



**Cherry Creek Basin Water Quality Authority
Technical Advisory Committee Meeting Agenda
Thursday, November 3, 2022, 9:00 a.m.**

**In-Person: SEMSWA
7437 S. Fairplay St.
Centennial, CO 80112**

**Virtual: Zoom¹
<https://zoom.us/j/3039689098> Passcode: CCBWQA
Phone (669)900-6833 Mtg ID 3039689098# Passcode: 542117**

TAC Meeting Documents can be found online at the link below.

<https://drive.google.com/drive/folders/12BoEhmFbnnMCxivnpjY2l7T5TzP8Azlq?usp=sharing>

1. Call to Order
2. Meeting Minutes from October 6, 2022 (enclosed)
3. Discussion and Action Items
 - a. TAC Appointments and Recommendations for 2023 (James, enclosed)
 - b. Site Specific Standards Scope and Memo (Clary, enclosed)
 - c. 2022 Annual PRF/PAP Observation and Maintenance Report (Borchardt, enclosed)*
 - d. 2023-2032 Capital Improvement Program (Borchardt, enclosed)
 - e. Lake Nutrients Criteria RMH (DiToro, enclosed)
 - i. Hydros Memo (enclosed)
 - f. Watershed Modeling (Clary, enclosed)*
4. Discussion Items
 - a. TAC Chairman and Vice Chairman Positions (James)
5. Presentations
6. Updates
 - a. Cherry Creek Stewardship Partners (Davenhill)
 - b. TAC Members
 - c. TAC Subcommittees
 - d. Contractors
 - i. [Water Quality Update](#) (Stewart, enclosed)
 - ii. Pollution Abatement Projects (Borchardt)
 - a. LUR Monthly Summary
 - b. CIP, Maintenance, and Operations Status Report
 - iii. Regulatory (DiToro)
 - e. Manager
 - f. Other
7. Upcoming Events
8. Adjournment

[CCBWQA Workplan](#)

¹ If you are unable to participate on the CCBWQA's Zoom platform, please email val.endyk@ccbwwa.org



**Cherry Creek Basin Water Quality Authority
Minutes of the Technical Advisory Committee Meeting
Thursday, October 6, 2022, 9:00 a.m.**

TAC Members Present

Ann Woods, City of Greenwood Village (zoom)
Ashley Byerley, SEMSWA
Casey Davenhill, Board Appointee, Cherry Creek Stewardship Partners
Jacob James, TAC Chairman, City of Lone Tree
Jeremiah Unger, CDOT
Jim Watt, Mile High Flood District (zoom)
Jon Erickson, TAC Vice Chairman, Board Appointee, Colorado Parks and Wildlife (zoom)
Lisa Knerr, Arapahoe County (zoom)
Rebecca Tejada, Special Districts, Parker Water and Sanitation District (zoom)
Rick Goncalves, Board Appointee
Ryan Adrian, Douglas County (zoom)
Sherry Scaggiari, City of Aurora (zoom)

Board Members Present

Bill Ruzzo, Governor's Appointee (zoom)
Tom Downing, Governor's Appointee

Others Present

Alan Leak, RESPEC
Erin Stewart, LRE Water
James Linden, SEMSWA
Jane Clary, Wright Water Engineers, CCBWQA Technical Manager
Jessica DiToro, LRE Water
Richard Borchardt, R2R Engineers
Val Endyk, CCBWQA

1. Call to Order

Jacob James called the meeting to order at 9:00 am.

2. Meeting Minutes from September 1, 2022

Ashley Byerley moved to approve the September 1, 2022 minutes. Seconded by Jon Erickson. The motion carried.

3. Discussion and Action Items

a. 2023 Sampling and Analysis Plan Update

Erin Stewart explained that the CCBWQA Sampling and Analysis Plan/ Quality Assurance Plan is updated on an as-needed basis to account for changes to the monitoring program based on regulatory support, modeling inputs, or other technical information needed. Suggested revisions and updates to the SAP/QAPP for 2023 have been summarized in the [memo](#) included in the packet and a redlined version has been provided to the technical

manager for review and approval. The redlined document can be found [here](#) if members of the TAC would like to provide feedback. Most of the changes are minor, providing clarification of the sampling program methodology or analysis parameters. The only substantive change is the addition of soil sampling to evaluate the water quality benefit of stream improvement projects and the effectiveness of phosphorus removal from PRF ponds.

Ryan Adrian moved to accept suggested changes to 2023 SAP/QAPP and provide a recommendation to send the updated document to the CCBWQA Board of Directors for final approval. Seconded by Lisa Knerr. The motion carried.

b. IGA Amendment for Cherry Creek upstream of Scott Road

Rich Borchardt presented the Cherry Creek upstream of Scott Road IGA Amendment for stream improvements on Cherry Creek. This project benefits water quality in Cherry Creek and Cherry Creek Reservoir by reducing bed and bank erosion and immobilizing phosphorus in the adjacent soils.

No funding is required from CCBWQA for this IGA Amendment.

Ryan Adrian moved that the TAC recommend that the Board authorize CCBWQA to execute the IGA Amendment with no expenditure. Seconded by Jeremiah Unger. The motion carried.

c. IGA Amendment for Happy Canyon Creek near I-25

Rich Borchardt presented the Happy Canyon Creek Stream Reclamation near I-25 IGA Amendment for stream improvements on Happy Canyon Creek. This project benefits water quality in Happy Canyon Creek and Cherry Creek Reservoir by reducing bed and bank erosion and immobilizing phosphorus in the adjacent soils.

No funding is required from CCBWQA for this IGA Amendment.

Jacob James moved that the TAC recommend that the Board authorize CCBWQA to execute the IGA Amendment with no expenditure. Seconded by Rick Goncalves. The motion carried.

d. IGA Amendment for Cherry Creek at Arapahoe Road

Rich Borchardt presented the Cherry Creek Stream Reclamation at Arapahoe Road IGA Amendment for stream improvements on Cherry Creek. This project benefits water quality in Cherry Creek and Cherry Creek Reservoir by reducing bed and bank erosion and immobilizing phosphorus in the adjacent soils.

This project is within CCBWQA's 2022 budget. The current funding level for the project is \$245,000 which includes previous contributions of \$25,000 from CCBWQA. The TAC and Board have previously authorized an expenditure of \$180,000 for this project; however, Aurora lowered their funding level. To meet CCBWQA's 25% participation level on partner projects, CCBWQA's funding is now at \$145,000. The IGA Amendment, which is still under review by CCBWQA's attorney, includes revised additional funding of \$470,000 (\$145,000 CCBWQA; \$50,000 Aurora; \$50,000 SEMSWA, and \$225,000 MHFD) and a transfer of \$288,828.30 (the remaining balance from the previous project on Cherry Creek near the soccer fields) for a combined total of \$758,828.30. The total current project costs are estimated at \$1,003,828.30 from the IGA Amendment. The project partners are still working on their Capital Improvement Programs and the full funding of this project.

Discussion included:

- Project required an easement from the Country Club.
- Budget includes some funding for property purchase but does not appear that there is time prior to this project.

Rick Goncalves moved that the TAC recommend that the Board authorize CCBWQA to execute the revised IGA Amendment, a revised expenditure of \$145,000, the transfer of the remaining balance from the previous project, and subject to final language as approved by CCBWQA's attorney. Seconded by Ashley Byerly. The motion carried.

4. Discussion Items

a. CCBWQA 2023 Draft Budget

Bill Ruzzo presented the CCBWQA [2023 draft budget](#) to the TAC. An overview of the three funds was provided: Enterprise Fund, Pollution Abatement Project Fund, and the General Fund.

Discussion included:

- Oversight of all PAP projects is included in Administrative costs since it is difficult to break out costs to specific projects.
- This is a working document and has been updated to include notes on changes and details of line items.
- The draft provided to the Board may be further revised before presentation to the Board.
- Land use referrals are included in the General Fund and have been added as a separate line item but will only be provided on an as-needed basis. An acknowledgement response will be provided for land use referrals, but CCBWQA will rely on the local governments to provide review. If local agencies require additional review, requests will be provided to the administrative and technical manager for additional review and comment.
- Regulatory Support from WWE and LRE scopes has been recategorized into a separate line item for the 2023 budget. The goal of this change was to allow for easier tracking of regulatory costs in the future. LRE's Regulatory Support budget for 2023 includes all anticipated 2023 RMH support (not just the Lake Nutrients Criteria RMH) along with regulatory stakeholder workgroups. The Regulatory line item also includes a conservative estimate of the cost to develop a Site Specific Standard (including technical analysis by Hydros) and associated legal fees to participate in the 2025 Rulemaking Hearing. The full cost is shown as a 2023 expense; however, a portion of the cost may be spread over several years.
- Watershed Master Plan has been added into budget - 2023 will include a scoping effort but major lift will likely occur in 2024. Contingency fund included to account for more in depth work if time allows.
- Update on WQ fee included in State Park passes (Recreation fees) follow up with CPW Commission. Proposed an assessment of the fund changes at the end of the year, when CCBWQA would agree upon fund transfer with CPW.
- Wastewater surcharges have also shown changes and should be looked into.

b. 2022 Capital Improvement Program

Rich Borchardt presented an overview of the [10 Year CIP](#) which includes details on the next 3 years. Projects are categorized into reservoir, stream reclamation, preservation, and operations and maintenance projects. Draft budget will go to the Board in October and the final draft will be provided to the TAC in November.

Discussion included:

- RDS system update moved to 2024 to allow for final updates on Watershed Model to be completed before direction is determined. However, the system is aging and should be considered in near future to avoid expenses involving costly repairs when system replacement or upgrade may be more cost-effective.
- Reservoir Nutrient Mitigation feasibility analysis has also been moved to 2024.
 - PAP considerations and qualifications towards 60%.
- East Shade Shelters and Tower Loop design is underway. Construction for East Shade Shelters is scheduled for 2023 and Tower loop the following year.
- Some projects still need funding to be finalized.
- Many stream reclamation projects planned in the long term CIP, but projects in the 2-3 year window have been detailed.
- Lone Tree Creek in Cherry Creek State Park is shown in 2032 based on CCBWQA's prioritization or in 2022 as a partner project with Centennial.
- Happy Canyon at Jordan Rd - Funding to keep the project going.
- Dove Creek Upstream of Pond D-1 to Chambers - Broken out into two phases - working with SEMSWA to keep it moving forward.
- Piney Creek Reach 1 to 2 (SEMSWA) - Additional funding to carry out the project.

- O&M pieces - What is done on an annual basis to keep things running, small category of work done on PRFs (operations = continued operations by CCBWQA, i.e., weather station and destratification system).
- Annual inspection of PRFs - will be used to populate this section of the CIP - In progress.
- Inflation effects on projects was discussed. When a project is conceptualized, rough cost estimates are based on other projects of similar linear feet. During design and through field investigations, project costs are updated and re-budgeted as needed. Adjustments for inflation are not included in the current budget. Costs are refined at the design cost stage.

c. Broader Scope CR72 RMH

Jessica DiToro gave an update on the Broader Scope CR72 RMH efforts. In October, the TAC recommended that the Board move to not be the proponent at the 2023 CR72 RMH (unless currently unforeseen issues are identified through coordination with the WQCD between now and the date of the informational hearing). The recommendation also included language specifying that CCBWQA would obtain party status at the RMH to allow participation. In October, the Board moved in support of the TAC's recommendation. The Board also stated that the letter that staff will draft for the CR72 Informational Hearing (April 10, 2023) will be reviewed and approved by the TAC and Board before it is submitted to the WQCC in early 2023.

d. Lake Nutrients Criteria RMH

Jessica DiToro presented a [memo](#) on the Lakes and Reservoirs Nutrients Criteria RMH which included background information describing two motions by others to delay the hearing presented to the WQCC. Jessica explained that the WQCC released an order in response to the two motions on September 8th that the RMH be rescheduled for April 10, 2023. The new schedule of events related to the RMH was provided by the WQCC on September 19th and can be found in Jessica's memo.

CCBWQA provided a corrected dataset to the WQCD in August. Staff anticipates that the updated data model and the associated adjusted criteria will be the focus of the changes to the WQCD's supplemental PPHS.

CCBWQA Staff will continue to update the TAC and Board and will bring recommendations to the November TAC meeting if appropriate.

Discussion included:

- Proposed nutrient criteria increased slightly in the WQCD's supplemental PPHS (released October 6th) but does not likely change our position (TN increased from 600 ug/L to 610 ug/L and TP increased from 36 ug/L to 40 ug/L). Staff anticipates that the CCBWQA's request will remain for a delayed effective date to allow time for development of a site specific standard.

e. Site Specific Standards Budget Estimate (Clary)

Jane Clary provided an update on the cost estimates in order to develop a site specific standard. The estimated proposed costs for Hydros and DGS are included in the 2023 budget. In addition, as discussed with the 2023 budget, the new line items included reallocations of WWE's and LRE's scope to provide support for these activities.

5. Presentations

6. Updates

a. Cherry Creek Stewardship Partners (Davenhill)

Casey provided an update on the success of the Cherry Creek Watershed Conference. Thanks to SEMSWA for hosting the event and to all the speakers and attendees. Annual Report to come.

b. TAC Members

Lisa Knerr - SPLASH is having two rain barrel building sessions on October 21st and 28th.

Jacob James - Prepare for discussion of the TAC chair and vice-chair positions at the November TAC meeting.

c. TAC Subcommittees

d. Contractors

i. [Water Quality Update](#) (Stewart)

Erin Stewart provided a water quality update. The chlorophyll-a concentrations in the Reservoir were very high in July during the cyanobacteria blooms. The rain events in August helped bring the chlorophyll-a concentrations down but CCR likely will be in non-attainment of the chlorophyll-a standard for 2022. All portal tools are updated through August. There is a new tool on the portal that shows TN and TP seasonal photic zone averages compared to the current interim standards for TN and TP. All of July sampling conditions were poor, as opposed to simply being bad luck with the sampling dates.

ii. Pollution Abatement Projects (Borchardt)

a. LUR Monthly Summary

Summary provided in memo, including 22 LURs in September.

b. CIP, Maintenance, and Operations Status Report

Reservoir destratification system will be shut down for the year today. The run time was extended due to maintenance taking slightly longer than anticipated. Due to damage to the system from an anchor drag, repairs involved several hundred feet of line.

Wetlands harvesting - LRE is currently measuring the harvest area by GPS, and we will get a weight of how many tons of cattails were removed so we can determine TN and TP removed.

iii. Regulatory (DiToro)

No update beyond information provided earlier in the meeting.

e. Manager

Bill received an invite for the CCBWQA to speak at the SP CURE conference this afternoon. Jane and Erin accepted the invitation on behalf of CCBWQA and will provide an update on the conference.

f. Other

7. Upcoming Events

8. Adjournment

Jacob James adjourned the meeting at 10:48 am.

[CCBWQA Workplan](#)



MEMORANDUM

To: CCBWQA Technical Advisory Committee
From: Val Endyk - CCBWQA Administrative Assistant
Date: October 28, 2022
Subject: Current TAC Members
Board Appointed TAC Members

Alex Mestdagh	Town of Parker
Ann Woods	City of Greenwood Village
Ashley Byerley	SEMSWA
<u>Casey Davenhill</u>	<u>Board Appointee, Cherry Creek Stewardship Partners</u>
David Van Dellen	Town of Castle Rock
Jacob James	TAC Chairman, City of Lone Tree
<u>Jason Trujillo</u>	<u>Board Appointee, Cherry Creek State Park</u>
<u>Jeremiah Unger</u>	<u>Board Appointee, CDOT</u>
Jim Watt	Mile High Flood District
Joseph Marencik	City of Castle Pines
<u>Jon Erickson</u>	<u>TAC Vice Chairman, Board Appointee, Colorado Parks and Wildlife</u>
<u>Joshua Giovannetti</u>	<u>Board Appointee, CDOT - Alternate for Jeremiah Unger</u>
Lisa Knerr	Arapahoe County
Rebecca Tejada	Special Districts, Parker Water and Sanitation District
<u>Rick Goncalves</u>	<u>Board Appointee</u>
Ryan Adrian	Douglas County
Sherry Scaggiari	City of Aurora
<u>Tripp Minges</u>	<u>Board Appointee, CDOT - Alternate for Jeremiah Unger</u>
<u>Wanda DeVargas</u>	<u>Board Appointee, E-470</u>



ACTION ITEM MEMORANDUM

To: CCBWQA Technical Advisory Committee (TAC)
From: Jane Clary, Technical Manager
Date: October 25, 2022
Subject: Cost Estimate to Develop Site-Specific Standards for Cherry Creek Reservoir

Request: That TAC recommends that the Board engage Hydros Consultants to conduct analysis to develop site-specific nutrient standards for Cherry Creek Reservoir in accordance with the scope of work and cost estimate provided by Hydros Consultants on September 16, 2022.

Issue: The Colorado Water Quality Control Division (Division) has proposed statewide nutrient standards for select high-priority lakes and reservoirs in Colorado. Review of the proposed standards by CCBWQA's technical consultants indicates that the proposed standards are not appropriate for Cherry Creek Reservoir. Additionally, the Division's proposed Statement of Basis and Purpose includes this statement regarding site-specific standards: "*The commission may consider revised site-specific nutrients standards for the following lake and reservoir segments that have existing nutrient control regulations in future rulemaking hearings if information to support appropriate and protective revisions is developed: [...] Cherry Creek: 2 (COSPCH02; Cherry Creek Reservoir).*"

As requested by the TAC, Hydros Consulting has prepared a scope and cost estimate to develop site-specific nutrient standards for Cherry Creek Reservoir, as described in the attachment to this memorandum. Based on review of this memorandum, the approach and cost estimate are believed to be appropriate for the project. Additionally, Hydros has included multiple "go/no-go" steps in their approach that would enable the effort to end at an interim step in the process, if directed by CCBWQA.

