



MEETING NOTES

PROJECT:	23982-23929 I-70 West Vail Pass Safety and Operations Improvements
PURPOSE:	ALIVE ITF #5 Meeting
DATE HELD:	September 13, 2021
LOCATION:	Online Google Meet Meeting
ATTENDING:	John Kronholm, Project Manager, CDOT Region 3 Karen Berdoulay, Resident Engineer, CDOT Region 3 Rob Beck, Program Engineer, CDOT Region 3 Matt Figgs, CDOT Region 3 Cinnamon Levi-Flinn, CDOT Jen Prusse, US Forest Service Kristin Salamek, CDOT USFWS Liaison Michelle Cowardin, DNR Jeff Bellen, FHWA Dick Cleveland, Town of Vail Pete Wadden, Town OF Vail Julia Kintsch, ECO-resolutions Mark Gutknecht, Kiewit Jenn Bradtmueller, Kiewit Jeb Sloan, RS & H Mary Jo Vobejda, Jacobs Jim Clarke, Jacobs Pat Bastings, Jacobs Loretta LaRiviere, Jacobs
COPIES:	Attendees

SUMMARY OF DISCUSSION:

1. Introductions & Meeting Purpose

- a. Karen introduced the attendees at today's meeting.
- b. Mary Jo said the purpose and goals for today's meeting is to present the final Wildlife Crossings Memo, coordination efforts, and resulting wildlife crossing locations and designs; present guiding wildlife fence concepts and wrap up this ALIVE ITF.

2. ALIVE Development Process

- a. Mary Jo stated that we began the IFT ALIVE process by reviewing all the guidance documents, then Julia took you through her methodology for informing the siting and design of the wildlife crossing structures using all of the documentation and national and international expertise she compiled that is documented in the memo. Based on your input, the preliminary locations and crossing sections were revised which influenced the design. The 30% design for the entire project has proceeded and is getting ready for be reviewed at the FIR meeting later this month.

3. Work Completed

- a. Julia noted since the last ALIVE meeting in May, the final Draft Wildlife Crossing Memo was completed and sent to you a few weeks ago to review in advance of

today's meeting. We will be discussing the memo conclusions later in the meeting and will solicit your input then. We have been working closely with the drainage, roadway, and structures design teams to finalize the design of the wildlife crossings structures. We have also been coordinating with the Aesthetics group in the development of aesthetic guidance relative to the wildlife crossings and other mitigation features. Julia said a lot of what we are going to talk about today is a result of the Wildlife Crossing Memo and conclusions and how our findings influence the design of both the large and small wildlife crossings on West Vail Pass.

1. Wildlife Crossings Memo

- a. Julia said we reviewed published and grey literature from projects in six western states and Canada. We focused on projects with similar target species, specifically lynx, elk, and mule deer as well as small and medium mammals. In particular we dug into the factors influencing crossing success for the target species which included dimensions of the structures, the layout and other design or environmental considerations. Of course, all this has to be balanced with all the other roadway and project considerations.
- b. The Environmental Assessment identified mitigation commitments for addressing habitat fragmentation barriers to wildlife movement and the opportunity this project presents to restore connections for wildlife across I-70.
- c. To meet that goal, at the outset of the design process we established objectives for the design of the wildlife crossings:
 - The wildlife crossings would be used by all the target species identified in the EA and we would design these structures with the objective of achieving a minimum success rate of 60% for each target species but with a goal of 80% for each target species.
 - As we conducted our review of wildlife crossings in other areas, we sought to learn from what worked and what didn't work in those projects so we could use that information to inform our design on West Vail Pass.
- d. Julia noted the final locations for the Wildlife Crossings are:
 - Two large crossings at MP 187.3 and MP 188.3.
 - Four small to medium crossings are located at MP 185.5, MP 188.7, MP 189.0, and MP 189.6.

2. Wildlife Crossings Memo Conclusions

- a. All Wildlife Crossings
 - In general, both the large and small structure crossing locations were optimized to access to wildlife habitat. That means we focused in on areas with adjacent suitable habitat on either side of I-70.
 - We will naturalize the approach to the wildlife crossing structures with variable grading and retaining and as much natural tree and vegetation cover as possible in



the vicinity of the crossings. We will augment natural cover with additional vegetation plantings and will leave some of the felled trees in place because those are important to retain native soils and provide cover for small fauna in those areas. And, to the extent possible we looked to situate the crossings away from recreation trail and to minimize human activity in the vicinity of the crossing structures.

