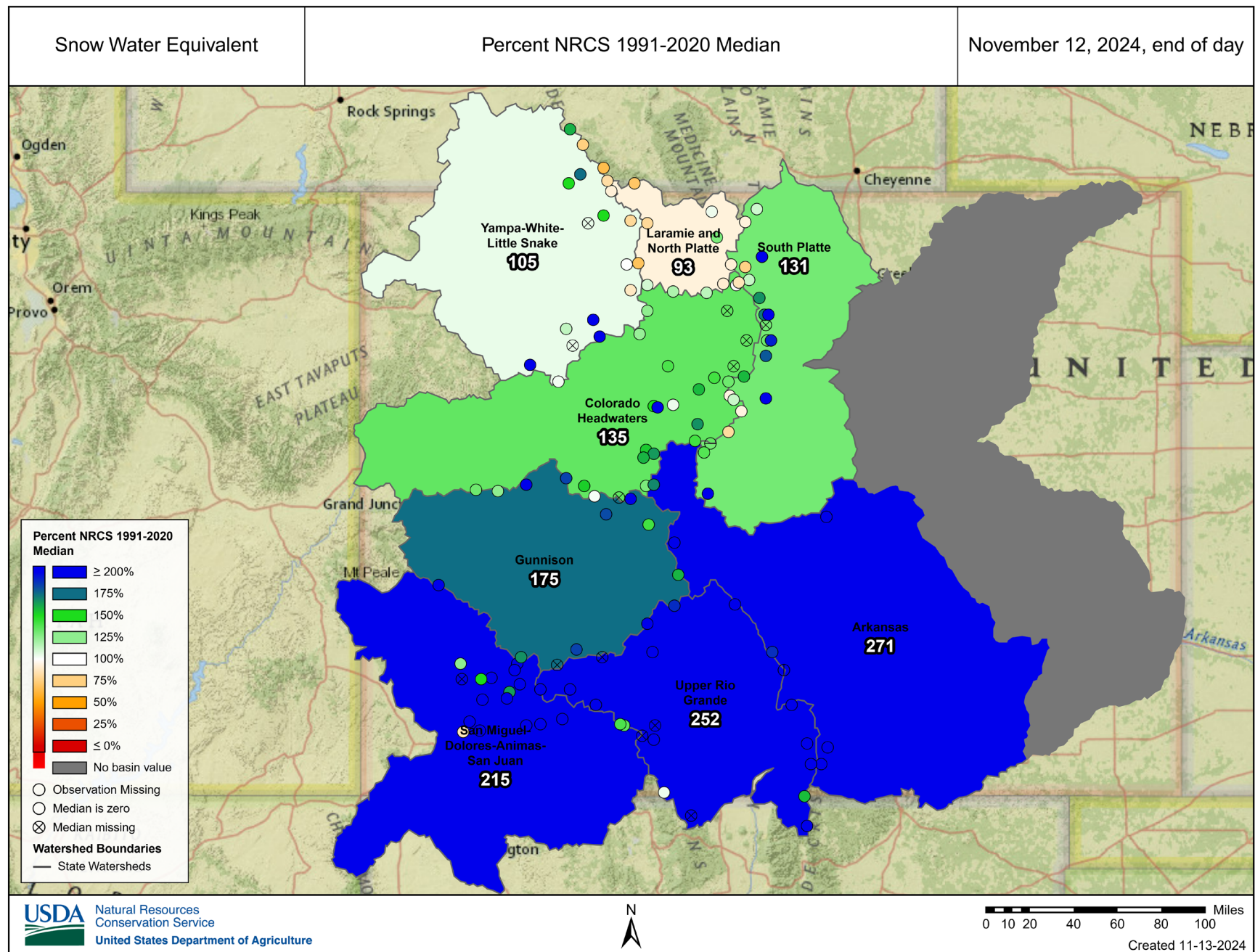
Author:
Brad Pugh
NOAA/NWS/NCEP Climate Prediction Center



<https://go.usa.gov/3eZGd>



Current Snowpack



System Storage

Source	April 2025 Storage (acre-feet)	Demands/Losses (April 1, 2025 - March 31, 2026) (acre-feet)	Yields (April 1, 2025 - March 31, 2026) (acre-feet)	April 2026 Storage (acre-feet)
	(1)	(2)	(3)	(4)
NCWCD (C-BT)	16,500	16,402	11,402	16,402
WINDY GAP	2,500	2,500	0	0
GLIC SYSTEM	10,305	7,000	11,100	14,405
TUNNEL	1,100	1,000	1,000	1,100
TOTAL	30,405	26,902	57,307	31,907
		Target Storage Volume		21,300

- Initial CBT quota set at 50%
- GLIC reservoirs filled in July
 - 52% capacity – Avg for November
- HMR's delivered successfully in 2024



Summary

- Drought conditions present in the South Platte River basin
- Good start to snowpack
- Soil moisture is decent for a warm and dry summer
- Reservoirs levels are average for November
- Remain in adequate water year and monitor conditions through the winter months

Questions?



MEMORANDUM

TO: Sean Chambers, Water and Sewer Director
FROM: Alex Tennant, Water Resources Administrator III
DATE: November 20, 2024
RE: November 2024 Water Supply Update

OBJECTIVE

In accordance with the Drought Emergency Plan, staff will report the water supply status to the Greeley Water and Sewer Board ("Board") in April, July and November of each year. Previous modeling analysis has shown that the amount of water needed in storage to supply the citizens of Greeley for 12 months is approximately 21,300 acre-feet.

BACKGROUND

The theme of this past irrigation season was hot and dry. By middle of June, high temperatures were in the high 80's or low 90's and the 90-degree days were a mainstay through September. Greeley also experienced below average precipitation. There were concentrated rain events in June, July, and August; however, they weren't widespread enough to provide beneficial moisture to irrigated fields. Because of these conditions, Northern Colorado reservoirs delivered a lot of water to irrigators, but almost every ditch company was full coming into the year, so storage is average entering November. The current drought conditions are poor, especially in Boulder, Larimer and Weld Counties. There is some degree of drought across the state and the three-month climate outlook is not favorable, calling for a warmer than average winter with slightly below average snowfall. Despite the forecast, Colorado has gotten the first sizable snowstorm already and much of the state snowpack is over 100% of average, both the South Platte and Colorado basins are over 130% of average.

In terms of production demand, Greeley is right around average. Boyd and Bellvue treated a combined 24,060AF through October. This is right in line with 2021 and 2022 production. The projection through December is 26,900AF which compared to the max production in 2012 at 28,250AF is positive.

The HMR system filled in 2024, this yielded the expected 4,300AF of available water for agriculture. The Greeley Loveland System (GLIC) yielded 24,683 acre-feet which was a full dividend. This resulted in a spill of all carryover water from 2023 which has been common the past couple of years. Greeley rented out over 7,300 acre-feet of excess Colorado Big Thompson

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We promise to preserve and improve the quality of life for Greeley through timely, courteous and cost effective service.

water (C-BT) to agriculture. Another 1,650 AF of CBT was rented to oil and gas and industrial uses. In total, Greeley leased approximately 30,420 acre-feet in agricultural leases and high mountain reservoir water.

The Greeley System Storage Analysis table for Water Year 2025 shows the April 2026 storage level will be approximately 31,907 acre-feet. This conservatively assumes the following:

- High demands in Greeley
- No Windy Gap carryover or pumping (yet)
- 50% quota issued for the C-BT project
- Collateralizing 3,000 acre-feet of C-BT for Greeley's Windy Gap use
- Dry year yields for the GLIC system

	April 2025 Storage (acre-feet)	Demands/Losses (April 1, 2025 - March 31, 2026) (acre-feet)	Yields (April 1, 2025 - March 31, 2026) (acre-feet)	April 2026 Storage (acre-feet)
Source	(1)	(2)	(3)	(4)
NCWCD (C-BT)	16,500	16,402	11,402	16,402
WINDY GAP	2,500	2,500	0	0
GLIC SYSTEM	10,305	7,000	11,100	14,405
TUNNEL	1,100	1,000	1,000	1,100
TOTAL	30,405	26,902	57,307	31,907
		Target Storage Volume		21,300

SUMMARY

Initial Projections show the target storage volume is greater than 21,300 acre-feet. Staff will revise the projected storage volume in April after Northern declares the quota and the Board will make a determination of adequate water year at the April 2025 Board meeting.



Water & Sewer Agenda Summary

November 20, 2024

Key Staff Contact: Cadee Oakleaf, Civil Engineer III

Title:

Wastewater Treatment Phase II Update

Summary:

The Wastewater Treatment Phase II consists of the Primary Treatment and Phosphorus Side Stream Treatment project is currently in the contracting phase with an anticipated notice to proceed of November 2024. The project includes asset renewal/replacement of equipment in headworks, primary treatment, aeration, a new cake hopper, centrate handling and processing, and site-wide backup power. Alkalinity dosing will be added to balance the use of ferric. A new phosphorus side stream treatment process will be added to reduce the internal recycling of phosphorus.

Recommended Action:

Informational Only

Recommended Motion:

None

Attachments:

1. Wastewater Treatment Phase II Update



Wastewater Treatment Phase II Update

Cadee Oakleaf, Civil Engineer III
Water and Sewer Board – November 20, 2024



Infrastructure and Mobility

Agenda



- Project Summary
- Asset Renewal/Replacement
- New Process
- Current Chemical Dosing
- Project Budget and Schedule
- Comments or Questions

Project Summary

- Primary Treatment and Phosphorus Side Stream Treatment Upgrades project
- Modified Phase 2 of the 2018 Liquid Stream Master Plan
- Drivers:
 - Asset Renewal
 - Future Regulatory Requirements
 - Reg 31 Voluntary Incentive Program Credits

