



Floyd Hill - SWEEP ITF Meeting #5

Meeting Summary

January 24, 2023, 9:00 AM to 11:00 AM

Lookout Mountain Conference Room and Microsoft Teams Virtual Meeting

1. Welcome and Agenda Review

Mandy Whorton, Peak Consulting welcomed the group, and did a roll call of participants:

- Amy Birtwistle, USFS
- Anthony Pisano, Atkins
- Ashley Giles, Colorado Trout Unlimited
- Elizabeth Cramer, FHWA
- Francesca Tordonato, CDOT
- Gary Frey, Colorado Trout Unlimited
- James Patanio, Atkins
- Jeffrey Hampton, CDOT
- Jordan Falzetti, Atkins
- Josh Giovannetti, CDOT
- Julia Kintsch, ECO Resolutions
- Kevin Shanks, THK
- Kristin Salamack, USFWS CDOT Liaison
- Kurt Kionka, CDOT
- Loretta LaRiviere, Peak Consulting
- Maddie Shields, CORVUS
- Mandy Whorton, Peak Consulting
- Matt Aguirre, Atkins
- Matt Kizlinski, Peak Consulting
- Matt Montgomery, USACE
- Paul Winkle, CPW
- Scott Garncarz CDPHE
- Stephanie Gibson, FHWA
- Tyler Brady, CDOT
- Valerie Thompson, USFS
- Wendy Wallach, Peak Consulting

Mandy Whorton (Peak Consulting) reviewed the agenda and thanked everyone for attending. The presentation from the meeting is attached to these notes for reference.

2. Project Updates and Status

Mandy reminded the group the project is divided into three sections; the East Section is in 90% design review and the Central and West sections are between 30 and 60% design.

Mandy said the design team was able to avoid the realignment of Clear Creek across from the Maintenance Yard just east of Hidden Valley, which simplifies the project quite a bit as an



Individual Section 404 Permit will not be needed. The planned enhancements do not change, as the enhancements were not intended to be compensatory mitigation. We did a new delineation because the wetlands and waters of the US delineation was about five years old, and some of the boundaries have changed. The impacts in the Finding of No Significant Impact (FONSI) reflect the new boundaries; the impacts are still small (0.17 acres) but larger than identified in the Environmental Assessment (EA), which is a result both of the refined boundaries but also the advanced design and construction information that came from the Construction Manager/General Contractor (CMGC) process.

Maddie Shields (Corvus) and the Corvus team are finishing up the functional assessment of the different reaches in Clear Creek that we thought could be affected by the project in either a positive or a negative way. We are looking for opportunities to improve function in areas that were low functioning and maintain function in the areas that are functioning better.

With the alignment of the roadway now set, the design of the creek enhancements and Greenway can progress. We are trying to balance a lot of different priorities, but it is an exciting process because there is a lot of opportunity with removal of the highway from the canyon. The available space is significantly better than what is available today, and we will be working to determine the best uses over the next year.

The major Greenway design changes are in the Central Section. In the West Section, by pushing all the highway widening to the north, Clear Creek, the Greenway and County Road 314 can stay in their current locations from Idaho Springs to Hidden Valley. Between Hidden Valley and US 6, there are a lot of Greenway and creek opportunities that will be the primary focus for design.

In other updates, Mandy said two of the early projects - the Genesee wildlife crossing and the roundabout intersections at US 40 in the Floyd Hill neighborhood - are under construction. The transfer pavement for the Genesee wildlife crossing is almost complete, so it won't affect traffic as much as it had earlier. We anticipate the wildlife crossing to be completed this summer/fall. The Empire wildlife crossing and the new transit and electric vehicle charging lot at El Rancho in the Evergreen area will move into construction this summer.

The FONSI was signed on January 12, 2023.

We have a public meeting planned for March 7th at Clear Creek High School from 6 until 8pm, and you will be notified through the email updates and hope you can attend.

The East Section Final Office Review (FOR) (90%) plans are out for review for the CDOT specialties and Technical Team. We anticipate construction to start in early June. The West Section will start in the fall, and the Central Section will start in spring 2024. There could be some Central Section work done offline ahead of the bulk of the work because portions of the new roadway to the south in the Saddle Cut area in Clear Creek Open Space property can be constructed outside of traffic. The project is expected to be completed by 2028.



We have a 1041 permit application submitted to Clear Creek County, which will have a public review period in March. These permits are for any projects that have a statewide interest in a local community.

3. Design Updates

East Section

Matt Aguirre (Atkins) showed an aerial view of the East Section, which starts around County Road (CR) 65. The major infrastructure improvements are to the west of CR 65, with a similar design approach. Widening will be to the south. Westbound will have two lanes going down the hill as it is today with an additional express lane picking up where the current roadway drops from three to two lanes.

Going eastbound there are three general purpose lanes, and the project will add an auxiliary lane between the United States Highway (US) 6 and Homestead Road interchanges. We are widening into the hillside and will have walls in those areas with a closed drainage system.

Matt said the existing pavement currently sheet flows over the edge of westbound I-70 pavement and then runs down a steep slope to the north approaching US 40 before it enters another ditch. The existing conditions present several erosion issues. To address those issues, we will be implementing a curb underneath the guardrail and transporting that water through the shoulder section to the curb where it will release in the same three locations to better manage the flow and address the erosion.

We are doing quite a few changes to the US 6 interchange, which will generally be included in the Central Section design. There will be a new US 6 to eastbound I-70 on-ramp and that is associated with the eastbound auxiliary lane, which will allow trucks to get up to speed on I-70 and not create conflicts with the rest of eastbound traffic. The westbound I-70 to US 6 off-ramp will remain but it is realigned both vertically and horizontally.

West Section

Matt said the design in this section is rapidly advancing. One bigger change in this section is the change in intersections for the Hidden Valley interchange. Originally roundabout intersections were proposed, but traffic analysis found the signals operate sufficiently at the interchange and given the additional cost of implementing roundabouts, the design team is moving towards signalized intersection treatments.

Mandy said the roundabouts have a large footprint and the intersections are far apart from a visual standpoint but very close together for being roundabouts, so there is very limited space to get through the intersections. The change to a signalized intersection eliminates retaining walls and reduces creek impacts.

From the Hidden Valley interchange, we move into full reconstruction. We shift the highway to the north, which avoids the creek relocation and allows us to implement a floodplain bench just to the south of the new proposed highway facility. There will be two new bridges. We are doing the analysis for what those are going to look like and what the impacts to the creek might be. We are around 30% design and moving towards 60%. Right now they are shown as



three span structures, which leaves a lot of space for the creek and other needed improvements.

