



I-70 Bakerville to Eisenhower-Johnson Memorial Tunnels (EJMT) Westbound Auxiliary Lane Technical Team (TT) Meeting #3

Meeting Summary

December 1, 2022, 2:00 PM - 4:00 PM

In Person and Virtual Meeting

1. Welcome and Agenda Review

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

- Ben Davis, CDOT
- Francesca Tordonato, CDOT
- Maria Rocken, CDOT
- Christiana Lacombe, CDOT
- Shannon Mero, CDOT
- Kristin Salamack, USFWS
- Tracy Sakaguchi, CMCA
- Angy Casamento, Ulteig
- Lindsey Wickman, Ulteig
- Kory Kleinknecht, Ulteig
- Brian Dabling, FHWA
- Nora Kern, DRCOG
- Margaret Bowes, I-70 Coalition
- Julie Smith, EPA
- Mandy Whorton, Peak Consulting Group
- Loretta LaRiviere, Peak Consulting Group
- Wendy Wallach, Peak Consulting Group

1. Welcome and Meeting Purpose

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

Mandy said the primary purpose of today's meeting is to review the options developed by the design team and the preliminary evaluation criteria (attached)* that are representative of the established core values. The primary objective is to solicit input and ideas from the TT on the evaluation to support a decision as to the preferred option. She added that there is a lot to cover, so issues not relevant to the topic will be recorded for discussion later. The design team needs TT input to continue their work.

*Note: The evaluation criteria matrices have since been revised to reflect the discussion at this meeting.

2. CSS Flowchart and Measures of Success



Mandy reviewed the Context Sensitive Solution (CSS) Process which includes the evaluation criteria and measures of success which the team will use to assess different options. She noted these were distributed prior to the meeting with the work plan. She asked if there were any questions about CSS materials sent out previously. No one commented.

3. Design Options

Mandy explained the flow of the design review, which included consideration of the following elements: Beginning of Aux Lane, Widening Options, Terminus of the Aux Lane, and the US6 Interchange. Chain stations and wildlife crossings are other project elements but not part of this meeting's discussion. She added that the group may not get through all the options including the interchange discussions, but nothing will be solidified without input from the Technical Team.

Lindsey Wickman (Ulteig) walked through the design options using the evaluation criteria developed through the CSS process in a matrix format. NOTE: The matrix is attached, and these minutes summarize discussion for criteria with comments or questions. If there was no clear differentiator between options, those criteria were not discussed in detail.

Beginning of Aux Lane Design Options

The group started reviewing the three options for the start of the auxiliary lane: Options 1A, 2A and 3A (shown in attached figures).

- 1A starts from the WB on-ramp of the Bakerville interchange. Some challenges include a slight uphill 2% grade and potential weaving conflicts to access the auxiliary lane between traffic entering WB I-70 from the Bakerville on-ramp and trucks accessing the existing chain station.
- 2A begins approximately 6,000 feet west of the Bakerville interchange and west of the first existing chain station. This option does not impact traffic patterns at the interchange, minimizes weaving movements, and starts at an uphill grade of 4 to 6%. This option would reduce the auxiliary lane length by over a mile.
- 3A starts the farthest east of the three options, east of the Bakerville interchange. This option starts at an approximate 2% grade and begins in the same area as the taper for the off ramp.

Core Value Safety

General discussion: Ben voiced concerns about the options that start at steep grades, due to the challenges that causes for trucks. However, both options closer to the interchange have more potential for weaving conflicts compared to the option farther west that starts on 6% grade.

Truck Safety in all seasons?

Amy Saxton (Clear Creek County) asked why Option 3A resulted in better truck safety for all seasons. The rationale is that the trucks can access the auxiliary lane earlier and at a 2%



grade, resulting in better safety for all seasons. Lindsey added that starting the aux lane west of the chain station decreases weaving conflicts with the chain station and the interchange. Ben said Option 2A starts farther west and avoids some of the weaving conflict points so might be more beneficial. Mandy said the 6% grade is what decreased the rating of Option 2A.