Asset Renewal/Replacement



-  Headworks
-  Primary Treatment
-  Aeration System

Asset Renewal/Replacement

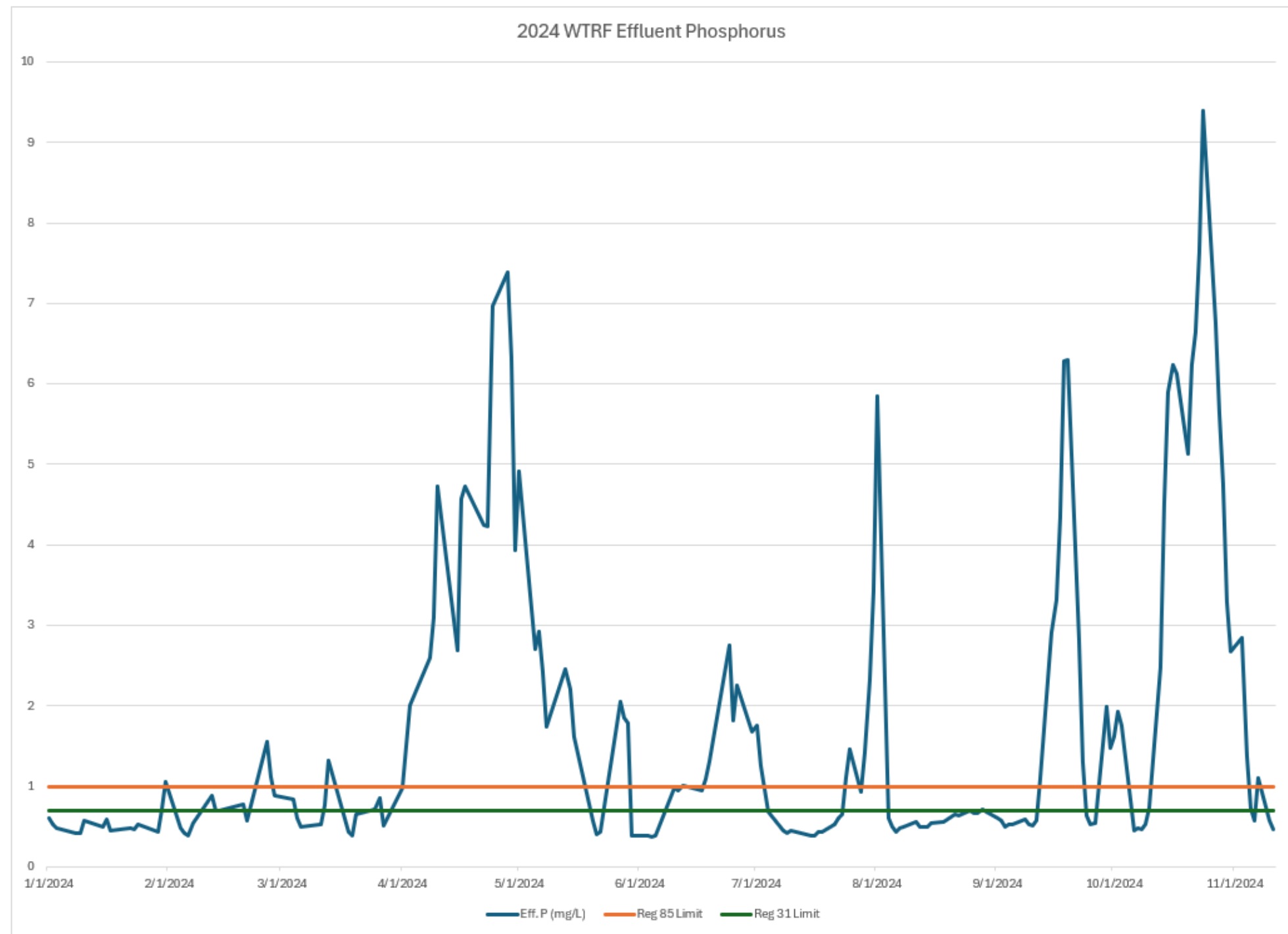


-  Alkalinity Addition
-  Cake Hopper
-  Centrate Handling and Processing (CHAP)
-  Generator

New Process

- Phosphorus Side Stream Treatment
- Reduce internal phosphorus recycle and chemical usage
- VIP Credits



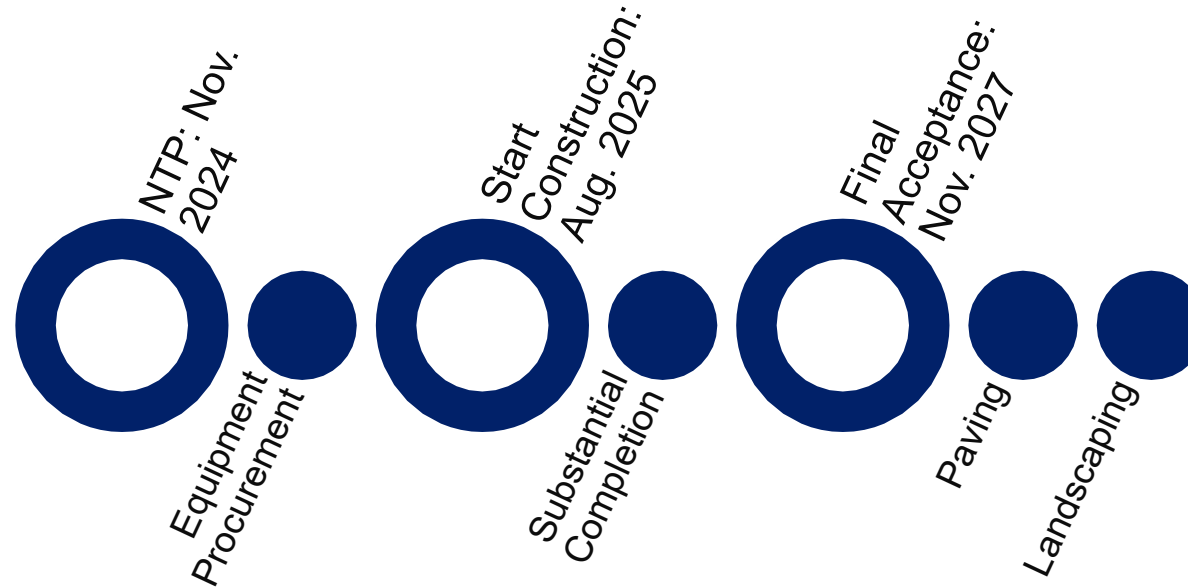


Current Chemical Dosing



- Ferric
- Alkalinity in future
- Usage ~90 days/year
- ~\$200,000/year at current flows

Project Budget and Schedule



Contract Value: \$46,882,282

Comments or Questions?





Water & Sewer Agenda Summary

November 20, 2024

Key Staff Contact: Dena Egenhoff, Water Conservation Manager, Margarita Padilla - Water Efficiency Resource Coordinator

Title:

Local Initiative for Landscaping and Conservation (LILAC) Study

Summary:

The Water Conservation team recently completed a study for the new LILAC initiative, focused on local landscaping and conservation. This presentation will cover the study's objectives, key findings, recommendations, and action plan. LILAC aims to address accessibility barriers, ensure equitable landscaping resource distribution, and enhance community engagement and impact.

Recommended Action:

Informational Only

Recommended Motion:

None

Attachments:

1. Local Initiative for Landscaping and Conservation (LILAC) study

LILAC **(Local Initiative for Landscaping & Conservation)** **Study**

Dena Egenhoff – Water Conservation Manager

Margarita Padilla – Water Efficiency Resource Coordinator



Agenda



Purpose: To update the W&S Board on Greeley Water Efficiency Study for a new local initiative for landscaping and conservation program (LILAC) to connect and support our under-represented customers, non-English speaking residents, and disadvantaged residents.

- Grant
- Overview of the Study's Objectives
- Key Findings
- Recommendations
- Action Plan

Sonoran Grant

- LILAC- Local initiative for landscaping and conservation
- Growing Water Smart Technical Assistance Grant with the Sonoran Institute & Lincoln Institute's Babbitt Center for Land & Water Policy
- Contract with University of Northern Colorado to:
 - Host community survey
 - Conduct community workshops
 - Analyze and interpret data
 - Provide recommendations



Greeley's Landscapes



Study Objectives

Obj. 1	Understand current needs and barriers of the community's accessibility of installing water-wise landscapes
Obj. 2	Identify best methods for equitable assistance
Obj. 3	Discover potential ways to lessen mentioned barriers
Obj. 4	Clear steps from community on implementing the LILAC Program
Obj. 5	Collect information to provide a lens for a potentially new concept distinct from other programs

Four Key Findings



Lack of information and outdoor water conservation methods and landscaping information.



The upfront costs associated with landscapes.



Need for personalized assistance, particularly in the form of physical help and services with plant installations and landscaping.



Some individuals faced challenges qualifying for existing City of Greeley program assistance due to specific requirements.

Recommendations

Lack of information and outdoor water conservation methods and landscaping information

Enhance	Explore	Conduct	Develop
Enhance info access with workshops and multilingual digital resources.	Explore automatic enrollment for economically disadvantaged participants in LILAC.	Conduct door-to-door outreach in lower-income areas.	Develop "example yards" to showcase water-wise landscaping benefits.



Recommendations

The upfront costs associated with landscapes.

Offer	Provide	Seek
Offer incentives and financial aid for initial costs.	Provide starter kits to support landscape transformation	Seek grants and funding for lower-income households.



Recommendations

Need for personalized assistance, particularly in the form of physical help and services with plant installations and landscaping.

Provide	Offer	Engage
Provide help with scheduling and labor.	Offer materials in multiple languages.	Engage volunteers and youth for landscaping aid.