Matt said the existing structures that cross Clear Creek include some debris walls that are really constraining the creek and as part of the design, we are looking at removing those, which would not increase the base flood elevation.

Mandy said there is a riparian floodplain bench where we are looking to create about 2.5 acres of riparian vegetation.

Matt said the northern bank is constrained with a tall wall so being able to implement this floodplain bench is going to be a big improvement. The Greenway will stay where it is, and the existing roadway retaining wall will be removed. There will be a type 3 guardrail that goes straight down into some grading and then into the floodplain riparian area, similar to the work at Twin Tunnels.

Matt said there will be some minor widening to the west for westbound I-70 in this section to address the interaction between the project's full-time express lane and the Westbound Mountain Express Lane.

Matt said there is also a proposed noise wall that was included as part of the FONSI on the east end of Idaho Springs.

Central Section

Mandy said this section is characterized by changes to the US 6 interchange, the elevated I-70 referred to as the Saddle Cut, and the tie-in at Hidden Valley from the 30 to 80 foot elevated portion of the highway back to grade.

Matt said coming down Floyd Hill toward US 6 is what we refer to as the Hillside section. In between the US 6 interchange and the Saddle Cut is the Narrows because it is constrained between the creek and then there is the section between the Saddle Cut and the Hidden Valley interchange where we get back to grade.

We are developing the westbound off ramp to US 6 farther back to the east to soften the longitudinal grade as well as get the off-ramp underneath I-70.

From the end of the east section in the middle of Floyd Hill (near Johnson's Gulch), we start building westbound I-70 elevation on an approximately 6,000-ft-long viaduct structure that we are calling Bridge A. It ranges from 100 feet tall to 30 feet tall. Westbound I-70 shifts to the south side of the canyon.

The design avoids about 1300 feet of creek relocation and realignment of the Greenway Trail. As the design progressed, the team found 20 foot high walls would be needed along the trail. There are schedule constraints to work through with utility relocations and the seasonality timeframe for the creek relocation. Those things led us to consider other options that would allow us to mitigate impacts to the creek and also reduce some of the schedule impacts of utility relocation. It does require more rock cuts on the north side of I-70 but less than what was anticipated in the EA design. Additionally, much of the area can be excavated and does not require blasting.



The refined design leaves an open area for potential Greenway enhancements. Keeping the creek in its existing condition ensures we don't reduce its function and we have an opportunity to enhance other locations.

Mandy said the FONSI includes the original design for the creek relocation and associated mitigation. Now that we have an avoidance option, we will reevaluate those impacts and the mitigation. Overall, there is a large reduction in impacts to waters of the US and wetlands.

Paul Winkle (CPW) said the western edge of the Central Section has some activity of brown trout and nest spawning, so avoiding stream relocation would be good overall from an aquatic standpoint. He shared a Google Earth map with the fall 2020 survey locations in the project area. The 2022 survey had very similar results. The concentration is around the Central City Parkway exit and the Game Check Trailhead area. There is very little spawning around the Sawmill Gulch area and a little bit of spawning activity towards the east end near the entrance to US 6.

4. Wetlands and Stream Function

Matt Kizlinski (Peak Consulting) said there was a 2017-2018 delineation survey and because of the time that has passed and the overall dynamic nature of the creekside system, the project areas were re-delineated in 2021. The survey area was expanded around Central City Parkway to account for potential enhancement areas identified in the 2020 field review. We found the same type of wetlands and waters. The majority of the wetlands are very small fringe wetlands along the creekside and reflect a lack of floodplain width. Most are scrub-shrub wetlands dominated by a different species of willows. Besides the three miles of Clear Creek, there is a pond near the City of Blackhawk's water treatment intake and there is an unnamed drainage on the east side of the Saddle Cut that has an inlet that could be improved with the design.

Mandy said there are some very high-quality wetlands at Beaver Brook near Clear Creek High School, and because those were avoided, they were not delineated in 2021.

Mandy said we have a series of project wetland mitigation commitments and as we look at revised impacts from the new design at the Saddle Cut area, they may change a little bit. For the most part the wetland impacts and considerations are mostly the same throughout the project area. Any affected wetlands will likely be mitigated through banking but that hasn't been fully determined. We will apply Best Management Practices (BMPs) to protect the wetlands during construction. Anything that is temporarily affected and can be returned to existing conditions will be. As we get further into the creek design and incorporate the information from Corvus' team, they may evolve a little bit.

5. Colorado Stream Quantification Tool (CSQT)

Maddie said the CSQT is a regulatory tool the US Army Corps of Engineers (Corps) has recommended to use when quantifying debits or credits from permanent impacts to streams as part of the Section 404 permitting process. It has a regulatory lens, so it is looking at very



specific functional categories and there are other metrics for identifying the function of the creek as well.

Mandy said previously that we were looking at what the function was for the relocated portion of Clear Creek because from a regulatory standpoint, we were looking at compensatory mitigation for the area that was being affected. Now we don't have any large reaches of waters that are being affected, but the data collected by Corvus helps give us information on what could be effective. We just won't use the data for regulatory purposes, which gives us some flexibility to capture some of these other non-regulatory things that could potentially improve creek function.

Maddie said they assessed eleven reaches along Clear Creek and one reach along Sawmill Gulch.

The functional categories assessed include reach hydrology, hydraulics, and geomorphology.

The scoring is put into different categories of functions. Functioning means the reach supports an ecosystem function and structure. Functioning at Risk means the reach may be supporting an ecosystem and function. Not Functioning means the reach does not support an ecosystem and function. It's important to note that because not every functional category was assessed, we can only achieve up to 60% of the function for the stream. The two functional categories that were not assessed include biology and physical chemicals, which are reserved for projects that are focused on doing stream restoration.

Mandy said we have some data, but we didn't include all of the categories with this tool because the primary function of this project is a highway project, and the secondary function is to improve the stream and wetland health. She asked if we could look at those parameters but not through the CSQT regulatory lens?

Maddie said yes, if we come to the end of our assessment and we're looking at needing additional function lift, that would be a way we could achieve it.

Mandy said with the enhancements we are planning, we have flexibility to apply those and not try to get the credit, but still have the potential to improve function.

Maddie said there is plenty of opportunity for a functional lift, but the CSQT is looking at very specific functional categories in the assessment.

