

Shaver Creek Road Crossing Replacement - Virtual Walkthrough

Purpose

Provide and overview of the planning process and construction of 11' bottomless arch pipe

Existing plunge pool and failing 3' round pipe

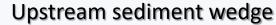






Details of replacement

- Existing 3' round pipe
- Bankfull ~8 ft
- Watershed area ~100 acres
- ~2.7% stream slope
- New structure 11' bottomless
- Precast footers





Downstream scour pool



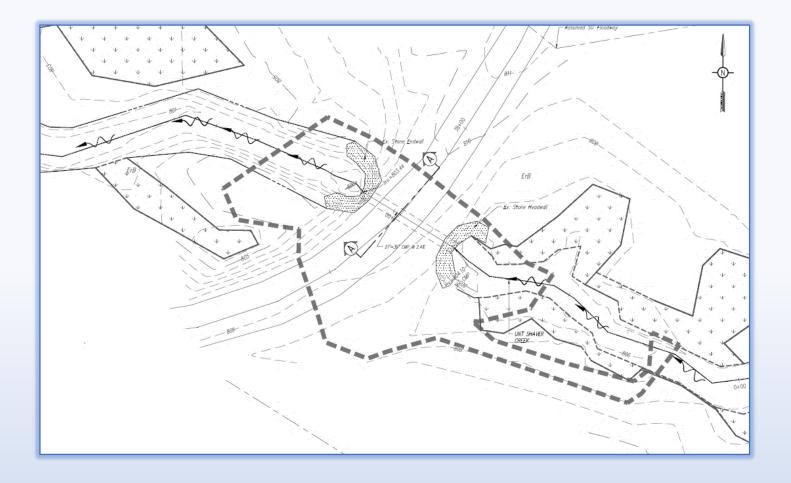








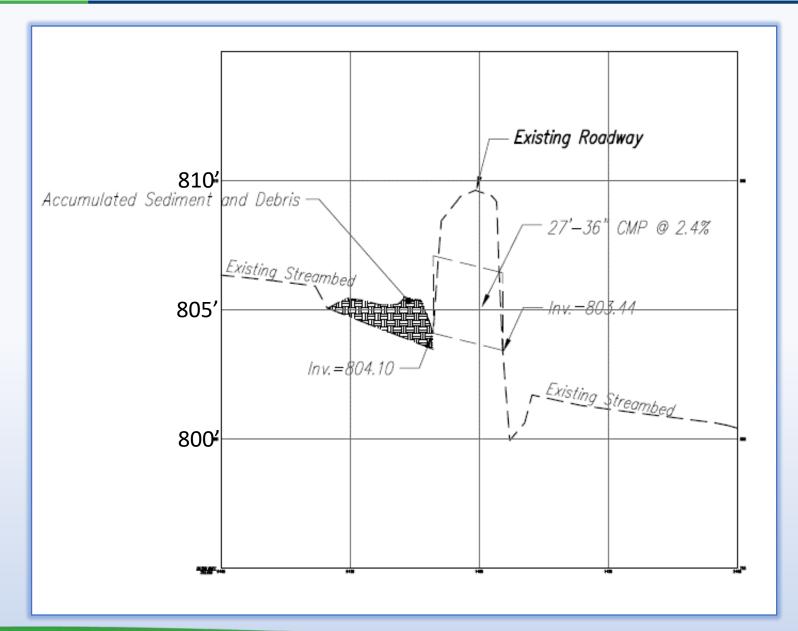
- Detailed engineering survey ~100' downstream and 100' upstream
- Wetlands delineation
- Part of larger road project
- GP-11 with 4 crossings







Existing Survey Profile



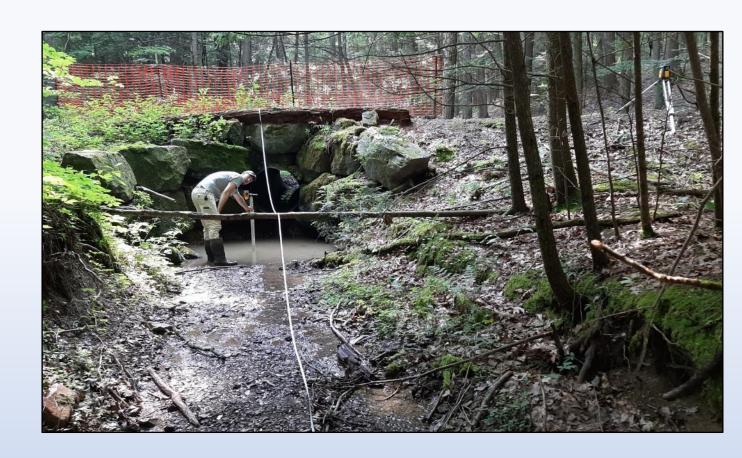




Longitudinal Profile: A survey conducted upstream, downstream, and through an existing structure to determine the stream channel features that are critical to a successful structure replacement.