Recommendations

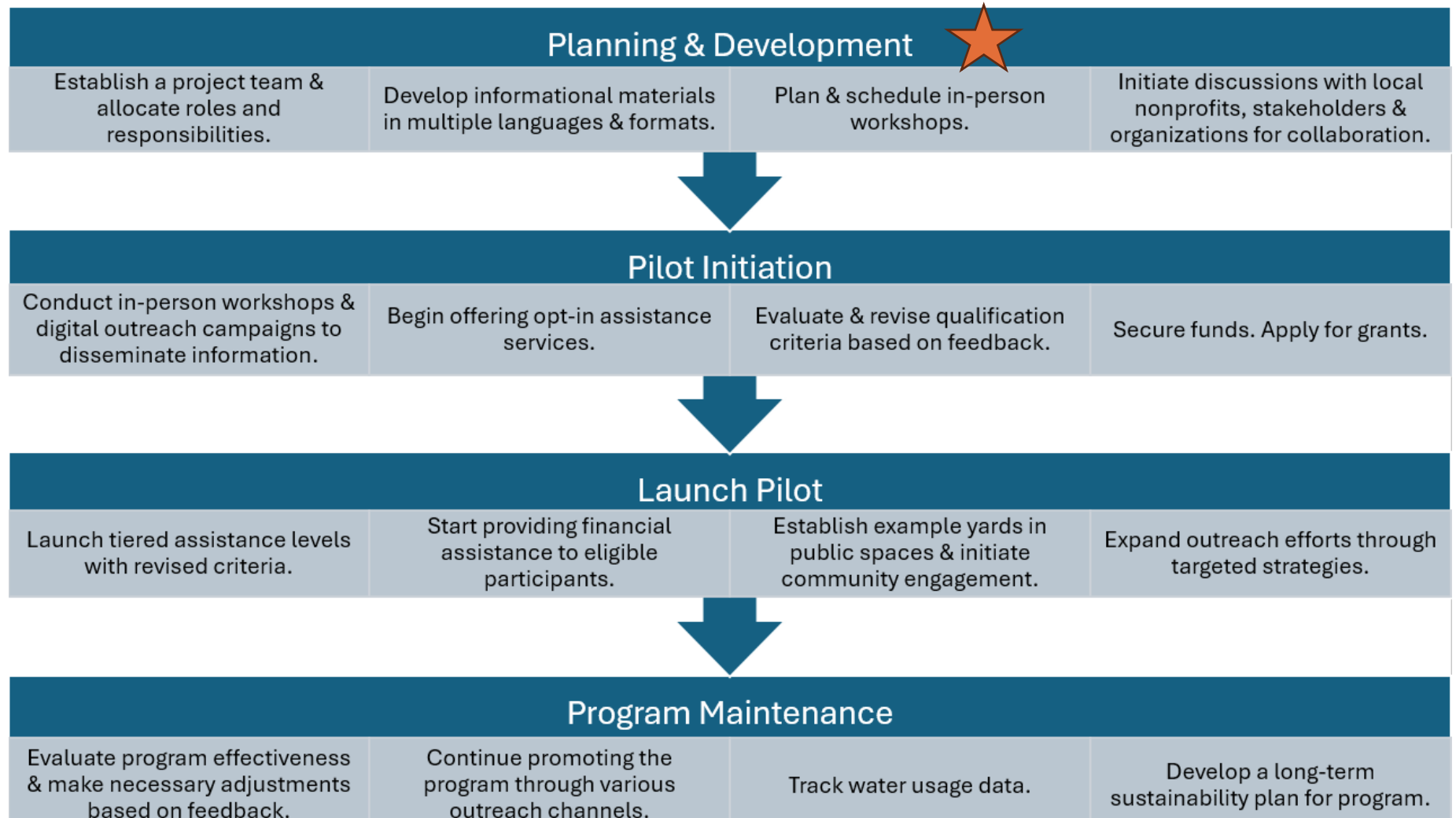
Some individuals faced challenges qualifying for existing City of Greeley program assistance due to specific requirements.

Assess	Implement
Assess qualification criteria to close gaps.	Implement tiered assistance with reduced-cost options for moderate-income groups..





Action Plan



LILAC

Local Initiative for Landscaping and Conservation



**LILAC
PROGRAM**

Local Initiative for
Landscape and
Conservation

- Qualified Greeley residents
- Scan the QR Code
- Answer a questionnaire
- Become more water-efficient

greeleygov.com/LILAC

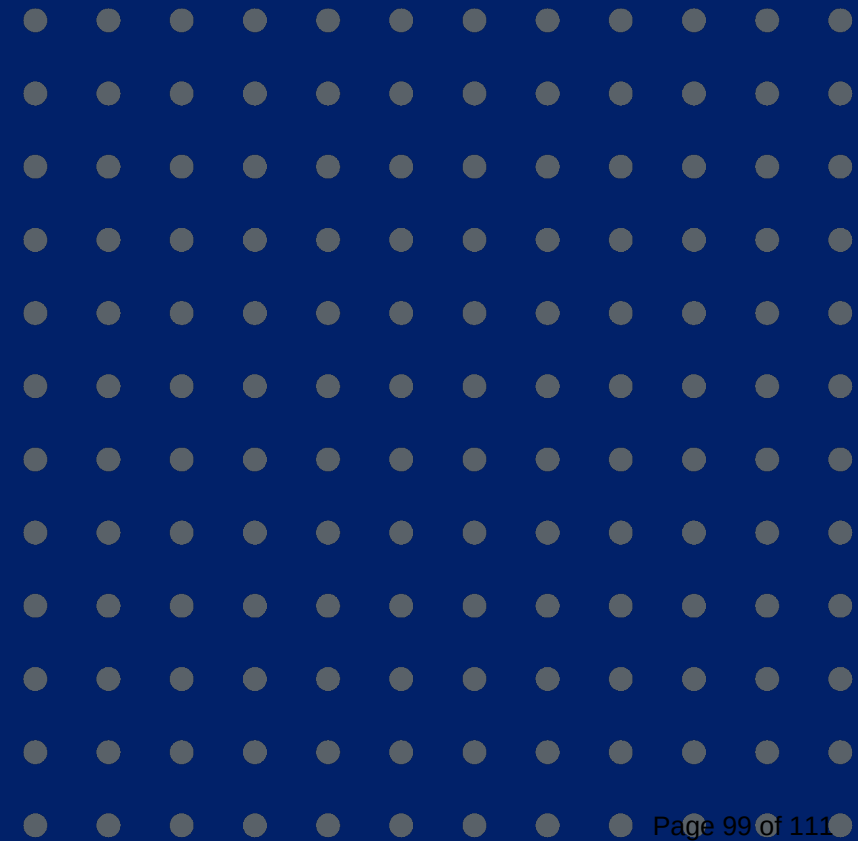
Transform your yard!

iStoc
Credit:

City of Greeley



Thank you





Water & Sewer Agenda Summary

November 20, 2024

Key Staff Contact: Leah Hubbard - Deputy Director of Water Resources

Title:

Legal Report

Summary:

This report has been provided by James M. Noble, outside counsel for the Greeley Water & Sewer Board.

1. Based on review of the September 2024 Water Division 1 Resume, staff and water counsel did not identify any new matters to recommend that the Water and Sewer Board file a statement of opposition by the end of November, 2024.
2. Update on Colorado Supreme Court Case No. 23SA141 – *Parker Water & Sanitation District v. Rein*: Mr. Noble will provide a brief update on Supreme Court Opinion filed on November 4, 2024, affirming the Water Court.

Recommended Action:

Informational Only

Recommended Motion:

None

Attachments:

None



Water & Sewer Agenda Summary

November 20, 2024

Key Staff Contact: Sean Chambers, Water & Sewer Director

Title:

Director's Report

Summary:

The Director will provide Board with a summary of relevant water industry events and provide an update on notable current activities. Update Items include the following:

- Water Industry Education and Advocacy Events
- 2024 Election results that impact water policy and the State Legislature
- Update on Laramie River Neff Lake Pipeline PSA
- 16th Street Enhancement Project Utilities Phase Construction Update
- Poudre Ponds Mining and Poudre River Bank Stabilization and Armament Project Update

Recommended Action:

Informational Only

Recommended Motion:

None

Attachments:

1. CWC-State Joint Election Summary
2. 16th Street Enhancement Project
3. Board Meeting Charts_2024



UPDATED UNOFFICIAL ELECTION SUMMARY

With two or three exceptions which will likely be subject to recount, the partisan balance continues to favor the Democrats despite more than twenty new faces that will be sworn in January 8. Following is a recap of the election results for Colorado races as **of November 9 at 10:52 pm**. Military and overseas voters, alongside those who need to cure their ballot, have until Nov. 13 for their ballots to be counted. Winners will not be officially called until November 27.

Senate Elections. The Senate appears to have maintained its partisan balance with Democrats picking up one GOP seat in SD 12 with the apparent election of Democrat Rep. Mark Snyder (may be subject to recount) and Republicans regaining one seat with election of Scott Bright in SD 13 (replacing term-limited Sen. Kevin Priola). Republicans targeted perceived vulnerability in SD 16 (Arapahoe County), HD 19, and HD 50, and depending on the FINAL vote tally **may have** narrowed the gap and eliminated the Supermajority. However, that leaves the majority party still in control with significantly more than the 33 votes necessary to pass legislation without any Republican assistance. Two other key Senate races on the Western Slope remain in Republican control with former Representative Marc Catlin winning the open SD 5 seat vacated by Sen. Perry Will and incumbent Senator Cleave Simpson retaining his seat in SD 6., denying the Dems their coveted Super Majority. In addition to promoting Catlin to the Senate, seven other House members are moving up to open Senate seats, including Rep. Lisa Frizell (R) elected to SD 2; Rep. Cathy Kipp moving to the seat of former Sen. Joan Ginal, Rep. Lindsey Dougherty taking over from Sen. Rachel Zenzinger; Rep. Mike Weissman moving up to SD 28 previously represented by Sen. Rhonda Fields, and Rep. Judy Amabile filling the seat of held by Sen. Steve Fenberg. Republican Senators Kirkmeyer and Liston were both re-elected as were Democrat Senators Bridges, Coleman, Jaquez Lewis, Kolker, Michaelson Jenet, Buckner and Hansen.

Senate members who did not face elections this year and will return are B Pelton, Hinrichsen, Baisley, Rich, Robers, Lundeen, Exum, Marchman, Butter, Danielson, Mullica, F. Winter, Sullivan, Rodriguez, J Gonzales, and R Pelton. Republican Kevin van Winkle won a spot on the Douglas County Board of Commissioners, so his Senate seat will be filled by a vacancy committee.

House Elections. In the 65-member House, Democrats continue with a clear majority, with both parties generally retaining the seats they held during the 2024 session. However, two races remain very close at **10:52 pm on Nov. 9: HD 16 where Republican Rebecca Keltie now leads incumbent Steph Vigil by a scant 21 votes and HD 19, where former House member Dan Woog pulled ahead of Democrat newcomer Jillaire McMillan by 207 votes**. If both seats were to flip to the Republicans, the Democrat Super Majority would evaporate.

Returning (re-elected) House members include Democrats Bacon, Bird, Boesenecker, Brown, Clifford, Duran, English, Froelich, Garcia, Hamrick, Jodeh, Joseph, Lieder, Lindsey, Lindstedt, Lukens, Mabrey, Marshall, Mauro, Martinez, McCluskie, McCormick, Ricks, Rutinel, Sirota, Story, Titone, Valdez, Velasco, **Vigil?** Willford, Woodrow

Returning (re-elected) to the House are Republicans Representatives: Armagost, Bottoms, Bradfield, Bradley, deGraaf, Hartsook, Luck, Pugliese, Soper, Taggart, Weinberg, T Winter

New Faces. More than 20 new faces will be seen at the Capitol in 2025 as winners of open seats are sworn in:

- Amy Paschal (HD 18 western El Paso County)
- Jillaire McMillan (HD 19) (Weld and Larimer counties) Outcome in question
- Cecelia Espenoza (HD 4 northwest Denver)
- Sean Camacho (HD 6 Central Denver)
- Lindsay Gilchrist (HD 8 northeast Denver)
- Jarvis Caldwell (HD 20 northern El Paso County)
- Lisa Feret (HD 24 northern Jefferson County)
- Rebekah Stewart (HD 30 central Jefferson County)
- Jacqueline Phillips (HD 31 Thornton)
- Michael Carter (HD 36 western Adams County)
- Gretchen Rydin (HD 38 Littleton area)
- Max Brooks (HD 45 Castle Rock area)
- Leslie Smith (HD 49 Boulder area)
- Yara Zokaie (HD 52 Fort Collins)
- Christopher Richardson (HB 56 rural Adams and El Paso counties)
- Larry Don Suckla (HD 58 Montrose area)
- Katie Stewart (HD 59 Durango)
- Lori Sander (HB 65 parts Larimer and Weld counties)
- Carlos Barron (HD 48 southern Weld County)
- Dusty Johnson (HD 63 northeastern Colorado)
- Ryan Gonzalez (HB 50 Greeley area)

The number of new faces could grow if Rebecca Kiltie, and Dan Woog win their tight races. The two Republican challengers are currently in the lead by narrow margins.