Maddie said preliminary results for Clear Creek Reaches 1-10 & 12 averaged 17% of function which puts them in the Not Functioning category. This is out of 60%, not 100%. Reaches 1, 4 & 10 were less than 10% function, Reaches 2 & 5 exhibited greater than a 25% function, and the rest were somewhere in the middle.

The reaches that were Not Functioning were because of reach runoff, floodplain connectivity, lateral migration and limited riparian vegetation. There was some bedform diversity probably because of the rafting, but it was not consistent.

Reaches exhibiting greater than 25% at the higher end of Not Functioning have floodplain benches and riparian vegetation in some areas, but still limited floodplain access.



Sawmill Gulch (Reach 11) scored 46%, which is in the Functioning at Risk category. This is a relatively untouched area and all of the parameters were functioning except bedform diversity which isn't really applicable in this area because it is a second or third order headwater stream and doesn't have the power to create those bedform elements. Sawmill Gulch probably will not be impacted by the project.

Maddie said the proposed condition assessment will be completed based on the project design. We have identified ways to increase function by improving reach runoff by improving filtration at stormwater outlets. A lot of the concentrated flow points don't have any buffer so any pollutants that are coming through the system are going directly into the creek. Adding buffer filtration on those concentrated flow points will help improve the function of the creek. We can also potentially reduce impervious surfaces in the watershed by removing the old roadway material that is being replaced. Getting rid of concrete will help to improve function and the score of the creek. Removing riprap will allow a little more lateral migration, but there could be limitations because we are working with a roadway. Improving geomorphology by reconnecting the floodplain will be huge and improves riparian vegetation. There is a benefit from using hydrology appropriate plants in the floodplain benches.

Maddie said the team is working to incorporate design elements that will increase function along Clear Creek while also showing a functional lift in the CSQT assessment.

Question: What is lateral migration?

Answer: It is the ability of the stream to move laterally within the valley. This is also known as perpendicular flows.

6. Deicer Studies

Mandy said the team completed a literature review of deicer treatments. Chlorides are extremely hard to treat. The most effective way to treat them are changes in maintenance practices, which are very hard to implement because of the shortage of drivers and the existing equipment.

Mandy said there is a research project that CSU has proposed to get some more information about how chlorides are affecting wetland vegetation. One of the things that is effective is vegetation filtration to treat chlorides but those also have some negative impacts. The wetlands are good at capturing those but at some point, they can't capture any more.

7. Water Quality

East Section

Jordan Falzetti (Atkins) said the water quality approach hasn't changed. The project goal is to treat 90% of the added impervious areas across all three sections of the project. Where we don't have control measures (CMs), we will manage sediments and other pollutants in non-structural ways such as riprap and pellet pads designed to slow down the water and prevent erosion. In the structural CMs, we will keep maintenance accessibility in mind. Storm systems that outlet directly to Clear Creek will be designed to minimize impacts.



Question: What is the definition of impervious?

Answer: Impervious is roadway surface pavement. With the project widening the highway and other roadways, there is an increase in impervious pavement, which increases the runoff potential when rain falls. During summer storm events, pollutants from brake dust and metals that are on the road get washed off the pavement into the ditches and travel downstream. Winter maintenance causes issues with deicers and chlorides. Our structural and non-structural CMs like riprap and outlet control measures help prevent those pollutants from travelling downstream.

Jordan said the east section adds about 7.51 acres of impervious areas along I-70. Control measures included in the 90% plans will treat 7.21 acres of that, primarily with a new pond. It will have concrete access for maintenance vehicles and there will be permeable pavers at the bottom to allow the water to infiltrate a little bit and then continue through an outlet structure and weir structure down I-70 eastbound along a system of ditches to Johnson's Gulch. The slopes will be 3:1 so they can be vegetated and look natural.

Jordan said we are widening into the hillside so there will be some walls, ditches or both along I-70 eastbound. There are ditches and step ditches to catch snow and drain it in a controlled manner. In some places, there will be ditch above the wall to catch the rainfall runoff coming from the slope and in other places, the ditch will be in the front of the wall behind the guardrail.

West and Central Sections

The existing I-70 roadway is being vacated in a lot of areas and in those areas, we are looking to put more structural CM ponds to achieve the project water quality goals. Some areas will have treatment similar to the East Section. There are also opportunities to include more ponds or CMs in constrained areas, including smaller drainage areas. We will try to treat in a similar way as the East Section where there will be step ditches to control velocities and reduce sediments and pollutants being flushed into ditches. We will do informal treatments like riprap basins and control measures that dissipate energy at pipe outlets in smaller ditches before entering Clear Creek.

Question: Mandy said these locations of water quality CMs are one of the factors that must be balanced in the overall Greenway plan. While removing the highway from the canyon provides more space, there is still a lot of competition for water quality and other features that we may want for the Greenway. Is the goal of 90% treatment a regulatory goal or a project goal?

Answer: Josh Giovannetti (CDOT) said there is no regulatory requirement, but CDOT determined that 90% treatment was appropriate for the project based on previous commitments and recommendations in the Sediment Control Action Plan (SCAP) and SWEEP. This is a large project outside of a municipal separate storm sewer system (MS4) boundary, so we have guidelines to follow from the Water Quality Program Manual which specify water quality modeling. Because this is such a large project, we have the opportunity to install treatment now with many different siting and location options.

Question: Mandy asked if the SELDM modeling informed or changed our approach?



Answer: Jordan said it did. We had several pollutants of concern; sediments, metals and deicers. It showed most of the structural CMs have a strong benefit for treating the sediments and metals. We feel comfortable with the 90% treatments for the structural CMs to treat the impervious areas which is where the metals and sediments are. We understand we need to do further research into maintenance best practices for chlorides.

Josh said there are fifteen pollutants of concern, not just chlorides.

Question: Mandy asked if the CMs we are proposing would also treat some of the offsite metals from Clear Creek?

Answer: Josh said we are trying to address our impacts, which are much more significant than what is up the hill, and the volumes and flows are so extensive we would need a lot more CMs to treat them.

8. Deicers and Chloride Mitigation

Mandy said chlorides have been a long-time concern. They affect the vegetation and water quality and are hard to treat.

A lot of the proactive mitigation strategies involve operational practices and maintenance such as training, record keeping, material storage, prewetting of the roadway and reducing the number of times the roadway is treated and the quantity used. It is a balance that maintenance is facing in their objectives of keeping the roadway functional and people safe, but also not overapplying materials.

Reactive mitigation strategies would be trying to do some sort of storage and filtration. Generally, wetlands are effective for filtration. She noted that the previous traction sand practices also had negative consequences, and returning to those practices is not preferred environmentally or for safety.