Christiana Lacombe (CDOT) said in terms of considering 1A and 3A, there is not a high volume of traffic using the Bakerville interchange. There would be weaving but 1A would have less of a conflict because there are less people using the on ramp.

Tracy Sakaguchi (CMCA) asked what the overall traffic count is at the Bakerville Interchange—how many cars are going westbound using the on and off ramps? She noted that Option 1A does have curved geometry before the chain station and expressed concerns about that conflict. She said she is leaning towards 2A being more desirable except for the steep grade, which is especially concerning considering that the chain station would be a stopped condition in the winter. She asked how frequently the interchange is used and how traffic volumes will change over time, including changes at the trailhead. She asked what the designed shoulders widths are. The design team responded that the standard is 10 to 12-foot shoulders and 10 feet are currently being shown to minimize impacts due to the widening and any potential wetlands. Tracy prefers 12-foot shoulders for the safety of the drivers and the design team is receptive of this request and will evaluate further when survey is available. Lindsey said the Ulteig traffic team will evaluate design and future growth. Christiana said traffic counts for 2010 weekday use was 23-28 vehicles per hour using westbound on ramp and that more people use the east side.

Mandy summarized that conflicts primarily result from weaving and grades, but the effect of the conflict is dependent on traffic volumes. Option 3A has conflicts on the off ramps at the Bakerville interchange. Option 1A has conflicts on the on ramp and chain station access but if traffic volumes from the on ramp are smaller there may not be as significant of an impact. Christiana said 3A may not be as problematic with respect to weaving movements because the off ramp removes exiting traffic which may decrease mainline weaving.

Amy said the county wants to put a more formalized parking facility at the Bakerville interchange on the south side, as the current parking facility is not sustainable. If a more formalized rest stop or recreational access facility is built, there will be more traffic and increased use in the future. Ben said CDOT agrees improvements are needed and has been exploring funding, but because there are no approved plans or funding, it would be difficult to plan for future unknown uses at this point for this project.

Tracy asked who uses the Bakerville frontage road to the east? Amy said a few residents who reside to the north use it, and it serves as a connector to Silver Plume.

Core Value Mobility and Accessibility

Support ease of freight movements?

Tracy said that conflicts and merging challenges commonly occur when the lane markings aren't clearly delineated. Tracy noted an advantage to 2A is that trucks can enter directly into the auxiliary lane from the chain station with enough length for acceleration. She said



the wayfinding with 3A seems problematic, and the conflicts at the Bakerville interchange going westbound would remain. Amy asked if 2A would still feel advantageous in normal weather when chain station usage may not be required. Angy Casamento (Ulteig) said 2A would serve as acceleration from the chain station to mainline I-70. Angy said the chain stations may be moved or expanded with this project, so the start location of the auxiliary lane should be evaluated separately from possible improvements/changes of the other project elements. Tracy said she would not want the chain station moved farther up the hill (west) because the steep grades and chaining on steeper grades is difficult for drivers. The CMCA would like to separate the trucks from moving traffic as much as possible, and additional lighting would be helpful. Mandy closed the conversation saying that 2A has some benefits but was previously thought to be problematic for trucks simply because of steep grades. With Tracy's input, the team will revisit the criteria for Option 2A shown in the matrix.

Ben noted there is not a specific criterion about the effect of steep grades in the evaluation matrix and requested that it be added.

Core Value Community

Ensure that highway improvements and recreation facilities act in concert and support expanded recreation opportunities?

Lindsey explained that all three options were rated as “fair” under this criterion, with Option 3A having more potential to conflict with recreational traffic exiting at Bakerville interchange. Amy agreed with the evaluation and said the presence or absence of the auxiliary lane does not have a large effect on the interchange operations. Changes to the interchange operations would be the only way to impact recreation facilities and access.

Core Value Environment

General discussion: Lindsey said these criteria were all marked as “non-differentiators”. Because the auxiliary lane length does not vary significantly between each option, the criteria would need to be studied more in depth later to understand environmental impacts. Amy said she believes 2A has fewer overall impacts because there is less rock cut, less asphalt, and ultimately less snow removal materials. She suspects that there are other differentiators that should be discussed. The group suggested that the team modify the environmental portion of the matrix accordingly to distinguish the differences between the options.