Typical Measuring points and Critical Features:

- Transitional points along the channel profile
- Top of grade controls
- Riffle crests
- Bed feature between grade control crests (one point at minimum)
- Rock clusters ('key pieces') or transverse ribs (extended riffles & 'pocket water')
- Other notable features (bedrock, etc.)







Longitudinal Profile Outputs

- Channel and Structure slope
- Grade control type and spacing
- Scour depth
- Aggregational wedges
- Plunge pools
- Vertical offsets
- Riffles
- Available cover







Proposed Conditions and Structure Selection

- Where will you do the work??
- How to reconnect the stream bed?
- Cover height?
- Structure height?
- Slope?
- Sour depth?
- Bottom?
- No bottom?

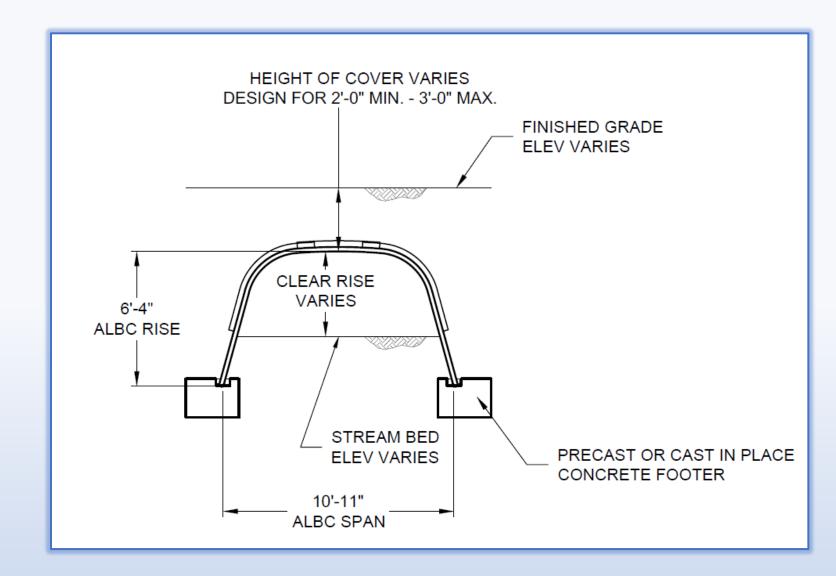






Final Structure Selection

- 10'-11" x 6'-4" bottomless
- Precast footers
- Contech structure from winning bid



Design: GP-11 Plans





Perm Terra

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LANCASTER REGION OFFICE: 3904 B AREL DRIVE COLUMBIA, PA 17512 PH: 717-322-3031 Fox: 717-322-3046

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Bed ____ N____

SHAVERS CREEK ROAD

GENERAL PERMIT

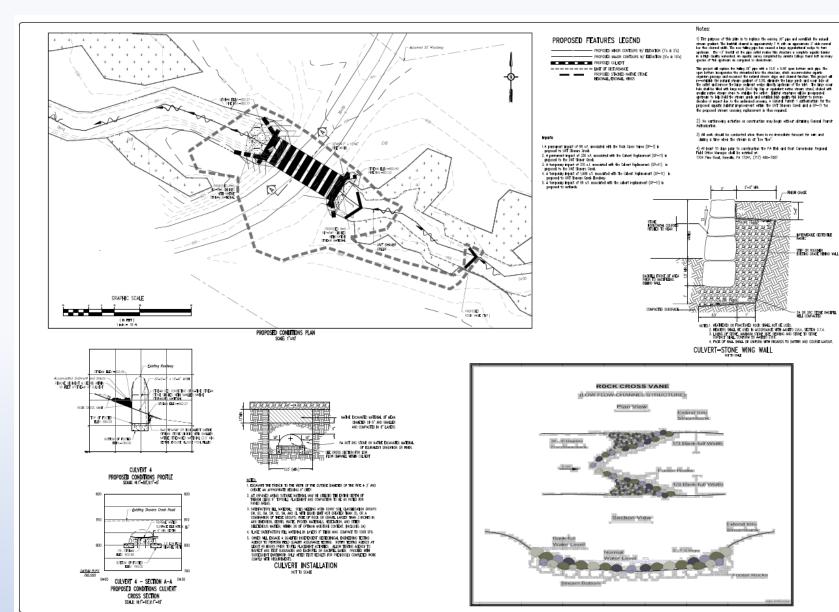
UNNAMED TRIBUTAR! TO SHAVERS CREEK — CULVERT REPLACEMENT &