Budget: Hydros' proposed budget is \$87,755 with an optional task for additional meetings of \$5,000 for a total of \$92,755. This cost has been included in the proposed 2023 CCBWQA budget.

Recommendation: TAC recommends that the Board engage Hydros Consultants to conduct analysis to develop site-specific standards for Cherry Creek Reservoir in accordance with the scope of work and cost estimate provided by Hydros Consultants on September 16, 2022.

Next Steps: Work on development of site-specific standards is expected to begin following the April 2023 Lake Nutrients Criteria Rulemaking Hearing. This timeline is based in part on ensuring that CCBWQA's effort takes into consideration the outcome of the April 2023 rulemaking, as well as Hydros' availability to begin work on the project.



TECHNICAL MEMORANDUM

TO: Jane Clary, Cherry Creek Basin Water Quality Authority (CCBWQA) Technical Manager
FROM: Christine Hawley, Hydros Consulting Inc.
SUBJECT: Development of Site-Specific Standard Values for TN and TP in Cherry Creek Reservoir
DATE: September 26, 2022

The Water Quality Control Division (WQCD) has proposed table value standards (TVS) for total nitrogen (TN) and total phosphorus (TP) in a proponent's pre-hearing statement (PPHS; WQCD, 2022) for the November 2022 Rulemaking Hearing (RMH). This includes TN and TP standards that would be applicable to Cherry Creek Reservoir (CCR) if adopted. The November 2022 RMH has since been delayed to April 2023 by the Water Quality Control Commission (WQCC, 2022) in response to stakeholder concerns. At this time, it is unclear whether the currently proposed TN and TP standards will be modified prior to the April 2023 RMH.

At the request of CCBWQA, Hydros reviewed the WQCD methodology behind the currently-proposed TN and TP standards in the context of CCR (Hydros, 2022). Several concerns regarding overall methodology and data issues were noted. Additionally, it was determined that the proposed standards would be highly overprotective and not appropriate for CCR. Further, it was recommended that CCBWQA move forward with efforts to develop site-specific standards for TN and TP for proposal at the next South Platte Basin RMH, currently scheduled to occur in 2025.

This memorandum summarizes the proposed approach, schedule, and budget to develop site-specific TN and TP standards for Cherry Creek Reservoir. Briefly, standard development is expected to be based on analysis of observed CCR data and use of the existing reservoir water-quality model. The scope of work (SOW) is scheduled for completion in 2023, with delivery of a draft technical memorandum summarizing findings and recommendations for next steps by December 31, 2023. There are two decision points built into the schedule to provide opportunities for CCBWQA to revise/refine the approach or discontinue the effort entirely based on information that will become available or be developed during 2023. The anticipated time and materials budget is \$87,755. An optional task for up to \$5,000, subject to CCBWQA approval, is also included to cover CCBWQA-requested participation by Hydros in any currently-unanticipated relevant meetings/communications. Finally, in addition, an as-needed budget for other Hydros support in 2023 is included, as requested. Descriptions of the proposed approach, schedule, and budget are provided in the following sections.

1 Approach

The objective of this effort is to develop reasonable and defensible site-specific standards for TP and TN in Cherry Creek Reservoir that support efforts to attain the site-specific chlorophyll *a* standard. The proposed TN and TP standards will be defined to reflect site-specific chlorophyll *a* response, to the extent reasonably possible.

To meet this objective, four tasks (plus one optional task and one as-needed task) are proposed, as follows:

Task 1. Review Results of April 2023 Hearing

The current WQCD-proposed TN and TP standards for lakes may or may not be modified by WQCD for the April 10, 2023 RMH. Hydros will follow those developments closely, considering implications for CCR. If revised TN and TP standards are proposed by WQCD for the April 2023 RMH, Hydros will evaluate the reasonable applicability of those values to CCR. Following the April 2023 RMH, Hydros will brief CCBWQA and discuss whether Tasks 2 through 4 are still needed or whether any modifications to the SOW may be needed. This is the first (of two) decision point in this SOW. For scheduling, it is anticipated that this coordination and any resulting change of direction for the SOW will be resolved by May 15, 2023.

Task 2. Technical Analysis to Develop Site-Specific Standard Recommendations

A technical approach will be developed and implemented to generate recommended site-specific nutrient standards. This effort will make primary use of the extensive CCR observed dataset. Additionally, the existing mechanistic, hydrodynamic, water-quality model of the reservoir will be used in this process. It is anticipated that the model will be useful to support quantitative consideration of complexities introduced by the strong nitrogen limitation at CCR. This includes modeling to evaluate the effects of reducing phosphorus to levels that show phosphorus limitation. This also includes evaluating concerns about inadvertently exacerbating the dominance of nitrogen-fixing cyanobacteria if nutrient targets lead to inappropriate modification of the nutrient balance in the reservoir.

In consideration of this SOW, it is important to understand that any appropriate site-specific TN and TP standards developed for CCR are likely to be at values that will be routinely exceeded in the reservoir (particularly for TP). In other words, the eventual site-specific TN and TP standards will not eliminate regulatory nutrient concerns for CCR. The nutrient standards should be set to reflect the Chl *a* standard, and CCR fails to meet the 18 µg/L Chl *a* standard in most years. Therefore, it follows that CCR would likely fail to meet appropriate nutrient standards in most years. That said, it is still considered absolutely critical to pursue site-specific TN and TP standards, as opposed to accepting highly overprotective TVS values. The TN and TP standard values will ultimately be relevant to discharge permits as well as to eventual targeted, TMDL-based load reductions, so they should be developed based on a scientifically-defensible, site-specific analysis.

Task 3. Coordinate with WQCD and CCBWQA during Technical Analysis

If possible, the CCR site-specific standard development effort should be coordinated with the WQCD between now and the 2025 South Platte Basin RMH, keeping the WQCD staff apprised of the planned approach and findings. Ideally such coordination will allow WQCD to support the eventual site-specific standard proposal as it is brought to the WQCC at the 2025 RMH. For this SOW, two meetings with WQCD are envisioned following the April 2023 RMH. The first meeting with WQCD will be an

informational meeting to share the planned general approach and schedule and to seek any initial reactions or recommendations. This first meeting will likely take place when Hydros is well into Task 2, and no major changes to the approach are expected. The purpose of the second meeting with WQCD will be to present draft findings and planned values for the site-specific proposal. It is envisioned that each of those meetings will be preceded by internal coordination meetings between Hydros and CCBWQA. The meeting between Hydros and CCBWQA that precedes the second meeting with WQCD will serve as the second decision point in this SOW. At that meeting, Hydros will present the proposed site-specific standard recommendations to CCBWQA, and CCBWQA may decide whether or not to proceed with those recommendations. For budgeting purposes, it is assumed that all meetings will be remote.

Task 4. Prepare Technical Memorandum Summarizing Findings and Recommended Standards

A technical memorandum summarizing the objective, approach, findings, and recommended site-specific nutrient standards will be prepared and provided to CCBWQA. The draft technical memorandum will be delivered electronically by the close of business on December 16, 2023. A final technical memorandum will be provided to CCBWQA within two weeks of receiving comments. It is assumed for budgeting purposes that required edits will be minimal and revisions will require no more than 8 hours. Note that this SOW does not include development of a site-specific standards proposal for the 2025 RMH or time for Hydros participation in the 2025 RMH. It is assumed that any such additional support will be included in a subsequent SOW.

Optional Task. Additional Meetings/Communications as Directed by CCBWQA

This optional task is included here recognizing that additional meetings and/or communication needs (beyond what is anticipated in Tasks 1 through 4) may arise to meet the objectives of this SOW in 2023. There is uncertainty regarding how the process will unfold and the need for additional coordination with CCBWQA and/or WQCD is possible. Any activities conducted under this optional task would only occur in response to CCBWQA direction and approval.

As-Needed Hydros Support in 2023

This additional as-needed budget of \$10,000 for calendar year 2023 is included to cover coordination between Hydros and CCBWQA personnel on any relevant topics that may arise in 2023. This may include participation in a brainstorming/planning meeting regarding the future use of models to support design/testing of watershed and/or in-reservoir management projects.

2 Schedule and Budget

The proposed schedule is summarized in Table 1, including key anticipated meetings, CCBWQA decision points, and deliverables. Dates are approximate, recognizing that meetings have yet to be schedule and will likely need some adjustment to accommodate WQCD and CCBWQA schedules. The entire SOW is scheduled to be complete in 2023, though the final technical memorandum may follow in early 2024, depending on the timing of CCBWQA review.

Table 1. Summary of Anticipated Project Timeline

Project Milestone	Target
Hydros Briefing to CCBWQA Following April 2023 RMH	On or before April 24, 2023
CCBWQA Decision-Point to Stop, Proceed, Modify SOW	On or before May 15, 2023
Approach Meeting with WQCD	Mid-September 2023
Draft Findings Meeting with CCBWQA	End of October 2023
CCBWQA Decision-Point to Stop, Proceed, Modify SOW	Mid-November 2023
Draft Findings Meeting with WQCD	Late November 2023
Draft Tech Memo to CCBWQA	December 16, 2023
Final Tech Memo to CCBWQA	Two Weeks after Receiving Comments

The total anticipated budget for this project is \$87,755. The task-by-task cost estimate is summarized in Table 2. This total does not include costs for the optional task (additional meeting participation/communications development, as directed by CCBWQA). The optional task is assumed here to have a not-to-exceed budget of \$5,000, with activities under this task only occurring with approval by CCBWQA. The total in Table 2 also does not include an additional \$10,000 as-needed budget for CCBWQA-requested support from Hydros on any tasks outside of Tasks 1 through 4 in this scope of work that may arise in 2023.

Table 2. Summary of Estimated Cost by Project Task

Project Task	Anticipated Cost
Task 1: Review Results of April 2023 Hearing	\$8,455
Task 2: Technical Analysis	\$45,536
Task 3: Coordinate with WQCD and CCBWQA	\$19,862
Task 4: Tech Memo	\$13,902
Total Cost:	\$87,755*

*Does Not Include **Optional Task: Additional Meetings/Communications as Directed by CCBWQA** (Optional Task not-to-exceed \$5,000).

3 References

Hydros. 2022. Applicability of WQCD-Proposed TN and TP Standards to Cherry Creek Reservoir. Technical Memorandum from C. Hawley (Hydros) to J. Clary (CCBWQA). August 8, 2022.

WQCC. 2022. Procedural Order Regarding Joint Motions to Continue Hearing; In the Matter Concerning the Adoption of Revisions to the Nutrients Management Control Regulation, Regulation #85, and Revisions Pertaining to Lakes Nutrient Criteria in the Basic Standards and Methodologies for Surface Water, Regulation #31. September 7, 2022.

WQCD. 2022. Prehearing Statement of the Water Quality Control Division to the Colorado Water Quality Control Commission. August 3, 2022.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB
CHERRY CREEK BASIN WATER QUALITY AUTHORITY																										
TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES																										
REVISIONS FOR 2023 CIP																										
<p>Date: October 25, 2022</p> <p>Color Code: Blue: Project Completed Green: Planned for design/construction during 5-year period Red: See 2021 CIP Notes for changes to this Spreadsheet</p> <p style="background-color: #cccccc; padding: 2px;">Projects have been updated with most recent data from 2022</p>																										