Upcoming CDOT Research Projects

Assessing the Sensitivity of Mountain Wetlands to Road Salt

This research would also be beneficial for the Bakerville Auxiliary Lane project, which has some very sensitive fen wetlands that are very close to the roadway and are subject to some of these runoff limitations. Colorado State University (CSU) has proposed a study to research what is happening with fens and Francesca Tordonato (CDOT) is championing the study. Fens are thousands of years old and hard to mitigate, so this will look at how deicing affects fens. We are hoping to fund opportunities to contribute to effective project mitigation for this project or future deicing practices.

Francesca said the Research Branch is still in the process of evaluating the submittals for funding and should hear soon if we are selected.

Josh said he believes the Structures Group is also submitting a problem statement for the impact of salts and chlorides on pavement and bridge structure corrosion.



Josh said CDOT has updated their water quality monitoring stations for stream chlorides and at some point in the near future he hopes to start looking at the boundary between the edge of roadway to the creek to see how the chlorides are moving through the shoulder soil.

Josh said there is no other highway like I-70 in the US and very few in the world with the elevation and weather. These conditions leave limited options.

9. Clear Creek Floodplain

Mandy said we have committed to less than 0.5 foot rise in the existing floodplain. There are locations where that becomes a challenge for Jordan and his team, but they are confident they can solve it.

Jordan said they will try to prevent floodplain rise by more than 0.5 foot so we won't have to do a Conditional Letter of Map Revision (CLOMR). Reevaluated flow rates have been done and after the project is complete, the floodplain will be remapped with flow rates and include changes like the floodplain bench to show the proposed floodplain in the FEMA revision.

Question: Mandy asked if we have a reduction in base flood elevation, will it be captured on the map revision and not require a CLOMR?

Answer: Jordan said that is correct, it would just be a LOMR after construction.

10. Greenway Trail

Mandy said a primary focus for our team over the next year is the Greenway design. The Greenway floodplain and Clear Creek itself are an integrated system in the design and the aspects of recreational and ecological health.

Mandy said we have a wish list of things we would like to do to make this a first-class recreational area and significantly improve creek conditions.

Kevin Shanks (THK Associates) said there are Greenway Issue Task Force (ITF) meetings to look at everything together because there are some competing interests that need to be balanced like recreational improvement and impacts to environmental resources to maximize benefits. Mandy said it would be helpful to include the SWEEP ITF in the Greenway meetings.

Kevin said the creek access points are pretty accessible and we will have to think through the protection of certain areas versus trying to encourage people to access the creek in other areas. The rafting companies have formal and informal put in and take out areas and safety training.

Mandy said there are also some walls remaining at the Sawmill Gulch site that is of historical importance to Clear Creek County.

Question: You've talked in the past about petroleum products. Did you look at that when you were assessing the soil-based products?



Answer: Jordan said they don't relate the same as how chlorides interact with the CMs and control measures. Oils would relate more like sediment and normal pollutants, so the larger structural control measures and ponds would be able to treat those more effectively.

Question: What about a vehicle in the stream that causes a spill and what is CDOT's role if that happens?

Answer: Mandy said we will have an Incident Management Plan implemented during and after construction for general operations. The potential for tanker spills or trucks overturning will be improved by straightening horizontal curves.

Josh said we coordinate with the local emergency management jurisdictions. CDOT may be the first on the scene but often it is the State Patrol. Clear Creek County or Golden may assess the incident and then CDOT contracts out the removal of vehicles and the spill cleanup.

11. Schedule

The East Section final design will be completed in March 2023 with construction beginning in May and substantial completion fall of 2025.

The West Section final design will be completed in September 2023 with construction beginning in October and substantial completion fall of 2026.

The Center Section final design will be completed in April 2024 with construction beginning in May and substantial completion in early 2028.

12. Next Steps and Action Items

Action Item: Mandy said she will send Paul an email to request the survey data to get it integrated into the overall Greenway design plans.

Action Item: Presentation will be included with the meeting notes.



COLORADO

Department of Transportation

Floyd Hill to Veterans Memorial Tunnels

SWEEP Meeting #5

January 24, 2023



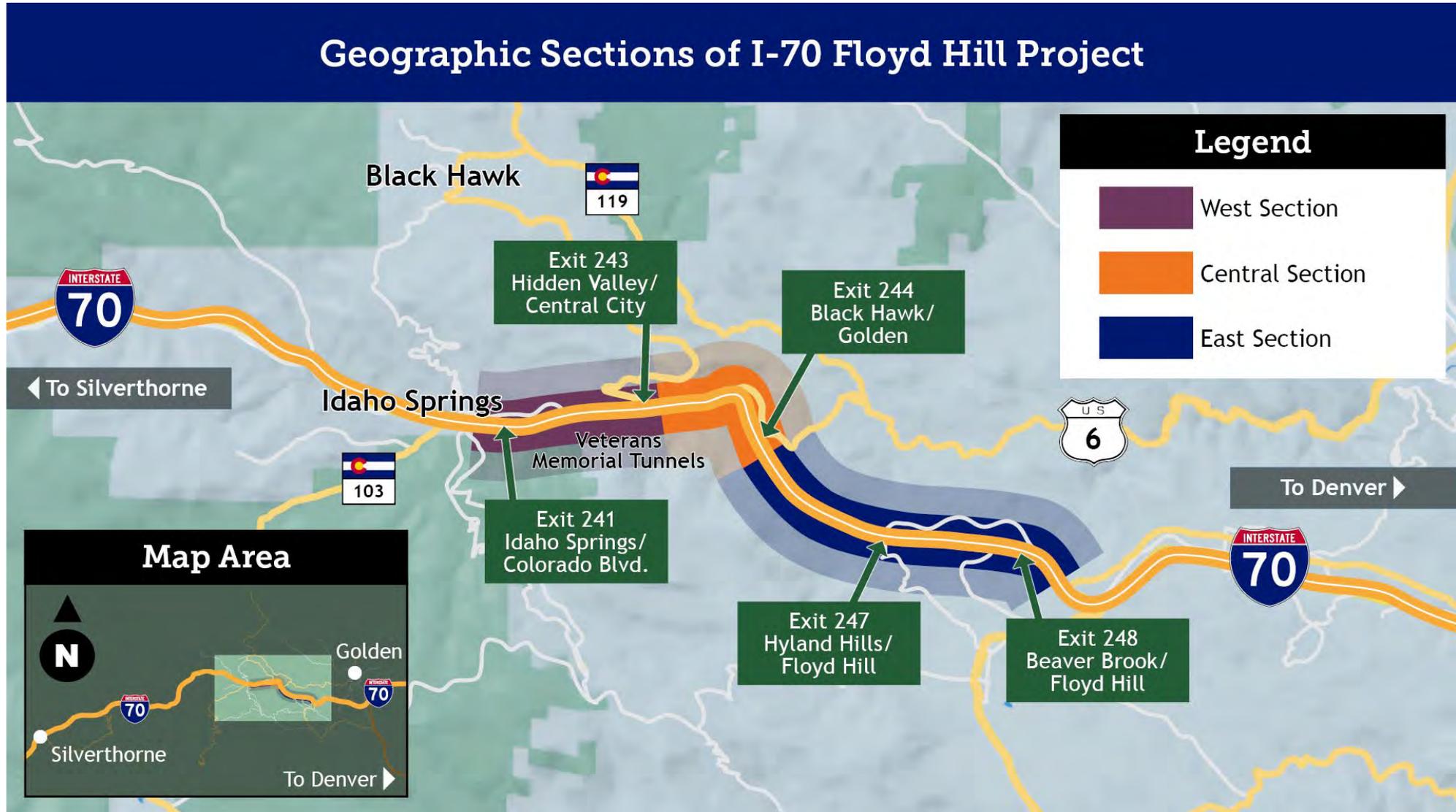
- Project Updates and Status
- Design Updates and Progress by geographic section
- Water Quality Design and Issues
- Wetlands and Waters of the US
- Greenway Design and Riparian Area Restoration
- Next Steps and Action Items





