

**2021**



# **LYCOMING COUNTY BRIDGE BUNDLING PROGRAM**



Pictured From Left to Right, Matt McDermott, Scott Metzger, Tony Mussare, Scott Williams, Austin Daily, Shannon Rossman, Mark Murawski, Dale Winter, Richard Mirabito, Connor Bassett, Britt Bassett

## **BRIDGE BUNDLING PROGRAM OVERVIEW:**

The Federal Highway Administration has required since 1971 that all bridges spanning over 20 feet receive full NBIS inspections at least once every 4 years. Lycoming County suspected that small municipally-owned bridges might be seriously neglected because they had never been formally inspected. PennDOT first surveyed these bridges, and then Lycoming County began inspecting all between 8 to 20-foot spans in 2010; this was the first County-wide Small Bridge Inspection Program in the Commonwealth. Bassett Engineering conducted full NBIS inspections on 104 bridges every one to four years, depending on the conditions from 2010-2016. Over 40% of the bridges were structurally deficient. Some municipalities repaired and replaced bridges, but many were unaffordable. Lycoming County took the initiative to begin this greatly needed infrastructure project. The Commissioners took out a \$7.2 million Pennsylvania Infrastructure Bank (PIB) Loan from PennDOT, and they enacted the \$5/vehicle annual surcharge on vehicle registration fees to pay back the loan. Bassett Engineering had experience bundling multiple bridges into single construction projects, realizing significant costs and time savings, and the PennDOT Rapid Bridge Replacement (RBR) Program also provided an example. The County worked with its consulting engineers to select the 17 bridges, both over and under 20 foot-span, each from a different municipality, to include in this first Bridge Bundling Program.

The bridge bundling program is upgrading local bridges at significantly lower costs than if each bridge was repaired or replaced individually. Cost savings result from the considerable economy of scale gained by building multiple bridges of the same type under one contract. Bassett conducted a feasibility study considering a wide variety of bridge types to determine the optimum structure for each location. This program also involved a steering committee of the seventeen municipalities, PennDOT, PADEP, PA Fish & Boat, and the Lycoming County Conservation District.

The project is split into four bundles: each bundle consists of 3 to 5 bridges of the same structure type. The Feasibility Study began in July 2020. Bundle 1 was designed in 2020 and early 2021 and constructed in 2021. Bundles 2 and 3 are being designed in 2021 and will be constructed in 2022. Bundle 4 will be designed in 2022 and constructed in 2023.

### **Bundle 1: Aluminum Box Culverts**

Aluminum Box Culverts (ALBC's) offer the greatest hydraulic opening at the lowest cost for any full highway traffic-rated structure for spans up to 20 – 25 feet.

- |                    |                    |
|--------------------|--------------------|
| • Eldred Township  | Calebs Creek Road  |
| • Hepburn Township | Klump Road         |
| • Limestone        | Township Mill Road |
| • Muncy Township   | Auchmuty Road      |

The 4 ALBC's were purchased directly from Conspan through COSTARS at a cost of \$205,345. The total construction cost for Contech plus Wolyniec was an average of \$166,000 per bridge , and a total of \$664,933 for all 4 structures.



## BUNDLE 1



### LIMESTONE TOWNSHIP, MILL ROAD

Mill Road crosses over an unnamed tributary to Antes Creek. The Aluminum Box Culvert, which is Limestone's fourth, provides a 70% greater hydraulic opening than the railroad tanker it replaced. The aluminum arch is set on Express footings, which are galvanized steel forms filled with cast-in-place concrete. The bottom of the footing was set 6 feet below the streambed to meet PennDOT requirements. The natural open bottom allows the free movement of aquatic organisms, which is known as Aquatic Organism Passage (AOP), for the native trout that live in this wild trout cold-water fishery. The stream disappears into a sinkhole a quarter-mile downstream. The bridge is located immediately downstream of a historic mill and another ALBC. The ALBC can pass the 700-year storm.

#### Size:

16" Span x 5' Clear Rise x 40' Long

#### Total Cost:

\$154,151





## BUNDLE 1



### ELDRED TOWNSHIP, CALEBS CREEK ROAD

Caleb's Creek Road crosses over Caleb's Run which is classified as an Exceptional Value stream with both stocked and wild trout. An Aluminum Box Culvert set on Express footings with an open bottom was also installed here. The ALBC provides approximately double the hydraulic opening of the existing twin pipes and can pass the 50-year storm, where the old pipes could not pass even the 10-year. The open bottom allows natural streambed movement and full AOP. Like Klump Road, the guide rail is set on moment slabs over the center of the arch. The footings were set in bedrock and locked in place with flowable fill. Calebs Creek Road provides the main access to Rider Park, which is an 867-acre park with trails for hiking, mountain biking & cross-country skiing, plus scenic vistas.