AQUATIC HABITAT IMPROVEMENT — PROPOSED PLAN

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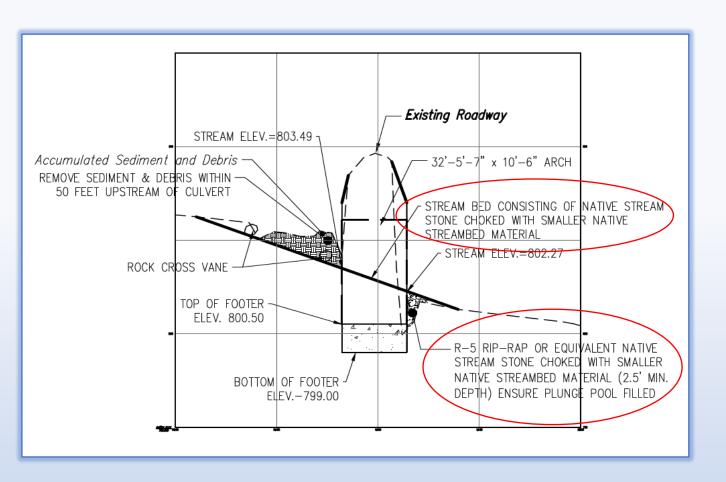
- Designed by Civil Engineer
- Provide input and be involved
- Review the plans
- Grade Control needs GP-1

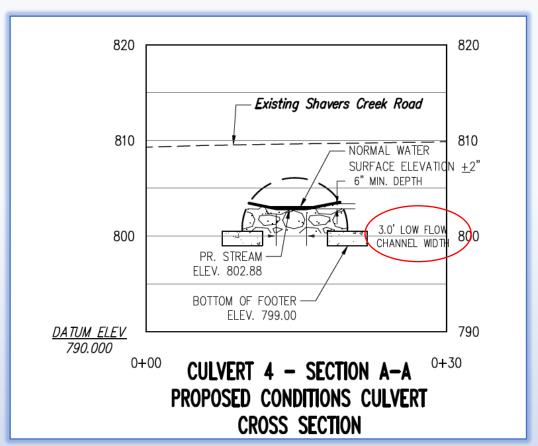






Proposed conditions design – GP11



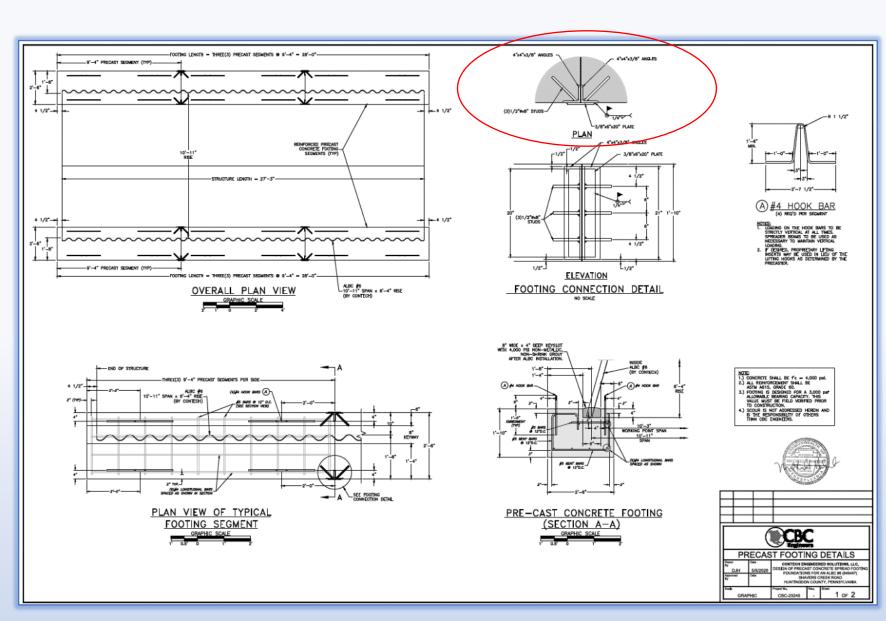


Design: Footers





- Designed by Contech contracted engineer as part of structure bid
- Separate precast bid for manufacture
- Connections?
- Liftpoints?
- Delivery?