Once the newly elected folks begin the Orientation process, set to begin November 18-19, leadership in both House and Senate will face the daunting task of selecting committee chairs and assigning members. Appointments of committee members usually occur in early December after careful review of the relative numbers of each political caucus. Committee membership reflects majority-minority ratios, the backgrounds and strengths of potential committee members, and must also consider the scheduling of each committee. When the respective chambers are not conducting floor work, six or seven committees may be meeting and considering bills simultaneously, so assigning members to committees resemble a Rubik's cube.

Caucuses Elect Leaders. Democrat and Republican caucuses met Nov. 7, 8 and 11 to elect leadership for the upcoming session. Because of the extreme weather on the Front Range, caucus elections were held by zoom. In the House, two Democrats were allowed to vote provisionally because their elections on November 5 are in question. Leadership for the 75th General Assembly is:

Senate Republicans Elected Thursday

Minority Leader: Paul Lundeen (continuing)
Asst. Minority Leader: Cleave Simpson
Minority Caucus Chair: Byron Pelton
Minority Whip: Janice Rich
JBC Member: Barbara Kirkmeyer (continuing)

Senate Democrat Leadership Elected Friday morning

Senate President: James Coleman
President Pro Tempore: Dafna Michaelson Jenet
Majority Leader: Robert Rodriguez (continuing)
Asst. Majority Leader: Sen. Lisa Cutter
Caucus Chair: Dylan Roberts
Majority Whip: Nick Hinrichsen
JBC members: Jeff Bridges (continuing) and Judy Amabile

House Republicans - elected Friday morning

Minority Leader: Rose Pugliese (continuing)
Asst. Minority Leader: Ty Winter (continuing)
Caucus Chair Anthony Hartsook
Minority Whip Ryan Armagost
JBC Members: Rick Taggart

House Democrats Elected Monday

Speaker Julie McCluskie (continuing)
Majority Leader Monica Duran (continuing)
Asst. Majority Leader Jennifer Bacon (continuing)
Majority Co-Whips Matthew Martinez and Iman Jodeh
Caucus Co-Chairs Mandy Lindsey and Junie Joseph
JBC Members (not mentioned but assumed to be Shannon Bird and Emily Sirota continuing)

16th Street Enhancement Project

Nov. 14 Pre-Construction Meeting



The 16th Street Enhancement Project kicks off November 18!

Underground utility replacement construction and canal crossings will run through March. After, we'll begin our transportation work and aesthetic upgrades, which we expect to last into summer.

Save the date!

Join the City of Greeley and Connell Resources for a pre-construction stakeholders meeting Thursday, November 14 at John Galt Coffee to learn more about this first phase of work. We'll have food and drinks, and we look forward to connecting again and answering your questions.

Date: Thursday, November 14

Time: 4-6 p.m.

Location: John Galt Coffee, 709 16th St., Greeley

The future for the 16th Street corridor is bright!

Learn more at speakupgreeley.com/16th-street

Para acceder a los materiales del proyecto en español o solicitar interpretación durante la reunión, envíe un correo electrónico a ce@greeleygov.com.



Water & Sewer Department
1001 11th Ave., 2nd Floor
Greeley, Colorado 80631

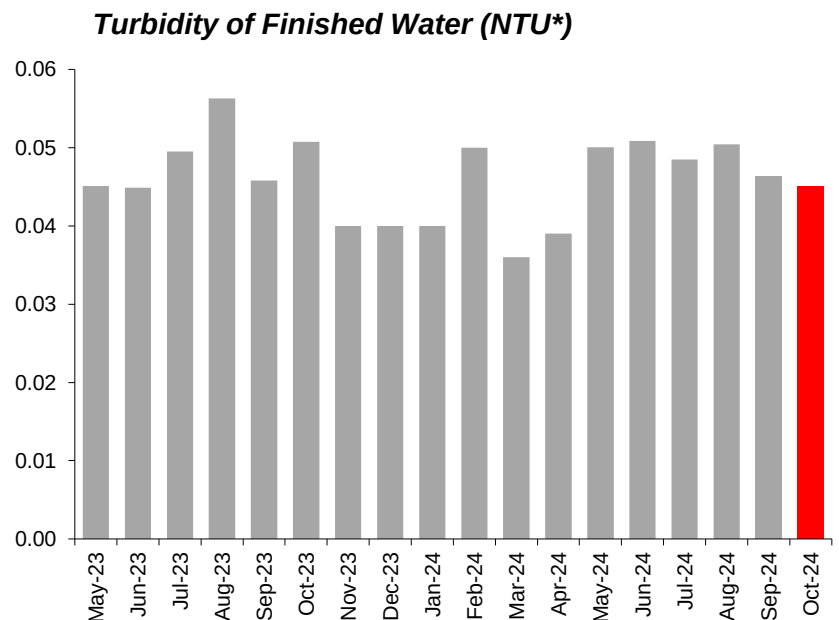
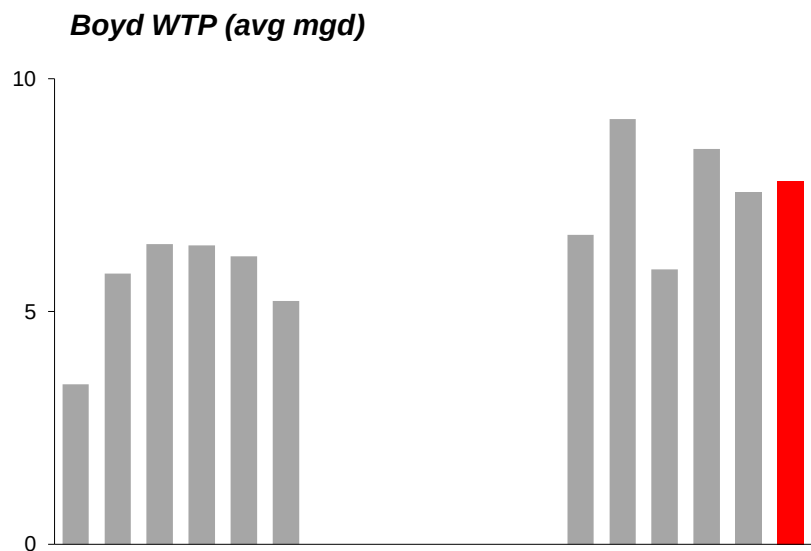
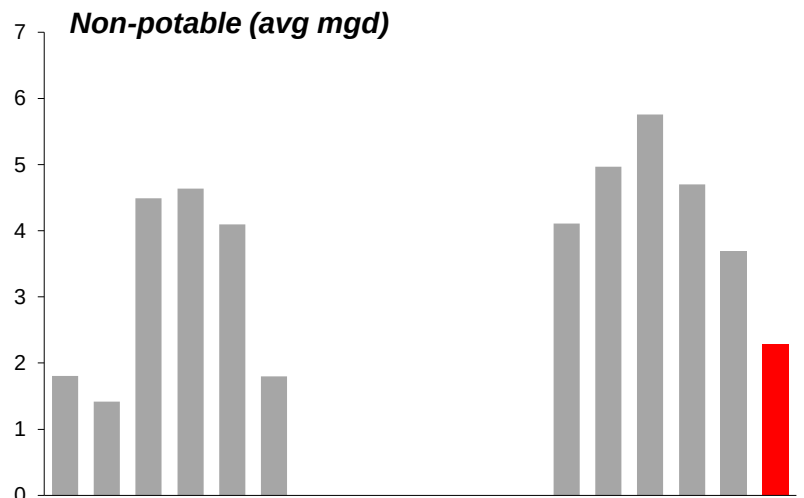
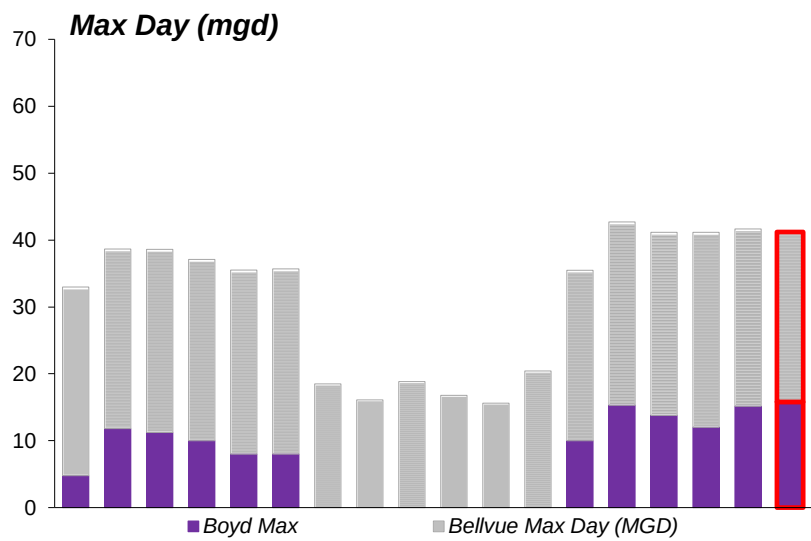


Water Treatment

Bellvue Water Treatment Plant operates year-round with a transmission capacity of 29.1 million gallons per day (mgd) (plant capacity is 32 to 35 mgd). Water sources include Poudre River direct flows, Colorado-Big Thompson (C-BT), Windy Gap, High Mountain Reservoirs, Laramie-Poudre Tunnel, and Water Supply and Storage. Average volume is 19,000 acre-feet a year (2000-2011). The plant was built in 1907, with its last treatment upgrade in 2009. Solar panels were added in 2014.