b. Large Mammal Crossings

- The large crossings target elk, mule deer and lynx. A primary objective was to minimize the crossing structure length. In part we did that by making the structure perpendicular to roadway and by limiting the structure length to the roadway footprint so that there aren't big dirt shoulders beyond the pavement which would require an animal to cross under that longer distance. We were able to minimize the crossing structure length given the needs of the roadway and project constraints to add the auxiliary lane. From there we could optimize the width and height to provide a large opening for these target species while also balancing in the other terrain and roadway constraints. The final structure dimensions for the two large crossings are 48' wide by 14' high. One crossing location is 140' long and the other is 144' long.
- In some of our earlier ALIVE meetings we talked about a possible bridge or arch culvert options for these large crossings. In working with our structures group, we determined the best and most cost-effective option for meeting the structure dimension objective and other design consideration would be a precast concrete arch. There will be naturalized 2:1 side slopes leading up to the walls on either side.
- We have been working a lot with the drainage and SWEEP teams to divert drainage that is either coming from the roadway or off the adjacent hillsides. All that drainage will be diverted around the crossing structures so that flow isn't entering into the structure. But inevitably there will be some local drainage through the structure. We learned from the Highway 9 in Grand County how important it is to have grading through the structure itself to prevent stagnation of localized water flows and icing in the winter during melt/freeze cycles. By incorporating a small side slope and a small drainage channel those water flows will be diverted out of the structure.
- All of the large crossings will have a natural, open bottom with a small cross slope through culvert to keep local drainage to one side.
- There will be a flat bench area in front of openings grades into the approach slopes to provide a clean line of sight through the structure and from there the approach slopes will be graded to match the surrounding terrain.
- We have been working to strategically place the sediment ponds uphill from the crossing structures to capture the drainage and sediment from the roadway to prevent it from flowing through crossings.

c. Canada Lynx

- The crossing location near the top of Vail Pass located at MP 189.6 was sited and designed with for lynx passage. CPW collar data from 2010 and 2011 documented multiple lynx approaching I-70 in this area and a lynx was documented making a



successful at-grade crossing. These data really helped to confirm the habitat suitability for lynx in this area. The research on lynx use of wildlife crossing structures states that having a suitable lynx habitat is a critical factor influencing the successful use of lynx using crossing structures. While lynx are known to generally prefer larger structures, there is evidence from several different areas around the country where we have data on lynx use of structures, that they will also use smaller structures with 4' to 10' openings.

- At MP 189.6, this wasn't an area where we could fit in a larger crossing structure, but we are able to fit in a smaller structure with an opening that fits into the 4' to 10' range. We wanted to create as large an opening as possible with the least impacts to the surrounding habitat and to do that we opted for an elliptical shaped culvert that is 8' wide by 6' high with a soil substrate through the culvert.

1. Kristin asked Julia to send her the reports she has on lynx.

Julia said she would send her what is available. Some of the information, for example Maine, isn't in the literature but she obtained it because she worked directly with the DOT Biologist.

- d. Small to Medium Crossings

- We also have a wide variety of small to medium mammals around Vail Pass. Crossing structure preferences for these animals, is not just based on body size, we also have to think about predator and other risk avoidance strategies these species employ and how that influences their use of crossing structures. To accommodate that rather broad range of needs, we wanted to provide a range of crossing structure designs for these four small crossing structures.
- General guidance for the small to medium crossings is similar to the large crossings. They will have a flat bench area at the front of the culvert openings that is proportional to the size of the crossing. On the uphill slope which is on the east/north side of I-70, we are aiming for a maximum slope 3:1, with 4:1 preferred. However, we will be applying the same approach of variable grading so that it might not be an even slope approach. It may vary and contour into the natural terrain. All of the grading will aim to minimize impacts to the adjacent tree cover.
- Where there are steep downhill slopes at the outlet side of the culvert on the south/west side of I-70, we will grade in some small wildlife trails to help animals find these locations on those steep downhill slopes.
- We are using several different culvert types and sizes. Two culverts will be pipe culverts, one is 6' diameter and one is 4' diameter and two elliptical arches. One arch is 8' wide by 6' high and the other is 7' wide by 5' high. The length of these small culverts is really determined by the roadway footprint for some of these culverts we had to skew them so they are not exactly perpendicular to the road, so the lengths range from less than 200' to a maximum of about 278' at MP 189.6. The culvert slopes range from a small slope of 1% up to 5% and they all have soil substrate through the bottom of the culvert between 6" and 1'.



- Similar to the large crossing structures, we will be diverting the drainage away from the wildlife crossing so the drainage culverts are separate from the crossing structures and have minimal drainage through the crossings. We will provide small mammal cover through the culverts and at the approaches. For the small culverts we won't have any woody debris or rocks through the structures, but cover features (e.g., woody debris and natural plantings) around the small culvert approaches.

