STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report Supplemental; Retaining Wall

FOR

Orleans Village BF 0310(7)

VT ROUTE 58 (TH 1), Bridge 10 over the Barton River

August 5, 2014

I. Contents

I. Site Information

The bridge is located in an urban area along VT Route 58 approximately 0.4 miles east of the junction with US Route 5. Bridge 10 is located on Main Street just outside the center of Orleans Village. The bridge is located on a curved segment of VT 58. Maple St. and Water St. intersect VT Route 58 approximately 30 feet and 75 feet east of the bridge respectively. The existing conditions were gathered from a combination of a Site Visit, the Inspection Report, the Route Log and the existing Survey. (See correspondence in the Appendix for more detailed information.)

Need

A report was prepared and presented to the town. No decision was made regarding which approach to use. The town has since expressed concern about the water getting behind the retaining wall extending beyond wingwall two of the existing bridge. They have requested that measures be taken to either protect the wall or replace it with one less susceptible to erosion and scour.

Design Criteria

The design standards for the replacement of the retaining wall on this project are the Vermont State Standards, dated October 22, 1997.

Existing Conditions

Based on the record plans from the 1948 rehabilitation project it is assumed that the portion of wall in question is made of laid up stone, on timber cribbing, which bears on ledge. Based on the record plans for the adjacent abutment the ledge is estimated to be at an elevation of 723ft.

Hydraulics

From preliminary hydraulics report:

> Recommendations
>
> The bridge option selection criteria should provide a bridge opening that does not restrict the bank full width, nor provide an unrealistic widening, of the existing channel, or create any worse backwater flooding conditions than the existing conditions. The VANR Bank Full Width (BFW) equation estimates the width to be approximately 89 feet, but the actual field conditions have varying bank full stream widths within the study reach between 35 to 50 feet. Options to meet the hydraulic standard would require widening the existing 44-ft span to a minimum 90-ft span or by raising the roadway profile by 4-ft.

Any alternative selected would be in the same location as the existing retaining wall.

Utilities

The Original Scope of work stated that the aerial utilities crossing the river upstream of the bridge will likely need to be relocated. The retaining wall is located directly below these utility lines. For this work to be done the utilities would need to be relocated including the hook ups for the Lake Region Senior Center.

Right Of Way

The property impacted by the repair/reconstruction of the retaining wall is owned by the Village of Orleans and should not impact the ROW costs though the area that must be acquired will increase.

Resources

The resources present at this project were listed in the original report. Only those resources which will be further impacted are listed below.

Historic:

The section of retaining wall in question is within a region listed as a unique Resource. From the original scoping report;

> "Bridge 10 is a historic bridge, significant for its railing. Contributing features to the bridge include granite block abutments and wing walls. The bridge is located in the Orleans Village Historic District, which extends to Maple Street, Church Street, and Water Street.
>
> Note on this project that there is a unique resource - the park in between Water and Maple Streets. It has been identified as a historic resource, as well as contributing to the historic district. The bridge is on this property and it is anticipated that additional permitting will be required."

II. Maintenance of Traffic

This work will increase the scope of work and add up to a week to the duration of time traffic will need to be maintained but it should not need additional traffic control beyond whichever option is selected from the original report

III. Alternatives Discussion

Currently we only have inspection reports for the bridge abutment; however, the Village is not comfortable with the current retaining wall. They are concerned that the flow of water from the Barton River will get behind/under the existing wall and compromise it's foundation through scour. Were the area of the wall in question to fail it would it would likely tip towards the river prior to the bend. This would cause erosion behind the wall and erode a portion of the senior center park area; however it is unlikely to impact the adjacent roadway.

No Action

This option would leave the wall as it stands. A failure is unlikely to cause a bridge closure and the work will increase the area of disturbance in an area marked as a sensitive resource. For those reasons this option will be considered.

Reface Masonry Wall:
This option would apply a concrete face to the existing stone wall. This would prevent water getting through the wall but ignores the timber cribbing which is likely to be the failing point of the wall. For this reason this option is not recommended.

Repair Masonry Wall:
This option would include either relaying the stone wall. This option ignores the timber cribbing which is likely to be the failing point on the bridge. For this reason this option is not recommended.

