

# **I-70 Mountain Corridor Chain Station CSS Process Summary**

## Introduction and Background

The Colorado Legislature recently proposed and passed HB07-1229 Bill. This new law puts into effect stricter fines for truck drivers who do not use chains when the chain law is in effect. The goal of this legislation is to improve the operations during winter months of the major interstates within Colorado.

This law has implications for the I-70 Mountain Corridor. One particular impact for the I-70 Mountain Corridor is the need for more chain-up and chain-down stations and for improvements to the existing stations. The Colorado Department of Transportation Region 1 staff is responsible to plan, design and construct the needed chain station improvements.

When a truck has chains on the tires there must be snow pack on the road surface or damage to the chains and the roadway surface will result. This requires chain stations to be available in close proximity to locations where the chain law is most frequently put into effect. These locations are coincident with steep grades through the corridor, such as Floyd Hill, Georgetown Hill, Vail Pass, and the approach to tunnel.

Truckers, local Emergency Medical Providers, and local users are concerned about the safety of these chain stations. Further local residents and CDOT maintenance workers see the year round uses of these chain stations and are concerned about the safety for summer users, protecting the wildlife from closer access by tourists, and the use of these areas as rest stops.

To address the multi-faceted nature of these stations and arrive at a mutually acceptable design and phasing plan for these chain stations, a Context Sensitive Solutions approach was employed.

This approach began with the CSS Corridor Management Team studying the engineering elements of chain stations, understanding the current available funding, and planning a day long workshop bringing together the many concerned stakeholders.

The workshop was held on April 17, 2007 and the many interests were well represented. Attendees included representatives from the trucking industry, the local emergency medical response providers, the Colorado State Patrol, the Port of Entry, CDOT maintenance teams, the design team and the Region 1 leadership for the corridor. This agenda was used to conduct the workshop.

Attached to this summary are the comments, concerns, and ideas discussed during the workshop. The morning was spent discussing the best design elements that should ultimately be included in all of the chain station designs. The afternoon was a discussion of the best use of the current funding. The workshop wrapped

### Agenda

<b>9:00 a.m. – 9:30 a.m.</b>	<b>Welcome and Introductions</b>
<b>9:30 a.m. – 10:00 a.m.</b>	<b>CSS and Chain Station Project Overview</b>
<b>10:00 a.m. – 12:00 a.m.</b>	<b>Final Design Issues</b>
<b>12:00 p.m. – 1:00 p.m.</b>	<b>Lunch and Summarize</b>
<b>1:00 p.m. – 2:00 p.m.</b>	<b>Phasing the Construction</b>
<b>2:00 p.m. – 3:30 p.m.</b>	<b>Prioritize for Phasing</b>
<b>3:30 p.m. – 4:00 p.m.</b>	<b>Summarize and Wrap up</b>

up with a discussion of the engineering considerations used to prioritizing the construction package elements given the available funding.

## **Design Issues Summary**

The following issues and goals are a sampling of those expressed, discussed and agreed up by both small groups as the important design considerations.

**Safety** - All agreed this is the single most important issue. Separation between the travel lane and the parking area designated for chaining activities was seen as the safest design. Separation also provides for a single exit and entrance point for users of the chain station, this improves safety because those not stopping at the chain stations know where trucks will re-enter the traffic.

**Multi-use** - The mountain corridor is limited in locations that provide for pulling off the road, whether these are used for chain stations, disabled vehicles, enforcement activities, or scenic stops for travelers, these areas are limited. Therefore, designing specific chain stations for multi-use is agreed to be an important consideration.

**Environmental** - Noise, air pollution and water quality impacts are concerns and designs that lessen or eliminate these impacts should be employed.

**Lighting** - During snow storms when the chain law is in effect, lighting to aid the truckers in chaining their vehicles is important. However, this lighting should not be available at any other times. Lighting affects wildlife and residents, as well as increasing maintenance.

**Signing** - Intelligent Transportation Signing is considered the best options for the chain stations. ITS can be in effect only when needed, it will be more noticeable during snowing, and it can serve multiple purposes, such as lowering the speed limit and informing drivers of the proximity of chain stations.

**Enforcement** - Founded in years of observation, there is great concern about out-of-state truck drivers ignoring the chain law. The chain law, when in effect requires truckers to use chains, but further it requires chains are on board all trucks traversing the mountains.

**Education** - Again, based on years of observation, not all truck drivers are aware of the chain law and its requirements nor are they aware of the location of chain stations. Information provided in pamphlets and in interactive kiosks at truck stops can give drivers new to the Colorado mountains valuable information about the chain law requirements, real-time notice the chain law is in effect, locations of chain stations, and even locations to purchase chains if needed.

## **Priorities for Phasing Summary**

The following summarizes the group's discussion and agreement of what should be considered when determining the phasing of the chain stations.

**Safety** - Again, there was complete agreement that improving safety and building all new spaces in the safest and most cost effective way possible was the most important consideration when phasing the constructions.

Safety was felt to be best served with a combination of elements.

- **Signing** was also seen as a highest priority with the safety issues. Without signing directing truckers to the chain stations, many simply pull off the road to complete chaining activities.
- **Physical separation** between the travel lanes and the parking areas was considered the best safety improvement.
- **Reduction in speed limit** available with ITS signing was also considered a critical safety issue.
- **Additional spaces** were recognized as a critical need to improve safety.

**Build at fewer locations and do the chosen sites as models.** A great concern was expressed that doing many locations in a least cost approach would result in little or no improvements in the future. The citizens and local medical providers were concerned that once adequate parking spaces for chaining were available the pressure would be gone to add other elements like physical separation, ITS signing, wildlife friendly fencing and other multi-use elements.