Boyd Water Treatment Plant operates normally from April to October with a plant capacity of 38 mgd (transmission capacity is 40 mgd). Water sources include Greeley-Loveland Irrigation Company, C-BT, and Windy Gap. Average Volume is 8,200 acre-feet (2000-2011). The current plant was built in 1974, with its last treatment upgrade in 1999. Solar panels were added at Boyd in 2014. In 2016, tube settlers and platte settlers were replaced in the sedimentation basins. In 2018, all old existing chemical lines were replaced with new lines and the piping was up-sized to carry more chemical. A PLC upgrade was done on the SCADA system. Sludge pumps were replaced and hooked into the Trac Vac system that pulls sludge out of the sedimentation basins.

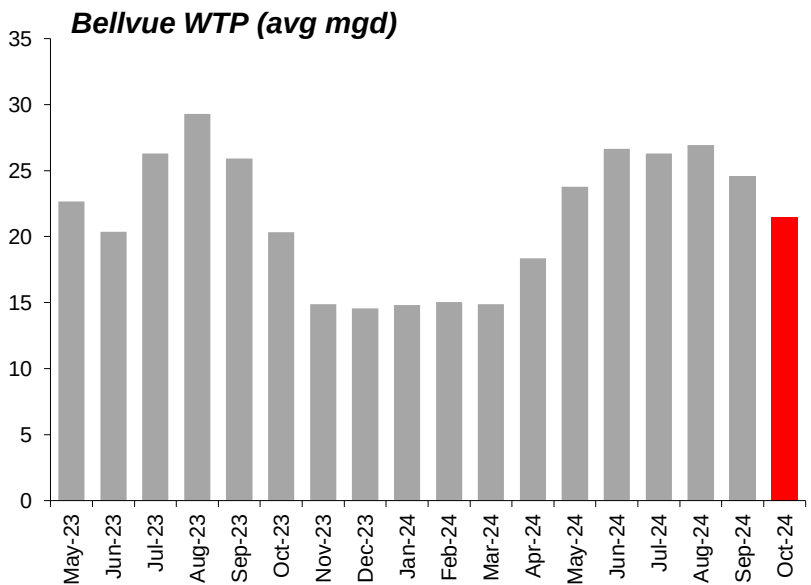
Combined, Bellvue and Boyd can treat a maximum of 70-73 million gallons per day.



Starting May 2016 Bellvue turbidity measurements will use a new method resulting in more accurate readings.

*Turbidity limit: 95% of samples must be below 0.3 NTU.

Turbidity is the measure of relative clarity of a liquid. Clarity is important when producing drinking water for human consumption and in many manufacturing uses. Turbidity is measured in Nephelometric Turbidity Units (NTU).

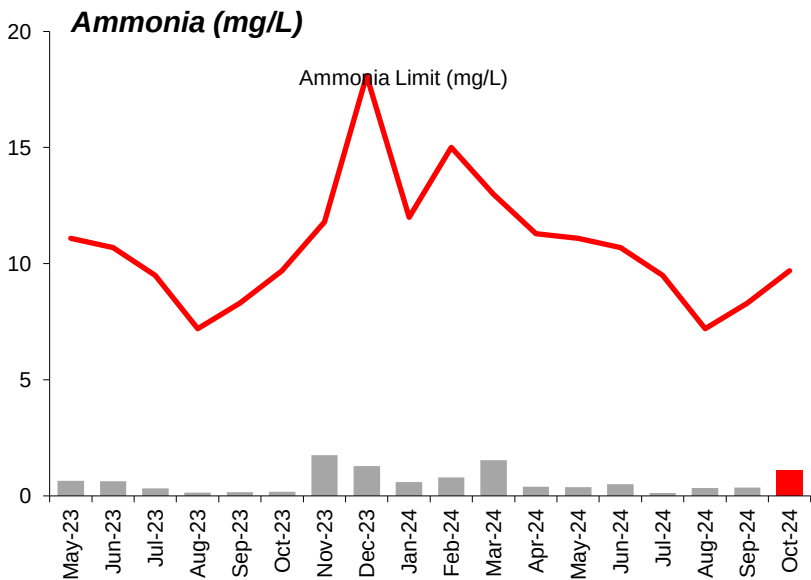
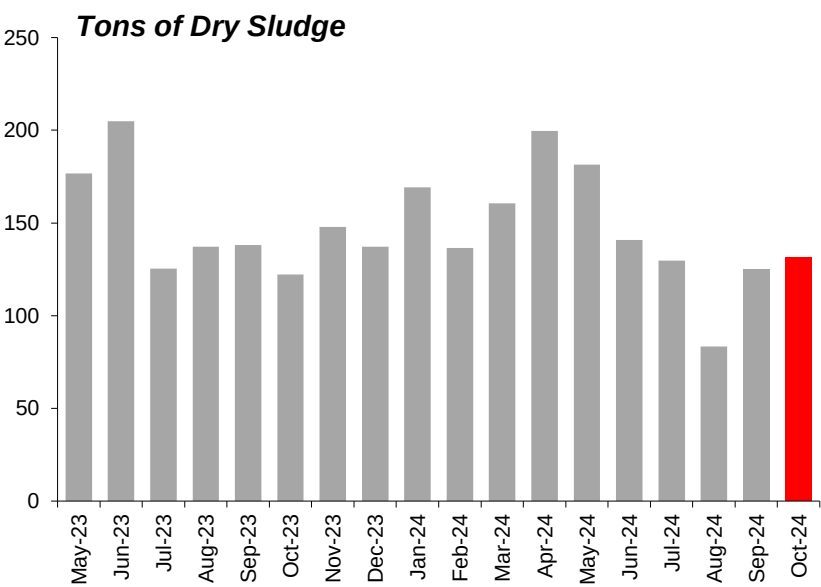
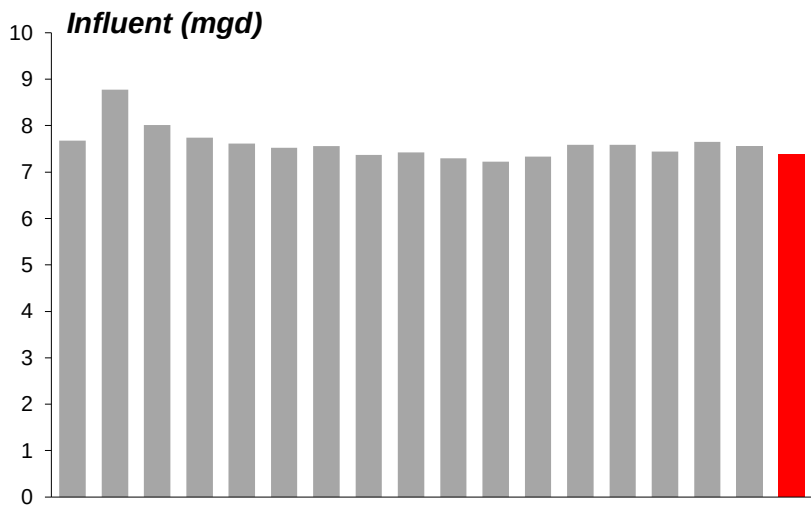
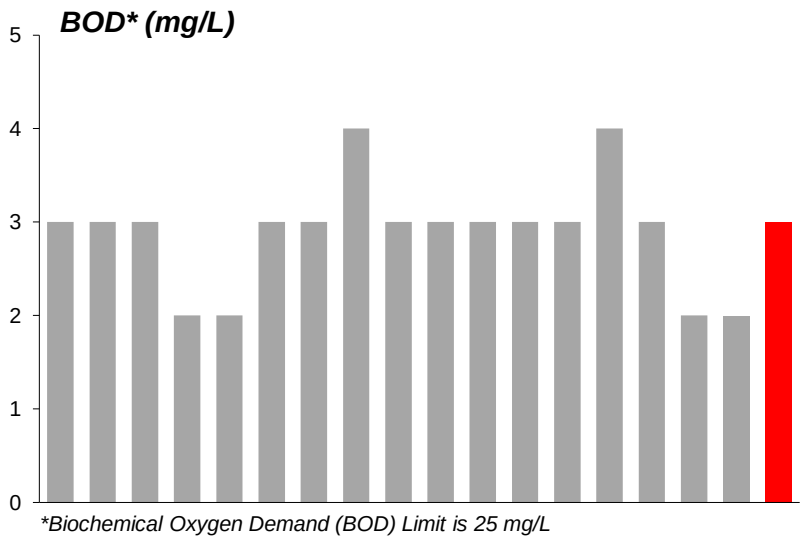
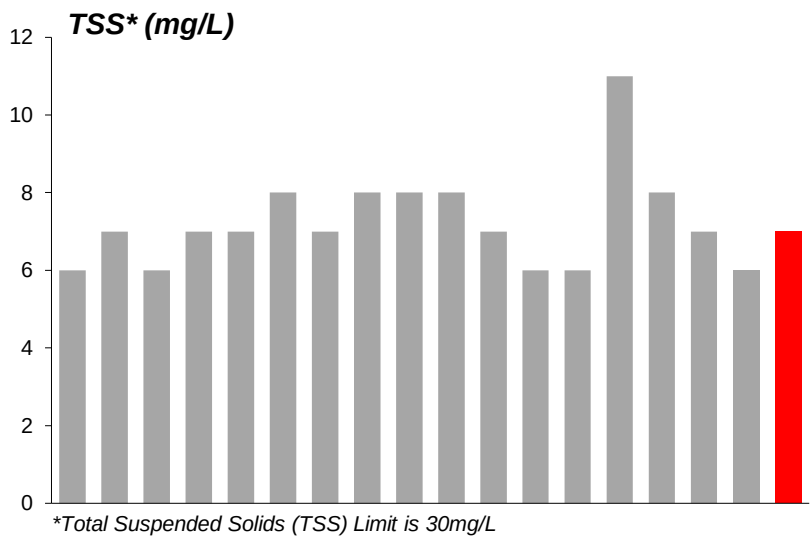


Wastewater Treatment

The Water Pollution Control Facility (WPCF) staff are dedicated environmental professionals who provide quality, safe and cost-effective wastewater treatment services for the citizens of Greeley. The WPCF treats wastewater to meet or exceed Environmental Protection Agency (EPA) and Colorado Department of Public Health & Environment requirements.

In 2011, the WPCF received an Xcel Energy Custom Efficiency Achievement Award for saving 2.78 million kWh and reducing CO2 emissions by 1,584 tons. In 2012, the WPCF received the Rocky Mountain Water Environment Association's (RMWEA) Sustainability Award for Colorado demonstrating excellence in programs that enhanced the principles of sustainability. A Certificate of Achievement from the Colorado Industrial Energy Challenge program managed through the Colorado Energy Office was received in the same year. In 2013, the plant received the City of Greeley's Environmental Stewardship Award for outstanding efforts to reduce energy (watts), conserve energy and water, reduce air and water pollution, and educate and encourage others to be environmental stewards. Also, in 2013, the plant was the recipient of a Bronze Award from the Colorado Environmental Leadership Program. In 2015, after having 5 years without a plant violation, the plant received the 2015 National Association of Clean Water Agencies (NACWA) Platinum Peak Performance award for the City of Greeley Water and Sewer Department.