11	Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads			Projected Treatment			Cost Estimate (1000S)							Unit Cost (\$/pound)		Note			
					PRF Type	Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)	w/o cost sharing		w/cost sharing		
12	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)			
14	CCR-1	Reservoir Destratification (mixing)	Officially start-up April 2008	Use inlake mixing to minimize algae blooms, therefore chlorophyll a	369	sq mi	n/a	n/a	n/a	n/a	n/a	n/a	n/a	810	lbs/season	\$ 968				28	\$ 80	100%	\$968	\$ 99	\$ 99		
15	CCB-1	CCSP Wetlands	Prelim design prepared in 2003 (Ref 1, 8)	Restore 60 Acres of wetlands in multiple phases	369	sq mi	3.5 cfs avg daily flow	1415 af/210 days	0.35	mg/l	1050	lbs/yr	Base flow	600	lbs/season	\$ 1,928	\$ -	\$ -	\$ -	19	\$ 123	100%	\$1,928	\$ 204	\$ 204	18	
16	CCB-5.1	Cherry Creek Sediment Pond at Arapahoe Road (see CCB-5.14)	Project eliminated and area combined into Phase III of CCB-5.14	Design and construct sediment pond	369	sq mi		3600 cy sed/yr	14.6	mg/l	92	lbs/yr	base flow	85	lbs/year	\$ 2,355	\$ 50	\$ -	\$ -	\$ 90	\$ 219	18%	\$424	\$ 2,575	\$ 463	1, 19	
17	CCB-5.2	Arapahoe/Douglas County Line Stream Stabilization	Project completed w/o Authority participation	Local stream stabilization (L = 2700 ft)	0.51	mi			100	lbs/mi	51	lbs/yr	Storm Flow	90%	46	lbs/year	\$ 1,062	\$ -	\$ -	\$ -	1	\$ 58	0%	\$0	\$ 1,258	\$ -	
18	CCB-5.3	Cottonwood Bridge Stream Stabilization	Project completed by Parker w/o Authority participation	Local stream stabilization (L = 2700 ft)	0.51	mi			100	lbs/mi	51	lbs/yr	Storm Flow	90%	46	lbs/year	\$ 436	\$ -	\$ -	\$ -	2	\$ 25	0%	\$0	\$ 551	\$ -	
19	CCB-5.4	Cherry Creek Stream Stabilization at Main Street (Parker)	Conceptual design by UDFCD	Local stream stabilization (L = 4000 ft)	0.76	mi			100	lbs/mi	76	lbs/yr	Storm Flow	90%	68	lbs/year	\$ 1,776	\$ -	\$ -	\$ -	1	\$ 96	11%	\$200	\$ 1,410	\$ 159	2, 3
20	CCB-5.5	Stroh Road Stream Stabilization	Project completed by Parker w/o Authority participation	Stream stabilization (L = 5000 ft)	0.95	mi			100	lbs/mi	95	lbs/yr	Storm Flow	90%	85	lbs/year	\$ 218	\$ -	\$ -	\$ -	1	\$ 13	0%	\$0	\$ 149	\$ -	
21	CCB-5.6	Cherry Creek Stream Stabilization at Lincoln Avenue (Parker)	Conceptual design by UDFCD	Local stream stabilization (L = 2350 ft)	0.45	mi			100	lbs/mi	45	lbs/yr	Storm Flow	90%	40	lbs/year	\$ 1,447	\$ -	\$ -	\$ -	1	\$ 79	21%	\$304	\$ 1,960	\$ 412	2, 3
22	CCB-5.7	Cherry Creek Stream Stabilization at Eco-Park (SEMSWA)	IGA w/SEMSWA for design in 2010 and construction in 2011/2012	Local stream stabilization (L = 6850 ft)	1.30	mi			100	lbs/mi	130	lbs/yr	Storm Flow	90%	117	lbs/year	\$ 4,756	\$ -	\$ -	\$ -	1	\$ 256	24%	\$1,155	\$ 2,191	\$ 532	2, 3
23	CCB-5.8	Cherry Creek Stream Reclamation U/S Arapahoe Rd (Aurora) (see CCB-5.14)	Now Phase 5 of CCB-5.14	Local stream stabilization (L = 2200 ft)	0.42	mi			100	lbs/mi	42	lbs/yr	Storm Flow	90%	38	lbs/year	\$ -	\$ -	\$ -	\$ -	1	\$ 1	35%	\$0	\$ 27	\$ 9	2, 3
24	CCB-5.9.1	Cherry Creek Stream Stabilization at 12-Mile Park (CCSP) - Phase I	Design completed in 2011 for Phase I.	Local stream stabilization (L = 500 ft)	0.09	mi			100	lbs/mi	9	lbs/yr	Storm Flow	90%	9	lbs/year	\$ 296	\$ -	\$ -	\$ -	1	\$ 17	100%	\$296	\$ 1,979	\$ 1,979	2, 20
25	CCB-5.9.2	Cherry Creek Stream Stabilization at 12-Mile Park (CCSP) - Phase II	Design completed in 2013 for Phase II.	Local stream stabilization (L = 2500 ft)	0.47	mi			100	lbs/mi	47	lbs/yr	Storm Flow	90%	43	lbs/year	\$ 1,429	\$ -	\$ -	\$ -	1	\$ 78	100%	\$1,429	\$ 1,820	\$ 1,820	2, 20
26	CCB-5.10	Cherry Creek Stream Stabilization at PJCOS (Vermillion Creek, PJMD.)	Design completed by PJMD. Authority is funding partner in design	Local stream stabilization (L = 5100 ft)	0.97	mi			100	lbs/mi	97	lbs/yr	Storm Flow	90%	87	lbs/year	\$ 3,017	\$ -	\$ -	\$ -	2	\$ 164	21%	\$643	\$ 1,882	\$ 401	2, 3
27	CCB-5.11	Cherry Creek Stream Stabilization at Norton Farms (Parker)	Conceptual design by UDFCD identified priority 3	Local stream stabilization (L = 2200 ft)	0.42	mi			100	lbs/mi	42	lbs/yr	Storm Flow	90%	38	lbs/year	\$ 900	\$ -	\$ -	\$ -	1	\$ 49	28%	\$252	\$ 1,313	\$ 368	2, 3
28	CCB-5.12	Cherry Creek Stream Stabilization at Pine Lane	Project completed by Parker w/o Authority participation	Local stream stabilization (L = 1500 ft)	0.28	mi			100	lbs/mi	28	lbs/yr	Storm Flow	90%	26	lbs/year	\$ 500	\$ -	\$ -	\$ -	1	\$ 28		\$0	\$ 1,087	\$ -	
29	CCB-5.13	Cherry Creek Stream Stabilization at Shop Creek Trail	Preliminary design completed in 2010 (Ref 12).	Local Stream Stabilization (L = 2000 ft)	0.38	mi			100	lbs/mi	38	lbs/yr	Storm Flow	90%	34	lbs/year	\$ 603	\$ -	\$ -	\$ -	6	\$ 38	100%	\$603	\$ 1,125	\$ 1,125	2, 3
30	CCB-5.14	Cherry Creek Stream Reclamation - CCSP to Eco Park (Ph II to V)	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 11000 ft)	2.08	mi			100	lbs/mi	208	lbs/yr	Storm Flow	90%	188	lbs/year	\$ 10,200	\$ -	\$ -	\$ -	1	\$ 547	25%	\$2,499	\$ 2,920	\$ 715	2, 3
31	CCB-5.14A	Cherry Creek Stream Reclamation - Eco Park to Soccer Fields	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 2700 ft)	0.51	mi			100	lbs/mi	51	lbs/yr	Storm Flow	90%	46	lbs/year	\$ 1,850	\$ -	\$ -	\$ -	1	\$ 100	35%	\$650	\$ 2,181	\$ 766	2, 3
32	CCB-5.14B	Cherry Creek Stream Reclamation - Valley Country Club	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 2000 ft.=1400 ft on Cherry Creek and 600 ft. on Tributary)	0.38	mi			100	lbs/mi	38	lbs/yr	Storm Flow	90%	34	lbs/year	\$ 2,284	\$ -	\$ -	\$ -	1	\$ 123	21%	\$484	\$ 3,607	\$ 764	2, 3
33	CCB-5.14C	Cherry Creek Stream Reclamation - Valley Country Club to Soccer Fields (Reaches 3 and 4)	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 5167 ft on Cherry Creek)	0.98	mi			100	lbs/mi	98	lbs/yr	Storm Flow	90%	88	lbs/year	\$ 5,287	\$ -	\$ -	\$ -	1	\$ 284	25%	\$1,322	\$ 3,223	\$ 806	2, 3
34	CCB-5.14D	Cherry Creek Stream Reclamation - Remaining Sections (not included in Reaches 3 and 4) from Valley Country Club to Soccer Fields	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 3688 ft on Cherry Creek)	0.70	mi			100	lbs/mi	70	lbs/yr	Storm Flow	90%	63	lbs/year	\$ 2,980	\$ -	\$ -	\$ -	1	\$ 161	25%	\$745	\$ 2,556	\$ 639	2, 3
35	CCB-5.15	Cherry Creek Stream Reclamation at Country Meadows (Hess Rd)	Project by Town of Parker and Douglas County	Local stream stabilization (L = 7700 ft)	1.46	mi			100	lbs/mi	146	lbs/yr	Storm Flow	90%	131	lbs/year	\$ 2,170	\$ -	\$ -	\$ -	2	\$ 118	24%	\$520	\$ 901	\$ 216	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB	
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																											
2	TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES																											
3	REVISIONS FOR 2023 CIP																											
4	<p>Date: October 25, 2022</p> <p>Color Code: Blue: Project Completed Green: Planned for design/construction during 5-year period Red: See 2021 CIP Notes for changes to this Spreadsheet</p> <p style="background-color: #cccccc; padding: 2px;">Projects have been updated with most recent data from 2022</p>																											
5																												
6																												
7																												
8																												
9																												
10																												
11	Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads			Projected Treatment			Cost Estimate (1000\$)							Unit Cost (\$/pound)		Note				
PRF Type					Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)	w/o cost sharing	w/cost sharing					
36	CCB-5.16	Cherry Creek Stream Reclamation - 12 Mile Phase III	Project w/in CCSP identified as Reach 1 in Project CCB-5.14 work.	Local stream stabilization (L=30 ft.)	0.01	mi			100	lbs/mi	1	lbs/yr	Storm Flow	90%	1	lbs/year	\$ 300	\$ -	\$ -	\$ -	3	\$ 19	100%	\$300	\$ 37,299	\$ 37,299	2, 20	
37	CCB-5.16A	Cherry Creek Stream Reclamation - Reservoir to Lake View Drive (Reach 1 in Muller's 2022 Stream Assessment Report)	Project w/in CCSP	Local stream stabilization (L=6365 ft.)	1.21	mi			100	lbs/mi	120.5	lbs/yr	Storm Flow	90%	108	lbs/year	\$ 6,842	\$ -	\$ -	\$ -	68	\$ 435	100%	\$6,842	\$ 4,009	\$ 4,009	2, 20	
38	CCB-5.16B	Cherry Creek Stream Reclamation - Lake View Drive to North Side of DOLA (Reach 2 in Muller's 2022 Stream Assessment Report)	Project w/in CCSP	Local stream stabilization (L=5220 ft.)	0.99	mi			100	lbs/mi	98.9	lbs/yr	Storm Flow	90%	89	lbs/year	\$ 5,612	\$ -	\$ -	\$ -	56	\$ 357	100%	\$5,612	\$ 4,010	\$ 4,010	2, 20	
39	CCB-5.16C	Cherry Creek Stream Reclamation - North Side of DOLA to CCSP Boundaries (Reaches 3 and 4 in Muller's 2022 Stream Assessment Report)	Project w/in CCSP	Local stream stabilization (Cherry Creek Reach 3 L=7353 ft, Piney Creek Reach 4 L=2000 ft)	1.77	mi			100	lbs/mi	177.1	lbs/yr	Storm Flow	90%	159	lbs/year	\$ 10,054	\$ -	\$ -	\$ -	101	\$ 639	100%	\$10,054	\$ 4,009	\$ 4,009	2, 20	
40	CCB-5.17.1A	Cherry Creek Stream Reclamation at KOA	Preliminary design completed 2019, Extension Requested by UDFCD and Parker in 2019	Local stream stabilization (L=1400 ft original, L=2000 ft with 600 ft extension)	0.38	mi			100	lbs/mi	38	lbs/yr	Storm Flow	90%	34	lbs/year	\$ 2,035	\$ -	\$ -	\$ -	20	\$ 129	20%	\$375	\$ 3,795	\$ 776	2, 3	
41	CCB-5.17.1B	Cherry Creek Stream Reclamation at Dransfeldt	Design in 2021, Construction in 2023	Local stream stabilization (L=2400 ft original)	0.45	mi			100	lbs/mi	45	lbs/yr	Storm Flow	90%	41	lbs/year	\$ 6,010	\$ -	\$ -	\$ -	60	\$ 382	7%	\$400	\$ 9,340	\$ 622	2, 3	
42	CCB-5.17.2	Cherry Creek Stream Reclamation U/S Scott Road	Project requested by Douglas County and UDFCD in 2019	Local stream stabilization (L= 4300 ft)	0.81	mi			100	lbs/mi	81	lbs/yr	Storm Flow	90%	73	lbs/year	\$ 5,237	\$ -	\$ -	\$ -	52	\$ 333	17%	\$900	\$ 4,543	\$ 781	2, 3	
43	CCB-6.1	Piney Creek Stream Stabilization - Project 1	Authority funded \$118,000 Arapahoe County in 2002.	Restore 5200 lf upstream of Parker Road	22.90	sq mi	n/a	n/a	100	lbs/mi	100	lbs/yr	Storm Flow	90%	90	lbs/year	\$ 997	\$ -	\$ -	\$ -	at	#VALUE!	13%	\$130	#VALUE!	#VALUE!	2, 3	
44	CCB-6.2	Piney Creek Stream Stabilization - Project 2 U/S Buckley Rd	Project completed w/o Authority participation	Reclaim 1700 lf upstream of Buckley Road	0.32	mi			100	lbs/mi	32	lbs/mi	Storm Flow	90%	29	lbs/year	\$ 998	\$ -	\$ -	\$ -	1	\$ 54	12%	\$120	\$ 1,880	\$ 226	2, 3	
45	CCB-6.3	Piney Creek Stream Sediment Removal - Saddle Rock Golf Course	Request from Aurora in 2011	Sediment removal to restore channel capacity (L = unk)					unk		unk	unk	Sediment	100%	5346	unk	\$ 383	\$ -	\$ -	\$ -	\$ 10	\$ 30	25%	\$96	\$ 6	\$ 1		
46	CCB-6.4	Piney Creek Stream Reclamation - Reachs 6 & 7	Request from UDFCD in 2014	Local stream stabilization (L = 6,000 ft)	1.14	mi			unk		365	lbs/yr	Storm Flow	90%	329	lbs/year	\$ 11,000	\$ -	\$ -	\$ -	\$ 2	\$ 591	25%	\$2,750	\$ 1,800	\$ 450	12	
47	CCB-6.5	Piney Creek Reach 1 to 2 (SEMSWA)	Requested in 2020	2900 lf of stream reclamation	0.55	mi			100	lbs/mi	55	lbs/mi	Storm Flow	90%	49	lbs/year	\$ 2,350	\$ -	\$ -	\$ -	\$ 2	\$ 128	22%	\$515	\$ 2,588	\$ 567	2, 3	
48	CCB-6.6	Piney Creek Tower to Orchard (SEMSWA)	Requested in 2020	3800 lf of stream reclamation	0.72	mi			100	lbs/mi	72	lbs/mi	Storm Flow	90%	65	lbs/year	\$ 3,000	\$ -	\$ -	\$ -	\$ 2	\$ 163	23%	\$700	\$ 2,512	\$ 586	2, 3	
49	CCB-7.1	McMurdo Gulch Reclamation (Castle Rock)	Project completed in 2011	Stream Reclamation (L = 15,000 lf)	2.84	mi			100	lbs/mi	284	lbs/yr	Storm Flow	90%	256	lbs/year	\$ 1,470	\$ -	\$ -	\$ -	28	\$ 107	43%	\$630	\$ 419	\$ 180		
50	CCB-7.2	McMurdo Gulch Reclamation (Castle Rock) 19/20 Project	Design in 2019, Construction in 2020	Stream Reclamation (L = 2,000 lf)	0.38	mi			100	lbs/mi	38	lbs/yr	Storm Flow	90%	34	lbs/year	\$ 1,677	\$ -	\$ -	\$ -	17	\$ 107	25%	\$420	\$ 3,127	\$ 783	2, 3	
51	CCB-7.3	McMurdo Gulch Reclamation (Castle Rock) 20/21/22 Project	Design in 2020, Construction 2021	Stream Reclamation (L = 3,700 lf)	0.70	mi			100	lbs/mi	70	lbs/yr	Storm Flow	90%	63	lbs/year	\$ 2,460	\$ -	\$ -	\$ -	25	\$ 156	25%	\$615	\$ 2,480	\$ 620	2, 3	
52	CCB-7.4	McMurdo Gulch Reclamation (Castle Rock) 22/23/24 Project	Design in 2022, Construction 2023 and 2024	Stream Reclamation (L = 6,550 lf)	1.24	mi			100	lbs/mi	124	lbs/yr	Storm Flow	90%	112	lbs/year	\$ 3,298	\$ -	\$ -	\$ -	33	\$ 210	25%	\$825	\$ 1,878	\$ 470	2, 3	
53	CCB-8	Limestone Filter Enhancement	Specific project not identified	Construct limestone filter bed downstream of retention pond	1.0	sq mi	n/a	10.7 af/year/sq mile	427	lbs/sq mi	427	lbs/yr	Base and storm flow	20%	85	lbs/year/mi ²	\$ 943	\$ -	\$ 595	\$ -	1	\$ 83	43%	\$405	\$ 977	\$ 420		
54	CCB-11	Advanced Water Treatment Plant	Conceptual design prepared	Construct 2 MGD AWT plant on Cottonwood Creek to treat Cherry Creek and Cottonwood Creek flows (0.21-mg/ influent, 0.03 mg/l disch)	3	cfs	2-MGD	2260	0.21	mg/l	1272	lbs/yr	Base flow and groundwater	90%	1145	lbs/year	\$ 4,593	unknown	unknown	\$ -	69		100%	\$4,593	\$ -	\$ -	11	
55	CCB-12	Bowtie Property PRF	Purchase completed 2003	Stabilize confluence (Ph I) and construct sediment pond (Ph 2)	22	sq mi	2-year flood	300 af	500	mg/l/ton	85	lbs/yr	base flow and minor flood	70% pond 65% wetlands	235	lbs/year	\$ 826	\$ 300	\$ 63	\$ 1.8	\$ 6	\$ 70	100%	\$826	\$ 299	\$ 299		
56	CCB-12.1	Bowtie Phase I	No action to date	Constructed Wetlands u/s Bowtie Property in Cherry Creek (0.20-disch)	369	sq mi	0.5 cfs avg daily flow	210 af/210 days	0.35	mg/l	86	lbs/yr	Base flow	assumed effluent conc	86	lbs/season	\$ 235	\$ 200	\$ 80	\$ -	\$ 7	\$ 35	100%	\$235	\$ 404	\$ 404		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB	
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																											
2	TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES																											
3	REVISIONS FOR 2023 CIP																											
4	<p>Date: October 25, 2022</p> <p>Color Code: Blue: Project Completed Green: Planned for design/construction during 5-year period Red: See 2021 CIP Notes for changes to this Spreadsheet</p> <p style="background-color: #d3d3d3; padding: 2px;">Projects have been updated with most recent data from 2022</p>																											
5																												
6																												
7																												
8																												
9																												
10																												