It was also discussed that doing an excellent design now on a couple of sites would make future funding more easily available because it would show the quality of work CDOT does. A discussion of sites that should have the highest priority, lead to the direction those sites chosen should be those with the greatest need. Determining this need should be based on frequency of the chain law in a location, proximity to steep grades, locations with a current shortage of spaces and locations with an accident history.

**Lighting** was recognized as a critical element for the chain stations. Improved visibility for truckers while they are chaining will decrease the time it takes and make each parking space available sooner for the next trucker. However, it was also discussed that lighting should not be included in the current project because of the limited dollars available.

**Education** was also seen as a critical element in the safety of the corridor and enforcement of the chain law. Several ideas were discussed and it was agreed that the current construction dollars are best spent on construction in the corridor. Other avenues should be explored to increase the information and understanding of the mountain driving conditions. Several members of the group have considerable insight into means and methods to get the information in the hands of the truckers.

**Courtesy Service** was discussed and all agreed that a program that provides chains, tows, information and even help in chaining-up would directly improve the operations and safety of traveling in the corridor during inclement weather. The possibility was discussed of the Courtesy Service providing the snow plowing for the chain stations.

## **Workshop Wrap Up**

The conclusion of the workshop was a recap of the small group discussions. The group has several information requests of the project team, concerns about the environmental

clearance status of the upcoming construction and interest in staying informed on the next steps taken.

The following commitments were made to the group.

The Chain Station Design Team will provide:

- Accident data for the corridor

- Status of the clearances

- The decision matrix which will be used to prioritize the construction dollars

The CSS Team will:

- Discuss the possibility of more time to determine the priorities for construction

- Work with the Chain Station Design Team on the decision matrix

- Research additional dollars to complete more of the elements identified

- Get back to the community regarding the decisions made

### **Follow up Meetings**

Two meetings were held after the workshop to discuss the specifics of the design package being prepared. One meeting was held on April 20, 2007 and another meeting on April 24, 2007.

#### **April 20, 2007 Meeting**

The meeting held April 20, 2007 was intended to use the feedback from the April 17<sup>th</sup> Workshop and developed what should be included in the chain station design package.

The attendees at that meeting were:

- Scott Hoftiezer/CDOT Reg. 1 Traffic

- Bernie Guevara/CDOT

- Saeed Sobhi/CDOT

- Bill Scheuerman/CDOT

- Mary Jo Vobejda/CH2M HILL

- Dave Millar/PBS&J

- Flo Raitano/I-70 Coalition

- Cindy Neely/Georgetown

- Patty Olsgard/CMC (Colorado Motor Carriers)

- Joe Russel/Silverthorne Police

The group discussed and agreed that the following items were the critical goals/directions for CDOT to address:

- Make improvements in fewer locations or improve only one location(s). This is the approach preferred given CDOT's limited funding for chain station development. It is better to focus on a few locations rather than to spread the resources over several locations.
- Physical separation. Primarily for safety reasons, CDOT should strive for physical separation, not just separation by distance.
- Provide as many spaces as possible for truckers.
- Address wildlife issues.

The group identified the priorities stations for expanding and physically separation as:

- 219 EB Herman Gulch
- 229 WB & EB (connected to 219. If CDOT does a better job at 219 then 229 may not be an issue) Georgetown

The group agreed that 219 EB Herman Gulch is the best location for an expansion. This site should be the number one priority and completed as a "signature project".

Physical separation is possible at 219 EB. The site could be expanded to maximize the spaces.

The following item still needs to be completed at 219 EB:

- Agreement with Fish & Wildlife Service regarding the Biological Opinion. US Fish & Wildlife believes this is a critical lynx crossing, therefore, CDOT has proposed to mark 1% of the funds from every project for use to construct a crossing. This proposal has been reviewed by US Fish and Wildlife and it looks like this will lead to a quick Biological Opinion.
- Stipulate in the plans that CDOT will not build this site if no Biological Opinion is agreed upon.

Other high priorities discussed by the group include:

- Signing
- CDOT making a formal commitment to fund the ultimate vision for chain up areas in the I-70 mountain corridor.

### **Options for Design Package**

To prepare for the April 20<sup>th</sup> meeting, the design team prepared a matrix of costs for each station and 3 improvement options that seemed to be consistent with the direction of the April 17<sup>th</sup> workshop.

The design team has used the following elements in a decision matrix to consider and discuss the priorities for the current funding.

Some criteria had several elements and each criterion was weighted. See table below.

### Weighting of Criteria for the Decision Matrix

Criteria		Weight
Demand		5
Safety	Does it have a buffer or not?	5
	Site Distance	1
	Accel/Decel lanes	1
	Buffer Size	3
Sustainability		1
Crash Information		1
Cost		1

**The design team looked at the highest score and then cost effectiveness.** From this matrix 3 design options were developed. All options held EB 219 as the highest priority, it could be the model. The group assumes that 229 could also have some improvements completed. The following describes the improvements included at stations 229 WB, 229 EB, and 219 EB.

#### **Georgetown 229 WB:**

- Physical separation, lighting, signing
- Could have even more spaces with double line of spaces
- Needs a landscape solution

#### **Herman Gulch 219 EB chain down:**

- Physical separation, lighting, signing
- Meets the demand
- Has the wildlife issue & requires Fish & Wildlife Service to agree with the plan

#### **Georgetown 229 EB = chain down:**

- Lower priority if 219 EB is done this year

A forth improvement option, Option 4, was developed from the conversation and the attendees agreed that it would be consistent with what was heard at the April 17<sup>th</sup> workshop and was a good use of the \$2.37M.

**Option 4 included:**

Signing and communication at MP 177, MP 183, MP 184, MP187 and MP 195

Signing, communications, additional spaces at MP 203 & 205 EB

Construction of 12 new spaces with signing and communications at MP 219 EB

Construction of 8 new spaces with signing and communications at MP 221 WB

Signing and communication at MP 223 WB

Signing and communication at MP 228 EB \*

\*hope to eliminate the need for more spaces based on the improvements at MP 219 EB

Construction of 15\* new spaces with signing and communications at MP 228 WB

\* the 15 spaces was assumed based on the idea of widening further and creating two lanes

Signing and communication at MP 241 EB

Highlighting indicates these items were able to be included in the design package presented at the April 24, 2007 meeting.