Note: the red column indicates the current month.



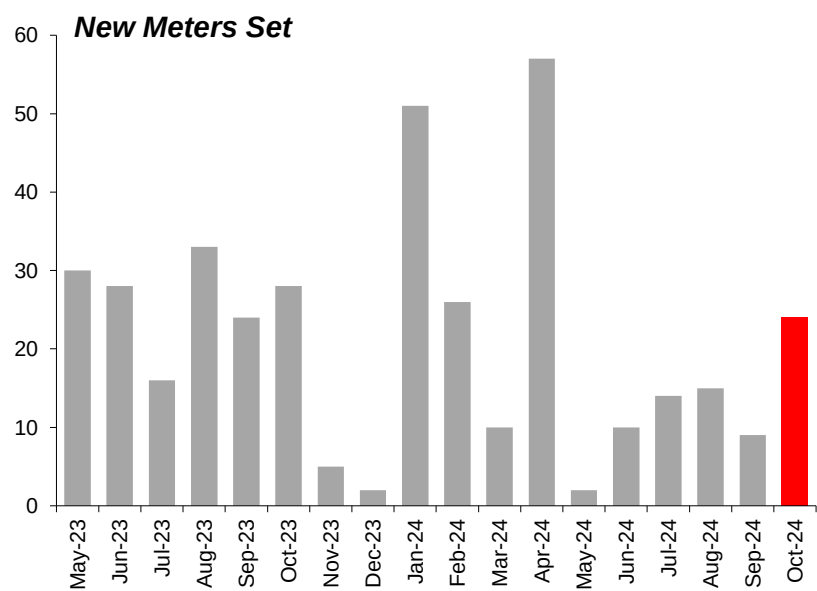
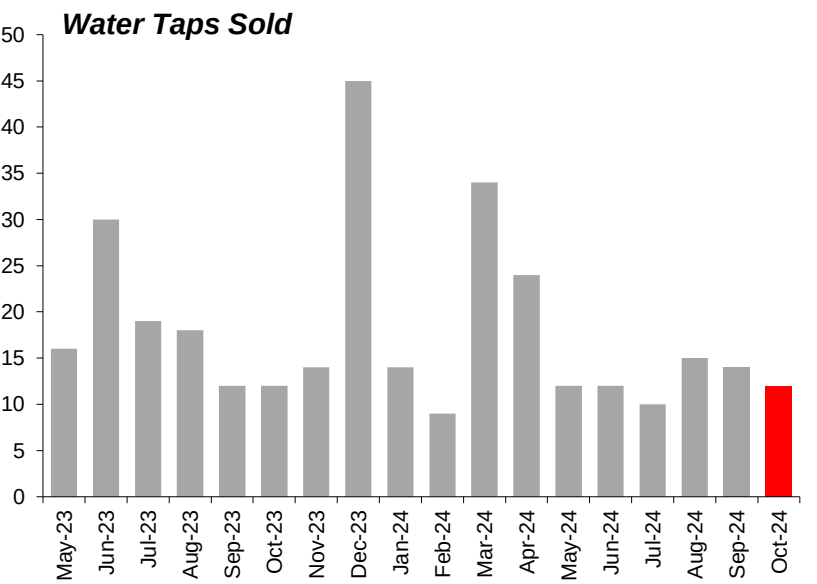
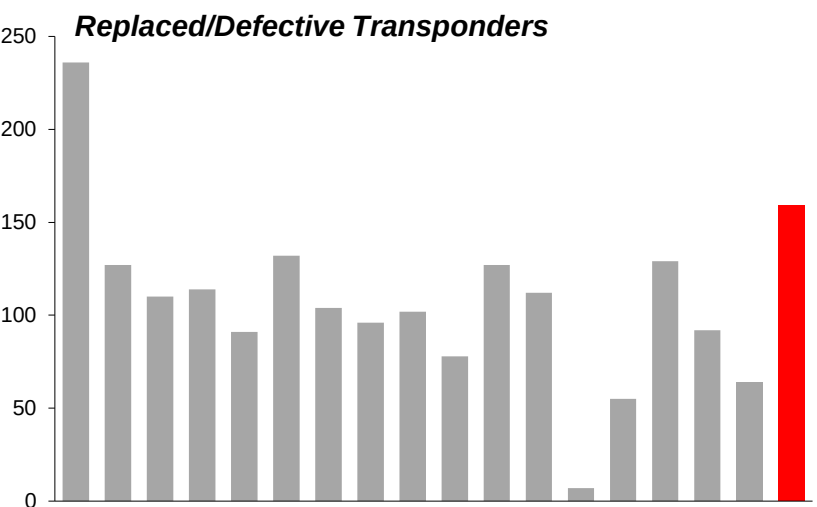
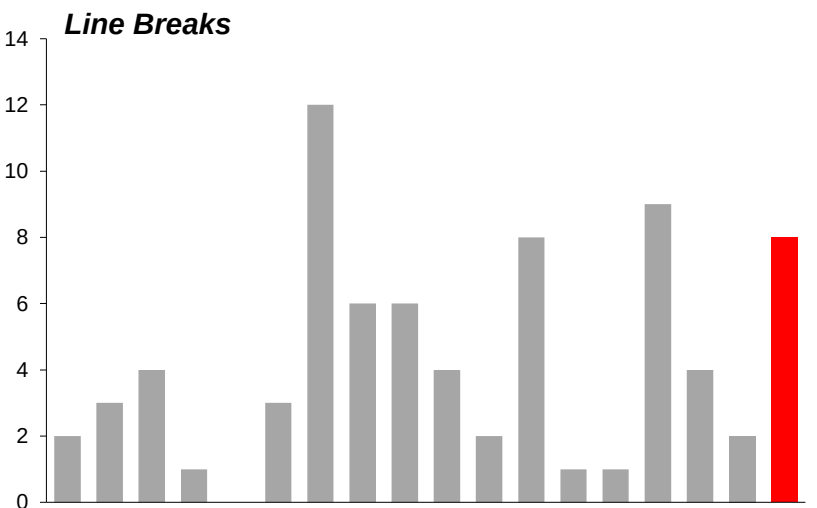
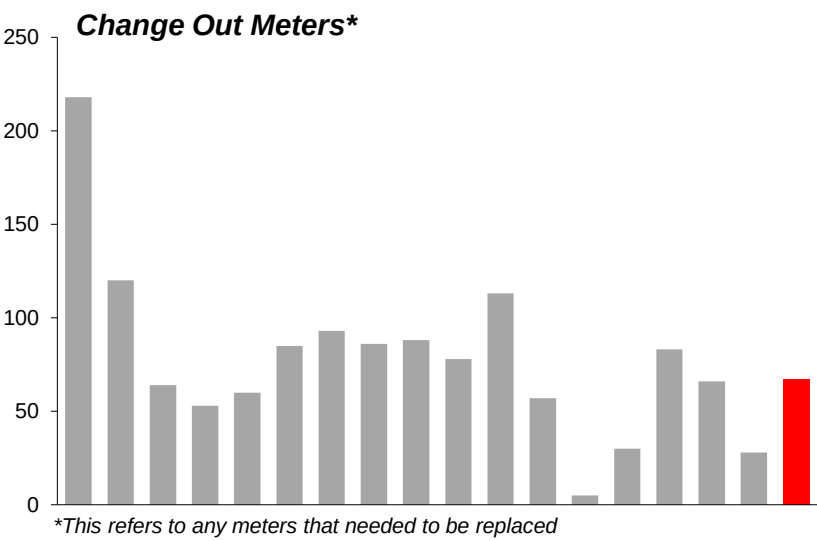
Water Distribution

The Greeley water distribution system consists of various sizes of pipes that generally follow the streets within the City. The distribution system serves residences and businesses in Greeley, Evans and Garden City, and the system is divided into four pressure zones.

There are 69.75 million gallons of potable water storage in Greeley. The water is stored within three covered reservoirs and one elevated tank; 23rd Avenue - 37.5 million gallons, Mosier Hill - 15 million gallons, and Gold Hill - 15 million gallons. The system also has 476 miles of pipeline, 24,233 water meters and 3,378 fire hydrants.

The water pipes in the distribution system vary in size from 4" to 36". Pipe material is steel, ductile iron, cast iron, or polyvinyl chloride. The age of the pipes varies from the 1890's to new installations.

Note: the red column indicates the current month.