11	Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads			Projected Treatment			Cost Estimate (1000\$)							Unit Cost (\$/pound)		Note					
					PRF Type	Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)	w/o cost sharing		w/cost sharing				
57	CCB-13.1	Cottonwood/Peoria Wetlands Pond	Completed 2003. Restorative maintenance required in 2009	Joint funded project with UDFCD, GWV, Arapahoe County	8.30	sq mi						base and flood flows	measured	363	lbs/year	\$ 1,636	\$ -	\$ -	\$ -	\$ 5	\$ 93	12%	\$196	\$ 255	\$ 31	2			
58	CCB-13.2	Cottonwood Stream Reclamation in CCSP	Phase I completed in 2004. Phase II completed June 2008 (Ref 2)	11,600 lf of stream reclamation from Peoria to Perimeter Rd. Pond	2.20	mi			100	lbs/mi	220	lbs/yr	base and flood flows	see separate calcs	730	lbs/year	\$ 2,200	\$ -	\$ -	\$ -	\$ 55	\$ 173	100%	\$2,200	\$ 237	\$ 237	2		
59	CCB-13.3	Cottonwood Creek Stream Stabilization at Easter Avenue	Authority contributed \$338,000 for construction in 2010.	2,600 lf of stream reclamation from Easter Ave to Briarwood Ave	0.49	mi			100	lbs/mi	49	lbs/yr	Storm Flow	90%	44	lbs/year	\$ 1,350	\$ -	\$ -	\$ -	\$ 1	\$ 73	25%	\$338	\$ 1,655	\$ 414	2		
60	CCB-13.3.1A	Cottonwood Creek Cattail Harvesting from Reservoir to Peoria Street-	Pilot Project - Odd Years Harvest Left Bank	1.7 Acres of Cattail Harvesting	2.90	mi				lbs/mi	30	lbs/yr	Storm Flow	100%	59	lbs/year	\$ 60						100%	\$60	\$ 1,017	\$ 1,017	4		
61	CCB-13.3.1B	Cottonwood Creek Cattail Harvesting from Reservoir to Peoria Street-	Pilot Project - Even Years Harvest Right Bank	2.0 Acres of Cattail Harvesting	2.90	mi				lbs/mi	237	lbs/yr	Storm Flow	100%	60	lbs/year	\$ 60						100%	\$60	\$ 1,000	\$ 1,000	4		
62	CCB-13.4	Peoria Trib B/Airport East and West Pond (Outfall C-1)	Cottonwood Creek Master Planned Improvements. Ponds combined into one.	Combined existing detention ponds and provided EURV	0.35	sq mi			400	lbs/sq mi	140	lbs/yr	Base and storm flow	40%	56	lbs/yr	\$ 523	\$ -	\$ -	\$ -	\$ -	\$ 28	25%	\$131	\$ 500	\$ 125			
63	CCB-13.5.1	Cottonwood Creek at Briarwood (SEMSWA)	Requested in 2019	700 lf of stream reclamation	0.13	mi			100	lbs/mi	13	lbs/yr	Storm Flow	90%	12	lbs/year	\$ 850	\$ -	\$ -	\$ -	\$ 9	\$ 54	16%	\$140	\$ 4,529	\$ 746			
64	CCB-13.5.2	Cottonwood Creek D/S Easter Avenue	Requested in 2019	800 lf of stream reclamation	0.15	mi			100	lbs/mi	15	lbs/yr	Storm Flow	90%	14	lbs/year	\$ 800	\$ -	\$ -	\$ -	\$ 8	\$ 51	20%	\$160	\$ 3,730	\$ 746			
65	CCB-13.5.3	Cottonwood Creek Tributary - Shooting Area Tributary (CCSP)	Requested in 2020	600 lf of stream reclamation	0.11	mi			100	lbs/mi	11	lbs/yr	Storm Flow	90%	10	lbs/year	\$ 300	\$ -	\$ -	\$ -	\$ 3	\$ 19	25%	\$75	\$ 1,865	\$ 466	2,3		
66	CCB-13.5.4	Cottonwood Creek and Tributary C (IWSA)	Requested in 2020	2080 lf of stream reclamation	0.39	mi			100	lbs/mi	39	lbs/yr	Storm Flow	90%	35	lbs/year	\$ 1,664	\$ -	\$ -	\$ -	\$ 17	\$ 106	25%	\$416	\$ 2,984	\$ 746	2,3		
67	CCB-13.5.5	Windmill Creek Pond W-9 Retrofit (SEMSWA)				sq mi		3600	cy sed/yr		mg/l	lbs/yr	base flow			lbs/year	\$ 150	\$ 50	\$ -	\$ -	\$ 90	\$ 101	25%	\$38	#DIV/0!	#DIV/0!	5		
68	CCB-14	Bellevue Wetlands	Co-funding opportunity with USACE on indefinite hold	Retrofit existing develop. w/wet detention pond	235	Ac SF Resid			400	lbs/sq mi	145	lbs/yr	Base and storm flow	50%	73	lbs/year	\$ 210	\$ -	\$ -	\$ -	\$ 2	\$ 13	100%	\$210	\$ 183	\$ 183	2		
69	CCB-15	Surface Water Reuse at Cherry Creek Vista	Supplemental water not available. Project on indefinite hold.	Use water from Cottonwood Creek to irrigate 10-acres			2.92	af/ac-yr	29.2	af/yr	0.20	mg/l	15.9	lbs/yr	base flow	80%	13	lbs/year	\$ 50	\$ -	\$ -	\$ -	\$ -	\$ 3	100%	\$50	\$ 211	\$ 211	
70	CCB-16	Stream Corridor Preservation	No projects identified	Partner with others to purchase property or conservation easements along Cherry Creek													\$ 100				\$ 5	100%	\$100			1			
71	CCB-17.2	Reservoir Shoreline Stabilization Mountain Loop Trail	Scheduled for construction beginning in 2012	CCSP Recreation sites: Mountain, Lake and Cottonwood Creek Loops											54	lbs/yr	\$ 1,131	\$ -	\$ -	\$ -	\$ 5	\$ 66	100%	\$1,131	\$ 1,215	\$ 1,215	1,16		
72	CCB-17.2.1	Mountain and Lake Loop - 2021 Shoreline Maintenance	Identified during 2020 annual PRF observation	45 lf of bank stabilization	45	lf	0.1	cy/yr/ft	0.14	lbs/lf	6.3	lbs/yr	bank erosion	80%	5.04	lbs/yr	\$ 24	\$ -	\$ -	\$ -	\$ 2	\$ 3	100%	\$24	\$ 652	\$ 652	1,16		
73	CCB-17.3	West Boat Ramp Parking Lot WQ Improvements	Final design completed in 2012	Provide water quality treatment of parking lot runoff.	3.43	ac prkg lot					3	lbs/yr	parking lot	70%	2.1	lbs/yr	\$ 330	\$ -	\$ -	\$ -	\$ 1	\$ 19	100%	\$330	\$ 8,903	\$ 8,903	1		
74	CCB-17.4	East Boat Ramp Shoreline Stabilization Phase II	Identified during 2012 annual PRF inspection	100 lf of bank stabilization	105	lf	0.1	cy/yr/ft	0.14	lbs/lf	14.7	lbs/yr	bank erosion	80%	11.8	lbs/yr	\$ 63	\$ -	\$ -	\$ -	\$ 2	\$ 5	100%	\$63	\$ 457	\$ 457	1,16		
75	CCB-17.4.1	East Boat Ramp Shoreline Stabilization Phase III	Identified during 2012 annual PRF inspection	400 lf of bank stabilization	400	lf	0.1	cy/yr/ft	0.14	lbs/lf	56.0	lbs/yr	bank erosion	80%	44.8	lbs/yr	\$ 350	\$ -	\$ -	\$ -	\$ 2	\$ 21	100%	\$350	\$ 463	\$ 463	1,16		
76	CCB-17.5	East Shade Shelter Shoreline Stabilization Phase II	Identified during 2012 annual PRF inspection	20 lf of bank stabilization	20	lf	0.1	cy/yr/ft	0.14	lbs/lf	2.8	lbs/yr	bank erosion	80%	2.2	lbs/yr	\$ 18	\$ -	\$ -	\$ -	\$ -	\$ 1	100%	\$18	\$ 431	\$ 431	1,16		
77	CCB-17.5.1	East Shade Shelter Shoreline Stabilization Phase III	Identified during 2014 annual PRF inspection	400 lf of bank stabilization	400	lf	0.1	cy/yr/ft	0.14	lbs/lf	56.0	lbs/yr	bank erosion	80%	44.8	lbs/yr	\$ 906	\$ -	\$ -	\$ -	\$ -	\$ 49	100%	\$906	\$ 1,083	\$ 1,083	1,16		
78	CCB-17.6	West Shade Shelter Shoreline Stabilization PRF ¹⁴	Identified initially in 2006. UCD Student Project w/WPR in 2013	1,400 lf of bank stabilization	1400	lf	0.1	cy/yr/ft	0.14	lbs/lf	196.0	lbs/yr	bank erosion	80%	179	lbs/yr	\$ 704	\$ -	\$ -	\$ -	\$ 1,000	\$ 51	65%	\$458	\$ 285	\$ 185	21		
79	CCB-17.7	Tower Loop Shoreline Stabilization Phase II	Identified during 2014 annual PRF inspection	700 lf of bank stabilization	700	lf	0.1	cy/yr/ft	0.14	lbs/lf	98.0	lbs/yr	bank erosion	80%	78.4	lbs/yr	\$ 1,056	\$ -	\$ -	\$ -	\$ -	\$ 57	100%	\$1,056	\$ 722	\$ 722	1,16		
80	CCB-17.8	Dixon Grove Shoreline Stabilization Phase II	Identified during 2019 annual PRF inspection	200 lf of bank stabilization	200	lf	0.1	cy/yr/ft	0.14	lbs/lf	28.0	lbs/yr	bank erosion	80%	22.4	lbs/yr	\$ 235	\$ -	\$ -	\$ -	\$ -	\$ 13	100%	\$235	\$ 562	\$ 562	1,16		
81	CCB-18	OWTS Sewer Service	No action to date	Provide Sewer Service for OWTS Areas				To Be Determined					To Be Determined									100%				To Be Determined	1		

CHERRY CREEK BASIN WATER QUALITY AUTHORITY
TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES
REVISIONS FOR 2023 CIP

Date: **October 25, 2022**
Color Code: **Blue:** Project Completed
Green: Planned for design/construction during 5-year period
Red: See 2021 CIP Notes for changes to this Spreadsheet
 Projects have been updated with most recent data from 2022

Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads			Projected Treatment			Cost Estimate (1000S)						Unit Cost (\$/pound)		Note											
				PRF Type	Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)		w/o cost sharing	w/cost sharing									
82	CCB-19	Non-point Pollutant Management	No action to date	Assist agricultural contributors to water quality impact			To Be Determined		To Be Determined			To Be Determined			\$ 100	\$ -	\$ -	\$ -	\$ -	\$ 5	100%	\$100	To Be Determined		1								
83	CCB-20.1	Detention Pond Retrofit Program - McMurdo Gulch	Phase 1 - McMurdo Gulch	Modify existing ponds to meet current standards for WQ	1	Each			0.40	lbs/Trib Acre	0.4	lbs/yr	Residential		9	lbs/pond/yr	\$ 60	\$ -	\$ -	\$ -	\$ 0	\$ 4	100%	\$60	\$ 396	\$ 396	1, 17						
84	CCB-21.1	Lone Tree Creek in CCSP downstream of Pond (CCBWQA Only)	Identified in 2014. Request from Arapahoe County Open Space.	500 lf of stream reclamation from CCSP Boundary to Cottonwood Creek	0.09	mi			100	lbs/mi	9	lbs/yr	Storm Flow	90%	9	lbs/yr	\$ 340	\$ -	\$ -	\$ -	\$ 2	\$ 20	100%	\$340	\$ 2,372.03	\$ 2,372	2, 3						
85	CCB-21.2	Lone Tree Creek Pond L-3 Retrofit (SEMSWA)				sq mi			3600	cy sed/yr			mg/l			lbs/yr	base flow						\$ 2,355	\$ 50	\$ -	\$ -	\$ 90	\$ 219	#DIV/0!	\$18	#DIV/0!	#DIV/0!	5
86	CCB-21.3	Lone Tree Creek in CCSP upstream of Pond (Centennial Trail Portion)	Request from Centennial for Participation in Stream Reclamation portion of Trail Project.	710 lf of stream reclamation between CCSP Boundary and Windmill Creek Loop Trail	0.13	mi			100	lbs/mi	13	lbs/yr	Storm Flow	90%	12	lbs/yr	\$ 448	\$ -	\$ -	\$ -	\$ 2	\$ 26	25%	\$112	\$ 2,148.56	\$ 537	2, 3						
87	CCB-22	Happy Canyon Creek	MDP Priority Project	6,600 lf of stream reclamation upstream of I-25	1.25	mi			100	lbs/mi	125	lbs/yr	Storm Flow	90%	113	lbs/yr	\$ 7,702	\$ -	\$ -	\$ -	\$ 2	\$ 415	25%	\$1,926	\$ 3,685.78	\$ 921	2, 3						
88	CCB-22.1	Happy Canyon Creek at Jordan Road (SEMSWA)	Requested in 2020	2,500 lf of stream reclamation, project extended another 2000 feet in 2022	0.85	mi			100	lbs/mi	85	lbs/yr	Storm Flow	90%	77	lbs/year	\$ 2,731	\$ -	\$ -	\$ -	27	\$ 174	25%	\$683	\$ 2,264	\$ 566	2, 3						
89	CCB-22.2	Happy Canyon Creek Upstream of I-25 (MHFD)	Requested in 2020	3000 lf of stream reclamation	0.57	mi			100	lbs/mi	57	lbs/yr	Storm Flow	90%	51	lbs/year	\$ 5,441	\$ -	\$ -	\$ -	54	\$ 346	9%	\$500	\$ 6,765	\$ 622	2, 3						
90	CCB-23.1	Dove Creek U/S Pond D-1 to Chambers Rd (SEMSWA)	Requested in 2020	1300 lf of stream reclamation	0.25	mi			100	lbs/mi	25	lbs/yr	Storm Flow	90%	22	lbs/year	\$ 650	\$ -	\$ -	\$ -	7	\$ 41	25%	\$163	\$ 1,865	\$ 466	2, 3						
91	CCB-23.2	Dove Creek Otero to Chambers Rd. (SEMSWA)	Requested in 2020	1400 lf of stream reclamation	0.27	mi			100	lbs/mi	27	lbs/yr	Storm Flow	90%	24	lbs/year	\$ 700	\$ -	\$ -	\$ -	7	\$ 45	25%	\$175	\$ 1,865	\$ 466	2, 3						

BASIS FOR ANALYSIS:

- (A) Unit cost of phosphorus removal based on annualized cost of completed project over 35 years at 4% interest rate. **CRF = 0.053577**
 - (B) All projects identified provide for additional phosphorus immobilization beyond minimum requirements, unless noted otherwise.
- 2023 CIP NOTES:**
1. Assumed that augmentation for consumptive use not required
 2. Augmentation for naturally established wetlands not required (assumption)
 3. Phosphorus Estimated based on Interim Stream Reclamation Paper
 4. See 2020 Cattail Harvesting Pilot Project Memo. Phosphorus estimated based on SEMSWA 2020 Data.
 5. Pond updates to bring up to current standards and to facilitate maintenance. No phosphorus calculation provided, since ponds already exist.
 - 6.
 - 7.
 8. Water costs at \$ 6,500 per acre foot
 9. Present worth of capital replacement
 11. Land acquisition and water augmentation not defined. CWSD\ACWWA JWPP project influenced scope of project.
 12. Total Phosphorus loading derived from laboratory sediment samples & Stantec Geomorphic Study BANCS analysis.
 15. Estimate based on costs for similar work along East Shoreline dating back to 1996
 16. Benefit approximated based on other shoreline projects and estimates
 17. Loads and performance based on calculations for 3 McMurdo Gulch ponds.
 18. SEO opined that ET must be augmented. Also, recent Reservoir fluctuations may render project infeasible. Placed on indefinite hold.
 19. Approach was shifted to focus on stream reclamation (CCB-5.14) and reduction of sediment and nutrient sources from erosion.
 20. Joint project with CCSP. Integrate design with Dog Park uses and improvements. Estimate based on similar stream stabilization projects
 21. Phosphorus: Shoreline 177 lbs/yr + Parking Lot 2 lbs/yr =179 lbs/yr

REFERENCES

1. Muller Eng 2003. *Feasibility Evaluation for Cherry Creek State Park Wetlands Project*
2. Muller Eng 2003. *Feasibility Evaluation for Cottonwood Creek Stream Stabilization Project*
3. AMEC 2005. *Draft Feasibility Report Cherry Creek Reservoir Destratification*
4. AMEC 2006. *Recommendations for Prepurchase of Jamor Equipment for Cherry Creek Reservoir Destratification Project.*
5. Tetra Tech August 2006. *Phosphorus Estimates in Cherry Creek and Cost for Removal via Sediment Trap.*
6. WERF 2000. *Phosphorus Credit Trading in the Cherry Creek Basin: An Innovative Approach to Achieving Water Quality Benefits.*
7. Ruzzo, WP September 5, 2003. *Cherry Creek Corridor Master Plan-Estimate of Phosphorus Reduction from Stream Reclamation*
8. Ruzzo, W. P. September 21, 2006. *Cottonwood Creek Reclamation - Water Rights Augmentation Requirements.*
9. TetraTech December 2006. *Design of Cherry Creek Sediment Basin and Stream Stabilization.*
10. Brown and Caldwell Feb 2007. *Shop Creek Wetlands Pollutant Reduction Facility Wetland Assessment*
11. PBSJ October 2006. *Draft McMurdo Gulch Major Drainageway Master Plan*
12. Brown and Caldwell 2010. *Cherry Creek Stream Reclamation at Shop Creek Trail.*
13. CCBWQA TAC June 16, 2011. *Stream Reclamation Water Quality Benefit Evaluation Interim Status Report*
14. Ruzzo Memo, September 4, 2013, *West Shade Shelter Shoreline Stabilization PRF - Water Quality Analysis.*