## April 24, 2007 - FOR/FIR Meeting

### Discussion of the designs at specific locations included:

#### 219 EB:

- Physical separation of 30' clear zone
- ROW seems to be no problem

If CDOT improves 219 EB, it could take the demand away from 228 EB. This could mean no new construction would be needed at 228 EB. This could mean that CDOT would be able to push the EB pull-out further east, away from the entrance ramp

#### 228 EB Georgetown:

- May be less important with the improvements at 219 EB
- This location should be considered for a pull-out in the ultimate chain station vision (there is room)

#### 228 WB:

- This would be the "model" chain station for CDOT.
- A double - lane pull out should be constructed.
- A pull out with 30' clearance would work.
- ITS signing would be needed.
- These improvements result in only 20 spaces (this is only 1 more than currently exist)
- Courtesy Patrol should be seen as a way to increase capacity; this can be done when the chain law passes.
- **IDEA Developed by the Group!!** Locals might build split rail fences; may be able to eliminate "closure gate" if fencing was in place

CDOT needs to look for ways to get more spaces at 228 WB

**At the conclusion of the meeting the design team agreed to look at lengthening 228 to the east or widening more to increase the number of spaces.**

#### 241 EB:

- Located on the west side of the Twin Tunnels.
- Drainage is an issue in this area.
  - The group wants lighting.
- This chain station has merge & diverge issues.
- Can gain 11 spaces at this station.

- This is not a pull-out design.
- Could use a portable VMS at the point of entry to emphasize "USE THIS" chain up station.
- Includes ITS signing
- Idaho Springs can not issue permit while 1041 is under litigation!

**254 WB:**

- Buffalo overlook (widening will be done by another project).

**243 WB:**

- Not being done.

**251 EB:**

- Not being done.

**Wrap up on CSS discussions**

The CSS portion of the meeting was concluded with a comment period for the group.

The priorities of Tuesday, April 17th were used to create the work presented at the April 24, 2007 meeting; however, the ultimate vision could still need work. The design team will reconvene on Friday, April 27, 2007, to get the final design package for construction based on some of the feedback from the April 24, 2007 meeting.

**Summary of the Comments:**

- o Concern at Georgetown – Spending \$400, 000 for 1 space is not cost efficient. CDOT should find a way to add spaces at this location.
- o The CSS process that was used for the Chain up design process has been good. It is an improvement from the public process used to date on the corridor. One individual stated that they like talking directly to CDOT engineering & maintenance staff.
- o This has been a good process so far.
- o 219 EB needs to be done.
- o 228 EB needs to be separated.
- o Would like to see final design for 228 WB.
- o Good process.
- o It is important to move forward and make some of the chain up improvements.

- Provide information to the truckers before they get to mountains - VERY IMPORTANT!!
- Did we get accident information? Please include in recap.
- The process felt like collaboration.
- Providing information and education to the truckers is critical.
- The information strategy could use guidance.
- An individual appreciated the chance to bring up the wildlife issue.
- CSS process is working.
- Everyone is “seeing” the other person’s side.
- 228 WB design needs a little work.
- 241 is problematic.
- Keep groups engaged.
- Keep looking at new information to see if things are working.
- Think about having limitations 1<sup>st</sup> a better way to do the process
- Everyone needs time to look at things.
- Don’t anticipate Division of Wildlife will have issues that stop the show.
- An individual appreciated being included.
- Hope all will help secure money for multi-year funding.
- Georgetown; Herman Gulch; Floyd Hill are the highest priorities for the truckers.
- Capacity and safety are critical to being able to comply with the new law.
- Safety must remain our number 1 issue.
- This work is consistent with Colorado State Patrol goals to reduce fatalities.
- Need to partner to accomplish a reduction on fatalities.
- Safety is number 1 to CDOT maintenance staff
- No additional time is possible
- Working together has solved some of these needs
- Provide information on Twin Tunnel lighting
- An effort to monitor the actual operations on these stations should be started.

## **CSS SUMMARY**

The following summarizes the resulting design and construction activities:

### **Phase 1 - Scope comprises widening, asphalt, signs/communications.**

The project consists of work at 6 locations between MP 216 and 251. Signing and communications at 6 sites and asphalt work at 5 of these sites. A

separation buffer was included at WB 221/Bakerville, WB 228/Georgetown, EB 241/Twin Tunnels, and EB 251/El Rancho. No lighting is included with project.

Budget - \$2.47 Million

Schedule - Awarded to Asphalt Specialties. Completion in October '07. In conjunction with this project, added 4 other chain station sites that were done by on-going construction contracts (EB 205/Siverthorne, WB 254/Buffalo Herd Overlook, WB 260/C470 and WB 263/Denver West)

### **Phase 1A - (supplemental Project) Scope comprises mainly signing and communications.**

The project consists of work at 7 locations between MP 177 and MP 254. Signing and communications provided at 7 locations. A separation buffer was included at EB 219/Herman Gulch. No asphalt work or lighting is included with project except for WB 219.

Budget - \$1.4 Million

Schedule - Awarded to Interface Communications. Completion of signs at critical locations this year with remainder completed summer '08.

### **Phase II - Scope comprises mainly lighting the Phase 1 &1A sites**

The project consists of work at 17 locations. The majority of the work provides lighting at 16 of 17 locations with signing and communications at 4 of the locations. Asphalt work provided at 2 locations.

