
Appendix K:
Additional Buck Creek Replacement



An additional section of the Buck Creek Trail was investigated due to failure of the existing retaining wall along Buck Creek just north of SR 4. A site reconnaissance was performed to observe the distress to the asphalt bike pavements and adjacent creek bank, which is suffering from erosion. There are two separate concerns that need to be addressed relative to erosion. The first is the general lowering of the flowline of Buck Creek that is occurring closer to the SR 4 bridge, which carries Belmont Avenue over Buck Creek. The second is distress caused by the fast flowing current at the eastern end of the distressed creek bank. B&N reviewed historic USGS maps and the available bridge plans on file with ODOT and along with our field observations offer the following:

1. Buck Creek was significantly rerouted in this area between the early 1900's and 1950 and probably before 1935 when the bridge at Belmont Avenue was built. The original location of Buck Creek was north of the current location and the alignment of the creek existed in a more meandering fashion. Buck Creek was straightened and the meanders were removed which resulted in an increased energy gradient through this area.
2. The original bridge was constructed around 1935 and was rehabilitated in 1986. The plans indicate the flow line of Buck Creek dropped approximately 3 feet in that time frame.
3. The gradient of the creek and the channel cross sections are highly variable throughout this area. There are areas that are fast flowing through narrow channels that significantly increase flow velocities at the east end of the project. However, closer to the bridge, the channel is wide with lower flow velocities.
4. The eroded bottom of the relocated creek has created a change in the flow alignment as a result of a rock shelf which diverts flow that directly attacks the south bank at the east end of the project. This was likely an unforeseen consequence of the creek relocation and subsurface conditions.

Prior to preparing a final remedial action plan for this stabilization project and a final design, it will be necessary to perform an in-depth survey along with an in-depth hydraulic evaluation. We believe it may be more appropriate to relocate this creek back to the north along the eastern part of the project and divert the flow away from the current streambank and adjacent bike path. The environmental effects of this work will need to be similarly explored. However, for cost estimating purposes we believe there are two options for bank stabilization that can be considered.

These are the construction of a concrete retaining wall with the foundation fully embedded in bedrock where the stream velocities are high and the angle of attack of the stream is not desirable relative to the creek bank. Where the stream velocities are lower and parallel the creek bank a rock armored 2H:1V slope can be used that is keyed into the creek bed. Based on our review of aerial photography, we estimate for preliminary estimating purposes, approximately 250 feet of rock armored slope and 450 feet of concrete retaining wall. To construct the concrete retaining wall will require significant dewatering efforts consisting of constructing a barrier parallel to the work or possibly a temporary dam with bypass pumping or a combination thereof. Figure K-1 shows the approximate locations of these remedies.

The estimated cost for protecting the slope with 2.5 feet of ODOT Type B Rock Channel Protection is \$250 per foot of bank repair. The estimated cost of a concrete retaining wall is \$600 per lineal foot. The cost for temporary dewatering and stream pumping is estimated to be \$50,000- \$75,000. Using the above stated repair lengths for the work the preliminary cost of the work is anticipated to be on the order of \$400,000. A construction cost estimate of all these items and the required trail replacement is shown below.

Estimated Construction Costs for Recommended Improvement

Length	700 ft	Pavement Area	778 sq yd
Width	10 ft	Aggregate Area	910 sq yd
Aggregate Width	11.7 ft		

Item	Quantity	Unit	Unit Price	Total
Pavement Removed	778	sq yd	\$4.31	\$3,352.22
Surface Course	54	cu yd	\$180.00	\$9,722.22
Aggregate Base	151	cu yd	\$41.44	\$6,267.16
Tack Coat	58.3	gal	\$2.69	\$156.92
Subgrade Compaction	778	sq yd	\$1.77	\$1,376.67
Excavation	270	cu yd	\$12.50	\$3,375.77
Mobilization	-	-	-	\$20,000.00
Type B Rock Channel Protection	250	ft	\$250.00	\$62,500.00
Retaining Wall	450	ft	\$600.00	\$270,000.00
Temporary Dewatering & Stream Pump	-	-	-	\$70,000.00
Rounded Total				\$446,800.00