	A	B	C	D	E	F	G	H	M	O	P	Q	R	W	AB	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																								
2	TABLE 2 - SUMMARY OF RECOMMENDED POLLUTANT REDUCTION FACILITIES																								
3	2023 - 2032 BUDGET PROJECTIONS (1000\$)																								
4																									
5	Color Code:		Critical path after watershed model run results																						
6			Critical path after Lake Nutrients Criteria and pending 2023 Feasibility Study																						
7			Budget changes since 10/5/22 Draft																						
8																									
9																									
10		October 25, 2022	Current Project Budget				Prior Year Obligated Funds³	2022 Budget	Proposed 2023 Budget					Proposed 2024 Budget	Proposed 2025 Budget	Proposed 2026 Budget	Proposed 2027 Budget	Proposed 2028 Budget	Proposed 2029 Budget	Proposed 2030 Budget	Proposed 2031 Budget	Proposed 2032 Budget	2023-2032 Total		
11	Project No.	Project Title	Capital¹	Total	O&M	Authority Portion	Authority Portion	Total	Design	Capital	Water	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	
12	Budget Category - General																								
14	Budget Category - Reservoir Projects																								
17	CCR-2	Reservoir Destratification System - Distribution Preliminary Design - Includes evaluation of Optimization of Distribution with WWE Expansion Alternative	\$ 2,140	\$ 2,140		\$ 2,140	100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 270	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 935	\$ 935	\$ -	\$ 2,140		
18	CCR-3	Reservoir Nutrient Mitigation Alternatives Study	\$ 100	\$ 100		\$ 100	100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100		
19	CCB-17.5	East Shade Shelter Shoreline Stabilization Phase III	\$ 906	\$ 906		\$ 855	100%	\$ 51	\$ -	\$ 59	\$ 600	\$ -	\$ 659	\$ 196	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 855		
20	CCB-17.6	West Shade Shelter Shoreline Stabilization PRF	\$ 704	\$ 704		\$ 704	100%	\$ 154	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 550	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 550		
21	CCB-17.7	Tower Loop Shoreline Stabilization Phase II	\$ 1,056	\$ 1,056		\$ 1,056	100%	\$ 90	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 966	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 966		
22	Budget Category - Stream Reclamation Projects																								
23	CCB-5.4	Cherry Creek Stream Reclamation at Main Street (Parker)	\$ 1,776	\$ 1,776		\$ 200	11%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 200	\$ -	\$ -	\$ -	\$ -	\$ 200	
24	CCB-5.6	Cherry Creek Stream Stabilization at Lincoln Avenue (Parker)	\$ 1,447	\$ 1,447		\$ 304	21%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 304	\$ -	\$ -	\$ -	\$ 304	
28	CCB-5.14C	Cherry Creek Stream Reclamation - Reach 3	\$ 2,567	\$ 2,567		\$ 640	25%	\$ -	\$ -	\$ 130	\$ -	\$ 130	\$ 510	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 640	
29	CCB-5.14C	Cherry Creek Stream Reclamation - Reach 4	\$ 2,720	\$ 2,720		\$ 680	25%	\$ 25	\$ 180	\$ -	\$ 475	\$ -	\$ 475	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 475	
30	CCB-5.16A	Cherry Creek - Reservoir to Lake View Drive Alternatives Analysis	\$ 200	\$ 200		\$ 200	100%	\$ -	\$ -	\$ 200	\$ -	\$ 200	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 200	
32	CCB-5.17	Cherry Creek Stream Reclamation - U/S Scott Road (Douglas County)	\$ 2,500	\$ 2,500		\$ 625	25%	\$ 350	\$ 275	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
34	CCB-5.17.1B	Cherry Creek Stream Reclamation - at Dranfheldt Extension (Parker)	\$ 3,048	\$ 3,048		\$ 400	13%	\$ 60	\$ 170	\$ -	\$ 170	\$ -	\$ 170	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 170	
36	CCB-7.4	McMurdo Gulch Reclamation (Castle Rock)	\$ 4,308	\$ 4,308		\$ 1,078	25%	\$ -	\$ 171	\$ -	\$ 907	\$ -	\$ 907	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 907	
37	CCB-13.5.3	Cottonwood Creek Tributary - Shooting Area Tributary (CCSP)	\$ 300	\$ 300		\$ 75	25%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75	
38	CCB-13.5.4	Cottonwood Creek and Tributary C (IWSD)	\$ 1,664	\$ 1,664		\$ 416	25%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 416	\$ -	\$ -	\$ -	\$ 416	
39	CCB-21.1	Lone Tree Creek in CCSP downstream of Pond (CCBWQA Only)	\$ 340	\$ 340		\$ 340	100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100	\$ 400	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 500	
40	CCB-21.3	Lone Tree Creek in CCSP upstream of Pond (Done in conjunction with Centennial Trail Project)	\$ 448	\$ 448		\$ 112	25%	\$ -	\$ 112	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
41	CCB-21.3a	Lone Tree Creek in CCSP upstream of Pond (CCBWQA Only)	\$ 448	\$ 448		\$ 448	100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 448	\$ 448		
42	CCB-22.1	Happy Canyon Creek County Line to Cherry Creek (SEMSWA)	\$ 1,520	\$ 1,520		\$ 381	25%	\$ 25	\$ 68	\$ -	\$ 88	\$ -	\$ 88	\$ 50	\$ 75	\$ 75	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 288	
43	CCB-22.2	Happy Canyon Creek Upstream of I-25 (MHFD)	\$ 3,943	\$ 3,943		\$ 500	13%	\$ 250	\$ 250	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
44	CCB-23.1	Dove Creek U/S Pond D-1 to Chambers Rd (SEMSWA)	\$ 650	\$ 650		\$ 163	25%	\$ -	\$ 25	\$ -	\$ 63	\$ -	\$ 63	\$ 75	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 138	
45	CCB-23.2	Dove Creek Otero to Chambers Rd. (SEMSWA)	\$ 700	\$ 700		\$ 175	25%	\$ 25	\$ 75	\$ -	\$ 75	\$ -	\$ 75	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75	

	A	B	C	D	E	F	G	H	M	O	P	Q	R	W	AB	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																								
2	TABLE 2 - SUMMARY OF RECOMMENDED POLLUTANT REDUCTION FACILITIES																								
3	2023 - 2032 BUDGET PROJECTIONS (1000\$)																								
4																									
5	Color Code:		Critical path after watershed model run results																						
6			Critical path after Lake Nutrients Criteria and pending 2023 Feasibility Study																						
7			Budget changes since 10/5/22 Draft																						
8																									
9																									
10		October 25, 2022	Current Project Budget					Prior Year Obligated Funds ³	2022 Budget	Proposed 2023 Budget					Proposed 2024 Budget	Proposed 2025 Budget	Proposed 2026 Budget	Proposed 2027 Budget	Proposed 2028 Budget	Proposed 2029 Budget	Proposed 2030 Budget	Proposed 2031 Budget	Proposed 2032 Budget	2023-2032 Total	
11	Project No.	Project Title	Capital¹	Total	O&M	Authority Portion	Authority Portion		Total	Design	Capital	Water	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
46	CCB-6.5	Piney Creek Reach 1 to 2 (SEMSWA)	\$ 2,350	\$ 2,350		\$ 515	22%	\$ -	\$ 38	\$ 63	\$ -	\$ -	\$ 63	\$ 39	\$ 25	\$ 75	\$ 150	\$ 125	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 477	
47	CCB-6.6	Piney Creek Tower to Orchard (SEMSWA)	\$ 3,000	\$ 3,000		\$ 710	24%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75	\$ 150	\$ 235	\$ 250	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 710	
48	CCB-5.16A,B,C	Cherry and Piney Creeks in CCSP	\$ 22,500	\$ 22,500			0%	\$ -	\$ 250	\$ -	\$ -	\$ -	\$ -	\$ 450	\$ 1,400	\$ 1,000	\$ 1,355	\$ 1,900	\$ 2,000	\$ 920	\$ 960	\$ 1,500	\$ 11,485		
49	CCB-5.14D	Cherry Creek Stream Reclamation - Remaining Sections (not included in Reaches 3 and 4) from Valley Country Club to Soccer Fields	\$ 2,980	\$ 2,980		\$ 745	25%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100	\$ 100	\$ 545	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 745		
50	Budget Category - PRF Water Quality/Wetland Ponds																								
51	Budget Category - PRF Preservation, Acquisition, Lease																								
52	CCB-16	PRF Preservation, Acquisition, Lease of Land or Water	\$ 500	\$ 500		\$ -	0%	\$ -	\$ 50	\$ 100	\$ -	\$ 100	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 550	
53		SUB-TOTALS							\$ 2,052				\$ 2,930	\$ 2,881	\$ 2,200	\$ 2,085	\$ 2,350	\$ 2,350	\$ 2,354	\$ 2,321	\$ 1,945	\$ 1,998	\$ 23,414		

CHERRY CREEK BASIN WATER QUALITY AUTHORITY

TABLE 2 - SUMMARY OF RECOMMENDED POLLUTANT REDUCTION FACILITIES

2023 - 2032 BUDGET PROJECTIONS (1000\$)

Color Code: Critical path after watershed model run results
 Critical path after Lake Nutrients Criteria and pending 2023 Feasibility Study
 Budget changes since 10/5/22 Draft

10	October 25, 2022	Current Project Budget					Prior Year Obligated Funds ³	2022 Budget	Proposed 2023 Budget				Proposed 2024 Budget	Proposed 2025 Budget	Proposed 2026 Budget	Proposed 2027 Budget	Proposed 2028 Budget	Proposed 2029 Budget	Proposed 2030 Budget	Proposed 2031 Budget	Proposed 2032 Budget	2023-2032 Total
11	Project No.	Project Title	Capital ¹	Total	O&M	Authority Portion	Authority Portion	Total	Design	Capital	Water	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	
54	OPERATIONS AND MAINTENANCE																					
56	Routine Category																					
57	OM-7	Reservoir Destratification	\$ 350	\$ 350		\$ 350	100%	\$ 27		\$ 35		\$ 35	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 395
58	OM-14.1	PRF Weed Control	\$ 100	\$ 100		\$ 100	100%	\$ 8		\$ 10		\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 100
59	OM-14.2	PRF Reseeding at CCSP	\$ 50	\$ 50		\$ 27	100%	\$ -		\$ 5		\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 50
60	OM-14.3	PRF Mowing	\$ 50	\$ 50		\$ 45	100%	\$ -		\$ 5		\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 50
61		SUB-TOTAL	\$ 550	\$ 550		\$ 522		\$ 35		\$ 55		\$ 55	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 595
62	Operations Category																					
63	O - 1	RDS Utilities	\$ 650	\$ 650		\$ 650	100%	\$ 60		\$ 65		\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 650
64	O - 2	RDS Service Plan	\$ 155	\$ 155		\$ 155	100%	\$ 11		\$ 12		\$ 12	\$ 13	\$ 14	\$ 15	\$ 16	\$ 17	\$ 18	\$ 19	\$ 20	\$ 20	\$ 164
65	O - 3	PRF Emergency Repairs	\$ -	\$ -		\$ -	#DIV/0!	\$ 90		\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
66	O - 4	Meteorological Station	\$ 36	\$ 36		\$ 36	100%	\$ 6		\$ 3		\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 30
67		SUB-TOTAL	\$ 841	\$ 841		\$ 841		\$ 167		\$ 80		\$ 80	\$ 81	\$ 82	\$ 83	\$ 84	\$ 85	\$ 86	\$ 87	\$ 88	\$ 88	\$ 844
68	Restorative Category																					
69	OM -	Tree/Shrub Planting	\$ 18	\$ 18		\$ 18	100%	\$ -		\$ -		\$ -	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 18
70	OM -	Fence Repair	\$ 72	\$ 72		\$ 72	100%	\$ -		\$ -		\$ -	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 72
71	OM -	Shoreline / Bank Restoration																				\$ -
72		Average Annual Cost						\$ -		\$ -		\$ -	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 1,755
73		Shop Creek Concrete Repairs	\$ 10	\$ 10		\$ 10		\$ -		\$ 10		\$ 10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10
74		Mountain/Lake Loop Shoreline	\$ 24	\$ 24		\$ 24	100%	\$ 24		\$ 30		\$ 30	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30
75	OM -	Wetland Harvesting	\$ 900	\$ 900		\$ 900	100%	\$ 90		\$ 90		\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 900
76		SUB-TOTAL	\$ 1,024	\$ 1,024		\$ 1,024		\$ 114		\$ 130		\$ 130	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 2,785
77	Rehabilitation Category																					
78	OM -																					
79		SUB-TOTAL	\$ -	\$ -		\$ -		\$ -		\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
81		SUB-TOTAL O&M	\$ 2,415					\$ 316		\$ 265		\$ 265	\$ 436	\$ 437	\$ 438	\$ 439	\$ 440	\$ 441	\$ 442	\$ 443	\$ 443	\$ 4,540
82		GRAND TOTAL						\$ 2,368				\$ 3,195	\$ 3,317	\$ 2,637	\$ 2,523	\$ 2,789	\$ 2,790	\$ 2,795	\$ 2,763	\$ 2,388	\$ 2,441	\$ 30,006

\$ 2,368 2.8 \$ 5,563 5.6 \$ 8,880 8.4 \$ 11,517 11.2 \$ 14,040 14 \$ 16,829 16.8 \$ 19,619 19.6 \$ 22,414 22.4 \$ 25,177 25.2 \$ 24,802 28 \$ 27,618 28

Figure 1 - Stream Reclamation inside of CCSP

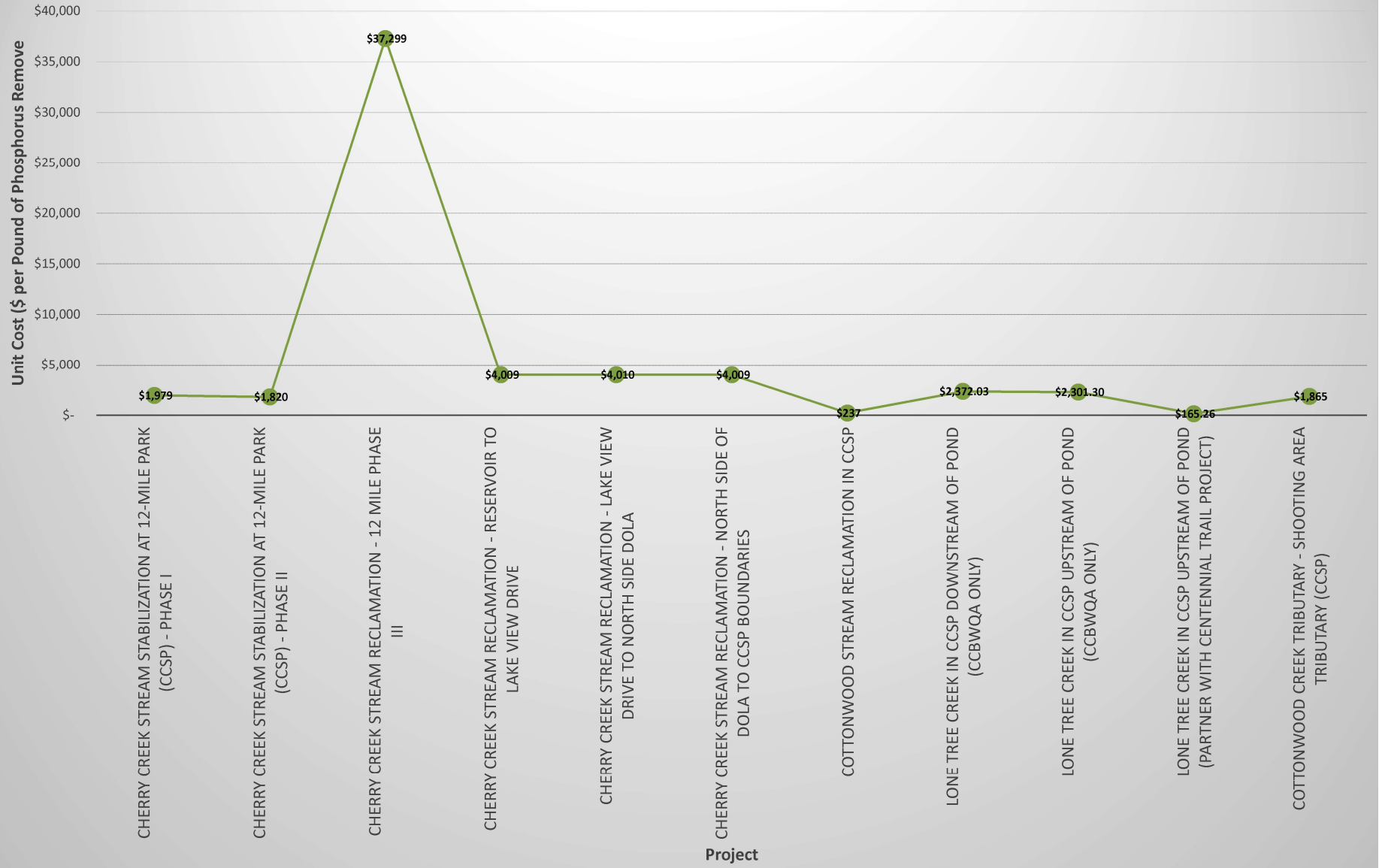
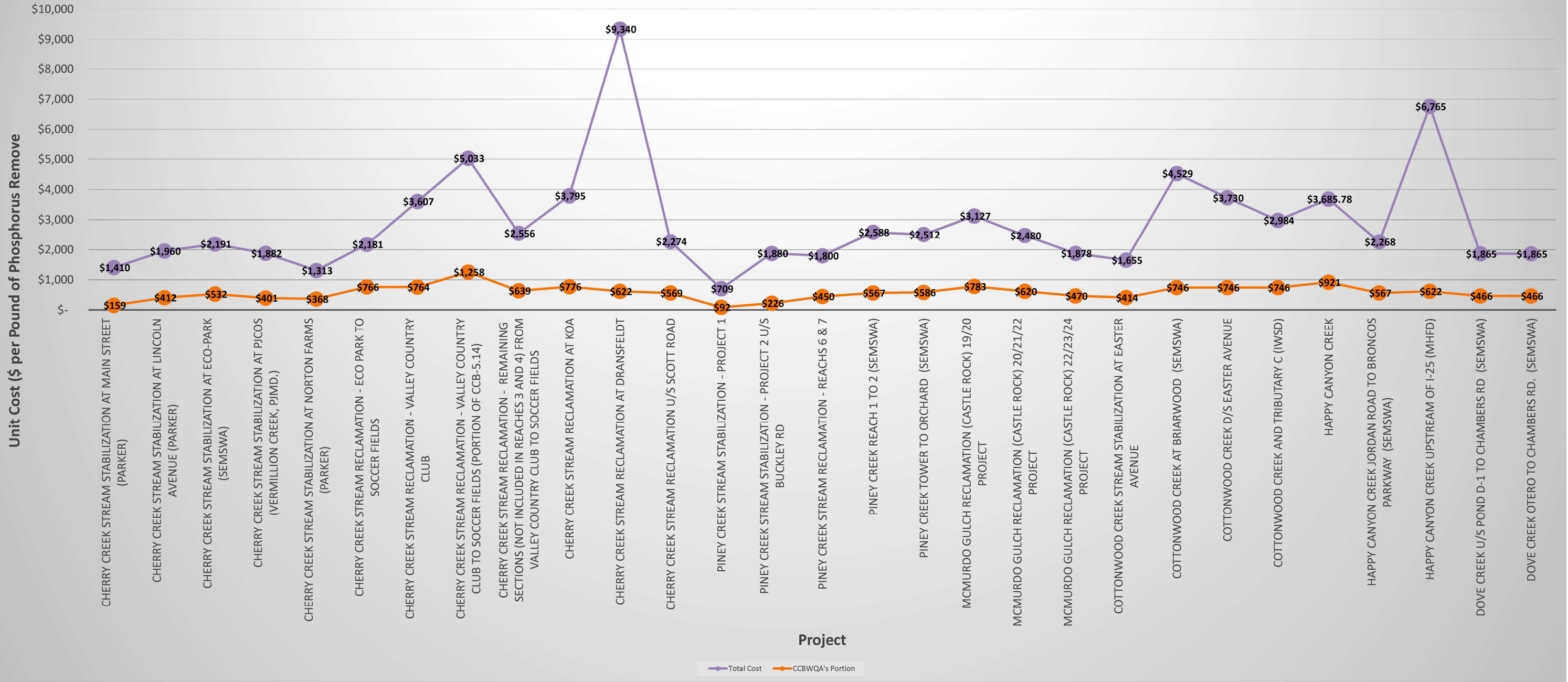


Figure 2 - Stream Reclamation outside of CCSP





Action Item Memorandum

To: CCBWQA TAC
From: Jessica DiToro, PE, LRE Water
Date: October 24, 2022
Subject: Lake Nutrients WQCC Rulemaking Hearing

Request: That the CCBWQA TAC recommends that the CCBWQA Board resubmit its Responsive Prehearing Statement (RPHS) for the Lakes Nutrient Criteria Rulemaking Hearing with the attached 10-7-22 letter from Hydros included as an exhibit to the previously submitted RPHS.