Budget - approximately \$4 Million

Schedule - Work anticipated to begin summer of '08 as funding becomes available

### **Actions forward**

The results of this report will be distributed to those participating. Performance of the completed chain stations will be monitored throughout the upcoming winter season. Resulting adjustments/revisions in performance standards will be incorporated in future chain station installations accordingly

**ATTACHMENT A**  
**SUMMARY OF WORKSHOP ISSUES**

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes
Global	Who uses Chain Stations? <ul style="list-style-type: none"> <li>• Rental Agencies</li> <li>• Truckers</li> <li>• Personal Vehicles (not commercial)</li> <li>• Variety of truck types</li> <li>• Drivers from Colorado</li> <li>• Drivers from other states</li> </ul>	<ul style="list-style-type: none"> <li>• Education for all users</li> <li>• Clear Signage</li> <li>• Clear Messages regarding who is affected by the chain law, when and where</li> </ul>	<ul style="list-style-type: none"> <li>• Flyers at truck stops, POE</li> <li>• Media coverage</li> <li>• Locations (chain-up or chain-down and truck parking)</li> <li>• Use VMS</li> <li>• Key is consistency and education</li> </ul>	
Global	Air Pollution	<ul style="list-style-type: none"> <li>• Minimize impacts to wildlife and local communities</li> </ul>	<ul style="list-style-type: none"> <li>• Restrict idling time</li> <li>• Analyze impacts site-by-site</li> </ul>	
Global	Noise at chain stations	<ul style="list-style-type: none"> <li>• Minimize added noise at chain stations near residences.</li> <li>• Consider how is it impacted for/by long-range</li> </ul>	<ul style="list-style-type: none"> <li>• Don't preclude future noise walls</li> <li>• Put walls in now if warranted by noise studies</li> <li>• Determine appropriate factors to perform noise studies and when</li> </ul>	

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes
		improvements	<ul style="list-style-type: none"> <li>• Minimize gearing up/down noise by placing of chain stations away from sensitive receptors</li> <li>•</li> </ul>	
Global	Restrooms	<ul style="list-style-type: none"> <li>• Install only at selected areas, not all.</li> <li>• Improve existing impacts to local communities</li> </ul>	<ul style="list-style-type: none"> <li>• Consider SST</li> <li>• Minimize maintenance challenges</li> <li>• No Temporary – make permanent</li> <li>• Minimize trash/wildlife impacts (sturdy containers, bear-proof, etc).</li> <li>• Aesthetics – fencing, color, general material considerations</li> </ul>	
Global	Multi-Use	<p>Chain stations get used during the summer for other uses, so plan for multi-use or sign for no use except when chain law is in effect.</p> <p>Carefully select the multi-use sites and then incorporate management controls for all of the various uses.</p>	<ul style="list-style-type: none"> <li>• Use wildlife friendly fencing</li> <li>• Minimize impacts (safety, wildlife, disruption, etc.)</li> <li>• Minimize parking duration (e.g. 30 minutes) where appropriate.</li> <li>• Allow for traffic stops, truck inspection, trucker rest areas.</li> <li>• Use option to close down if safety becomes an issue.</li> <li>• Redirect as appropriate to other areas (distribute usage).</li> <li>• Evaluate</li> </ul>	

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes
			<p>management of other issues (noise, pollution, etc.).</p> <ul style="list-style-type: none"> <li>• Evaluate speed mitigation measures.</li> <li>• Consider speed differential between chained vehicles and those not chained.</li> </ul>	
Global	Lightings	<p>Use only when chain law in effect. Minimize impact to wildlife</p>	<ul style="list-style-type: none"> <li>• Use “Dark Skies” compatible lighting.</li> <li>• Use wildlife and community friendly lighting.</li> <li>• Highway versus parking needs for lighting brightness should be considered.</li> </ul>	
Global	ITS – This is a high priority	<ul style="list-style-type: none"> <li>• Lighting</li> <li>• Cameras</li> <li>• Messages</li> <li>• High Advisory Radio (HAR)</li> </ul>	<ul style="list-style-type: none"> <li>• Use where possible now, plan for ITS at all locations when fiber connection is available.</li> <li>• Install wireless kiosks at advance locations where truckers could check road conditions</li> <li>• Install wireless kiosks at trucker stops/POE’s to provide information for what type of vehicles, station locations, etc</li> </ul>	High Priority

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes
			<ul style="list-style-type: none"> <li>• Activate signs and lights only when needed</li> <li>• Develop fail-safe system that works with or without power (e.g. outages or where fiber is not available).</li> </ul>	
Global	Need physical separation. Just widening with stripe/asphalt is not acceptable	Without separation is it a safety concern to truckers and traveling public. Striping does no good when snow is on the road.	<ul style="list-style-type: none"> <li>• Consider each site for the best option for separation</li> <li>• Where there is not room, don't build a chain station.</li> <li>• Vail Pass is a good example of how to build it right.</li> <li>• Guard rail is not preferred. Presents added hazard.</li> <li>• Consider low-profile delineation, e.g. change in grade/elevation, drainage swale, island</li> <li>• Consider that travel speeds are lower during inclement weather.</li> <li>• Don't use cable rail.</li> <li>• Consider traffic operations in proximity to interchanges and allow ample decel/accel.</li> <li>• Need to design to allow snow</li> </ul>	



Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes
			plowing. <ul style="list-style-type: none"> <li>• Consider courtesy patrols as a way to get chain stations plowed.</li> <li>• Evaluate speed mitigation measures, such as rumble strips for alert drivers to the chain station locations.</li> </ul>	
Global	Enforcement	Minimize road closures (full or partial)  Consistent enforcement	<ul style="list-style-type: none"> <li>• Increase awareness/funding for multi-jurisdictional enforcement (may require additional legislation)</li> <li>• Coordinate with Governor (Rep. Gibbs is already working on this) to determine various enforcement enhancements (e.g. more \$, staffing)</li> </ul>	
219 EB Herman Gulch	Multiple issues		<ul style="list-style-type: none"> <li>• Multi-use location</li> <li>• Provide lots of space</li> <li>• Provide separation</li> <li>• Improve advance signing (redirect from CS 217)</li> <li>• Lynx migration required</li> <li>• Minimize impacts to existing trails</li> <li>• Need Forest Service Permit for Chain up stations</li> </ul>	