Replace Cribbing with a Subfooting:
This option would require removing or bracing the existing wall so that the existing timber cribbing can be removed. A new concrete subfooting would be poured on ledge where the existing stone wall is and the existing wall will be put back in its place. While this option does not address water getting behind the existing wall, with filter fabric that water is not likely to cause a failure. For the reasons listed this alternative will be considered.

New Secant Pile Wall:
This option involves driving interconnected piles behind the wall such that the new pile wall will hold back the fill while the existing wall is left in place or removed. Removal would decrease the area of the existing resource and increase the area for flow within the channel. However due to the shallow depth to bedrock it is unlikely that piles could achieve capacity. For that reason this option is not recommended.

New Soldier Pile and Lagging Wall:
This option involves driving (soldier) piles at a set interval and installing lagging (cross braces) behind the wall. The new wall will hold back the fill while the existing wall is removed. Removal would decrease the area of the existing resource and increase the area for flow within the channel. However due to the shallow depth to bedrock it is unlikely that piles could achieve capacity. For that reason this option is not recommended.

New Reinforced Concrete Retaining Wall on Subfooting:
This option would remove the existing wall and timber cribbing in the section of wall under question. A subfooting would then be cast onto ledge; a new reinforced concrete wall would then be cast onto that subfooting. This option would have large but temporary impacts on resources and maintain the existing area of the channel. For the reasons listed this alternative will be considered.

IV. Alternatives Summary

Based on the existing information these are the viable alternatives:

Wall Alternative 1: No Action
Wall Alternative 2: Replace Cribbing with Concrete Subfooting and Reset Block Wall.
Wall Alternative 3: New Reinforced Concrete Retaining Wall on Subfooting.

VI. Conclusion

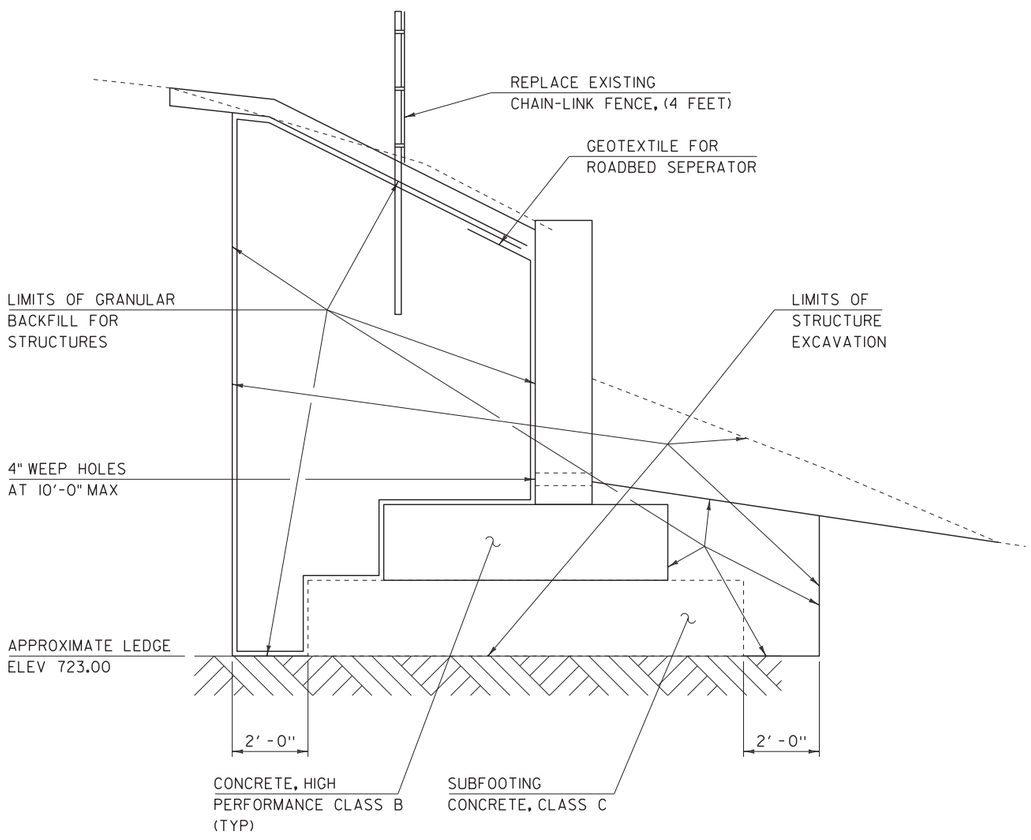
The retaining wall in question holds up a small park area that has been designated as a sensitive resource. Traditionally as the level of impact to any resource increases so does the potential for delays, in this case reinforcing the wall that protects this resource should minimize that effect though it will be another step in the process. Doing this work while traffic is already interrupted and a contractor is mobilized will reduce the overall cost of the work compared to if it was done as a second project.