Issue: On September 8th, the WQCC released an order in response to two motions requesting a delay in the Lake Nutrients Criteria Rulemaking Hearing (RMH) process. In the order, the WQCC ordered that the RMH be continued and rescheduled for April 10, 2023. All prehearing deadlines for the RMH were stayed until formally rescheduled. A virtual status conference was held on September 14th to establish a new schedule of events related to the RMH. On September 19th, the WQCC issued an official procedural order outlining the new schedule for the April RMH. The new RMH schedule can be found attached with CCBWQA TAC and Board meeting dates overlaid as Attachment 1 to this memorandum.

As part of the updated RMH schedule, the WQCD submitted a supplemental Proponent's Prehearing Statement (sPPHS) on October 5th. Prior to this, the WQCD had requested that stakeholders provide them with updated and corrected datasets so that the model could be rerun, and proposed criteria adjusted as appropriate. CCBWQA provided a corrected dataset to the WQCD in August with its original RPHS. The result of incorporating these updated and corrected datasets in the model is as follows:

Parameter	Original Proposal	Updated Proposal
Total Phosphorus (µg/L)	36	40
Total Nitrogen (µg/L)	600	610

Staff has reviewed the WQCD's sPPHS and has determined that it does not substantively affect the CCBWQA's previously submitted RPHS. Staff recommends that CCBWQA resubmit its RPHS so that it includes a brief letter from Hydros as an exhibit that describes the above statement in more detail. The letter from Hydros is attached below as Attachment 2 for review. Staff also recommends that the following sentence be added to the beginning of the RPHS: *"CCBWQA has reviewed the Division's Supplemental Proponent's Prehearing Statement and determined that it does not substantively affect the CCBWQA's previously submitted RPHS, as described in Exhibit X."*

Budget: Participation in this RMH effort is covered under the current CCBWQA regulatory budget for fiscal year 2022 and is also included in the draft budget for fiscal year 2023.

Recommendation: TAC recommends that the Board resubmit its Responsive Prehearing Statement for the Lakes Nutrient Criteria Rulemaking Hearing with the attached 10-7-22 letter from Hydros included as an exhibit to the previously submitted RPHS. Brief text referencing the exhibit will also be included in the revised RPHS.

Next Steps: If TAC approves the above recommendation, Staff will bring the supplemental RPHS and the 10-7-22 Hydros letter to the Board on November 17th for review and motion. If the Board moves to submit the supplemental RPHS and the Hydro letter exhibit, then CCBWQA's legal counsel (DGS) will file the supplemental RPHS as approved by the Board on November 17th by the December 21st due date.

Additionally, Staff will review the RPHSs submitted by the WQCD and other parties and provide updates to the TAC and Board as appropriate in January. CCBWQA Staff and legal counsel will engage with the WQCD as needed to negotiate between now and the Rebuttal Statement step of the RMH-process (Rebuttals are due February 15th).



MEMORANDUM

TO: Jane Clary, Cherry Creek Basin Water Quality Authority (CCBWQA) Technical Manager
FROM: Christine Hawley, Hydros Consulting
SUBJECT: Cherry Creek Reservoir and the Lakes Nutrient Standard WQCD Supplemental PHS
DATE: October 7, 2022

On August 3, 2022, the Water Quality Control Division (WQCD) proposed table value standards (TVS) for total nitrogen (TN) and total phosphorus (TP) in lakes and reservoirs in their proponent's pre-hearing statement (PPHS)¹. As requested by the Cherry Creek Basin Water Quality Authority (CCBWQA), Hydros conducted an analysis² to evaluate the applicability/appropriateness of the WQCD for to Cherry Creek Reservoir (CCR). On October 5, 2022, the WQCD provided a supplemental pre-hearing statement (sPHS)³, which included changes to the TVS values. Hydros has since reviewed the newly proposed TVS values in the sPHS and concludes that the findings from the original analysis of applicability/appropriateness for CCR remain unchanged. Those findings can be summarized as follows:

- The WQCD-proposed TN and TP standards for CCR do not reflect the observed Chl *a* response relative to the CCR Chl *a* standard. Based on this comparison, the proposed TN and TP standards are significantly overprotective for CCR.
- Data from CCR used in the WQCD methodology do not fit the WQCD stressor-response model and tend to fall below the WQCD-designated lines defining both Chl *a*:TP and Chl *a*:N relationships. This further indicates that the proposed standards would be overprotective for CCR.

Based on this analysis, it is strongly recommended that CCBWQA move forward with efforts to develop site-specific standards for TN and TP for proposal at the next South Platte Basin RMH (2025).

¹ WQCD. 2022a. Prehearing Statement of the Water Quality Control Division to the Colorado Water Quality Control Commission. August 3, 2022.

² Hydros Consulting Inc. 2022. Applicability of WQCD-Proposed TN and TP Standards to Cherry Creek Reservoir. Technical memorandum from C. Hawley (Hydros) to J. Clary (CCBWQA). August 8, 2022.

³ WQCD. 2022b. Supplemental Prehearing Statement of the Water Quality Control Division to the Colorado Water Quality Control Commission. October 5, 2022.

MEMORANDUM

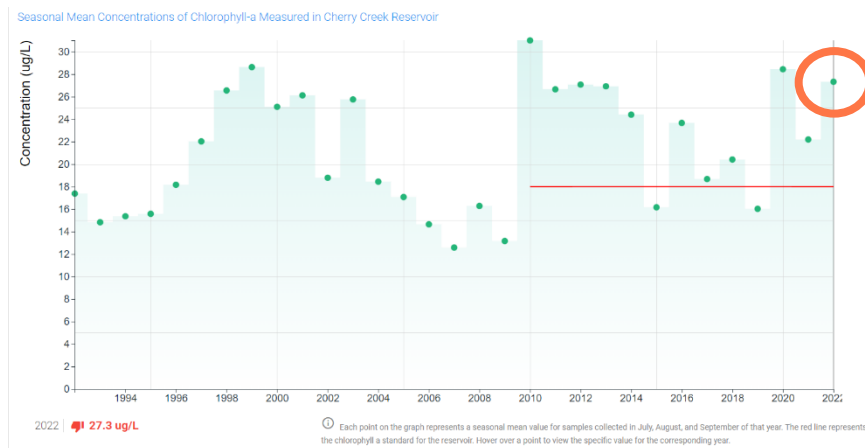
Date: 10/26/22
To: Cherry Creek Basin Water Quality Authority TAC
From: Erin Stewart, LRE Water
Subject: Water Quality Update – Nov 2022

CCBWQA Data Portal Water Quality Update Page Link - <http://ccbwqportal.org/wq-update/chlorophyll-a>

- Navigate to Chl- α , CCR Inflow Concentrations and Comparison, Field Depth Profile, Nutrients Depth Profile

The Water Quality Update pages provide a brief visual of the data collected during the current water year (WY 2022 - October 2021 through September 2022) with the data from previous years available as a reference. This memo provides a brief description of the highlights from the most recent monitoring data available on the data portal.

Chlorophyll- α



Chl- α concentrations are measured in Cherry Creek Reservoir from March through December. The water quality chl-a standard is based on a seasonal average of 18 $\mu\text{g/L}$ from July through September, with seasonal averages shown on the graph from 1992 through 2022. The mean seasonal chl- α concentration for 2022 is 27.3 $\mu\text{g/L}$, which does not meet the standard. The highest chl- α concentrations were measured during the cyanobacteria blooms in July. Concentrations decreased significantly after the storm in mid-August but increased again in late August and September.

CCR Inflow Phosphorus and Nitrogen Concentrations and Comparison to 5-Year Average (2017-2021)

Site	Cherry Creek @ CC-10		Cottonwood Creek @ CT-2		
	Month – FLOW	Total Phosphorus ($\mu\text{g/L}$)	Total Nitrogen ($\mu\text{g/L}$)	Total Phosphorus ($\mu\text{g/L}$)	Total Nitrogen ($\mu\text{g/L}$)
June BASE		274 (241)	827 (963)	63 (59)	841 (876)
June STORM		313	1560	71	1760
July BASE		258 (306)	916 (992)	58 (76)	1290 (1343)
July STORM		-	-	107	1990
August BASE		310 (263)	570 (787)	61 (63)	774 (1234)
August STORM		620	2950	240	2550
Sept BASE		239 (186)	563 (838)	65 (82)	953 (1,701)

* 2017-2021 5-year mean concentration values are shown in parentheses for reference.

The averages of the base flow and storm flow concentrations are calculated monthly. Although the values do not represent flow-weighted concentrations, the simple averages are included to provide a comparison to long-term monthly average concentrations.

Cherry Creek

In comparison to the 5-year mean (2017-2021), the base flow TP concentrations in Cherry Creek were **higher** in June, August, and September but **lower** in July. The base flow TN concentrations in Cherry Creek in June, July, August, and September 2022 were **lower** than the 5-year mean (2017-2021).

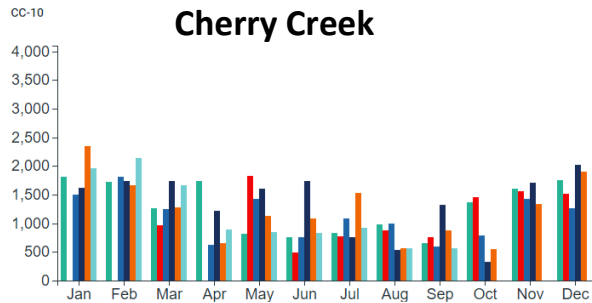
Cottonwood Creek

In comparison to the 5-year mean (2017-2021), the base flow TP concentrations in Cottonwood Creek in 2022 were **higher** in June but **lower** in July, August, and September. The base flow TN concentrations in Cottonwood Creek in June, July, August, and September 2022 were **lower** than the 5-year mean (2017-2021).

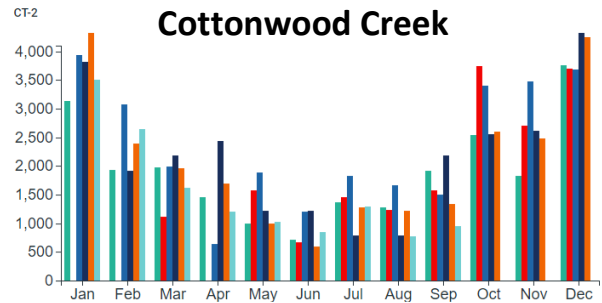
Total Nitrogen (ug/l)

● 2015 ● 2016 ● 2017 ● 2018 ● 2019 ● 2020 ● 2021 ● 2022

cc-10



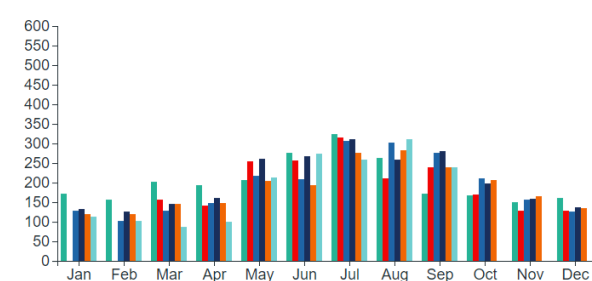
CT-2



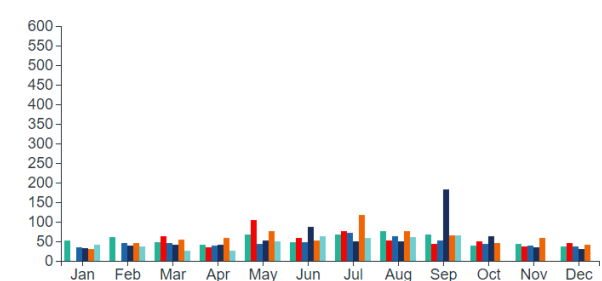
Total Phosphorous (ug/l)

● 2015 ● 2016 ● 2017 ● 2018 ● 2019 ● 2020 ● 2021 ● 2022

cc-10



CT-2

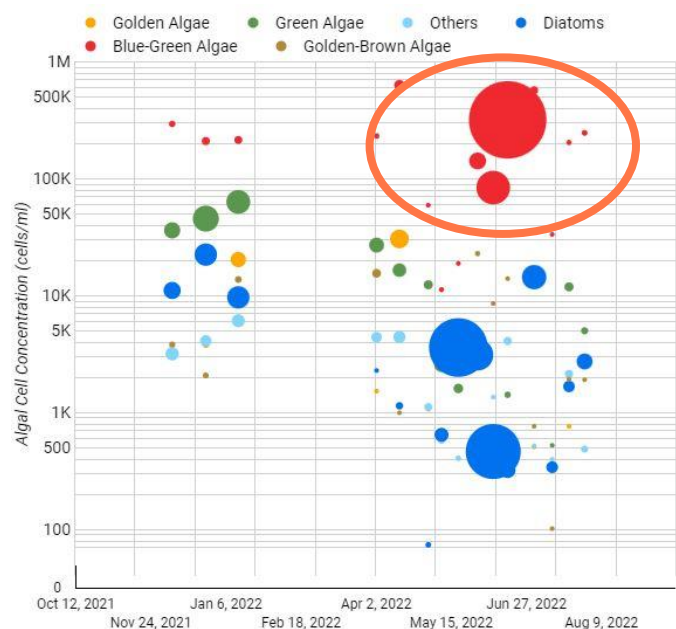


Plankton

Phytoplankton populations or “algae” are analyzed from Cherry Creek Reservoir monthly when ice is off (March-December).

In late June, a moderate bloom was observed and identified as Dolichospermum. Again, in early July through mid-month, the bloom appeared to be persisting and was very dense out throughout Reservoir. The July bloom was identified as Aphanizomenon, a potentially toxic cyanobacteria. The **orange** circle on graph highlights the cyanobacteria concentrations (counts) and biovolume during this period (larger circle = ↑ biovolume). “Caution” or “Warning” signs were posted but no closure was required since laboratory analysis did not detect toxin above the threshold limit.

Later in August and September, the bloom dissipated and did not appear again.