Protect Clear Creek as a fishery resource and its water quality in addition to its tributaries and protect/enhance wetlands and riparian areas?

Amy said it seems like the criteria related to water quality and wetlands could be differentiated because there are less threats to water quality with less pavement. Overall, the group agreed.



Protect/enhance wildlife habitat or movement?

Kristin Salamack (CDOT) said Option 2A may be best for lynx, following the same logic that if the auxiliary lane is shorter, it has less of an impact to lynx movement. Additionally, 1A and 3A have large rock cuts which could also present an additional barrier to lynx.

Tracy asked if there are underpasses or overpasses planned for the wildlife crossing. Lindsey said the team is considering two underpasses with the use of wildlife fencing in between. Kristin said that additional lighting for chain stations and other project elements affect wildlife and should also be considered. She suggested that the project consider options to turn the lights on and off like the lighting at Vail. (These considerations will be carried forward to the chain station elements and are not differentiators to the start of the auxiliary lane.)

Provide Opportunities to reduce Greenhouse Gas (GHG) emissions during construction and operations?

The team had similar comments as the other environmental criteria and noted that a shorter auxiliary lane would have less GHG impacts during construction and operations. The team will revise the matrix to note that smaller footprints would have fewer impacts for the environmental criteria.

Core Value Engineering Criteria and Aesthetics

Meet the I-70 Aesthetics Guidance?

Lindsey said with Options 1A and 3A there would be rock cuts, which provides an opportunity to improve the adherence to the Aesthetic Guidelines and therefore these options were rated as “better”. Option 2A has no rock cut so it was rated as “fair” because the existing rock cut does not meet the guidelines. It was discussed that categorizing rock cuts as a benefit is unusual, and Option 2A should not necessarily be scored lower than the other options. Amy suggested this criterion is not a differentiator.

End of Aux Lane Design Options

Due to time constraints, the group decided to review the evaluation for the auxiliary lane terminus instead of for the widening options.

The group reviewed three options: Options 1B, 2B, and 3B.

Option 1B ties into an established brake check area near the parking lot for EJMT and provides a deceleration lane to that exit. This option allows for a full-length auxiliary lane, meaning trucks won't need to merge onto I-70 to exit at the brake check.

However, the auxiliary lane ends at a 4 to 6% grade. This option also ties in at a curve but is designed with standard tapers. Also, trucks that exit at the brake check would have a short merge to reenter I-70.

- Option 2B ties in farther east before the brake check area on a tangent. The auxiliary lane ends a half mile before the brake check area where the grade is 6%.



- Option 3B continues the auxiliary lane as close to the tunnel as possible, continuing through the brake check area, and doesn't start the merge onto I-70 until the access points at the parking lot for the tunnel. The speed limit decreases before the tunnel thus the taper requirements are less and are designed to standard. The existing signal would need to be replaced/reset and still could be used for metering traffic, if needed. Ben said CDOT/design team has been working with maintenance staff at tunnel to understand their needs. Margaret Bowes (I-70 Coalition) noted in the eastbound direction when traffic is metered there are two different lights to help meter during peak periods. Ben said there is rarely a need to meter traffic on the east side of the tunnel for traffic heading west.

Angy said all the options have a potential for impacting the landslide area to the north, and there is minimal space to widen south into the median. Ben said we may be forced to tie in farther east to avoid the landslide area, and the team is being cautious. If the design has impacts to the north, additional investigations would be required.

Margaret asked if we could find out how often the westbound signal is used, which is something the design team is working on through conversations with CDOT maintenance. Tracy voiced concerns about Option 3B and the location of the traffic signal with such a short distance to merge before EJMT and the traveling speed of vehicles entering the tunnel. This is the same area as the "over height" sensor. Any truck over 13'-6" is not allowed in the tunnel, thus a sensor is triggered, a horn alerts the driver to stop, and the truck is removed from traffic. Truck drivers pull over to the side at the brake check area and are measured to determine height and whether the truck can enter the tunnel. If over height, the truck is rerouted over the loop road and back to US6. Tracy did not know the exact location of the over height sensor but assumes it is near the middle driveway near the portal house. This location was confirmed by Shannon Mero (CDOT). Christiana suggested that when the design team meets with CDOT maintenance group at the tunnel, to include Aaron Fischer as he may be deploying different options for overhead protection.