The question becomes do you replace the wall or repair it. The cost of this work is similar, a repair job to the wall would match the one done to the bridge adjacent bridge abutment and has proven to last over 80 years and is expected to last at least another 40 years. This option would match the existing wall and abutment aesthetically which for permitting purposes is least likely to draw out the process.

The other option is a new concrete wall in the same location. This option is slightly cheaper though not significantly cheaper. Both wall systems have the same "design life" which is the length of time a structure is expected to last. Historically concrete will deteriorate at a faster rate than stone making it more likely that at the end of that life the wall will need replacing again. This wall will match upcoming work along the other bank, but, it will look odd going from a stone wall, to concrete, and back to concrete. For the reasons listed it is recommended that the existing block wall be reset on a new concrete subfooting.

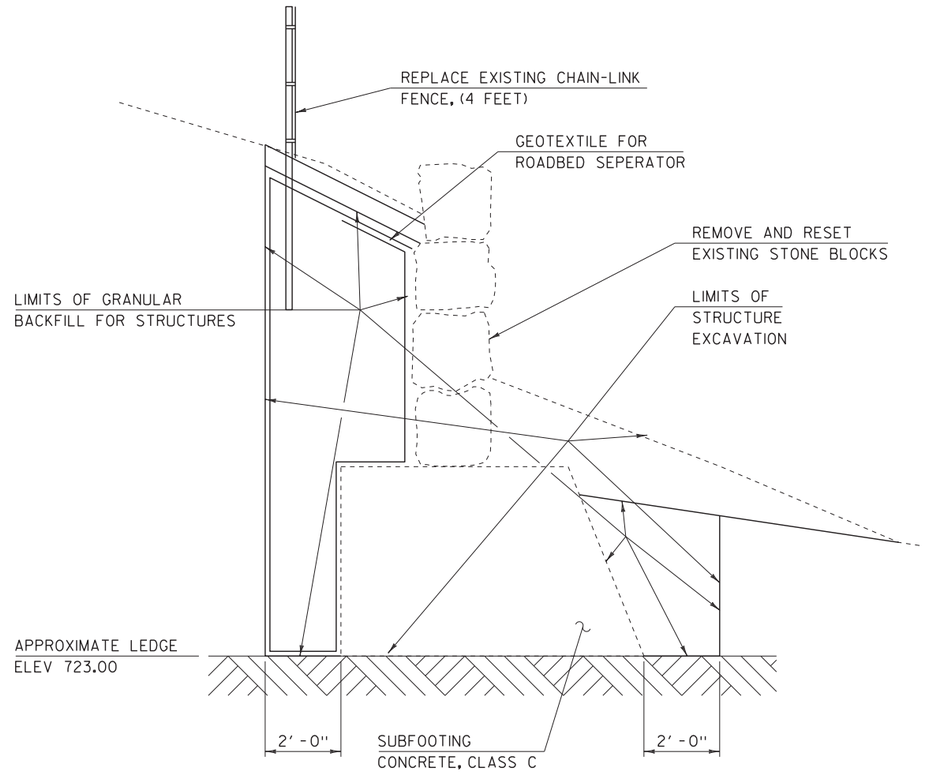
VII. Appendices

- Plans
  - Retaining Wall Typical Section
  - Retaining Wall Layout



WALL ALTERNATIVE 1 REPLACE WALL

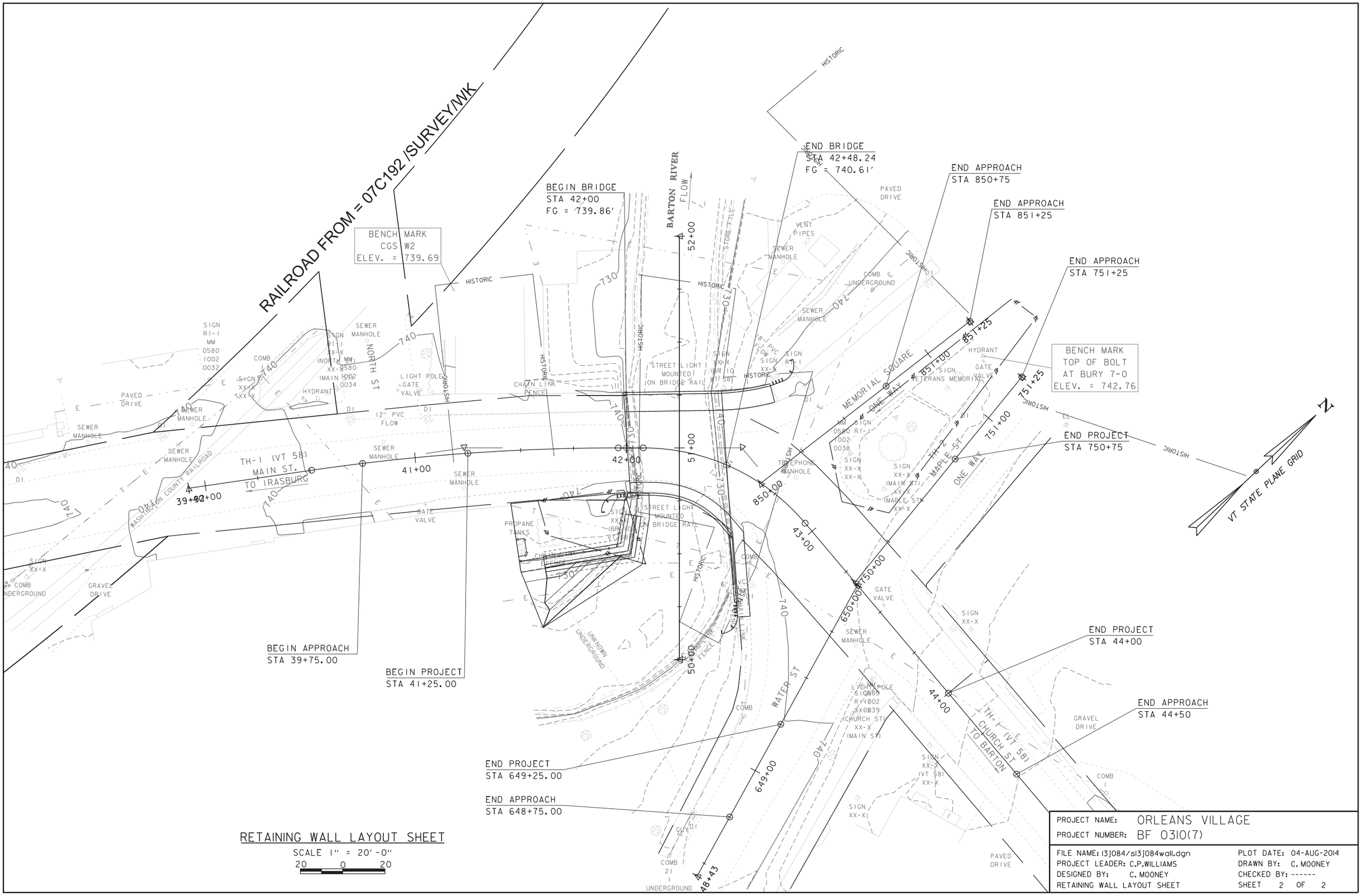
SCALE 1/2"=1'-0"



WALL ALTERNATIVE 2 REPAIR WALL

SCALE 1/2"=1'-0"

PROJECT NAME:	ORLEANS VILLAGE
PROJECT NUMBER:	BF 0310(7)
FILE NAME: 13j084/sl3j084wall.dgn	PLOT DATE: 04-AUG-2014
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: C. MOONEY
DESIGNED BY: C. MOONEY	CHECKED BY: ------
RETAINING WALL TYPICAL SECTION SHEET	SHEET 1 OF 2



RETAINING WALL LAYOUT SHEET

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME:	ORLEANS VILLAGE
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RETAINING WALL LAYOUT SHEET	SHEET 2 OF 2