Cherry Creek Basin Water Quality Authority							
Land Use Referral Summary							
Prepared:	October 27, 2022						
October has yielded 18 reviews to date down from 26 in September. 6 were commercial, 5 were residential, 4 were mixed use 2 were road and bridge, and 1 was parks and open space land use submittals.							
Oct-21							
Referral Agency	Proposed Development	Type of Land Use	Date Received	Review Deadline	Approx. Dev. Size (acres)	Review Date	Comments
Town of Parker	Kime Ranch	residential	10/3/2022	11/2/2022	42.9	10/7/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction BMPs 3. Construction Drawing file was unable to download from Etrakit, please send a copy of the construction drawings to landusereferral@ccbwwqa.org for our review of the Construction BMP plan.
Town of Parker	Newlin Crossing F3	residential	10/3/2022	11/2/2022	100.7	10/12/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction BMPs 3. When available please provide the construction disturbance phasing and schedule to show the maximum disturbance area and duration of disturbance. Please reference Control Regulation Section CR72.72.7(2.(b)(5)(i)A for construction BMP phasing requirements
Douglas County	South Metro Fire Rescue Authority, Amended and Restated Service Plan	Mixed use	10/4/2022	10/18/2022	0	10/10/2022	No exceptions taken with the amended service plan
City of Aurora	CATTLEMENS AT EAGLE BEND FLG #01	residential	10/4/2022	10/18/2022	9.1	10/11/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction BMPs 3. No further referrals to the Authority on this project are required
City of Castle Rock	Four Corners	Other - Road & Bridge	10/4/2022	Not provided	3	10/12/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction or Construction BMPs 3. No further referrals to the authority on this project are required.
Town of Parker	Lincoln Professional Park L3 - Andy's Custard	commercial	10/5/2022	11/2/20022	3.6	10/21/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the construction BMPs (Erosion Control Plain) submitted with the Project CDs. 3. Please provide a drainage letter or report detailing the proposed post construction BMPs or existing post construction BMPs for the site. 4. The authority reserves the right to review and comment on future submittals for the project.
Douglas County	6685 S State Highway 83	commercial	10/5/2022	10/26/2022	100	10/25/2022	The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). The post-construction BMPs for animal waste management includes prevention of groundwater and surface water contamination . Provide description of BMPs taken to prevent groundwater and surface water contamination (i.e. containment of manure storage/pile, storage/pile and application to pastures are outside of waterways and ditches); provide this information so that it can be reviewed. The Authority reserves the right to review and comment on future submittals.
City of Aurora	CATTLEMENS AT EAGLE BEND FLG #01	residential	10/10/2022	10/12/2012	9.1	10/12/2022	Signature set. No exceptions with the previous submittal
Douglas County	Douglas County Zoning Resolution (Zoning Resolution) Sections 3, 4, and 36	commercial	10/7/2022	11/7/2022	NA	10/19/2022	No exceptions taken with the amendment to the zoning resolutions. The authority reserves the right to review individual proposed developments (vet clinics) within the Cherry Creek Basin when they become available.
SEMSWA	Cobblestone Car Wash - Parker Rd	commercial	10/7/2022	10/19/2022	1.4	10/17/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction BMPs. 3. When construction BMPs (GESC Plan is available please provide for our review and comment.
City of Aurora	SMOKY HILL CROSSING FLG #01	commercial	10/13/2022	10/18/2022	0.9	10/17/2022	Previously reviewed 2334 1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction or Construction BMPs 3. No further referrals to the authority on this project
Douglas County	Rueter-Hess Reservoir Oxygenation Project, Parker Water & Sanitation District Location and Extent Request	Other- Utility	10/12/2022	10/26/2022	6.4	10/19/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction BMPs 3. Provide construction BMPs (GESC) for our review and comment when available.
City of Castle Pines	The Canyons Planned Development, 4th Amendment	Other - Parks and Open Space	10/19/2022	11/19/2022	320	10/24/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the Development Plan amendment; when detailed development plans in this amended area are available, the authority reserves the right to review and comment on future referrals.
City of Aurora	Kings Point North East	residential	10/21/2022	11/4/2022	908	10/24/2022	Previously reviewed 2337 Previous Comments Not addressed please see below: 1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. As noted in the drainage report, a variance was requested to bypass structural water quality for the rear portion of the lots backing Antelope creek. Tier 3 post construction BMPs are still required for these areas; please provide more detail of the acceptable post construction BMPs for the areas and provide supporting calculations. Utilization of existing landscape for runoff reduction BMPs is acceptable provided runoff reduction meets design criteria outlined in the USCDM Vol.3, however more information and supporting calculations needs to be provided. 3. This site includes development in the stream preservation areas which requires additional post construction BMPs per the CR72. See Section 72.7 (2.(c.)(8)(i) of the CR72 for more information regarding the requirements. Please explain what additional BMPs are being provided to meet these requirements. 4. The authority reserves the right to review and comment on future referrals for the project
CDOT	Parker Road Resurfacing and Pedestrian Improvements	Other - Road & Bridge	10/26/2022	Not Provided	0.57	10/26/2022	Previously Reviewed 2441 No exceptions taken with the Authorized exclusion for post construction BMPs for sidewalk construction

City of Centennial	Joliet Live-Work Units (PLAT)	Mixed use	10/24/2022	11/14/2022	5.8	10/27/2022	No exceptions taken with the proposed plat. See additional comments submitted for SITE-22-2022
City of Centennial	Joliet Live-Work Units	Mixed use	10/24/2022	11/14/2022	5.8	10/27/2022	1. The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction BMPs. 3. When construction BMPs (GESC plan) are available, please provide for our review and comment
SEMSWA	Joliet St Live Work	Mixed use	10/25/2022	11/11/2022	5.8		

CHERRY CREEK BASIN WATER QUALITY AUTHORITY
2022 Capital Project, Maintenance, and Planning Status Report
October 13, 2022

RESERVOIR PROJECTS

1. Reservoir Destratification System (RDS)– Distribution System Concepts (CCR-2)
 - a. Description: The RDS in-lake distribution system consists of several lines and 116 membrane disc diffusers that create the bubble plumes to help mix the reservoir and improve water quality. The RDS reduces the chlorophyll a in the reservoir. The RDS was originally installed in 2008. The in-lake distribution which has been requiring increased maintenance in 2019-2021, which is indicating that replacement may be needed within the 10-year CIP window. In January 2020, Wright Water Engineers (WWE) evaluated in-lake treatment in the Reservoir included an expansion of existing destratification system. This project evaluates the replacement and/or upgrade of the distribution system and informs cost and timing of the work.
 - b. Status: Project is waiting on watershed model runs, at which time it will be brought back to TAC and Board for further discussion, input, and direction (3/31/22).

2. Reservoir Nutrient Mitigation Alternatives Study (CCR-3)
 - a. Description: Nutrients in the Reservoir fuel the chlorophyll a level. In January 2020, Wright Water Engineers (WWE) evaluated in-lake treatment in the Reservoir. In 2021, Solitude Lake Management performed a sediment sampling and testing in the Reservoir. This study combines this recent work with CCBWQA's ongoing water quality sampling in the reservoir and the reservoir model, to inform options to reduce nutrients in the reservoir and refine their viability.
 - b. Status: *Alternatives study has been moved to 2024 pending feasibility and modeling results.*

3. East Shade Shelters Phase III and Tower Loop Phase II Shoreline Stabilization (CCB-17.5 and CCB-17.7)
 - a. Description: These projects were identified in 2014 through the annual inspection. The Tower Loop Phase II connects to the Phase I project and extends shoreline protection 570 feet to the southeast towards Dixon Grove. The East Shade Shelters Phase III starts on the north end of the Shade Structure and goes 400-feet to the south.
 - b. Status: Consultant selection is scheduled for the 1st quarter. A consultant selection committee will be set in February (1/29/21). At the February TAC meeting Jason Trujillo, Jon Erickson, Lanae Raymond, Bill Ruzzo were interested in serving on the consultant selection committee (2/11/21). This selection committee was discussed at the 3/18/21 Board Meeting, and no further members were added. The Request for Proposals (RFP) has been posted on BidNet and Proposals are due 04/21/21 (3/25/21). The pre-proposal meeting was held on 4/7/21. 5 proposals were received on 4/28/21; the selection committee is reviewing them. Interviews were held and a selection is being brought to the May Board meeting (5/14/21). Board authorized negotiations with RESPEC (5/27/21). Agreement has been executed with RESPEC (10/15/21). Field Survey of project areas and topographic mapping is underway (12/30/21). A design kickoff meeting was held on 4/22/22. A design sprint workshop was held on 7/12/22 which included a site visit and evaluation of alternatives. RESPEC is developing a recommended alternative (9/8/22). *RESPEC provided updated project costs for budgeting and is working on 30% submittal (10/13/22).*

STREAM RECLAMATION PROJECTS

1. Cherry Creek Monitoring Station CC-10, Flow Measuring Improvements (CCB-5.13)
 - a. Description: This project was identified in 2019 as part of the exploration of the downcut area and through the flow analysis with during the reservoir and watershed modeling effort. It installs equipment upstream of the perimeter road that would be used to measure the flow

that splits off to the west and bypasses the CC-10 and provide a new rating curve at CC-10 to improve measurements of high flow at this location.

- b. Status: RESPEC provided scope of work and fee for the engineering and survey work needed, and it was approved by the Board at their April 2020 meeting. Survey is scheduled for 5/29/20. Survey is complete. Updated rating curves are scheduled to be delivered by late September. Received update from RESPEC that information is under Quality Assurance and Quality Check review and will be submitted soon (10/8/20). RESPEC's draft memo was received on 12/4/20 and comments have been returned. A meeting was held with Erin, Chuck, Chris, and Rich on 12/16/20 to discuss measuring station improvements and scheduling. A tour with Jason Trujillo was held on 2/12/21, no fire damage was noted on CC-10. A stage gage will be added upstream of Lake View Drive to allow for flow measurement of flows that bypass CC-10 and go directly to Cherry Creek reservoir (3/12/21). Work order has been prepared to Hydrologik for stage measurement at Lake View Drive (4/13/21). Hydrologik has installed the stage measurement at Lake View Drive and RESPEC has submitted the Final Draft of the Rating Curve and it is currently under review (8/13/21). Comments on report have been provided to RESPEC (11/11/21). Additional analysis on rating curve for CC10 was done to determine effects of reservoir level (3/31/22). RESPEC prepared a detailed rating curve for Lake View Drive which will facilitate flow comparison between CC10 and Lake View Drive (5/13/22).
2. Cherry Creek Stream Reclamation at Arapahoe Road aka Reaches 3 and 4 (CCB-5.14C)
 - a. Description: This project continues the work on Cherry Creek by CCBWQA, MHFD, and local partners. It ties into the previous stream reclamation projects of Cherry Creek Eco Park to Soccer Fields (CCB-5.14A) and Cherry Creek at Valley Country Club (CCB-5.14B). The 5,167 Linear Feet of stream reclamation reduces bed and bank erosion immobilizing approximately 88 pounds of phosphorus annually. The project is anticipated to be funded over several years and likely be broken into phases.
 - b. Status: In 2021, and IGA was executed between CCBWQA, MHFD, City of Aurora, and SEMSWA to begin this work. IGA Amendment that brings in 2022 funding is under review (5/13/22). Board authorized IGA Amendment for 2022 funding on 7/21/22 (8/12/22). *IGA Amendment has been revised to show Aurora's lower participation; CCBWQA's participation was lowered accordingly to meet 25% partner project level; revised IGA Amendment received TAC recommendation and is being taken to Board for their consideration in October (10/13/22).*
 3. Cherry Creek Stream Reclamation at 12-Mile Park – Phase 3 (CCB 5.16A)
 - a. Description: The design contract with CH2M Hill was executed on November 27, 2018. Notice to proceed included only those services defined as Phase 1 in CH2M Hill's scope of services. As part of the approved Action Item Memo to the Board, staff recommended that a design review committee consisting of the Capital Projects Manager and up to three TAC members be established. The not-to-exceed fee totals \$104,991.88; with the Part 1 services not-to-exceed fee of \$45,078.88, and the Part 2 services not-to-exceed fee of \$59,913.00. The design review committee is David Van Dellen, Jacob James, Casey Davenhill, Bahman Hatami/Jon Erickson, and Richard Borchardt. CH2M Hill is now Jacobs.
 - b. Status: Jacobs is starting data collection for topographic survey and wetland mapping. Survey is scheduled to start 2/28/19 and is coordinated with Colorado State Parks. Survey has been completed and wetland mapping is underway. Jacobs has prepared updated schedule to account for weather delays on surveying and wetland mapping. The design kickoff meeting was held on 5/15/19. Jacobs is preparing concepts and costs for 4 alternatives. A field visit and progress meeting are scheduled for 8/8/19. Jacobs presented alternatives and costs to the design review committee on 8/8/19. Jacobs and the design review committee are preparing a presentation on alternatives and costs for the TAC (9/5/19 and 10/3/19) and Board (10/17/19). Received authorization from Board at 10/17/19 meeting to move project forward in 2 phases; Jacobs is working on scope of work adjustments needed for this approach. Final design of phase 3A (protects existing work done in phases 1 and 2) and permit level design of Phase 3B (adaptive approach downstream of breach area)

are underway. A progress meeting was held on 1/30/20; design on Phase 3A is about 30% complete. The initial site visit with the Army Corps of Engineers has been cancelled due to stay at home orders, approach has changed to supplying them a draft of the materials and addressing questions and comments. Progress meeting and site visit to look at Phase 3B was held on 6/1/20. Scope of work and fee for adaptive management and preliminary design of Phase 3B is under review by committee. A joint Cherry Creek Committees meeting is scheduled for 10/5/20 to discuss optimization between the Cherry Creek 12-mile Phase 3B project and the Cherry Creek Reservoir to Park Boundary study. Phase 3A was submitted to the US Army Corps of Engineers for their 408 review on 11/4/20. Construction BMPs plan and report were reviewed and approved by Arapahoe County on behalf of Cherry Creek State Park on 12/22/20. Jacobs submitted draft Scope of Work (draft SOW) for the optimization for Phase 3B (north of breach repair) for adaptive management approach; the joint committee meeting is schedule for 2/3/21 to review SOW. A meeting is scheduled with USACOE's new contact Bobbi Jo Trout for CCBWQA on 2/1/21 where a status update on the 408 review will be requested. The Joint Cherry Creek Committees recommended holding off on Jacobs draft SOW, as the scope and scale of adaptive management may evolve with Muller's Study of the area between Reservoir and the Park Boundary; Bobbi is checking on status of 408 review (2/11/21). A site visit with Bobbi and Jason was held on 4/26/21 to help facilitate the USACOE's 408 review. A site visit with the Cherry Creek subcommittee was held on 6/24/21, plan modifications associated with additional erosion from spring 2021 runoff and Muller's study work on Cherry Creek are being evaluated by the Cherry Creek subcommittee. A coordination meeting was held on 7/12/21 with Jacobs and Muller to discuss updating the location cutoff wall and layout (based on the erosion from the 2021 Spring runoff and the Muller's geomorphic and 2D modeling effort); Jacobs is preparing exhibits for subcommittee's discussion and consideration (7/29/21). The subcommittee met on 8/12/21 and provided Jacobs direction on cutoff wall location and plan revisions. Revised plans and engineer's opinion of probable construction cost has been sent to project committee (11/11/21). Board is considering the release of the project to Bid (12/9/21). Board authorized project for bidding with the base bid and add alternate at their December 2021 meeting. We received confirmation that plan revisions made are still in conformance with 408 approval; are waiting for response regarding revisions and the 404 permit; received approval on GESC plans and report (12/30/21). CCBWQA received concurrence on conformance with existing 404 permit and project is out for bid (1/13/22). The project is out to bid and the pre-bid meeting was held on 1/28/22. CCBWQA received 10 bids on 2/4/22; the low bidder is 53 Corporation. Notice of Award has been issued to 53 Corporation (3/10/22). Construction Agreement has been executed (3/31/22). The pre-construction meeting was held on 4/6/22 with construction scheduled to start on 4/25/22. Construction is underway (5/13/22). Construction is nearing completions with the final walk-through was held on 6/14/22. Project is substantially complete and is waiting for seeding and planting window to complete willow staking and touch up seeding (7/15/22). Jacobs is scheduled to do a site visit on 9/9/22 to evaluate post-storm condition and recommend repairs needed because of the 8/15/22 storm. *Repairs are minor and are being scheduled with 53 Corporation (10/13/22).*

4. Cherry Creek Stream Reclamation – Upstream of Scott Road (CCB-5.17)
 - a. Description: Design and construction of stream reclamation is in partnership with Douglas County and MHFD. It improves 4,100 feet of Cherry Creek and is located upstream of Scott Road.
 - b. Status: IGA was approved by the Board at their April 2020 meeting. Muller had been selected as consultant, and design scope of work is being prepared. Kickoff meeting was held on 12/11/20; a follow-up field visit will be scheduled for early 2021. Site visit was held on 1/29/21. Conceptual design is complete, negotiations are underway to contract for 60% design (4/8/21). Muller is working on alternatives (4/30/21). Muller is working on preliminary design and an IGA Amendment to bring in additional 2021 funding from Douglas County is being brought to the Board in October (10/15/21); IGA Amendment has been executed (11/11/21). Muller is preparing 60% Design Submittal (1/28/22). Muller submitted 60% Design on 2/2/22; comments have been provided on 60% Design Submittal (3/10/22). IGA

Amendment bringing in 2022 funding is scheduled for TAC and Board consideration in June (5/27/22). IGA Amendment was authorized at the June 16th Board Meeting (6/30/22).

5. Cherry Creek Stream Reclamation at Dransfeldt (CCB-5.17.1B)
 - a. Description: Design and construction of stream reclamation is in partnership with Town of Parker and MHFD. It improves 2,400 feet of Cherry Creek near the future location of Dransfeldt bridge which is just downstream of the Cherry Creek at KOA project.
 - b. Status: Initial scoping has begun, and a partners meeting was held on 1/30/21. IGA is scheduled for CCBWQA's May TAC and Board meetings (4/30/21). IGA was approved by all parties and has been executed (6/25/21). Muller Engineering has submitted their Draft Scope of Work for Design Services, and the project sponsors have reviewed it (7/8/21). Design kickoff meeting was held on 10/14/21. Alternatives are being evaluated (12/9/21). Pre-submittal meeting for the 404 permit is being scheduled (12/30/21). CLOMR is being prepared for project (3/10/22) and was submitted to FEMA on 3/31/22. CEI was selected for as project partner to provide contractor input during the design (5/27/22). CLOMR is under review by FEMA (8/12/22).
6. McMurdo Gulch 2020/2021/2022 Stream Reclamation (CCB-7.2)
 - a. Description: The design and construction of stream reclamation is in partnership with Castle Rock. Castle Rock is the lead agency. This phase continues the work from the previous project and the improves the next set of high priority areas about 2,500 feet. The Authority's water quality component share for design and construction is estimated to be \$360,000 (\$60,000 for design in 2020, and \$300,000 for construction in 2021). The total project cost is estimated at \$1,440,000.
 - b. Status: 2020 Funding was approved at June Board Meeting and capital budget restructure will be drafted for future consideration. 60% level progress meeting is scheduled for 10/5/20. Review comments on 60% submittal were provided on 10/6/20. 90% design submittal is scheduled by end of March (3/12/21). 90% design submittal is being reviewed (4/8/21). CCBWQA submitted comments on 90% design on 4/13/21. The 90% design review and progress meeting was held on 7/22/21, and the construction funding for project is being considered by the TAC at their August meetings (7/29/21). The IGA is currently be drafted and will be brought to the Board at their September meeting (8/13/21). The project is being bid by Castle Rock with the bid opening scheduled for 11/12/21. Tezak Construction was the apparent low bidder (12/9/21). The pre-construction meeting was held on 1/3/22. Construction is underway (2/11/22). A construction meeting was held on 3/8/22, with sites 1-3 have the general construction completing and are waiting for a revegetation window and site 4 has started work on riffle structure. Seeding and revegetation are underway during spring planting window (5/13/22).
7. Lone Tree Creek in Cherry Creek State Park (CCB-21.1)
 - a. Description: This project includes a trail connection to Cherry Creek State Park and includes 570 linear feet of stream reclamation on Lone Tree Creek from the State Park Boundary to the Windmill Creek Loop Trail. The City of Centennial is the project lead. CCBWQA participation is for the stream reclamation only.
 - b. Status: 95% submittal is under review (5/13/22); review comments have been returned (5/27/22). Project funding was brought to TAC at their 7/7/22 meeting, during drafting of IGA it was discovered that future maintenance of stream reclamation should be considered, project will be brought back to TAC at an upcoming meeting for maintenance discussion and recommendation (8/12/22). *A stakeholder meeting was held on 9/29/22 to discuss maintenance.*
8. Happy Canyon Creek – County Line to Confluence with Cherry Creek (CCB-22.1)
 - a. Description: The design and construction are in partnership with Southeast Metro Stormwater Authority and MHFD and includes 2,500 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$325,000. The total project cost is estimated at \$1,300,000.