Tracy also expressed a concern about trucks exiting mainline into that area and back into the lane prior to entering the tunnel. Overall, her preference is for 3B, as 3B allows trucks to operate at a slower speed the full length prior to the tunnel and may help to avoid hot brakes and major conflict.

Angy asked Tracy if ending the auxiliary lane 500 feet from the tunnel entrance where trucks would need to merge is a concern due to the short taper and quick transition. Tracy said she is concerned about this aspect of the design because it puts trucks so close to the tunnel access and it is difficult for trucks to move over with the cars approaching behind them at 55 or 65 miles per hour. She noted it is ideal for trucks to stay in the same lane and not have to merge. The design team offered a potential idea to change the striping approaching the tunnel to designate the left lane as the merging lane, not the added auxiliary lane. The team will investigate this option further.

Core Value Safety

Reduce potential for hazardous materials incidents and spills?



Lindsey said the design team did not believe there were any differentiators for this criterion as the trucks are able to access the brake check in all options. Ben said the option that ties into the brake check may offer additional operational benefits to get trucks off the mainline and to the side. The design team can look to reevaluate the criterion with an added understanding of responses. Tracy added that the brake check area is where they stage hazardous materials trucks when US6 is closed, thus options 1B and 3B would provide a safe, secure, and adequate space for these trucks.

Core Value Mobility and Accessibility

Lindsey reviewed the findings. Margaret asked if it would be possible to get crash data that indicates where the highest incidences of crashes are approaching the tunnel at the steeper grades. Christiana said this type of information is available, and the design team will use this information to more accurately evaluate travel time reliability.

Core Value Environment

Like the discussion of the start options, the group reiterated the need to reevaluate impacts of the longer lane options specific to effects of the larger footprints on water quality and greenhouse gases. The overall length of the auxiliary lane directly impacts the environmental criteria.

Core Value Historic Context

Lindsey commented that the design team determined there were no differentiators due to the absence of important cultural/historical resources. Mandy noted the historic surveys are ongoing so resources may be identified. She also noted that the EJMT tunnel is an NRHP-eligible historic resource, and even if we are not directly impacting the resource, the approach to the tunnel may be inside the historic boundary and needs to be considered. The design team will need to confirm the historic boundary. Shannon confirmed that impacts to the tunnel's historic setting is an important consideration for all projects at or near EJMT.

Next Steps

Margaret asked if these meeting materials will be distributed because she is very interested in the termini discussion and would like to see the detailed evaluation. Since time limited the discussion, and the widening and interchange options were not covered, Mandy asked if the team could make initial recommendations on the beginning and end locations of the auxiliary lane so that the design team can keep making progress.

Amy said while the group is willing to do homework, it's helpful to hear presentation from designers on the plans. She thought it might be helpful to wait until the next TT meeting to go through the evaluation of US 6 interchange and widening options together.

It was noted that Amy has a conflict with the first Thursday of the month for TT. A Doodle Poll will be sent out to determine another time that works for the group.

Action Items:



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Region 1

Region 1 West Program
425 A Corporate Circle
Golden, CO 80401

Add steep grades as an evaluation criteria and measures of success. (Lindsey Wickman, Ulteig/Wendy Wallach, Peak)

Use information from Tech Team#3 to modify the environmental portion of the matrix. (Lindsey Wickman, Ulteig/Wendy Wallach, Peak)

Find out how often the westbound signal is used for ramp metering. (Lindsey Wickman, Ulteig)

Meet with CDOT maintenance group at the tunnel (include Aaron Fischer) to discuss over height truck detection. (Ben Davis, CDOT)

Gather information about crashes in the close vicinity of EJMT and use it to assess travel time reliability (Lindsey Wickman, Ulteig)