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes
			219, 221, 223, and 229	
221 WB Bakerville	Noise		<ul style="list-style-type: none"> <li>• Provide noise mitigation</li> </ul>	
228 EB Georgetown	<p>Traffic operations between trucks in and out of chain station and cars entering the highway from the ramp.</p> <p>Drifting snow</p> <p>Tourist cross-traffic</p>		<ul style="list-style-type: none"> <li>• Consider exiting at Georgetown ramp to access truck chain-up</li> <li>• Consider chain up on widened on-ramp</li> <li>• If ingress does not change provide physical separation</li> <li>• Provide fencing to deter cut-through traffic (tourists) between frontage road and ramp</li> <li>• Improve geometrics to reduce snow drifting</li> <li>• Use Dark Skies lighting</li> <li>• Requires Design Review Commission approval (could be part of 106)</li> </ul>	
228WB Georgetown	<p>Multi-use Lighting</p> <p>Wildlife</p>		<ul style="list-style-type: none"> <li>• Provide physical separation</li> <li>• Provide wildlife friendly fencing</li> <li>• Improve geometrics to reduce snow drifting</li> <li>• Use Dark Skies lighting</li> <li>• Requires Design Review</li> </ul>	

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes
			Commission approval (could be part of 106) Similar issues (except for drifting) to 229 EB <ul style="list-style-type: none"> <li>• Key multi-use location</li> <li>• Manage Big Horn Sheep viewing area with signing and fencing</li> </ul>	
241 EB West of Twin Tunnels	Community Air/Water Impacts	Minimize	<ul style="list-style-type: none"> <li>• Design with the close proximity of the water discharge in mind</li> <li>• Study the use game check station road</li> </ul>	
243 WB	Sight Distance	Improve	<ul style="list-style-type: none"> <li>• Improve sight distance geometrics</li> <li>• Look at relocating within interchange area, on-ramps or cross road, consider operational/mixed-use impacts</li> <li>• Provide lighting</li> <li>• City of Black Hawk water intake - need to evaluate water quality impacts</li> <li>• Evaluate rock slide impacts</li> <li>• Look at alternative routing on US 6/40</li> </ul>	
254 WB Buffalo Herd Overlook 251 EB	Are these sites really of value?	Putting sites where they are needed and will be used.	<ul style="list-style-type: none"> <li>• May be lower priority due to infrequent need</li> <li>• May be</li> </ul>	No site specific issues at these

<b>Chain Station Location</b>	<b>Issue</b>	<b>Goal Surrounding the Issue</b>	<b>Group Solution or Direction to the Designers</b>	<b>Notes</b>
El Rancho			advantageous to relocate anyway due to distance to next chain station	locations

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
Global	Signing		<ul style="list-style-type: none"> <li>• CDOT should obtain input into the signage from the Colorado State Patrol (CSP)</li> <li>• CDOT should empower the maintenance people who are out clearing the roads to make the call to <b>turn on the chain law into effect</b></li> </ul>	
Global	Striping		<ul style="list-style-type: none"> <li>• Do striping well in advance of the stations</li> </ul>	
Global	ITS Application		<ul style="list-style-type: none"> <li>• Address this together with signing</li> <li>• When the chain law is in effect, reduce the speed limit on the roads. Tie these two together</li> <li>• Do portable VMS if necessary, such as is done on Vail pass</li> <li>• Provide the necessary</li> </ul>	

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<p>information to manage the sites</p> <ul style="list-style-type: none"> <li>Require truckers to have chains with their trucks as a standard safety device. Implement with legislation and enforce with CSP and Ports</li> <li>Make sure all signage, lights, and ITS applications are synchronized and working together</li> </ul>	
Global	Lighting		<ul style="list-style-type: none"> <li>Don't do downcast lighting at chain sites. Don't do the standard CDOT 30 foot lights. Very hard to see tires for chaining.</li> <li>Install side lighting to aid truckers with chaining</li> <li>Light both sides of the chain station</li> <li>Have station</li> </ul>	

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<p>lights on when ever chain law is in effect - day or night</p> <ul style="list-style-type: none"> <li>• Use LED lights</li> <li>• Address lighting at multi use stations differently, based on individual site needs</li> </ul>	
Global	Multi-Use		<ul style="list-style-type: none"> <li>• There is a need for multi use areas in the corridor. Look for opportunities for these. Some places are not feasible for multi use</li> <li>• Herman Gulch is a good site for multi use</li> <li>• Need parking off the highway and need restrooms</li> <li>• Sign all applications at a multi use site</li> <li>• Design it, sign it, size it,</li> <li>• Consider topography of</li> </ul>	

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<p>land and do a safe layout</p> <ul style="list-style-type: none"> <li>• Delineation between the road and station is critical</li> <li>• Be strategic. Consider construction, runoff, wildlife crossings. Keep people at stations from running up hill sides with dogs due to impacts to wildlife</li> </ul>	
Global	Restrooms		<ul style="list-style-type: none"> <li>• These are a good thing to have</li> <li>• Look for opportunities at multi use stations</li> <li>• Can strategically locate along the corridor. Don't need these at every station.</li> <li>• Make attractive</li> <li>• Separate restroom use area from chain station to reduce conflicts</li> <li>• Have trash</li> </ul>	



# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			cans at each station	
Global	Aesthetics		<ul style="list-style-type: none"> <li>• Blend into the environment. This will be different at each location. Look at the surrounding area and have it fit in</li> <li>• Don't want a parking lot for trucks</li> <li>• Do screening of the stations</li> <li>• Do physical separation from the highway</li> <li>• Signing is important that it doesn't obstruct views</li> <li>• Do aesthetic treatments at every site</li> </ul>	
Global	Noise		<ul style="list-style-type: none"> <li>• Residents of Vail don't like the noise but don't want noise walls</li> <li>• Address site specific</li> <li>• Wind, visual, noise break – can have 3 issues addressed with one treatment.</li> <li>• Always</li> </ul>	

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<p>consider when there are receptors in the vicinity of the station</p>	
Global	Delineation		<ul style="list-style-type: none"> <li>• Provide fully separated stations when physically possible - not just put up a Jersey barrier or other type of barrier. Take facility off the mainline.</li> <li>• Downhill grad approaching station is a real problem with safety. Need a full separation due to slick roads</li> <li>• Prioritize sites that can be separated.</li> <li>• Provide advance lighting and good stripping</li> <li>• The CSP says that full separation should be the end goal of all stations. This is the safest situation</li> <li>• Distance from</li> </ul>	

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<p>traffic should be greater than 15 ft, according to the CMC representative . This is the “reasonable” clear zone.</p> <ul style="list-style-type: none"> <li>• Physical barrier is the only way to ensure safety</li> <li>• Provide barriers that would guide trucks and force them to accelerate before going into traffic. Barriers can direct them.</li> <li>• Chain up and chain down stations have different issues to be addressed</li> <li>• Mitigate issues by reducing the number of stations in the corridor – balance with need for stations that keep trucks from driving on dry roads</li> <li>• Prioritize input from</li> </ul>	

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<p>emergency personnel in the corridor. They know the issues</p> <ul style="list-style-type: none"> <li>• Don't put stations near exits. Ports have problems with people driving into the port thinking it is the exit. Then, speed through the facility once they recognize their mistake. Creates a dangerous situation.</li> </ul>	
Global	Emissions		<ul style="list-style-type: none"> <li>• Address this location by location depending on receptors</li> </ul>	
Global	Water Quality		<ul style="list-style-type: none"> <li>• Address this location by location</li> </ul>	
Global	Safety		<ul style="list-style-type: none"> <li>• 15 or 30 feet space from traffic doesn't protect truckers because of the potential to slide during bad weather. Need a barrier</li> <li>• Maybe install barriers just</li> </ul>	

# Group

## 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			during the winter <ul style="list-style-type: none"> <li>• Operation with Respect to Maintenance</li> <li>• Evaluate merges in and out of stations to make safe</li> <li>• Don't impede snow removal vehicles</li> <li>• Don't add anything that will shade the road because of ice</li> </ul>	
Global	Grades		Find the flattest areas possible	
177 EB Vail	<ul style="list-style-type: none"> <li>• There is no WB chain down station for the Vail area. Consider this in the future (west of Vail Pass).</li> <li>• Management of the Station</li> </ul>		<ul style="list-style-type: none"> <li>• Work with Eagle County for parking</li> <li>• Do permanent signing, not a temporary portable VMS sign</li> <li>• Nothing for WB at this location so look across from EB 177 as a possible WB site</li> </ul>	<ul style="list-style-type: none"> <li>• Vail</li> <li>• Shown on map as (179-180)</li> <li>• Good location for a chain station</li> </ul>
187 EB Vail			No site specific issues at these location	
197 WB Copper Mountain			No site specific issues at these location	

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
197 EB Copper Mountain			No site specific issues at these location	
203 EB Frisco Scenic Area	<ul style="list-style-type: none"> <li>This is a multi-use area.</li> <li>Some commercial drivers may think they can sleep here if it is labeled as a multiple use chain station</li> </ul>		<ul style="list-style-type: none"> <li>Be sensitive to the aesthetics of signs to operate this site, be careful not to block views</li> <li>Sign and operate as a chain-up area only. Make it a single use instead of a multi use site.</li> <li>Sign could be located on the nearby bridge so that views are not blocked</li> <li>Direct truckers to Eagle Co Fairgrounds for longer term parking</li> </ul>	<ul style="list-style-type: none"> <li>Plans show an expansion of 19 spaces.</li> <li>203 EB is an existing overlook</li> <li>Plans show a reconfiguration of what is there</li> <li>Today, this is a multi-use application</li> <li>Planned as a 30 minute chain station</li> </ul>
205 EB Silverthorne Dillon	<ul style="list-style-type: none"> <li>Merge is an issue. Traffic is merging onto I-70 while trucks are pulling over to the right to go to the chain up station.</li> </ul>		<ul style="list-style-type: none"> <li>Provide warning signs to travelers that reduced speed limit signs are ahead</li> <li>Sign well in advance to let people know the chain station is there</li> <li>Provide warning signs</li> </ul>	<ul style="list-style-type: none"> <li>205 EB is an existing station</li> <li>Planned improvements are signing and striping</li> </ul>

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<p>on ramp (both sides) when chain law is in effect - "Use Extreme Caution - Truck Chain-up Site Ahead"</p> <ul style="list-style-type: none"> <li>• Ramp metering - consider this to see if it could improve operations</li> <li>• Move station further east to lessen the merge issue</li> </ul>	
217 WB West of EJMT Tunnel	<ul style="list-style-type: none"> <li>• An existing dirt pull-out. This is not an official site. CDOT needs to address whether this is a legitimate site or not, then approve as needed.</li> </ul>		<ul style="list-style-type: none"> <li>• Sign this area</li> <li>• A barrier is needed</li> </ul>	
219 EB Herman Gulch	<ul style="list-style-type: none"> <li>• Environmental issues at this location. Water quality, wildlife considerations.</li> <li>• Need Forest Service Permit to do this station.</li> </ul>		<ul style="list-style-type: none"> <li>• This site needs both outside and inside delineation.</li> <li>• 219 EB is a priority location for Clear Creek County. It is a "perfect" location. Easy to get away from the highway.</li> </ul>	<ul style="list-style-type: none"> <li>• This is a Chain down station</li> <li>• Herman Gulch is where the Continental Divide Trail starts</li> </ul>