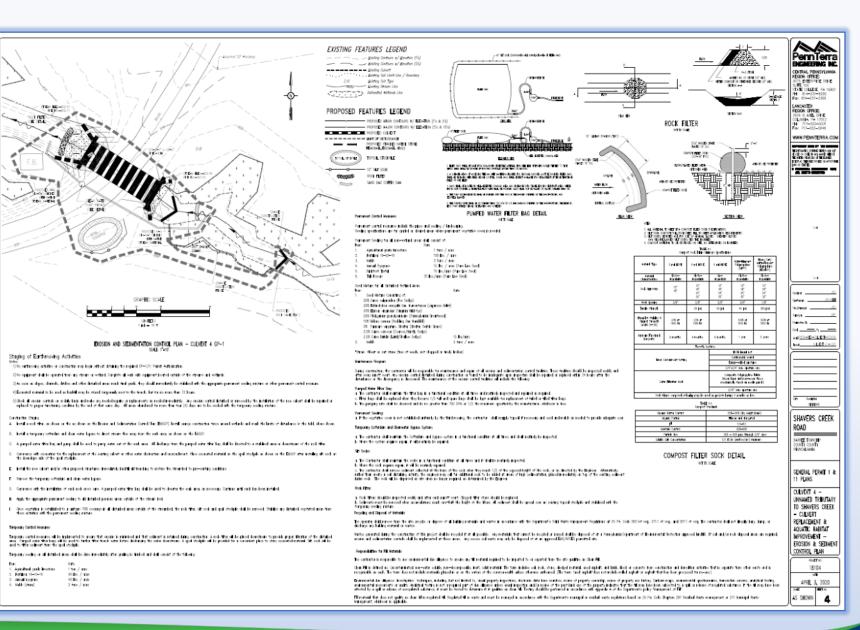


Design: Erosion and Sediment Control (E&S)





- Part of GP-11 plans
- Pipe through, bypass or pump around?
- Stockpile location
- Wetlands







Where will you do the work?

- Sediment wedge?
- Scour hole?
- Failing banks?
- Over widened channel?
- Solid grade control?





Design: Instream work





Where will you do the work?

- Sediment wedge?
- Scour hole?
- Failing banks?
- Over widened channel?
- Solid grade control?







Project Elements





- 1. Determine bankfull and establish the minimum width of the structure opening at the bankfull elevation.
- 2. Include bank margins based on site conditions and stream type. (1.2 to 1.5 x BF structure)
- 3. Survey a Longitudinal Profile and establish benchmark.
- 4. Determine the slope of the new structure from survey.
- 5. Given the bankfull width and site conditions determine the low flow channel width. (~1/3 BF average)
- 6. Based on scour depth surveyed, establish the structure bottom elevation and stream bed elevation.
- 7. Determine top elevation of structure to account for placement of material and determine if the road surface elevation is to be raised.
- 8. Establish grade control spacing and need for GP-1.
- 9. Given the site conditions determine the size of material to be installed in the structure. (Blend of materials such as R5, R4, 2RC and native material.)
- 10. Determine the tons of stream bed material to be placed in the structure. Can you reuse some/all native material?
- 11. How will the material be placed and will you need to wash in material.
- 12. Considerations for bottomless vs. structures with a bottom (invert)