Distribute draft evaluation with ratings to the Tech Team when the meeting minutes are distributed (Lindsey Wickman, Ulteig/Wendy Wallach, Peak)

Schedule January Tech Team Meeting (Mandy Whorton/Loretta La Riviere, Peak)



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Westbound Bakerville to EJMT Auxiliary Lane

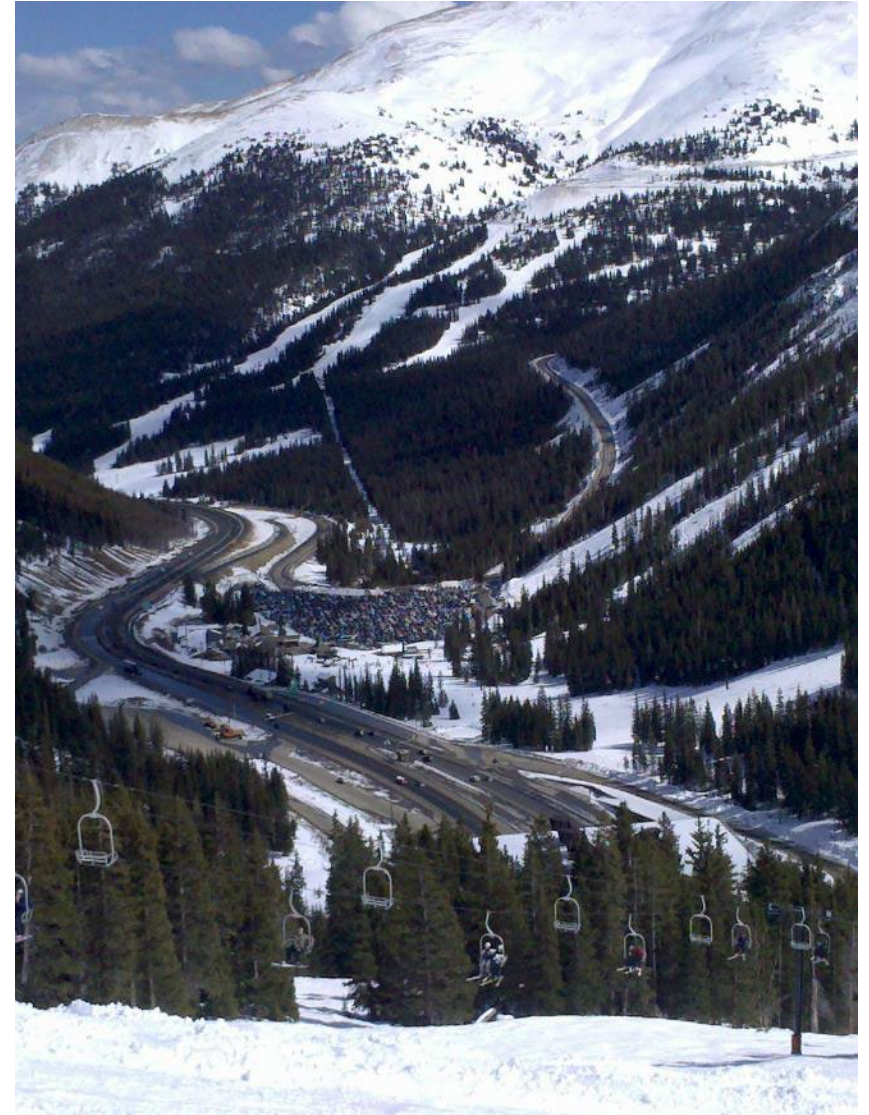
TT Meeting #3

December 1, 2022



- Welcome and Introductions (10 minutes)
- CSS Flowchart (5 minutes)
- Measures of Success (10 minutes)
- Design Options (40 minutes)
- Evaluation Matrix (50 Minutes)
- Next Steps (5 minutes)

MEETING PURPOSE: Evaluate initial design options against CSS criteria to determine which one to recommend for further consideration and development.