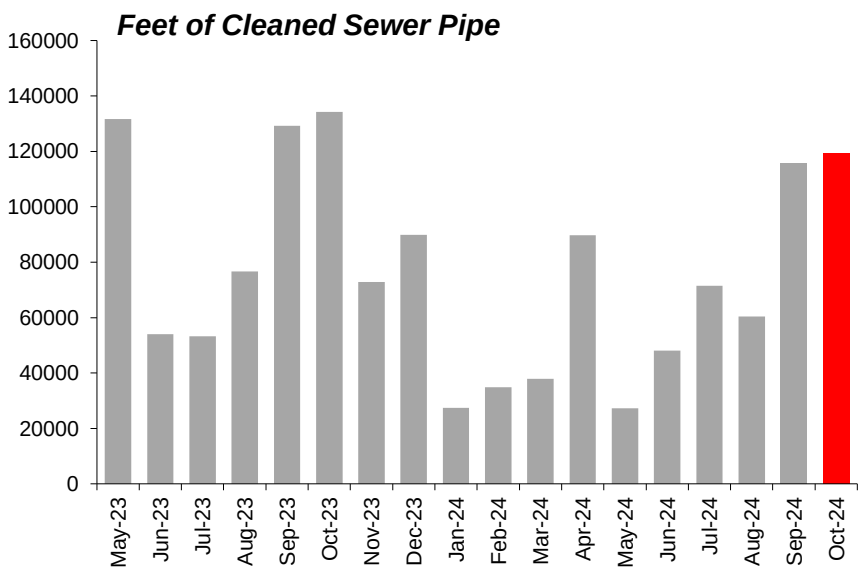
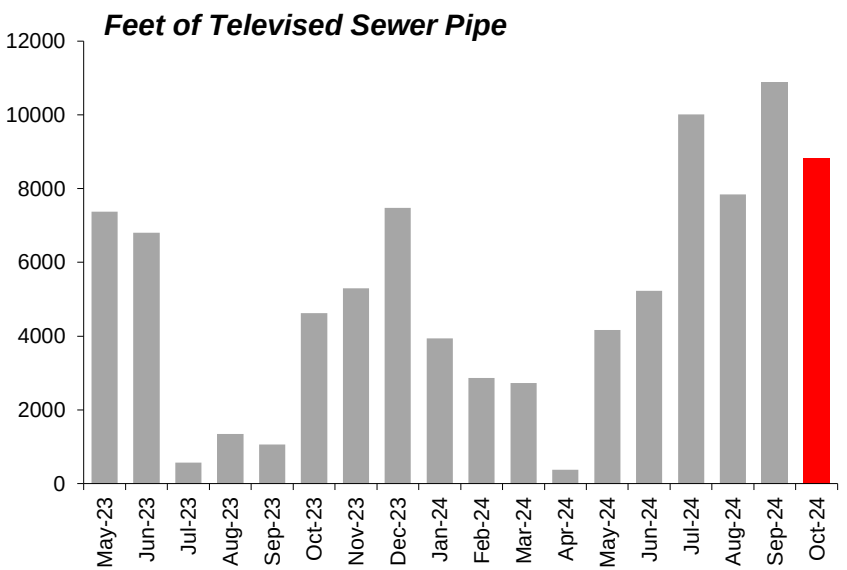
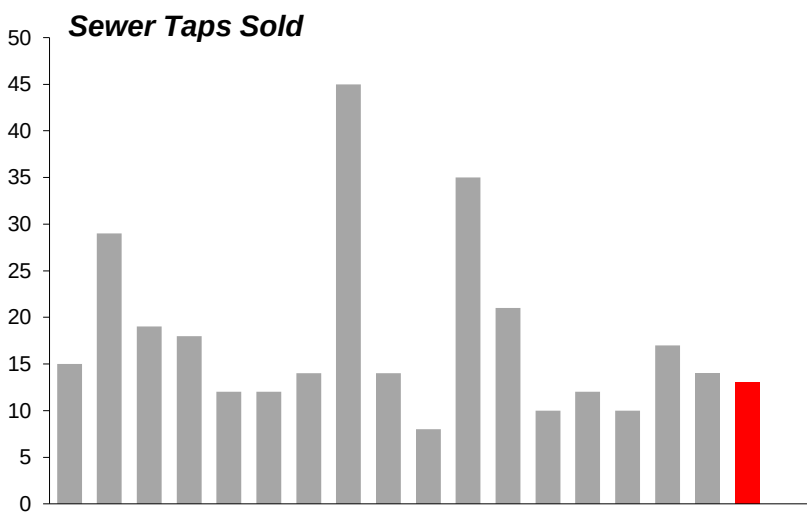
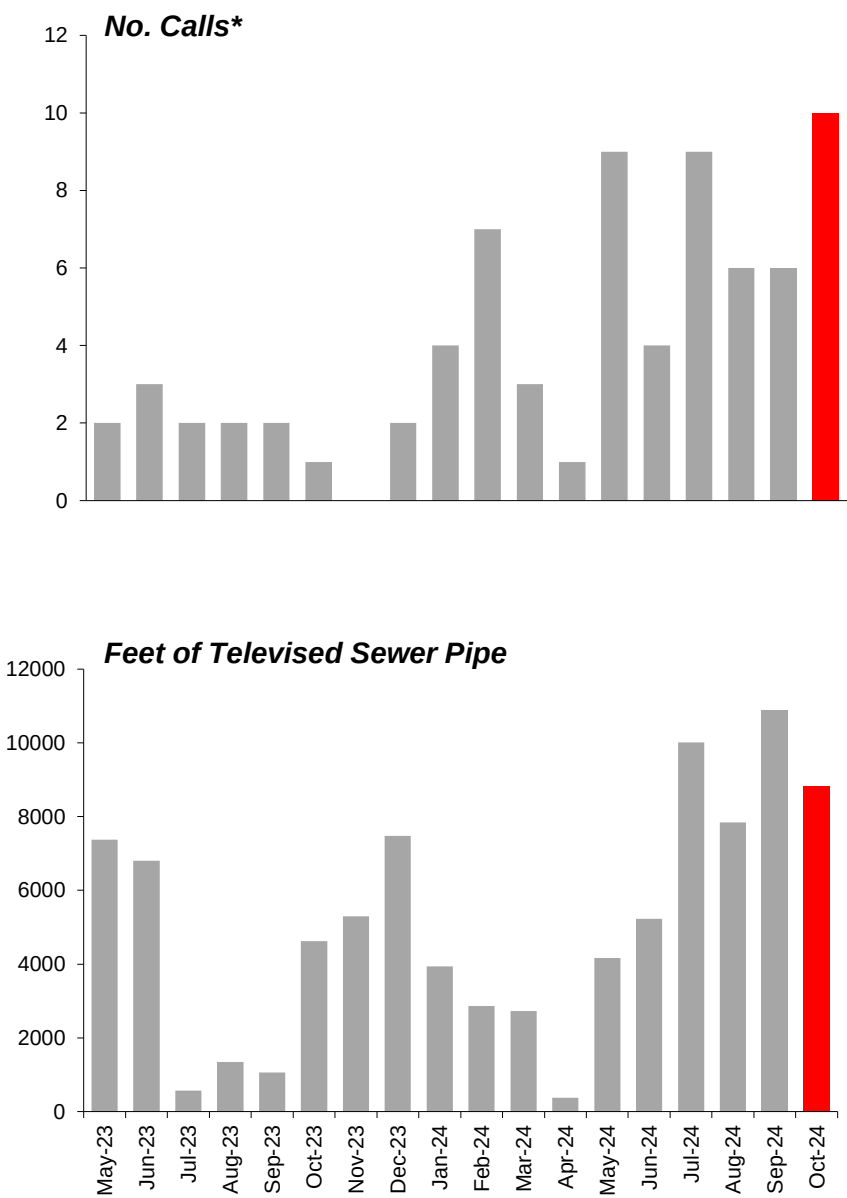
Wastewater Collection

The mission of the Wastewater Collection Division of the Water and Sewer Department is to protect community health by transporting wastewater away from homes and businesses. This includes respecting property values and public safety by reducing the frequency of blockages in the sanitary sewer lines.

A wide variety of work is performed including routine cleaning of sewer lines, inspection of sewer lines, maintenance of the sewage pumping stations, rehabilitation of the system and responding to emergencies.

The wastewater collection system dates back to 1889. At the end of 2017, the system had a total of 364.8 miles of line and 10 sewage pumping stations. The sewer service area is approximately 51 square miles. Over the last 10 years, the system has grown by 17 miles.

Note: the red column indicates the current month.

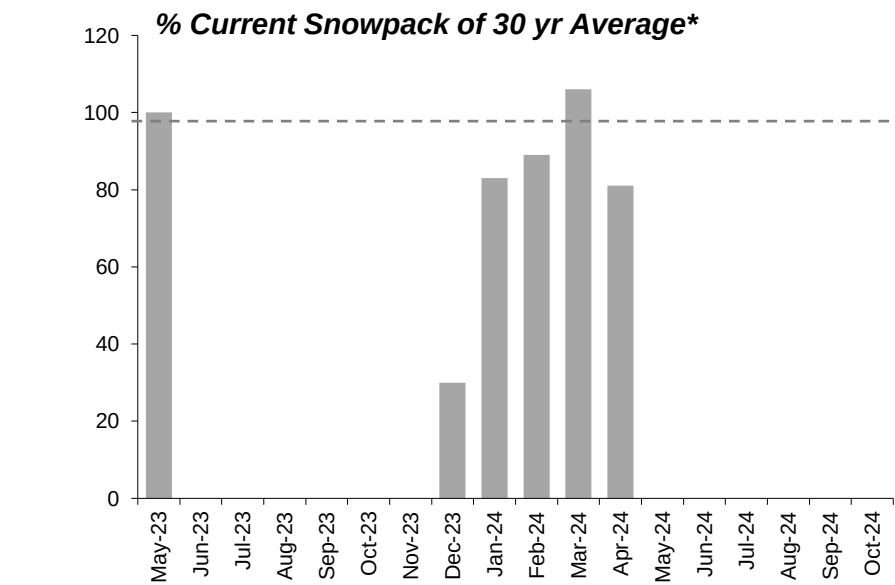
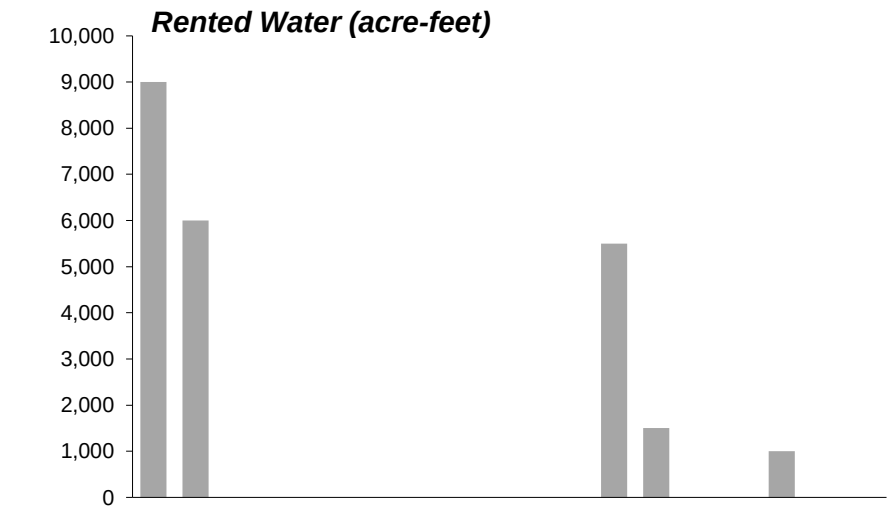
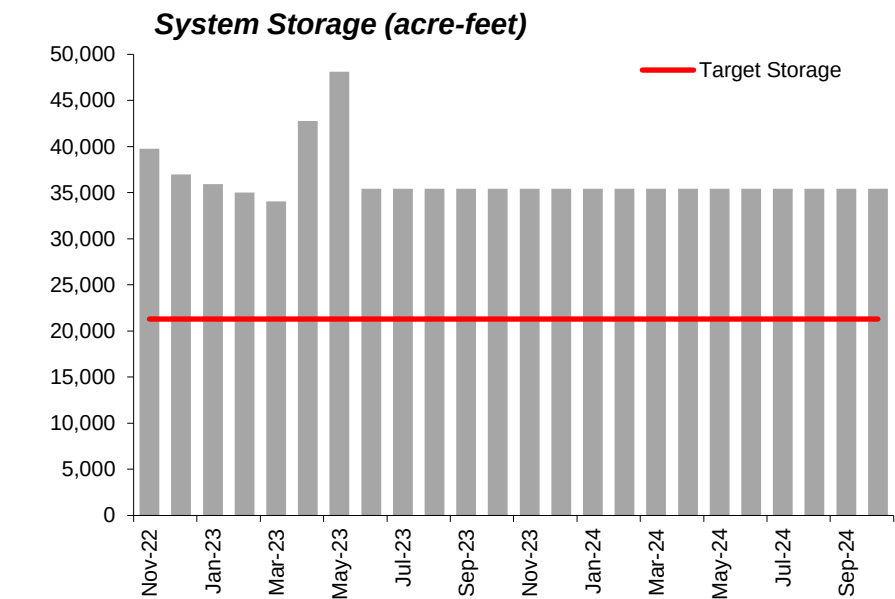