- Early Projects Construction
 - Genesee Wildlife Crossing - Nov 2023
 - US 40 Roundabouts - Dec 2023
 - Empire Wildlife Crossing - Summer 2023
 - Pegasus and EV Charging Lot - Spring 2023
- FONSI signed - January 12, 2023
- Public Meeting - March 7, 2023
- East Section Final Office Review Plans - Jan 2023









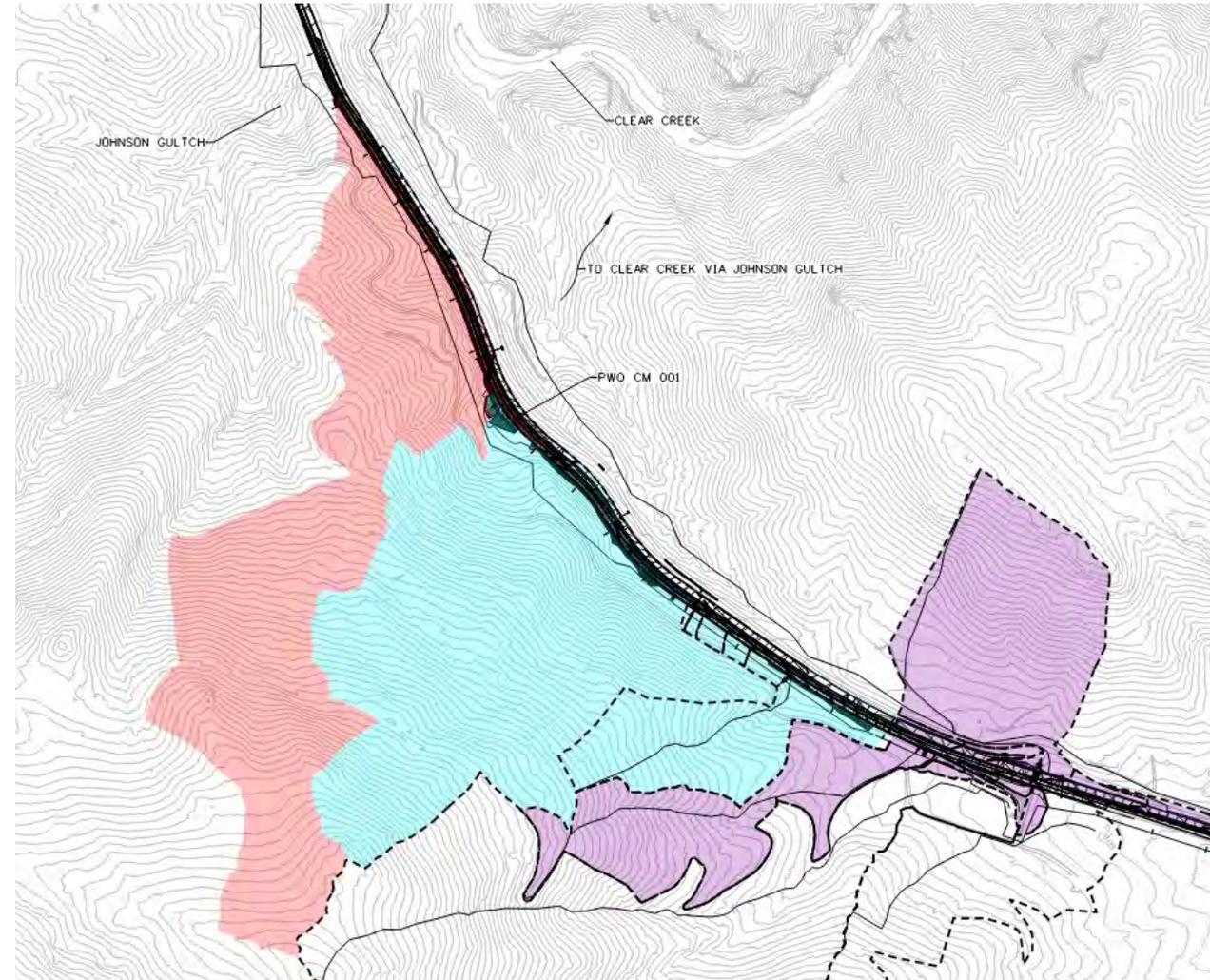
Water Quality Approach

- Treatment of 90% of added impervious across all three sections
- Management of sediments and other pollutants designed with maintenance accessibility in mind
- Storm systems which outlet directly to Clear Creek designed to minimize impacts



Water Quality Design - East Section

- Additional 7.51 acres of impervious area
- Control Measure treats 7.21 acres of impervious area
- I-70 Eastbound conveyance designed to reduce stormwater velocity





Water Quality Design - West and Central Sections

- Development of Permanent Water Quality Control Measures
- Central Section vacates areas of I-70 which will be used for between 3 to 5 different control measures to achieve Project water quality goals
- Smaller drainage areas and bridge drainage with unformalized treatment