- Maximize productivity
- Share time so that everyone can participate
- Stay on point and on time
- Record issues needing future discussion in parking lot
- Close decisions and identify action items





Context Statement

The I-70 Mountain corridor is a magnificent, scenic place in close proximity to the Denver Metro area. Human elements are woven through breathtaking natural features. The integration of these diverse elements has occurred over the course of time. The corridor is a recreational destination for the world, a route for interstate and local commerce and a unique place to live. I-70 is also federally designated as a high priority corridor, a significant part of the defense network, a major east/west continental corridor and a major economic corridor for Colorado. For many local communities along the corridor, I-70 is the lifeline, primary access and only connection to other communities.

Current I-70 roadway geometry is constrained with narrow shoulders and tight curves that impact safety, mobility, accessibility and capacity for travelers and residents.

In a manner that respects the unique environmental, historic, community and recreational resources in Clear Creek County, Westbound improvements are needed to lessen delays caused by peak period volumes.

* As modified by WB PPSL PLT and TT

Core Values

- Safety
- Mobility & Accessibility
- Implementability
- Community
- Environment
- Engineering Criteria & Aesthetic Guidelines
- Sustainability
- Historic Context
- Decision Making

Critical Issues

- Emergency response / incident management
- Safety of traveling public
- Geometric problems
- Traffic operations
- Local access
- Reliability
- Blends with future modes (AGS, Greenway)
- Roadway network connectivity
- Constructability
- Construction impacts
- Fiscally responsible costs
- Recreation access and facilities
- Supports private development
- Supports local businesses
- Tourism and economy
- Water wells
- Livability
- Clear Creek / fishery
- Wildlife habitat and movement
- Mining
- Erosion / water quality
- Landslide protection
- Balance design using CSS Guidance
- Aesthetics
- Geometric standards
- Maintenance
- Significant archaeological site
- Known historic properties
- Adherence to ROD, MOU and Design Speed Study

Evaluation Criteria

1. Accommodates emergency access and response?
2. Addresses safety of the traveling public and the community?
3. Improves mobility and reliability?
4. Improves traffic operations at interchanges?
5. Blends or does not preclude other modes (AGS, Greenway)?
6. Minimizes construction efforts?
7. Creates infrastructure investments that are reasonable to construct and provide the best value for their life cycle, function and purpose?
8. Supports / enhances recreation access and facilities?
9. Supports private development and economic development opportunities?
10. Enhances tourism and the economy?
11. Protects / enhances wildlife?
12. Protects Clear Creek, its fishery resource and water quality, including wells?
13. Minimizes conflicts with geologic hazards?
14. Meets I-70 Design Criteria and Aesthetic Guidance?
15. Minimizes effort and cost to maintain?
16. Protects historic and archaeological resources?
17. Adheres to ROD and Design Speed Study?
18. Consistency with Clear Creek County Visioning?