Project Walkthrough





Before



After













































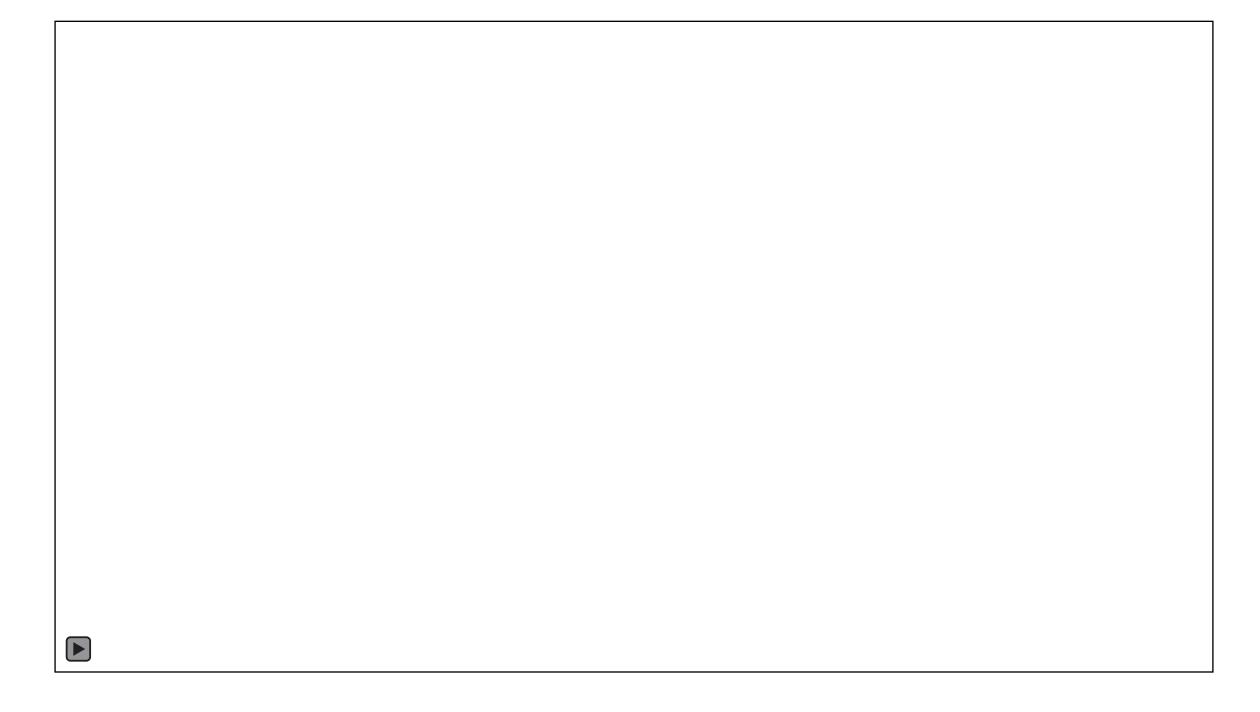










































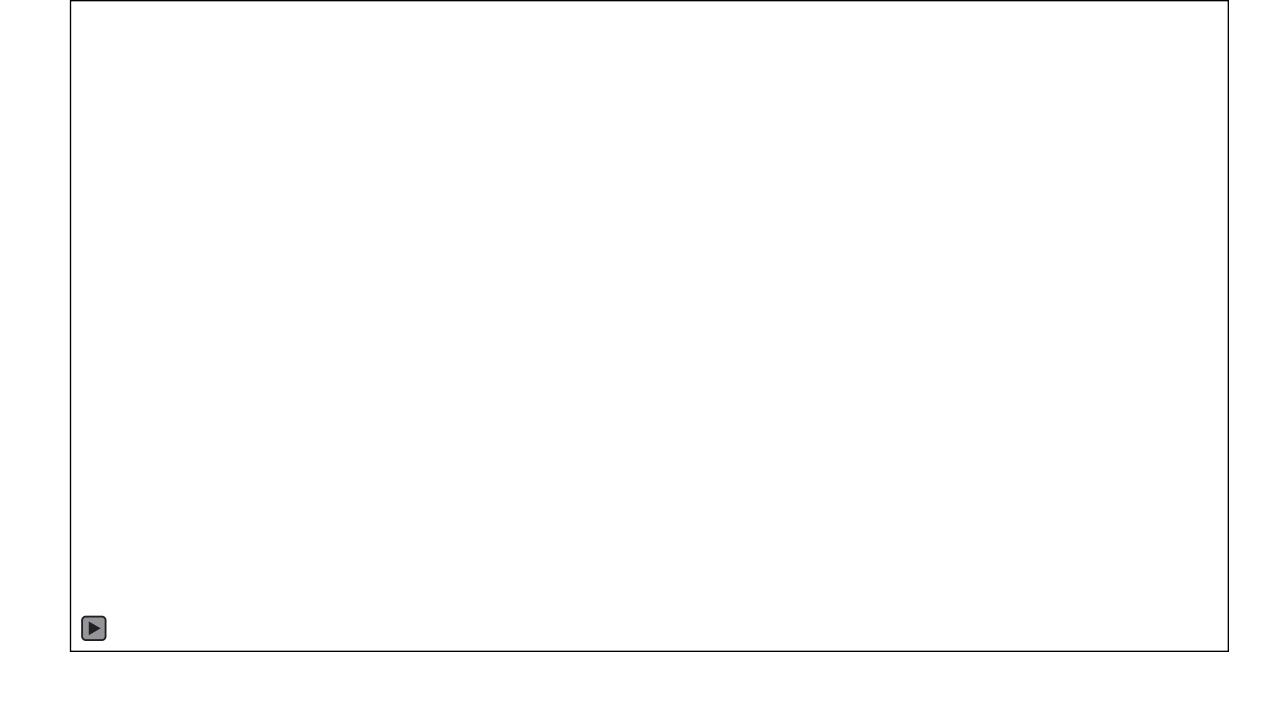


























































January 2021 after 2+" storm

















