UAA College of Engineering
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Cooper Creek Bridge

Project Team

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This project was prepared by Nomad Engineering for the Cooper Landing Walkable Community Project, an organization that works to improve the active transportation network within Cooper Landing.

Walkable Community Project
COOPER LANDING

Abstract

Nomad Engineering was selected to design a connection across Cooper Creek for non-motorized travelers. This pathway would expand upon the existing trail system within Cooper Landing and provide access between Alaska Wildland Adventures and Sackett's Kenai Grill. Three schematic design alternatives were considered and the the preferred alternative was further refined to a 35% design level.

Project Background

The existing path system within Cooper Landing stops just west of Alaska Wildland Adventures, which is located just west of Sterling Highway Milepost 50. This results in travelers using the space between the existing guardrail and shoulder of the road slope to travel further west. Upon reaching the Cooper Creek Bridge, which currently does not meet modern highway geometric standards and therefore provides no shoulders or non-motorized paths, travelers have to compete with vehicular traffic to cross Cooper Creek.

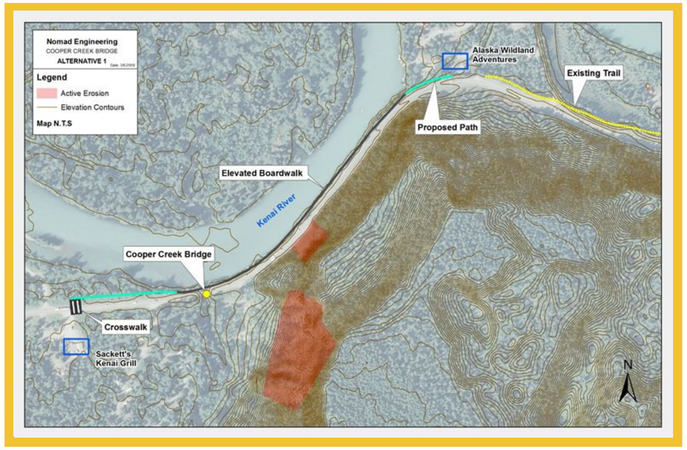
Objectives

Provide a safe east-west connection across Cooper Creek for active travelers while Improving upon the existing trail system within Cooper Landing.

Existing Conditions

- Lack of connectivity
- Inadequate path width
- Unsafe conditions
- Steep unstable backslopes
- Silty soils
- Anadromous stream habitat

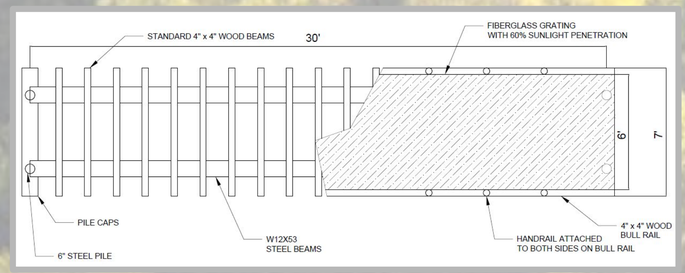
Explored Alternatives

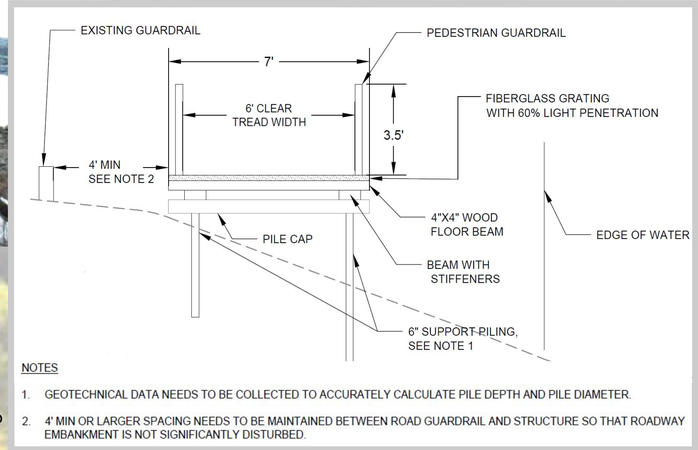


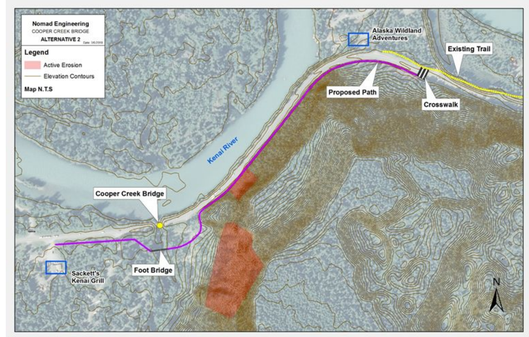
- **Alternative 1**
  Alternative 1 proposed constructing a walkway along the north side of the Sterling Highway. This provides a direct connection between the existing trail east of Alaska Wildland Adventures (AWA) and the Cooper Creek North Campground. This walkway will follow the existing alignment of the highway and will function as a separate structure that serves as a path for non-motorized travelers.
- **Alternative 2**
  Alternative 2 proposed developing a walkable path along the inside shoulder of the existing Sterling Highway alignment.
- **Alternative 3**
  Alternative 3 proposed using the hillside that rises from the inside shoulder of the existing highway, as a means to provide a scenic route for active travelers.