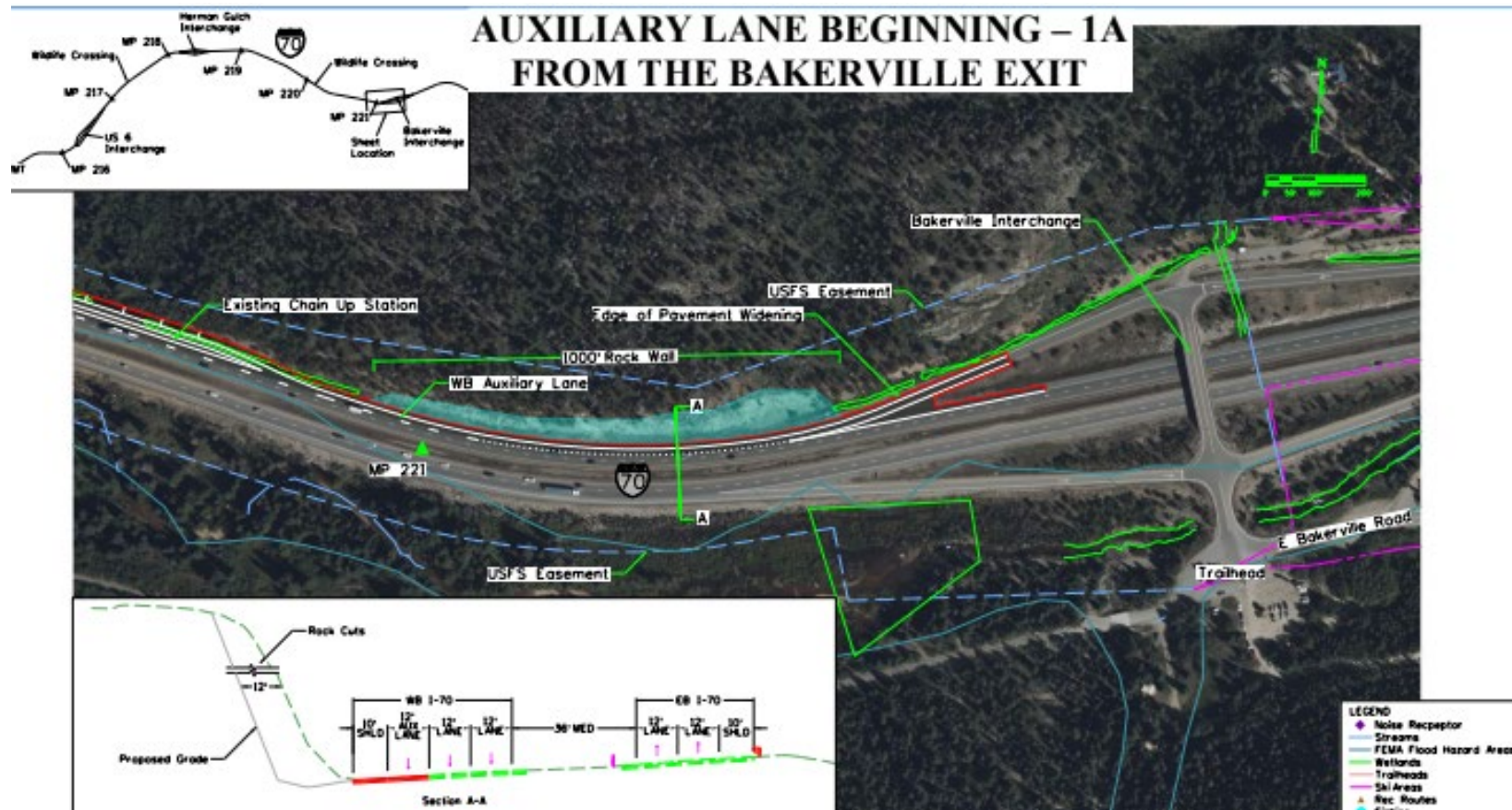
Measures of Success Mobility and Accessibility

Core Value—Mobility and Accessibility		
<ul style="list-style-type: none"> Traffic operations Freight operations Traffic conflicts Local access Truck parking Geotechnical hazards Advanced Guideway System (AGS) 	Reduce conflicts with slow moving vehicles?	<ul style="list-style-type: none"> Reduce speed differential between lanes
	Support ease of freight movements?	<ul style="list-style-type: none"> Protect hazardous materials freight route Reduce number of conflict points between heavy vehicles and passenger vehicles
	Improve travel time reliability?	<ul style="list-style-type: none"> Improve areas with high crash rates Provide weather or incident warnings ahead of time Provide mitigation of geohazard incidents Consider Pegasus plans for future operations in area Supports increased Snowstang service for Loveland Ski Area
	Improve local accessibility at Loveland interchange?	<ul style="list-style-type: none"> Reduce number of conflict points between people exiting I-70 and people entering I-70
	Accommodate truck parking?	<ul style="list-style-type: none"> Provide safe truck parking areas in emergency situations
	Reduce impact from geotechnical hazards?	<ul style="list-style-type: none"> Mitigate hazards (rockslide/avalanche locations, <u>etc</u>) Provide adequate snow storage locations
	Accommodate AGS?	<ul style="list-style-type: none"> Preserve AGS Feasibility Study hybrid alignment location