Water Resources

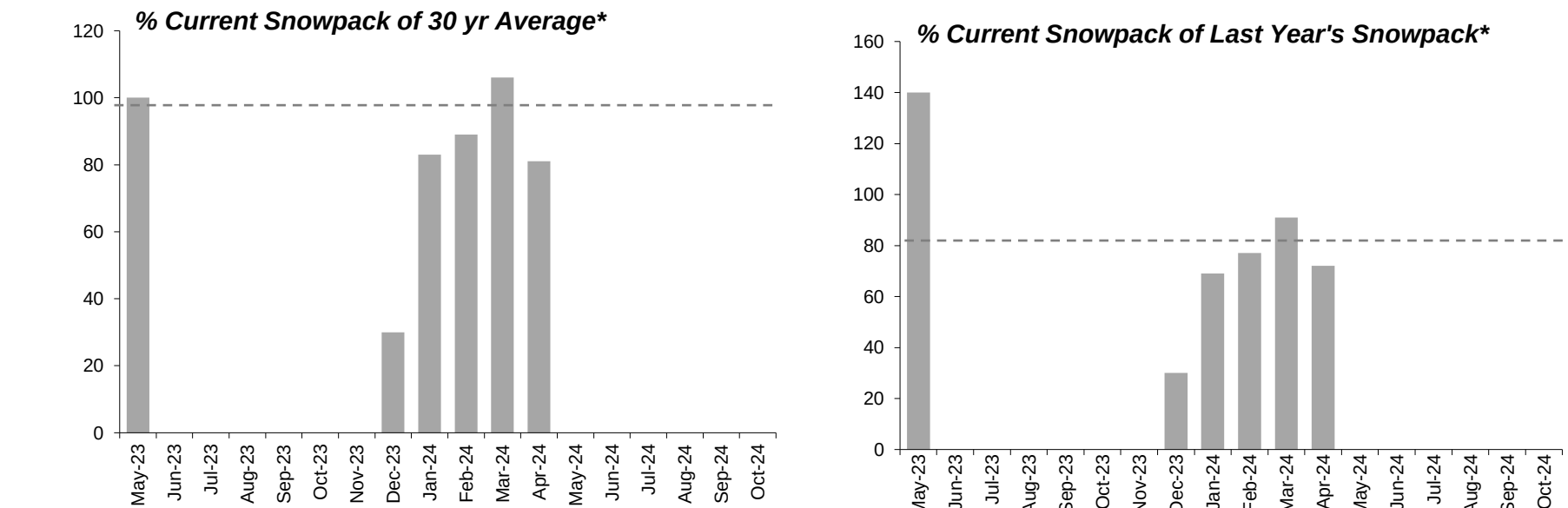
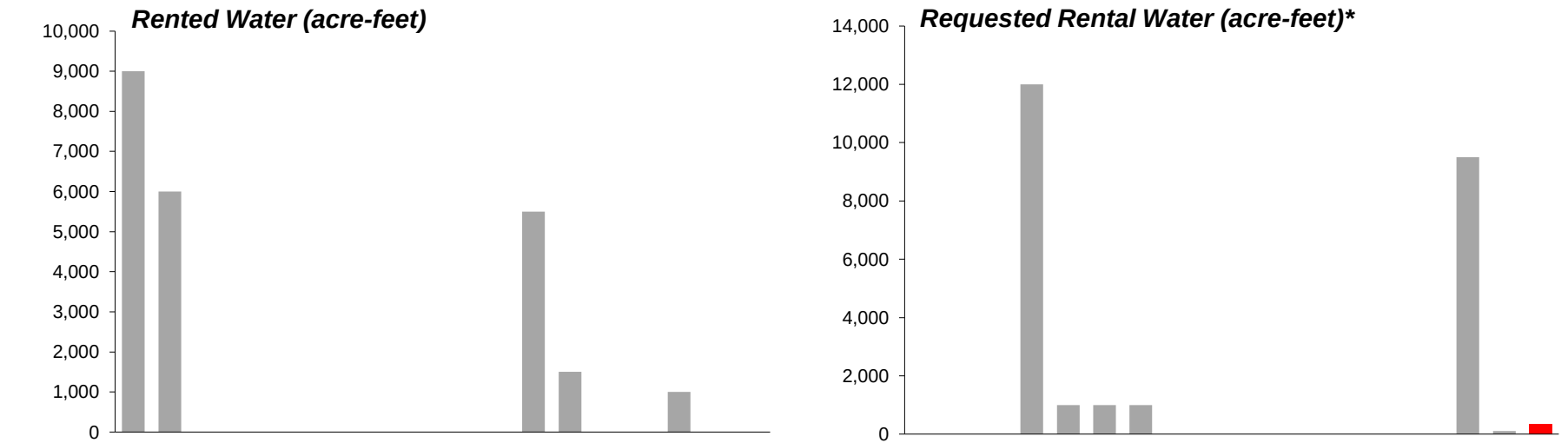
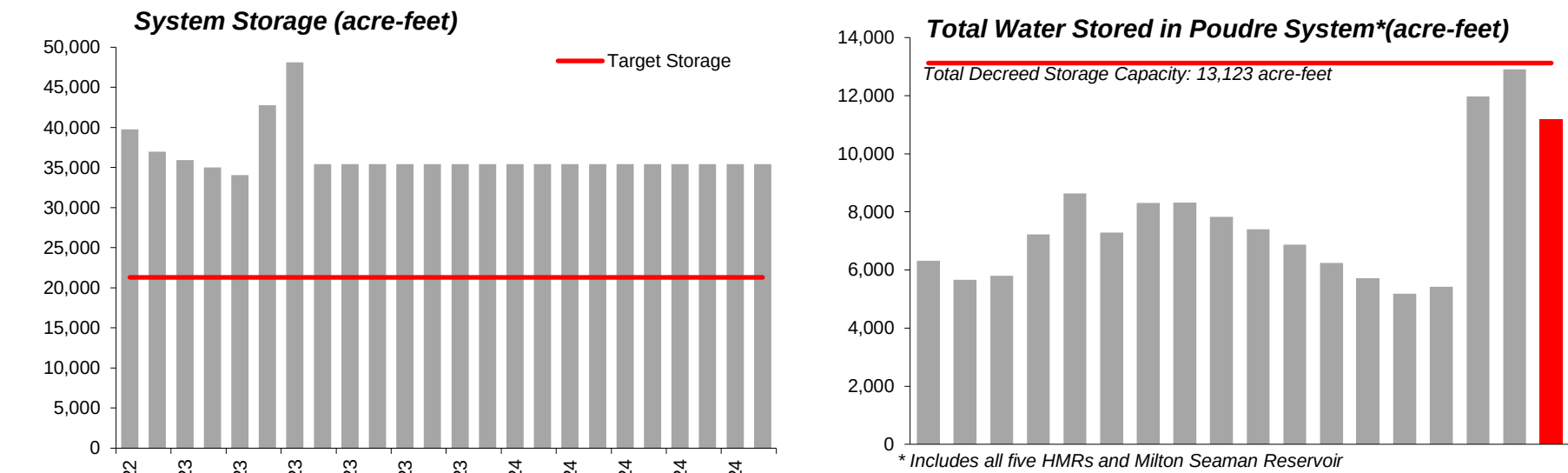
Greeley has numerous water rights in four river basins; the Upper Colorado River, Cache La Poudre, Big Thompson and Laramie River. The Water Resource staff must account for all of this water and comply with the rules of the Colorado Water Court and the State Engineer's Office which is in charge of allocating all of Colorado's water resources. Approximately one-third of the City's water supply comes from agricultural water rights. These water rights must be formally changed to municipal use by a special legal process through the Water Court. In this court, Water Resource staff and attorneys also defend the City's water rights against adverse claims from other parties.

Greeley's goal is to have enough water in carry-over storage to sustain Greeley through a 50-year critical drought. Water in excess of this carry-over drought supply can be leased to agriculture, both for revenue and to support our local agricultural community. Modeling has shown that, given existing population and demand factors, Greeley will have sufficient water for citizens, if at the beginning of the 6-year long, 50-year critical drought, there is 20,000 acre-feet in storage on April 1st of the following year.

Note: the red column indicates the current month.



*Data is from the 1st of the month
**Average of Deadman Hill and Joe Wright



*Data is from the 1st of the month
**Average of Deadman Hill and Joe Wright

Treated Water and Weather Data

January was a cold month with an aveage temperature of 24.63°F. Temperatures warmed up in February with an average temperature of 34.52°F. The average teperature was 40.38°F in March and 49.62°F in April. May signaled the start of summer with an average temperature of 57.27°F. June tracked slightly higher than average at 71.6°F. July temperatures were seasonably average at 73.3°F. Temperatures in August were slightly above average, but slightly cooler than July. Temperatures in September were well above average with an average temperature of 66.19°F compared to the historic aveage of 61.7°F. Temperatures continued to remain about five degrees above average in October, with an average daily temperature of 53.5°F.

Greeley received 0.35 inches of precipitation in January. A big snow storm brought 2.03 inches of precipitation in February. Greeley received 1.5 inches of precipitation in March and 1.6 inches in April. May brought less precipitation than expected, with 1.07 inches for the month. June precip was just below average, but kept the total precip above average. July was dry and only produced 0.58 inches of precipitation. There were 1.53 inches of precipitation in August, which is slightly below average. September precipitation was also slightly below average at 1.3 inches with cumulative precipitation just over 1 inch lower than the historic average. October saw the lowest precipitation o the year so far at just 0.32 inches, well below the historic average of 1.09 inches, leaving culmulative annual precipitation nearly two inches below average.