Types of Deicers

- Chlorides
 - sodium, magnesium, calcium
- Acetates
- Formates
- Glycols
- Succinates



Must look at trade-offs

- Chlorides don't break down and can accumulate over time, which poses risks to human health, water quality, aquatic flora and fauna, and the near road environment (cost reasonable)
- Others don't accumulate, but exert a higher biological oxygen demand as they break down and can also be toxic to aquatic species (can be cost-prohibitive)



Proactive Mitigation Strategies

- **Staff training** - learn new ideas, how to use technology, etc.
- **Monitoring and record-keeping** (water quality data, amount/type of deicers purchased/used)
- **Equipment calibration** - ensure materials are applied at the appropriate rate for a given material and storm scenario
- **Material storage** - store to minimize contamination of surface or groundwater
- **Anti-icing** - apply small amount prior to a storm to reduce amount of product used during the storm
- **Pre-wetting** - reduces the amount of material used during the storm
- **Road Weather Information Systems (RWIS)** - provides information to support decision-making with respect to snow and ice control products, application rates, anti-icing, staff, and equipment scheduling and optimization

Reactive Mitigation Strategies

- **Storage and release** - includes ponds and wetlands; mix runoff to reduce peak concentrations and mix baseflows and non-chloride laden runoff in stored wet pools to reduce concentrations; evaporation ponds infiltration, vegetated swales, and filter strips
- **Wetlands** - long-term harvesting to remove chloride-impacted vegetation and disposal of vegetation (regular activity that in a long-term commitment)
- **New and emerging technologies** that focus on capturing chlorides in filter media such as dolomite, calcium, or concrete, but more research is needed

Studies generally all agree that there are no perfect deicers out there and there are trade-offs with all of them. Research continues to be done, need to keep up with any new findings that come out.



Assessing the sensitivity of Colorado's mountain wetlands to road salt

- Problem statement submitted to CDOT's Applied Research and Innovation Branch - Francesca Tordonato is championing
- Will know if it's selected early in the 2nd quarter of 2023

Research Goals

- Collect/analyze soils and vegetation data in wetlands about 10,000 ft that are likely affected by road salts plus data from wetlands not likely affected road salts to compare impacts and sensitivity
- Create a statewide map of relative sensitivity to road salt for mountain wetlands along CDOT right of ways about 10,000 ft with recommended road salt application rates
- Review and summarize current state of knowledge on practices to mitigate salt loading in roadside wetlands

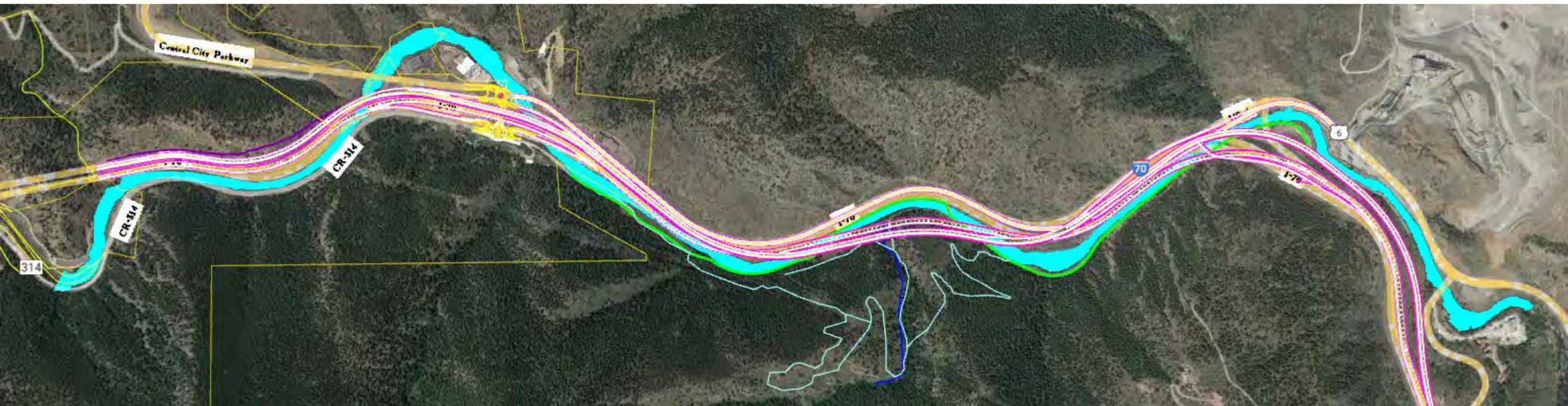


Water Quality Impacts and Mitigation

Location	Activity	Impact	Mitigation
Within Project limits	Runoff from roadway	Impacts to water resources as a result of water quality degradation	Train winter maintenance staff to implement non-structural CMs according to proper standard operating procedures.
Within Project limits	Runoff from roadway	Elevated sediment and chloride levels in Clear Creek due to winter maintenance activities, including use of liquid and solid deicer salts	Refine and implement water quality CMs recommended by SWEEP ITF and included in the <i>I-70 Floyd Hill to Veterans Memorial Tunnels Drainage and Water Quality Technical Report</i> (Appendix A21b), including detention basins to capture solids and associated pollutants and vegetated swales to capture and dilute salt and other dissolved pollutants to the extent possible.
Within Project limits	Runoff from construction	Impacts to water resources as a result of water quality degradation	Implement appropriate construction control measures/BMPs for erosion and sediment control according to the <i>CDOT Erosion Control and Storm Water Quality Guide</i> (CDOT, 2002), and develop a stormwater management plan, which includes water quality monitoring.
Within Project limits	Long-term erosion impacts from soil disturbance that occurred during construction	Erosion and increased sedimentation to adjacent water resources	Revegetate disturbed areas and implement permanent and temporary erosion control measures to stabilize vegetation in non-rocky areas. Apply mulch or mulch tackifier to prevent erosion in areas where permanent seeding operations are not feasible due to seasonal constraints (e.g., summer and winter months)
Within Project limits	Runoff from construction	Impacts to water resources as a result of water quality degradation	Obtain and follow provisions of all applicable state and local stormwater and dewatering permits.
Areas of rock excavation	Runoff from construction	Impacts to water resources as a result of the introduction of mineralized materials, which can increase loading of metals, dissolved solids, and suspended solids	Encapsulate mineralized rock generated during blasting activities beneath the roadway pavement, away from groundwater, to prevent the release of contaminants and migration of minerals into Clear Creek. If encapsulation is not feasible, mineralized rock will be removed from the Project area to an appropriate disposal site.