#### Size:

19' Span x 4' Clear Rise x 40' Long

#### Total Cost:

\$ 219,084





## BUNDLE 1



### HEPBURN TOWNSHIP, KLUMP ROAD

Klump Road crosses over Mill Creek, which Fish and Boat redesignated as a trout stream in July 2021, after Wolyniec started construction. An Aluminum Box Culvert with full Invert Plate and Fish Baffles replaced a severely deteriorated conventional bridge. The ALBC offered a 20% larger hydraulic opening than the old bridge and now passes the 400-year storm. . The full bottom plate is made of the same corrugated aluminum structural plate as the arch itself. This arrangement allowed the arch to be fully assembled alongside the road prior to setting it in place. Fish baffles retain the natural streambed and allow AOP while preventing significant bed movement inside the structure, and allow free AOP while. Conventional guide rail driven into the ground cannot be used directly over ALBC's. In Hepburn and Muncy Township, guide rail posts are omitted at the center of the span, and pressure-treated wooden break-away posts are mounted closest to the center of the arch.

#### Size:

15' Span x 5' Clear Rise x 27' Wide

#### Total Cost:

\$121,606





## BUNDLE 1



### MUNCY TOWNSHIP, AUCHMUTY ROAD

Auchmuty Road crosses over Oak Run, a wild trout stream. An Aluminum Box Culvert with full Invert Plate and Fish Baffles replaced a severely deteriorated concrete arch. Like Klump, the arch was set at the same slope as the stream bed to prevent a scour hole downstream. All of the ALBC's in this bundle share key common features:

The arch was sized to match the channel width. Maximizing the hydraulic opening reduces the risk of blockage by trees during high-water events. Aluminum headwalls, toe walls, and wing walls were used. The toe walls at both ends were set in flowable fill (low-strength grout) to prevent scour upstream and down. Arches are buried structures that do not require a cast-in-place concrete deck. This allows the normal road surfacing (asphalt for these 4) to continue uninterrupted across the arch, which greatly reduces long-term maintenance costs (no decks to resurface or replace). Riprap was set at all four corners to protect from scour. The entire arch was backfilled with PennDOT 2A subbase to minimize settling.

#### Size:

15'-1 Span x 4' Clear Rise x 31' Long

#### Total Cost:

\$113,837





## BUNDLE 2

### PRECAST CONCRETE

Jersey Shore Borough  
Loyalsock Township  
Moreland Township  
Susquehanna Township  
Franklin Township

Wilson Street  
Sheridan Street  
Bill Sones Road  
Valley Road  
Smith Road



Bundle 2 consists entirely of precast concrete structures: arches and box culverts. Box culverts were the only practical choice for Loyalsock Township and Jersey Shore. Precast arches are needed in Moreland, and Susquehanna Townships due to high stream velocities and challenging locations including heavy traffic, a major stream, and a heavy skew between the road and stream alignment. The structures are presently being pre-purchased through COSTARS.

## BUNDLE 3

### GRS-IBS BRIDGES

Gamble Township  
Mifflin Township  
Montgomery Borough  
Penn Township  
Wolf Township

Winner Lane  
Zinck Road  
Montgomery Park Road  
Logue Hill Road  
Penn Drive



Bundle 3 consists entirely of Geosynthetic reinforced soil foundations and abutments, combined with precast concrete plank beams and concrete decks. GRS Abutments are suitable where stream velocities do not exceed 12 feet per second. The abutments will be faced with large concrete blocks. GRS bridges offer the greatest hydraulic opening at the lowest cost for spans between 20 – 60 feet with acceptable stream velocities. These conditions are fairly common, such as on mountain plateaus and downstream wetlands, lakes, and ponds.

## BUNDLE 4

### TRADITIONAL BEAM BRIDGES

Fairfield Township  
Lewis Township  
Washington Township

Old Cement Road  
Upper Bodines Road  
Gap Road



Included in any group of 17 bridges will be those requiring unique solutions. Old Cement Road Bridge simply needs fascia beams replaced. The streambed of Slacks Run at Upper Bodines Road in Lewis Township is very unstable, and it experiences high velocities. A conventional bridge with a deep foundation is needed here. Gap Road Bridge in Washington Township needs a new superstructure, but the existing abutment can remain in service. That called for a beam-over bridge.



THANK YOU TO THE FOLLOWING:



# Bassett Engineering



*Wolyniec Construction, Inc*



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