Measures of Success Engineering Criteria and Aesthetics

Core Value—Engineering Criteria and Aesthetics		
<ul style="list-style-type: none">• Aesthetics• Design Considerations	Meet the I-70 Aesthetics Guidance?	<ul style="list-style-type: none">• Level of adherence to I-70 Mountain Corridor Aesthetic Guidelines
	Meet the I-70 Design Criteria or minimize the number of exceptions needed?	<ul style="list-style-type: none">• Minimize number of CSS design variances• Level of adherence to I-70 Mountain Corridor Design Criteria

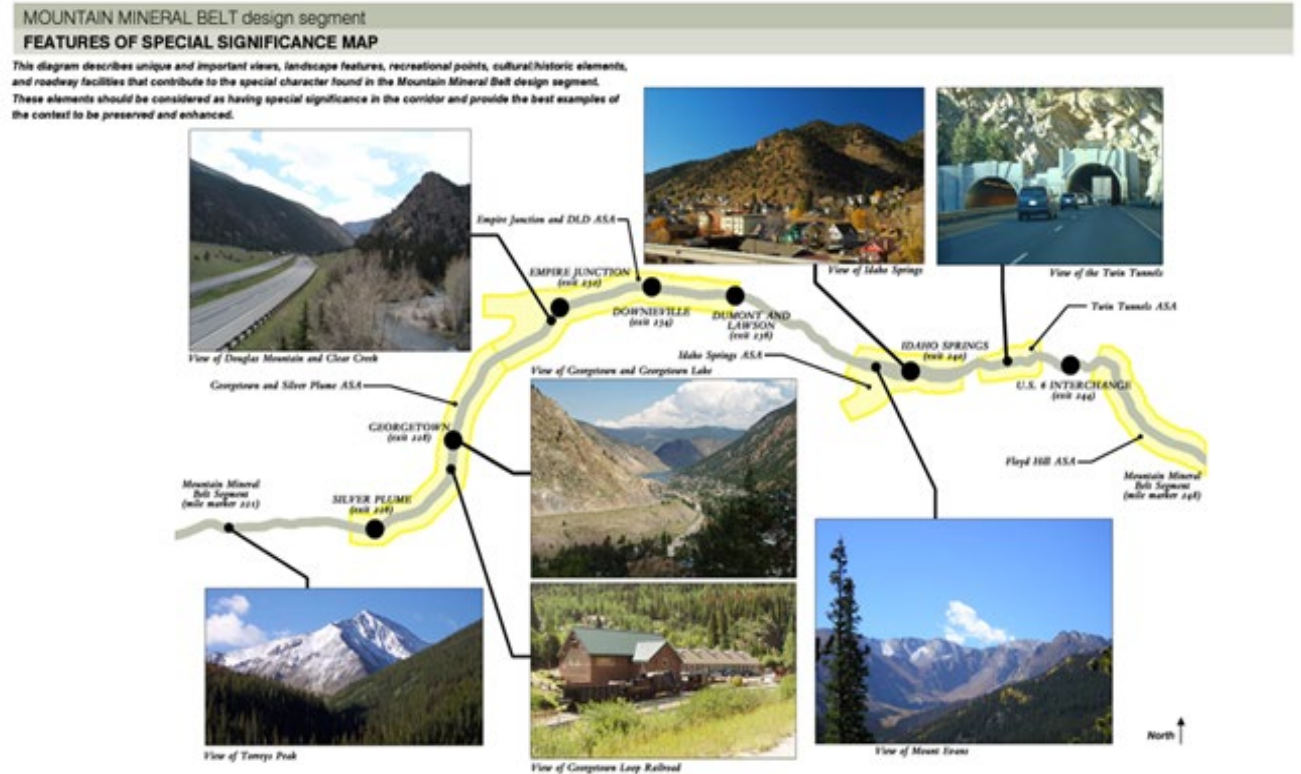


- -Beginning of Auxiliary Lane
- -Widening north/median
- -Terminus of Auxiliary Lane
- -US 6 Interchange
- -Chain Stations (TBD)



Evaluation Matrix

- Safety
- Mobility and Accessibility
- Implementability
- Community
- Environment
- Engineering Criteria and Aesthetic
- Sustainability
- Historic Context
- Decision Making





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Next Steps