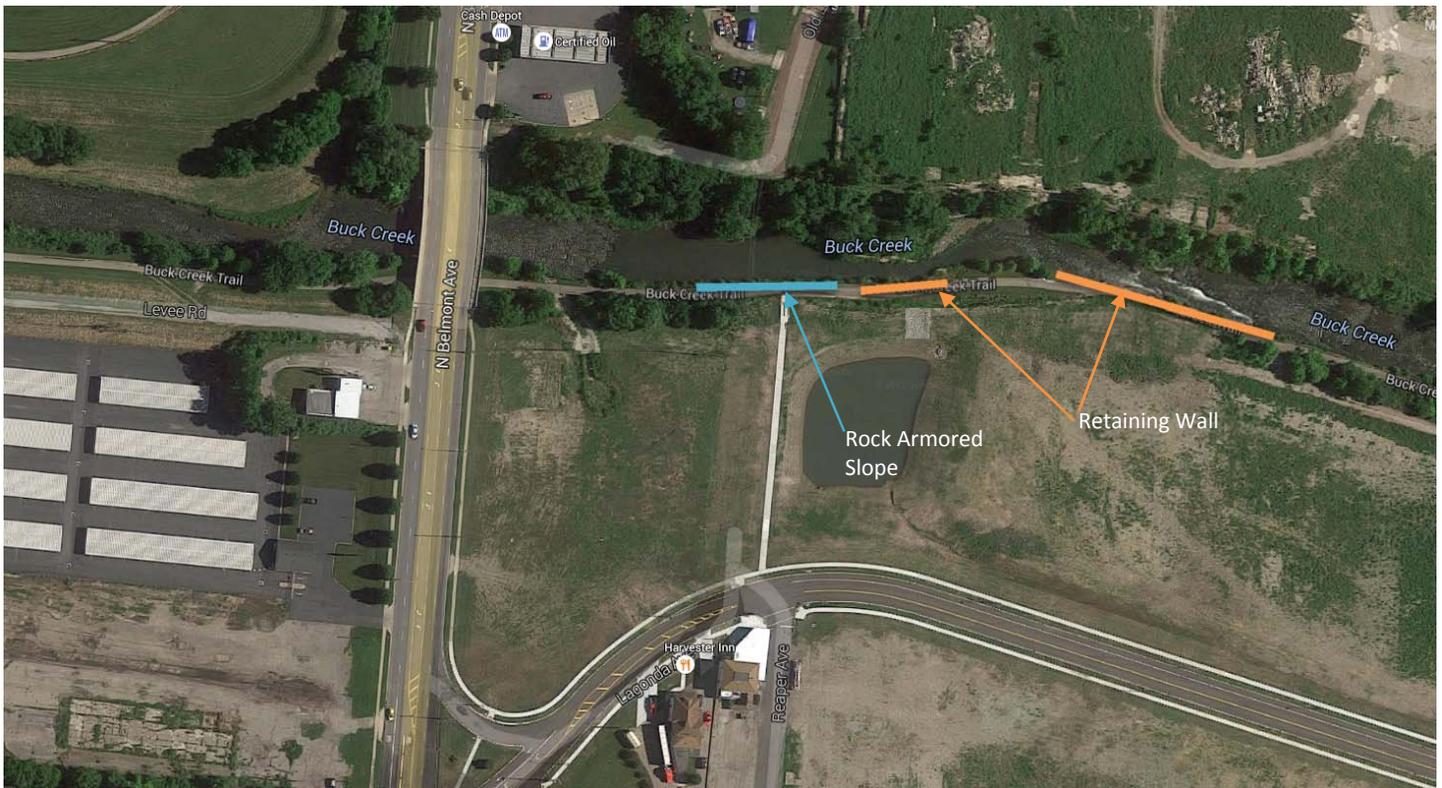


Fig. K-1