- Floodplain Modeling - Existing Conditions compared to Proposed Conditions
 - Project constraint: <0.5' of rise in the Base Flood Elevation (1% chance floodplain)
- FEMA Effective Floodplain Map Revision
 - Letter of Map Revision (LOMR) will be submitted after construction in the floodplain is complete.





Floodplains Impacts and Mitigation

Location	Activity	Impact	Mitigation
Central and West Sections	Construction within the Clear Creek floodplain	Although not expected to occur with the Project as designed, construction within the floodplain can result in changes to base flood elevations or floodplain limits	Hydraulic modeling will be performed during final design to confirm that the Project would not encroach on floodplains or result in greater than a 0.5-foot rise in water surface elevation. CDOT will continue to coordinate with the Federal Emergency Management Agency, the Clear Creek County floodplain administrator, and the Idaho Springs floodplain administrator to properly document the changes to the floodplain.



Wetlands and Waters of the US





33 wetlands, 5 other waters

- 3.06 ac of wetlands
 - 2.77 ac Scrub-Shrub (PSS)
 - 0.26 ac Emergent (PEM)
- Other Waters
 - Clear Creek
 - OW1 (pond)
 - OW2 (unnamed drainage)
 - Sawmill Gulch
 - Johnson Gulch





Wetlands and Waters of the US Impacts and Mitigation

Location	Activity	Impact	Mitigation
Within Project limits	General construction activities	Direct and/or indirect impacts to surface waters and wetlands	Install construction limit fencing around all delineated and mapped wetlands in the Project area to protect wetlands that are not directly impacted by the project.
Within Project limits	General construction activities	Direct and/or indirect impacts to surface waters and wetlands	Maintain temporary erosion controls and plantings to stabilize temporarily disturbed wetland areas.
Within Project limits	General construction activities	Direct and/or indirect impacts to surface waters and wetlands	Fertilizers and/or hydro mulching will not be allowed within 50 feet of wetlands
Within identified and permitted wetland areas	Construction activities resulting in a permanent loss of wetlands	Direct impacts to wetlands	Mitigate wetland losses by replacing wetlands at a ratio of 1:1, through purchase of credits from a wetland bank or on-site wetland creation as determined through the Section 404 permitting
Within and adjacent to all mapped wetlands and surface waters	Construction activities near Beaver Brook, Johnson Gulch, Sawmill Gulch, Clear Creek, and adjacent mapped wetland areas	Direct and/or indirect impacts to surface waters and wetlands	Ensure BMPs and containment structures are in place for work conducted within and adjacent to the OHWM and mapped wetlands to prevent concrete washout and other potential pollutants from reaching creeks and wetlands.
In the West and Central Sections of the Project	Construction activities	Direct impacts to riparian areas and surface waters	Restore and recreate riparian areas and implement stream and habitat improvements in areas where the highway is being removed from the canyon and creek edges. The enhancements will require 404 permitting with USACE and Senate Bill 40 wildlife certification with CPW. The 404 permit is separate from the mitigation plan required for the individual permit and is expected to fall under a Nationwide Permit 27 for Aquatic Habitat Restoration, Enhancement, and Establishment Activities.



Wetlands and Waters of the US Impacts and Mitigation

Location	Activity	Impact	Mitigation
Within identified and permitted surface water areas	Construction activities resulting in a permanent loss of surface waters, including demolition of existing bridges over Clear Creek	Direct impacts to surface waters	Closely monitor construction activities to ensure that additional fill is not placed within the OHWM
Clear Creek, West Section of Project	Clear Creek realignment, resulting in a permanent loss of surface waters	Direct impacts to Clear Creek surface waters	<p>Obtain a Section 404 Individual Permit.</p> <p>Verify impacts and identify any additional encroachment within the OHWM prior to submitting 404 Permit application. The mitigation plan will include mitigation of at least 1:1 linear area of functional stream length impacted. Mitigation requirements will be informed by the results of the stream functional assessment.</p> <p>Coordinate with the USACE, EPA, CPW, rafting groups, and the SWEEP ITF to develop the mitigation plan before submitting the Section 404 permit application</p>
Within mapped wetland and riparian areas	Construction activities at wetland and riparian areas	Temporary impacts to wetlands	Use timber mats or geotextile/ straw to minimize temporary impacts to wetlands from construction equipment traversing wetland areas
Clear Creek crossings where an OHWM has been identified	Construction of new bridges at Clear Creek crossings	Temporary impacts to surface waters	Identify all necessary in-stream access areas on plans. Prohibit construction equipment from entering the OHWM except where identified on design plans or pre-approved by CDOT Project Engineer



Wetlands and Waters of the US Impacts and Mitigation

Location	Activity	Impact	Mitigation
Construction staging areas within the Project area	Construction staging and storage activities	Disturbance of vegetation and potential pollutant discharges into wetlands	<p>Locate construction staging and materials stockpiling at least 50 feet from the edge of wetlands or creeks, when possible. No staging will be allowed in wetlands.</p> <p>Determine specific staging locations during construction planning to verify this buffer is achievable considering the narrowness of the corridor and limited areas available. If this buffer is not achievable, CDOT will consider allowing materials closer to the edge of wetlands or the edge of water and identify appropriate, additional BMPs that would be required to minimize disturbance of vegetation and prevent pollutant discharges into sensitive habitats. BMPs will be determined on a site-by-site basis and any modifications will require CDOT environmental staff's approval.</p>



Colorado Stream Quantification Tool

- Quantifies change
- Regulatory tool
- Assessment results

CSQT at Floyd Hill

- 12 Reaches, 11 along Clear Creek, 1 along Sawmill Gulch
- Functional Categories Assessed: Reach Hydrology & Hydraulics and Geomorphology.
- Completed existing condition assessment in Fall 2022 on areas of potential impact.



Scoring Overview

SQT scoring looks at the assessed reaches potential to support aquatic ecosystem structure and function.

Functioning -Value of 0.70 - 1.00

Functioning at Risk -Value of 0.30 - 0.69

Not Functioning -Value of 0.00 - 0.29

For this assessment, we are only realizing up to **60%** of the stream function since we did not assess all functional categories.



CSQT Existing Condition Preliminary Results

- Clear Creek Reaches 1 through 10 and 12: **Not Functioning**
- Average 17%* function across the assessed reaches.
 - Three reaches exhibited $\leq 10\%$ Function (Reaches 1, 4, 10)
 - Two reaches exhibited $\geq 25\%$ Function (Reaches 2, 5)
 - The rest sat somewhere in the middle
- Sawmill Gulch Reach 11: **Functioning at Risk**
 - 46%* function for the assessed reach.