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<p>This is where a physical separation should be implemented. This does not mean separation with a barrier.</p> <ul style="list-style-type: none"> <li>• Put a sign right outside of the tunnel so that truckers will see it and know that there is a chain station ahead.</li> <li>• Work with Michelle Li to get the permit from the Forest Service.</li> <li>• This site is a good multi-use opportunity and a priority location</li> </ul>	
219 WB Herman Gulch	<ul style="list-style-type: none"> <li>• Potential environmental issues at this location such as wildlife conflicts</li> <li>• Parking area is there now. Existing Forest Service parking lot</li> <li>• What is currently designed by</li> </ul>		<ul style="list-style-type: none"> <li>• Do multi-use at this location</li> <li>• Do separation</li> <li>• Use already disturbed ground</li> <li>• Use the existing Forest Service Parking lot as a chain up area</li> </ul>	<ul style="list-style-type: none"> <li>• CDOW is currently tracking animals to obtain wildlife information but don't have data on hand</li> </ul>



# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
	CDOT is not acceptable		<ul style="list-style-type: none"> <li>This is a priority location</li> <li>This site needs both outside and inside delineation</li> </ul>	
221 WB Bakerville	<ul style="list-style-type: none"> <li>Chain stations 217, 219 &amp; 221 are very close, which make it tough to adequately sign each</li> <li>Noise impacts to "receptors"</li> <li>Potential water quality issues</li> </ul>		<ul style="list-style-type: none"> <li>Keep all three stations but provide one sign for all three</li> <li>Noise barrier in the area is appropriate</li> <li>Address potential water quality issues</li> </ul>	<ul style="list-style-type: none"> <li>Planned for expansion 5-8 spaces</li> <li>The Colorado Motor Carrier Assoc. representative stated that all of these stations meet the needs for various types of trucks</li> </ul>
223 WB East of VMS Sign	<ul style="list-style-type: none"> <li>Noise impacts to receptors</li> <li>Potential water quality issues</li> </ul>		<ul style="list-style-type: none"> <li>Noise barrier in the area is appropriate</li> <li>Address potential water quality issues</li> </ul>	
228 EB Georgetown	<ul style="list-style-type: none"> <li>Merge problem. Truckers can pull out at any point because there is no access control at the site</li> <li>Double merge issue</li> <li>How do we sign this?</li> </ul>		<ul style="list-style-type: none"> <li>Provide improvements that physically direct trucks to take exit ramp, go through the stop sign, and then up the entrance ramp to the chain station</li> </ul>	<ul style="list-style-type: none"> <li>This is where trucker fatality occurred</li> </ul>

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
	<ul style="list-style-type: none"> <li>• Issues are similar to those listed in 228 WB</li> <li>• Wildlife habitat area</li> </ul>		<ul style="list-style-type: none"> <li>• Go up entrance ramp</li> <li>• Consider that stop sign</li> <li>• May need another lane for the trucks</li> <li>• Outside edge, need careful delineation</li> <li>• Need less of an acceleration lane</li> <li>• Not a multi-use site</li> <li>• Might want a windbreak in the area due to high winds</li> </ul>	
228 WB Georgetown	<ul style="list-style-type: none"> <li>• Merge problem</li> <li>• No access and egress delineated for trucks.</li> <li>• Bighorn sheep area, people stop to view the sheep</li> <li>• Multi-use issue is huge</li> <li>• Aesthetics - lights</li> <li>• Restroom sanitation</li> </ul>		<ul style="list-style-type: none"> <li>• Restrooms are needed at this site</li> <li>• 228 EB is a priority for safety</li> <li>• 228 WB is a high priority station for Clear Creek County</li> <li>• Physically separate this site from the highway. Do not separate with a guard rail or any other type of barrier. Grade separation is ok.</li> </ul>	<ul style="list-style-type: none"> <li>• Site located at Georgetown</li> <li>• This is the most popular chain-up area</li> <li>• Some fencing</li> <li>• Sheep want salt on road</li> </ul>

# Group 2

Chain Station Location	Issue	Goal Surrounding the Issue	Group Solution or Direction to the Designers	Notes (Not solutions or directions to designers)
			<ul style="list-style-type: none"> <li>Address multi-use issues at this site such as safety, signing of all applications and functions.</li> </ul>	
241 EB West of Twin Tunnel	<ul style="list-style-type: none"> <li>Merge issue</li> <li>Water quality - sewer plant close for Idaho springs</li> <li>Dust issue with potential water quality issues</li> </ul>		<ul style="list-style-type: none"> <li>Address merge issue</li> <li>Address water quality issues</li> </ul>	<ul style="list-style-type: none"> <li>This is planned as a new site with 11 new spaces</li> </ul>
243 WB Hidden Valley	<ul style="list-style-type: none"> <li>Merge Issue</li> <li>Dangerous area - truck accidents problematic</li> <li>Potential water quality issue</li> </ul>		<ul style="list-style-type: none"> <li>Make merge work</li> <li>Look at sight distance to see if that is a problem</li> </ul>	<ul style="list-style-type: none"> <li>243 WB planned for 4 new spaces</li> </ul>
251 EB El Rancho	<ul style="list-style-type: none"> <li>Merge Issue</li> </ul>		<ul style="list-style-type: none"> <li>Address the merge issues</li> </ul>	<ul style="list-style-type: none"> <li>El Rancho site</li> <li>6 new spaces are planned</li> </ul>
254 WB Buffalo Herd Overlook			No site specific issues at these location	