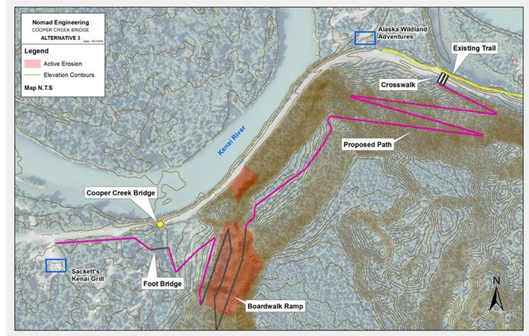
Elevated Light Penetrating Structure (ELPS)

An ELPS is an independent structure sitting on a driven pile foundation. This style of pathway was chosen for several reasons that are desirable in the overall project. Most importantly the ELPS provides a feasible and safe design that aligns with the client's vision. The low profile nature of an ELPS allows the pathway to follow the natural contours of the area, only having minor effects to the adjacent roadway, and the river's water.









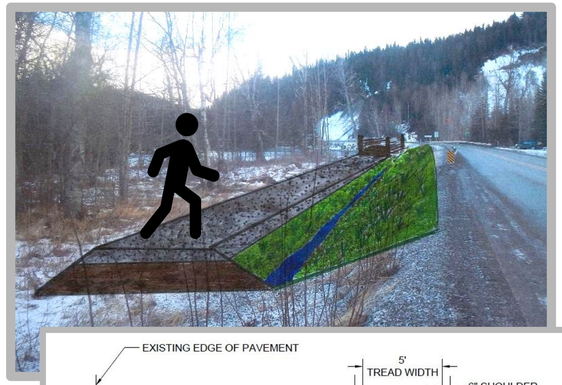
Chosen Alternative

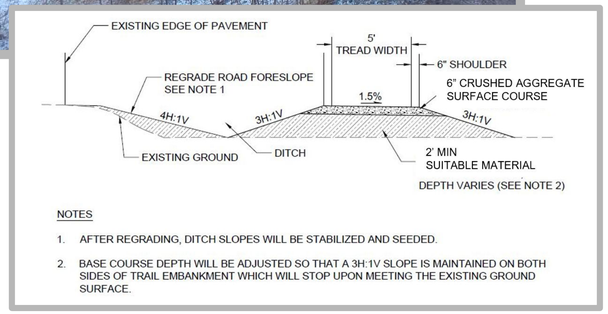
Alternative 1 was selected as the preferred alternative due to it's direct route, safe passage, and scenic view of the Kenai River. This pathway consists of four distinct components: upgrades or maintenance of the existing pathway, an elevated light penetrating structure (boardwalk), a prefabricated bridge, and a raised trail development.

The structure will have standard run of 30' per section (30' between pile sets) and is intended to provide pedestrian transport without having a large environmental impact. Structures should allow 60 percent of light to pass through to the vegetation underneath so that vegetation may continue to grow in the area. By having perforated fiberglass decking, the suggested percentage of light will be allowed to pass through, and continue growth beneath and around the pathway. The ELPS maintains a 3.5' railing on both sides, keeping travelers safe.

Developed Trail

The developed trail component would be constructed west of Cooper Creek, where the existing ground is both stable and wide enough to support the full development of the raised trail. The finished grade of the trail was designed to closely match the elevation of the existing roadway surface. Doing so would result in increased comfort and safety for active travelers who would be able to observe their surroundings and avoid getting soggy feet. This trail was designed to connect to an at-grade crosswalk that would provide safe passage between the Cooper Creek North Campground and Sackett's Kenai Grill.





Final Results

Alternative 1 was selected as the most feasible design option that best fit the needs of the project.

The portion of trail closest to Alaska Wildland Adventures is well compacted and free of vegetation. This section does not need to be redeveloped as long as a 5 ft minimum clear path width is maintained.

Where clear path width is unavailable, an elevated light penetrating structure would be developed. An ELPS is an independent structure sitting on a driven pile foundation. The structure will have a standard run of 30' between pile sets which allows the ELPS to follow the contours of the river and road. The piling foundation lowers environmental concerns in regards to affecting the Kenai River.

An independent pedestrian footbridge would cross Cooper Creek, connecting the ELPS to the developed trail section on the west side of Cooper Creek.

The finished grade of the developed trail, west of Cooper Creek, was designed to closely match the elevation of the existing roadway surface. Doing so would result in increased comfort and safety for active travelers.

Cost Estimate

Pathway Materials	$30,000
Prefabricated Bridge	$130,000
Boardwalk Structure	$752,000
Other (Construction/ Materials)	$188,000
Total Cost	**$1,100,000**

Conclusions and Recommendations

Installing an elevated pathway and an independent pedestrian bridge provides for safe non-motorized transportation that is currently not available in the area. Construction of this pathway would not be done until the Sterling Highway Bypass Project is completed in order to avoid vehicle delays and maintain an acceptable Level of Service (LOS) for motorized and active travelers along this stretch of highway.