- b. Status: IGA is scheduled for June TAC and Board meetings (5/27/21). IGA has been approved and executed by all parties (7/29/21). Jacobs has been selected as design consultant and project scoping is underway; limits have been extended upstream to the County Line and sediment capture area and transport will be included with the project (10/15/21). Jacobs has submitted their scope of work and fee for design which is under review by project sponsors (11/11/21). Project sponsors have completed a review of Jacobs' fee and scope of work and the agreement is being routed for signatures (1/28/22). IGA Amendment to bring in 2022 funding is in process (3/10/22). A project kickoff meeting was held on 3/28/2022. A site visit was performed on 4/12/22 to document existing conditions and identify sediment source/transport/deposition areas. Project Team is preparing a sampling plan for bank and bed materials to determine phosphorous content (5/13/22). The project team met on 5/24/22 to discuss project goals and Jacobs is progressing through the study. Jacobs and ERC are working on sediment transport analysis and model (6/30/22). The results from the sediment transport model were presented at the 8/23/22 progress meeting and an upstream sediment capture area just south of the JWPP was included in the alternatives analysis (8/26/22). The alternative analysis report is expected to be completed before the end of 2022 (10/13/22).
9. Happy Canyon Creek - Upstream of I-25 (CCB-22.2)
- a. Description: The design and construction are in partnership with Douglas County, City of Lone Tree, and MHFD and includes 2,500 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$500,000. The total project cost is estimated at \$2,000,000.
- b. Status: Douglas County, City of Lone Tree, and MHFD have initially funded and selected Muller Engineering as the design engineer. Design has started and a progress meeting was held on 1/27/21. Design is progressing (2/11/21). Muller has submitted 60% Design Deliverables (5/27/21). IGA for 2021 Funding is being brought to Board in September (9/9/21). 2021 IGA Amendment has been executed (11/11/21). Coordination with CDOT and easement acquisitions are on-going (1/13/22). Board authorized 2022 funding and IGA Amendment at their June 16th meeting (6/30/22). The project received environmental clearance from CDOT (8/12/22). The 90% design submittal is scheduled for delivery by end of September (8/26/22). *The 90% design submittal is being reviewed (10/13/22).*
10. Dove Creek - Otero to Chambers Rd. (CCB-23.1)
- a. Description: The design and construction are in partnership with Southeast Metro Stormwater Authority (SEMSWA) and with Mile High Flood District (MHFD) being a key stakeholder; it includes 1,300 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$175,000. The total project cost is estimated at \$700,000.
- b. Status: SEMSWA is drafting the Intergovernmental Agreement to bring in the 2021 funding for the project (3/12/21). RESPEC is the design consultant; two conceptual design alternatives have been prepared and reviewed during meeting on 3/15/21. IGA is scheduled for CCBWQA's May TAC and Board meetings (4/30/21). IGA has been approved and executed by all parties (7/29/21). 30% Design Review Meeting was held on 8/23/21. A Progress meeting is scheduled for 2/26/22 with 60% Plan submittal expected to follow (1/28/22). The 60% Design was submitted on 2/16/2022, comments were provided, and a design review meeting was held on 2/23/2022. IGA Amendment to bring in 2022 funding is in process (3/10/22). Construction costs were prepared by CEI based on 60% submittal (5/13/22). A design progress meeting was held 6/14/22 and 90% design submittal is being prepared (6/30/22). 90% design submittal is expected by the end of July (7/15/22). The 90% design submittal was reviewed, and comments were submitted on 8/22/22. *Construction is anticipated in 2023 (10/13/22).*
11. Piney Creek from Fraser Street to Confluence with Cherry Creek aka Reaches 1 and 2 (CCB-21.1)
- a. Description: This project includes 2900 liner feet of stream reclamation on Piney Creek. The project partners are SEMSWA and CCBWQA.

- b. Status: Project coordination meeting was held with SEMSWA on 6/29/22. IGA drafted and is being reviewed by SEMSWA (8/12/22). IGA was approved by CCBWQA at the 9/15/22 Board meeting.

MAINTENANCE

1. Reservoir Destratification Operations (OM-7)
 - a. Description: Includes 2022 Annual Operations and Maintenance of the Reservoir Destratification System (RDS).
 - b. Status: Ingersoll Rand replaced the top pressure regulating valve on 4/4/22; the pre-season check was done simultaneously, and no leaks were observed. The RDS was started for the season on 5/1/22. At the request of Colorado Parks and Wildlife (CPW) to aid in search and recovery efforts the RDS was turned off on 5/10/22 and it will be started back up when notified by CPW that it is appropriate. The RDS was restarted on 5/14/22. Ingersoll Rand performed compressor maintenance on 6/14/22 and B&RW repaired a leaky diffuser head on 6/22/22. Annual maintenance on the in-lake distribution system started on 8/22/22 and 8/23/22 with the remaining maintenance scheduled for the end of September. Compressor shut down with a high temperature warning on 9/2/22; the Ingersoll Rand technician responded on 9/7/22, cleaned out coolers, and restarted compressor. *A leak in the reservoir distribution was observed on 9/15/22, the affected zone 1 was turned off until repairs can be made, repairs were completed on 9/27/22 and zone 1 was turned back on then. Annual maintenance continued the week of 10/3/22 and when it was completed the system was turned off for the season on 10/6/22.*
2. PRF Weed Control (OM 14.1)
 - a. Description: Includes 2022 weed control from 2021 Annual Observation of Pollution Reduction Facilities (PRFs).
 - b. Status: *No weed control was performed in 2022.*
3. PRF Reseeding at CCSP (OM 14.2)
 - a. Description: Includes 2022 routine restoration of PRF vegetation at Cherry Creek State Park (CCSP) from 2021 Annual Observation of Pollution Reduction Facilities (PRFs).
 - b. Status: Is being scheduled for Fall seeding window (5/13/22).
4. Mountain and Lake Loop Shoreline Stabilization Phase II (OM 4.6)
 - a. Description: This project was identified in through the 2020 annual inspection and design and permitting started in 2021. It adds about 40 feet of shoreline protection where it has eroded leaving a 1-2 foot tall vertical bank.
 - b. Status: Construction Plans have been prepared and the GESC was submitted to Arapahoe County for review (1/13/22). Plans are being reviewed by US Army Corps of Engineers for 408 clearance (5/13/22).
5. East Boat Ramp Shoreline Stabilization Phase II (OM 4.6)
 - a. Description: This project was identified in through the 2012 annual inspection and design and permitting started in 2019. It connects to the Phase I project and extends shoreline protection 100 feet to the north towards the East Shade Shelters.
 - b. Status: Field work has been completed on the East Boat Ramp Shoreline Stabilization and design is underway. Permitting Meeting was held on 9/16/19. ERO has been contracted to for 404 permitting assistance. Preliminary Design was completed on the East Boat Ramp in December 2019; permitting and final design has begun. Design is about 80% complete. Site meeting with Colorado Parks and Wildlife was held on 3/25/20. ERO has prepared 404 permit application on 4/30/20. 404 permit application has been submitted. East Boat Ramp Plans were submitted on 8/26/20 to USACOE and Cherry Creek State Park staff for their review and approval. USACOE's 408 approval was received and final bid documents are being prepared (1/29/21). Contract Documents are being updated for Bidnet (5/27/21). GESC is being prepared (11/11/21). GESC was submitted to Arapahoe County for review

(1/13/22). Project is out for bid (5/13/22). The pre-bid meeting was held on 5/25/22. The bid opening was on 6/8/22 with 53 Corporation being the low bidder. The Board authorized the award to 53 Corporation and the construction funding at their June 16th meeting (6/30/22). 53 Corporation started construction on 8/22/23. *Project is nearing completion and final walk-through was held on 10/4/22.*

6. 2021 Wetland Harvesting Pilot Project (OM WHPP)
 - a. Description: Includes 2021 Wetland Harvesting on Cottonwood Creek (Western Bank) to remove Phosphorus and Nitrogen. Harvesting cuts the above ground biomass, collects and hauls off cuttings effectively removing the Phosphorus and Nitrogen trapped in the cuttings. The preserved below ground biomass will regenerate and regrow, creating a sustainable harvesting program that retains the natural and beneficial functions of the wetlands.
 - b. Status: The Board authorized Wetland Harvesting Pilot Project at their March 2021 meeting (8/13/21). The Pilot Project started on 10/11/21, a site visit was made on 10/13/21, and is scheduled to be completed by 10/31/21. Field work has been completed (11/11/21). Lab data is being compiled (12/9/21). LRE Water is preparing a google earth and GIS boundaries of 2021 harvest limits (12/30/21). Lab data on vegetation samples was received and nutrient removal information from 2021 harvesting is being developed (1/28/22). The 2021 update and data were presented to TAC at their 4/7/22 meeting. Presentation of 2021 Update is scheduled for the May Board meeting (5/13/22). An update on the regrowth of the 2021 Harvest Area will be provided at the 8/18/22 Board Meeting and 9/1/22 TAC Meeting.
7. 2022 Wetland Harvesting Pilot Project (OM WHPP)
 - a. Description: Includes 2022 Wetland Harvesting on Cottonwood Creek (Eastern Bank) to remove Phosphorus and Nitrogen. Harvesting cuts the above ground biomass, collects and hauls off cuttings effectively removing the Phosphorus and Nitrogen trapped in the cuttings. The preserved below ground biomass will regenerate and regrow, creating a sustainable harvesting program that retains the natural and beneficial functions of the wetlands.
 - c. Status: Action for 2022 is scheduled for the May Board meeting (5/13/22). The Board authorized the wetland harvesting work for 2022 (5/27/22). L&M is preparing proposal for 2022 wetland harvesting (8/12/22). The 2022 wetland harvesting is scheduled from 9/12/22 to 9/23/22 (8/26/22). *The 2022 wetland harvesting has been completed; lab results of samples, area measurement, and final weights of harvesting are in progress (10/13/22).*

PLANNING

1. Cherry Creek Master Plan Cherry Creek State Park Boundary upstream to the Mile High Flood District Boundary (PAPM-0)
 - a. Description: The Mile High Flood District (MHFD), Southeast Metro Stormwater Authority, Town of Parker, Douglas County, and CCBWQA are preparing a Major Drainageway Planning Study for Cherry Creek upstream of Cherry Creek Reservoir. The Plan identifies potential Pollution Abatement Projects (PAPs). Potential PAPs are stream reclamation (immobilizes phosphorus in soil).
 - b. Status: Muller Engineering has been selected as the consultant for the project and their scope of work and fee and currently under review by the project sponsors. Field visits by the consulting team started on 10/8/20 and were completed on 11/6/20. Progress meeting was held on 12/14/20, which included overview of field visits. At the 2/8/21 progress meeting, a water quality parametric was discussed, and could be mapped and used to identify deficiencies along Cherry Creek. Muller is scheduled to present at TAC at the 5/6/21 TAC meeting, and the 2021 Water Quality Planning Scope of Work and Fee will be considered at CCBWQA's May TAC and Board meetings (4/30/21). Muller provided update and 2021 Water Quality Planning work was authorized (5/27/21). A progress meeting was held on 10/11/21. Muller has added a water quality parametric to the overall stream assessment exhibit and is working with RESPEC to include information from watershed model (12/30/21). A draft storyboard of the work was presented at the progress meeting on 4/11/22. Water Quality text for StoryMap/WebPlan submittal is scheduled for mid-August (7/15/22).

Received water quality submittal on 8/26/22 and it is being reviewed (9/8/22). *Muller is incorporating final comments and presented story map at the 9/23/22 Cherry Creek Stewardship Conference.*

2. Cherry Creek Tributaries Major Drainageway Planning (PAPM-1)
 - a. Description: The Mile High Flood District (MHFD), City of Aurora, Southeast Metro Stormwater Authority, and Douglas County are preparing a Major Drainageway Planning Study for Cherry Creek Tributaries upstream of Cherry Creek Reservoir and Dewberry / J3 is the consultant. The tributaries included are Little Raven Creek, Suhaka Creek, Joplin Tributary, Grove Ranch, Valley Club Acres, North Arapahoe Tributary, South Arapahoe Tributary, Chenango Tributary, Tagawa Tributary, Kragelund Tributary, and 17-mile Tributary. This project identifies potential Pollution Abatement Projects (PAPs) within the Cherry Creek Tribs MDP and the areas of those tributaries in CCSP. Potential PAPs are stream reclamation (immobilizes phosphorus in soil) and water quality treatment within detention basins (settlement of sediments and attached phosphorus).
 - b. Status: Board authorized CCBWQA to enter into Agreement with Dewberry at their 2/20/20 meeting, and CCBWQA contracted with Dewberry. Dewberry conducted field work 4/28-4/30/20. Dewberry will continue CCBWQA's work in conjunction with hydrology and alternatives in MHFD master plan. Dewberry has submitted the Alternatives Memo which is being reviewed (10/15/21). Comments have been provided on Alternatives Memo (12/9/21). Dewberry is working on the grading of the proposed water quality ponds (6/10/22). Study progress meetings were held for 17-mile Tributary on 8/15/22 and Kragelund Tributary on 8/22/22. A study progress meeting was held for Chenango Tributary on 9/2/22.

3. Cherry Creek Stream Planning and Approach Study Reservoir to 12-Mile Park (BAPM-1)
 - a. Description: Several issues and concerns exist on Cherry Creek between the reservoir and 12 -mile Park: the continued head cut erosion and fallen and dying trees, CCBWQA's CC-10 monitoring station's declining accuracy and reliability of flow measurements, Bank and bed erosion along Cherry Creek from Perimeter Road to downstream, and the change in flow path downstream of the Cherry Creek 12-mile Park Phase 2 project (Breach Area). This study will help determine the water quality implications of these issues, CCBWQA's approach and role in the area, and stake-holders and possible partners.
 - b. Status: Interim committee is being set up to negotiate with Muller and determine scope of work, fee, and deliverables for TAC and Board consideration. Interim committee consists of Bill Ruzzo, John McCarty, Jon Erickson, Jason Trujillo, Rich Borchardt, and Chuck Reid. The scoping meeting is scheduled for 3/30/20. Muller conducted field assessment work on 4/28/20. Drone video is pending permit approval by USACOE. Muller has submitted draft base scope of work and optional additional services, which are being reviewed and considered by interim committee at their next meeting on 5/4/20. The next scoping meeting with interim committee and Muller is scheduled for 5/15/20; with a final draft of scope and fee being prepared for consideration shortly afterwards. Muller's scope of work and fee were distributed to TAC and Board authorized design services at their April 2020 meeting. Muller's revised scope and fee is being reviewed by committee. The study committee of John McCarty, Bill Ruzzo, Jacob James, Lanae Raymond, David VanDellen, and Jon Erickson has been formed to assist with decisions and direction during study. The kickoff meeting was held on 8/11/20. A joint Cherry Creek Committees meeting is scheduled for 10/5/20 to discuss optimization between the Cherry Creek 12-mile Phase 3B project and the Cherry Creek Reservoir to Park Boundary study. Muller is preparing draft scope of work for the optimization approach (11/12/20). Muller has submitted the draft scope of work and fee for the optimization approach on 12/9/20. Muller revised draft Scope of Work (draft SOW) for the optimization to include sub-consultant work; the joint committee meeting is schedule for 2/3/21 to review draft SOW. The Joint Cherry Creek Committees and TAC have reviewed the draft SOW, and the final version is being included for Board consideration at their February Board Meeting (2/11/21). The Board approved Muller's Optimization work at their February Board Meeting (2/26/21). Muller plans to provide an update at July TAC meeting (4/30/21). Muller provided a draft submittal of historical site information and the survey efforts on

5/24/21. Muller will provide an update at the July TAC and Board Meetings (6/25/21). Please submit any comments on Draft report to Rich by 8/20/21 (7/29/21). Muller's additional scope of work for workshops and partnering efforts are scheduled was authorized by the Board in September (10/15/21); amendment to Muller's contract has been executed (11/11/21). It is anticipated that the workshop will be held in 2022 (12/30/21). Muller submitted the water quality assessment report on 4/9/22 which is currently being reviewed by the Pollution Abatement Project Manager. Comments on water quality study and monitoring have been sent to Muller (5/27/22). Muller is revising study to include comments (7/15/22). Muller has submitted revised channel monitoring report on 9/8/22. *Muller has submitted the revised stream assessment report on 10/10/22.*