3. Aesthetics Coordination for Wildlife Crossings and Fencing

- a. Julia said they have been coordinating with the Aesthetic Guidance with regards to the wildlife crossing structures and the fencing. A large focus of this guidance is to preserve existing trees and shrubs and incorporating naturally occurring materials.
- b. We will use landscape retaining walls to minimize impacts to trees and shrubs. This may include rock walls around tree root balls and in some places we can apply that to the grading to some of these structures where we have steeper slopes to retain the tree cover, so we don't have to take the trees out and it fits into our variable grading approach.
- c. We will blend the wildlife fence into the environment.
- d. The guidance also stipulates avoiding excessive light levels and minimize light spillage into the adjacent habitat to protect the dark night sky

4. Wildlife Fencing Guidelines

- a. Julia said at previous meetings we mentioned we were hoping to conduct a fence test to test out several different fence designs and to determine what is the most durable fence design for the severe winter occasions we experience on Vail Pass. This test wasn't part of the INFRA Grant, and unfortunately we are not going to be able to do the fence test at all. But we are still able to apply lessons learned from some of the fencing that has been placed on I-70 in Eagle County and other locations with heavy snow loading and snowplow impacts and take what we've learned from those areas to create a more durable fence design for Vail Pass.
- b. We are still working on the precise alignment for the fence as the roadway is something that has been evolving alongside our work on the fence. We have developed some general concepts and guidelines for the fence alignment:
 - On uphill side of I-70, we will generally run the fence mid-slope, just below tree line so we can minimize impacts to trees during construction and it is also above sand line which represents the upper limits of the impacts of winter snow plowing.
 - The fence will tie into retaining walls or cliffs where that is appropriate
 - At wildlife crossing structures, the fence will tie into the structure abutments or run over the top of the smaller crossing structures
 - We are still considering using rockfall fence on top of concrete shoulder barrier at the smaller crossing locations to prevent snowplow or other damage to the fence in these areas where the fence comes up close to the interstate.



- On the south side of the interstate the fence will run between the interstate and recreation trail
- In general, we will have sediment ponds that are located on the right-of-way side of the fence for ease of maintenance access. However, at the large mammal crossings, and where the sediment ponds are acting as attractants for wildlife we are going to keep the ponds on habitat side of the fence and maintenance will have access to the sediment ponds through gates at those locations.
- The east end fence will be near top of Vail Pass interchange and there is some additional coordination with the Forest Service that is going to be necessary to determine the specific fence alignment. We have some ideas, but we need to have more discussion.
- The west fence end will tie into bridge abutments at Polk Creek.
 1. Dick said Vail Pass has historically been an unauthorized access point for hunters parking on the shoulders and accessing the back country from the highway. It has been an accepted practice for many years, and we do risk people cutting the fence to gain access from the roadway. It is an error not to include this in the discussion of at least looking at some access gates. The interstate has precluded any other access points to the forest. What sort of mitigation is included that will take that into account?

Julia said that is a great question and we have talked about it. It's not how people are supposed to access the forest. However, we do have to be aware of the need for access because it is not in the interest of the mitigation to have the fence cut or damaged so that people can get into places where they are used to having access.

Karen said the project team has talked about this. It is a tricky balance as hunters are not technically permitted access to the forest along the interstate. But we know it will happen and we don't want the fence to get damaged. We will need to work through this more to prevent damage to the fence.

We are having 30% design this month and the final design won't be until the spring of 2022, so we do have some time to work through details like this.

Michelle said if you have larger unlocked gates that people can access them, putting signs on them that say "keep gate shut" works surprisingly well on Highway 9. And make sure the latches are maintained.

2. Michelle said in the Wildlife memo tables you listed percentages and number of individuals but some cases you just give a percentage. I was wondering if in the table you can add what the sample size was.

Julia said they included both where they could, but some of the information detail from studies we reviewed was not formally documented and different agencies collect different information. But we will recheck our tables.



3. Michelle inquired for the four small to medium animal crossings do you know which pipe size and location are going to go?

Julia said she didn't present that today because we discussed it at our last meeting. MP 185.8 will be a 4' pipe. MP 188.7 will be a 5' high by 7' wide elliptical arch. MP 189.0 will be a 6' pipe and MP 189.6 is the 8' wide by 6' high elliptical arch.

4. Dick asked for clarification that all six wildlife crossings will be constructed in Package 3.

Matt said that is the intent. They will be advertised as part of Package 3. Package 3 is anticipated to start in summer 2022 but it may take until all the way to 2024 for completion. We are still working through on the exact schedule.

5. Dick asked is the large crossings are excavated or tunneled under?

Matt said they will be excavated. He said we are working through some phasing plans that would include potentially moving traffic around a bit doing some temporary paving to move traffic back and forth to do half at a time.

Karen said it will be quite the effort. We are replacing a box near Silverthorne and shifting lanes over there. It's a different type of structure but similar phasing and accommodating traffic and how we might build it.

5. Next Steps

- a. Design for the wildlife crossings and fence will continue with 30% design this month and 90% design scheduled in Spring 2022 as part of Construction Package 3.
- b. Wildlife crossing construction will start in late Summer 2022.
- c. Overall project will be completed in 2024.
- d. Mary Jo said this is intended to be our last meeting. The goal of all the ITF's is to gather experts and interested stakeholders to talk over the approach, determine what the criteria are, which is the memo Julia put together and then you are able to see how that influences and affects the design. At this time, unless something came up that we needed to gather you together, you have completed the work of the ITF. Thank you for all your time and effort put into this. It is appreciated not only by the designers and CDOT and hopefully the animals will appreciate it too. It's great to see these things come together.