## ATTACHMENT B

### CHAIN STATION CSS PROCESS SUMMARY

#### APRIL 17<sup>TH</sup> WORKSHOP

- #1 priority Safety – Signing/Separation/ITS - incl speed reduction
- Other Important Design Issues
  - Lighting
  - Public/Trucker Education
  - Courtesy Service
  - Landscaping
  - Wildlife signing
  - Snow removal
  - Sanitary facilities
  - Aesthetics
  - Noise

#### April 20<sup>th</sup> FOLLOW UP MEETING

- #1 priority – 219 EB (Herman Gulch), Separation/Lighting/Signing
- #2 priority – 228 WB, Separation/Expansion
  - WB – add separation, lighting, signing, spaces, landscape;
  - EB – same as WB improvements except no added spaces;
  - 228 EB may not be as critical if 219EB is built accordingly.
- Other Important Design Issues
  - Improve fewer locations, but do better job per Clear Creek County.
  - Separation (where can be accommodated) is ideal for improved safety.
  - Provide as many spaces as possible per CMCA.
  - Signing and changeable reduced posted speed limit.
- Other Options
  - MP 177, 183, 184, 187, 195  
Add signing/communications
  - MP 203, 205 EB  
Add signing/communications/additional spaces
  - MP 219 EB  
Add signing/communications/12 additional spaces
  - MP 221 WB  
Add signing/communications/8 additional spaces
  - MP 223 WB

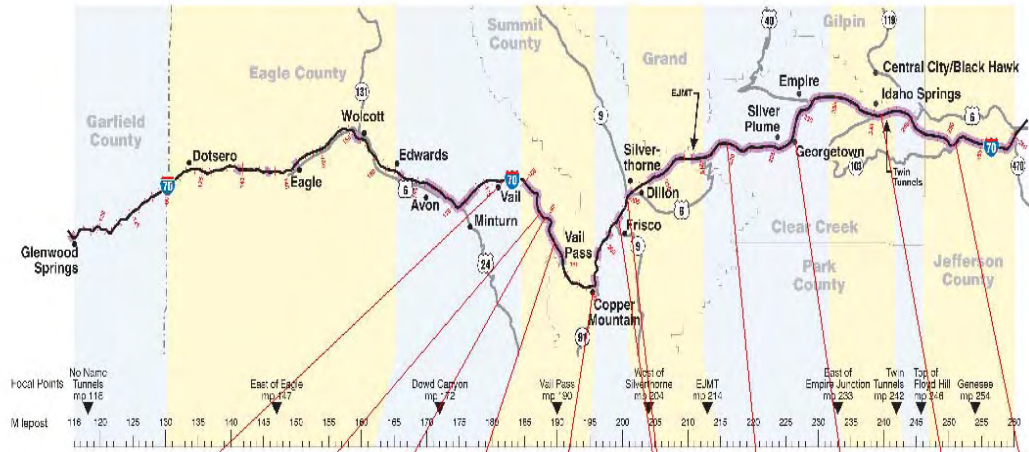
- Add signing/communications
- MP 228 EB
  - Add signing/communications
- MP 228 WB
  - Signing/communications/15 additional spaces
- MP 241 EB
  - Signing/communications/ 11 additional spaces.

**April 24th FIR/FOR mtg**

- 219 EB
  - Look to accommodate 30 ft separation
- 228 EB
  - Consider as pull-out in ultimate chain station vision
  - If CDOT improves 219 EB, demand would be taken away from 228 EB. CDOT instead could look to push the EB pull-out further east, away from the ramp entrance.
- 228 WB
  - Look at double lane entrance
  - Look to accommodate 30 ft separation
  - Add ITS signing
  - Look at lengthening or widening to the east to add more spaces
  - Locals might build split rail fences; may be able to eliminate “closure gate” if fencing was in place
- 241 EB
  - Look at improving drainage
  - Add lighting
  - Improve merge/diverge geometry
  - Add 11 spaces
  - Look at usage of portable VMS to emphasize “USE THIS” chain up station

# ATTACHMENT C

## I-70 MOUNTAIN CORRIDOR CHAIN STATION IMPROVEMENTS EASTBOUND



EB CHAIN STATIONS	MP 177 EB - APPROACHING VAIL	MP 183 EB	MP 184 EB	MP 187 EB	MP 195 EB -	MP 203 & 205 EB - DILLON AND SILVERTHORNE	MP 219 EB - HERMAN GULCH	MP 228 EB - GEORGETOWN	MP 241 EB - WEST SIDE OF TWIN TUNNEL	MP 251 EB - EL RANCHO
SPACES ADDED										
SIGNING/MESSAGE SIGNS ADDED										
LIGHTING ADDED										
Existing Spaces	37	11	15	19	5	30	0	16	0	0
New/Additional spaces	0	0	0	0	0	19	16	0	11	6
Total spaces	37	11	15	19	5	49	16	16	11	6

= Construction this year (07)
  = Construction next Year (08)

**ATTACHMENT D**

**I-70 MOUNTAIN CORRIDOR CHAIN STATION IMPROVEMENTS  
WESTBOUND**



WB CHAIN STATIONS	MP 197 WB - NEAR COPPER MTN	MP 215 WB - WEST OF EJMT	MP 218 WB	MP 221 WB - WEST OF BAKERVILLE INTERCH	MP 223 WB - EAST OF EXISTING VMS SIGN	MP 228 WB - GEORGETOWN	MP 254 WB - BUFFALO OVERLOOK	MP 280 WB AT C-470	MP 283 WB - DENVER WEST
SPACES ADDED									
SIGNING/MESSAGE SIGNS ADDED									
LIGHTING ADDED									
Existing Spaces	5	0	20	20	8	19	0	0	0
New/Additional spaces	0	8	0	8	0	22	12	7	30
Total spaces	5	8	20	28	8	41	12	7	30

= Construction this year (07)

= Construction next Year (08)

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