

Causey Reservoir Access Project:

Improving visitor safety and access now and for the future

Overview

In coordination with the Central Federal Lands Highway Division, the Causey Reservoir Access Project is a multidisciplinary endeavor to address infrastructural deficiencies around Causey Reservoir. The reservoir is a high-use land- and water-based recreation site on Cache National Forest, about a half hour east of Ogden, Utah. This project addresses a deteriorating bridge, insufficient parking, and roads damaged by landslides as shown in Figure 1.

Alternatives

Due to the complexity of the project, the alternatives were organized by each aspect addressed by the team. Many alternatives, not included in the following list, were considered. One such alternative was to 'Do Nothing'. The 'Do Nothing' alternative was quickly eliminated due to safety concerns.

Culvert Alternatives:

- Closed culvert
- Open culvert
- Concrete bridge
- Steel bridge

Slope Stability Alternatives:

- Roadbed cutting
- Roadbed filling:
 - Gabion
 - Cantilever
 - Anchored
 - Sheet Pile
 - Mechanically Stabilized Earth (MSE) Wall
 - Shored MSE Wall

Parking Alternatives:

- Refine current conditions
- Relocate parking
- Dam parking garage



Figure 1. (Left) Existing culvert has failing concrete that is causing scour and disrupting natural river flow. (Middle) Parking on road shoulder. Road is difficult to maneuver during peak recreation hours. (Right) Slope failure is encroaching on the road width and decreasing stability.

Selected Alternatives & Designs

After evaluation, the team selected an alternative for each aspect of the project and proceeded to design. A box culvert was selected and designed to replace the existing deteriorating bridge. To address parking issues around the reservoir, a newly designed parking lot will be constructed just south of the dam. The new parking lot will increase the amount of available parking around the reservoir and new access to the

reservoir. To fix slope stability issues on the road extending to the north of the reservoir, MSE Walls were designed for the four areas of safety concern. Each wall was designed to provide additional width for the road as well as fix the existing failing slope conditions. The designs for each aspect are shown in Figure 3.

Evaluation Criteria & Decision Matrix

The alternatives were evaluated using specified criteria designated by the team. The criteria are unique for each aspect of the project. Once the criteria was established, a decision matrix was used to evaluate each alternative. A simplified matrix used for evaluation is shown in Figure 2.

Each team member individually evaluated all three project aspects. Then, as a team, individual evaluation scores were averaged and the alternative with the highest weighted score was selected.

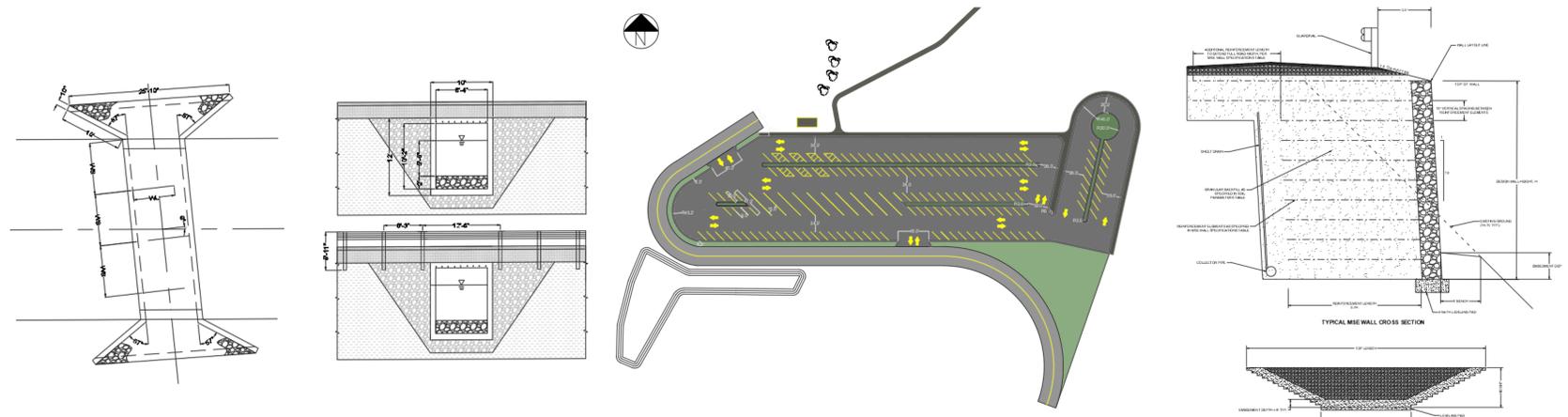
Alternative Evaluation Criteria

Culvert		Parking Lot		Slope Stability	
Cost	25%	Capacity	20%	Cost	35%
AOP	20%	Safety	15%	Durability	25%
Compliance	20%	Environment	15%	Safety	20%
Safety	20%	Construction	15%	Environment	15%
Durability	15%	Cost	12%	Aesthetics	5%
Feasibility	10%	Feasibility	10%	-	-
Construction	5%	Water Access	8%	-	-
Aesthetics	5%	Aesthetics	5%	-	-

Figure 2. Simplified team decision matrix.

Fun fact: OttR Engineering was named in honor of Dr. Halling's frequently used phrase: "Off to the Races." The tau's (pronounced tah) honor Dr. Loren Anderson.

Figure 3. (Left) Culvert layout and cross section. (Middle) Parking lot layout. (Right) MSE wall cross section and elevation view.



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