

Exhibit 4.3.01

Pedestrian Bridge Crossing of Bushkill Creek @ US 209

Alternatives Analysis Memo

PURPOSE:

The purpose of this investigation is to analyze options for the construction of a combined pedestrian and bicycle bridge over the Bush Kill Creek, adjacent to US Route 209, Milford Road. The new bridge will provide a separate crossing, just to the east side of the existing vehicular bridge, to connect the McDade Trail on the north side of the creek with the trail head at the Bushkill Meeting Center – National Park Service on the south side of the creek.

EXISTING CONDITIONS:

The existing US Route 209 bridge is a three-span structure consisting of cast-in-place reinforced concrete abutments and piers supported on steel piles. Ten (10) shallow steel girders support a reinforced concrete deck with cast-in-place concrete railings. Individual spans are 60'-0" long, giving the bridge an overall length of 180'-0". The abutments and piers are skewed approximately 75 degrees to align the substructure with the alignment of the Bush Kill Creek. Piers are constructed with plow-point leading edges to better handle ice and floating debris. The bridge deck consists of two lanes, approximately 11'-6" wide, with 5'-0" wide paved shoulders. Break-Away plastic delineators have been placed on the east shoulder to provide a visual separation between the north bound vehicle lane and the shoulder, which is currently functioning as a pedestrian route over the bridge.

PEDESTRIAN BRIDGE DESIGN:

The proposed pedestrian bridge will be designed following the AASHTO Guide Specifications for Design of Pedestrian Bridges. The Guide specifies the pedestrian load shall be 90 pounds per square foot. Additionally, to accommodate both pedestrian and bicycle traffic, railings shall be placed 4'-6" high to prevent bicycle riders from accidentally falling over the railing. The clear width of the bridge deck shall be 10'-0"; however, vehicle traffic shall be prohibited and prevented from accessing the new bridge by placing bollards at each end of the structure.

Option 1 – Cantilever Construction

- This construction includes attaching multiple new transverse steel girders perpendicular to the existing east fascia girder. The transverse girders will support new longitudinal steel beams that carry a new concrete deck and new aluminum railings.
- Modifications to the existing abutments will be required to support the ends of the new longitudinal beams at the termination of the pedestrian bridge.
- Additional guardrail will be required at each end to provide separation from the vehicular guardrail and to guide the trail away from the roadway shoulder.

Benefits:

- Eliminates the need to construct additional piers in the creek.

Detriments:

- Existing fascia girders are not designed for the additional load of the pedestrian bridge.
- Additional bracing between the girders will be required to prevent failure and undesirable deflection and bounce in the pedestrian bridge. This will require approval from the owner.
- Strengthening the fascia girders with additional flange plates is anticipated.

- Required modifications to the existing abutments will be difficult due to the swept back wingwalls. Improvements will require casting new concrete supports to accept the longitudinal beams.
- Required modifications to the existing piers will be difficult due to the shape of the piers and problems associated with placing new concrete against an existing concrete structure.
- The pedestrian bridge will be subjected to snow and salts plowed over the vehicle railing during snow removal efforts, impacting, and increasing the load on the bridge and rendering it unpassable without similar snow removal efforts.
- Will require permits for placement of construction vehicles and supports in the creek.

Option 2 – Stand-Alone Structure

- This construction includes construction of a separate bridge set to the east and away from the existing vehicular bridge.
- The new pedestrian bridge will be supported on new reinforced concrete abutments, and piers. The piers can be either reinforced concrete or exposed steel piles with a steel or concrete cap.
- Abutments can be constructed in line with the existing vehicle bridge abutments. Conversely, the new abutments can be placed behind vehicle bridge abutments and the lengths of the first and third spans lengthened.
- Individual spans are anticipated to consist of three (3) steel girders supporting a reinforced concrete deck and galvanized steel or aluminum railings.
- Based on the overall length of 180 linear feet, this bridge is expected to consist of three 60-foot spans. Steel girders can be fabricated using weathering steel or conventional painted steel.

Benefits:

- Placing the new bridge away from the existing vehicular bridge reduces excess snow impact and removal as noted under Option1.
- Modifications are not required to the existing vehicular bridge girders, abutments, or piers.
- Separation of the two bridges will provide an additional safety and comfort factor to pedestrians.
- It will be easier to design the new bridge to accommodate small trail maintenance vehicles, such as Gators, or 4-Wheelers.

Detriments:

- Added cost to construct new abutments and piers.
- May require review and approval from environmental groups due to construction of the piers in the creek and flood plain.
- Will require permits for placement of construction vehicles and supports in the creek.

Option 3 – Stand-Alone Premanufactured Structure

- Similar to Option 2, this construction includes construction of a separate bridge supported on its own abutments and piers.

- Bridge spans can consist of three (3) 60-foot truss spans with piers aligned with the existing vehicular bridge.
- Alternately, a single truss span is possible completely spanning the creek and eliminating the need for piers.
- The truss spans can be fabricated from weathering steel or painted steel.

Benefits:

- Reduced construction time by eliminating the need to construct the bridge superstructure in the field.
- A single span structure eliminates the need to obtain permits for construction in the creek.
- Placing the new bridge away from the existing vehicular bridge reduces excess snow impact and removal as noted under Option1.
- Modifications are not required to the existing vehicular bridge girders, abutments, or piers.
- Separation of the two bridges will provide an additional safety and comfort factor to pedestrians.
- Reduced construction costs by elimination of piers in the creek.
- The new bridge can easily be designed to accommodate small trail maintenance vehicles, such as Gators, or 4-Wheelers.

Detriments:

- Anticipated increased up-front cost for premanufactured bridge span(s).