*Total of 60% achievable function given the assessed parameters.



Clear Creek

- Reaches exhibiting $\leq 10\%$ Function, lower end of **Not Functioning**
 - Not functioning in terms of reach runoff, floodplain connectivity, lateral migration, riparian vegetation. Some bed form diversity, but not consistent.
- Reaches exhibiting $\geq 25\%$ but $< 30\%$ Function, higher end of **Not Functioning**
 - Presence of floodplain benches and riparian vegetation in some areas, greater (although still limited) floodplain access.

*Total of 60% achievable function given the assessed parameters.



I-70 Floyd Hill to Veterans Memorial Tunnels

CSQT





Sawmill Gulch

- Sawmill Gulch (Reach 11) - **Functioning at Risk**. 46%*
Function for the assessed
area.



*Total of 60% achievable function given
the assessed parameters.



Proposed Conditions

- Proposed Condition assessment will be completed based on the project design.
- Potential ways to increase function by parameter:
 - Reach runoff
 - Geomorphology



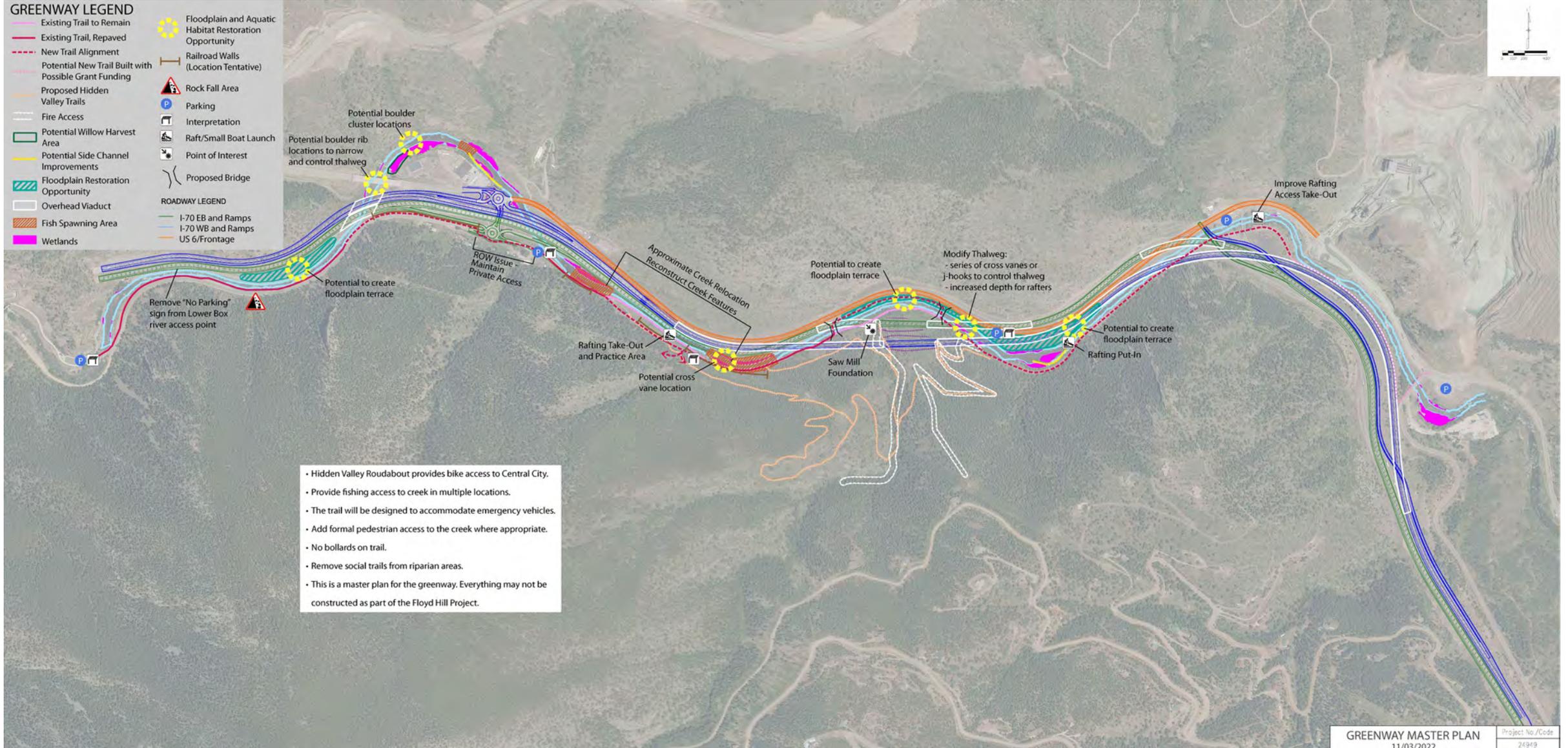
Summary

- Clear Creek falls within the “**Not Functioning**” category of the CSQT scoring matrix.
- Sawmill Gulch is “**Functioning at Risk.**” May not be impacted by the project.
- The team is working to incorporate design elements that increase function along Clear Creek while also showing a functional lift in the CSQT assessment.



I-70 Floyd Hill to Veterans Memorial Tunnels

Greenway Design and Riparian Area Restoration





Riparian Areas Impacts and Mitigation

Location	Activity	Impact	Mitigation
Within Project limits	Removal of existing roadway infrastructure and replacement with smaller roadway footprint	Reclamation of existing roadway that would not be incorporated into the Proposed Action	<p>Develop a landscape plan to be approved by a CDOT landscape architect for all reclamation areas prior to construction.</p> <p>Re-vegetate reclaimed areas with native species to replicate or enhance native vegetative communities.</p>
Within Project limits	Excavation and earth-moving activities	Clearing and removal of vegetation exposes soils to erosion and disturbs habitat	Re-vegetate and stabilize temporarily disturbed areas.
Within Project limits	Excavation and earth-moving activities	Potential to introduce noxious weeds or contribute to the spread of noxious weeds	<p>Conduct a noxious weed survey prior to construction to map existing weeds within the Project area.</p> <p>Develop and implement an Integrated Noxious Weed Management Plan to prevent the spread of noxious weeds into temporarily disturbed areas. Implement measures to control noxious weed spread, such as:</p> <ul style="list-style-type: none"> • Salvage weed-free topsoil for use in seeding • CDOT Standard Specification Section 217-Herbicide Treatment will be incorporated into the Project Specifications.





Next Steps and Action Items

