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Memorandum

To: ***Steven Blondo***

From: ***Dean Smith, PE***

Date: ***July 25, 2017***

Re: ***Coney Island Remnant Structure Review***
WSB Project No. 010258-000

Dear Mr. Blondo:

WSB & Associates, Inc. (WSB) is pleased to provide this memorandum to report the findings of the Coney Island Remnant Structure Review.

Background

Carver County (County) owns Coney Island on Lake Waconia in Minnesota. The County plans to create a public park on the island. There are several remnant structures on the island that have historic significance. The future park may include highlighting some of these structures. Steven Blondo requested that WSB review the remnant structures on the island for structural stability. Our scope of services included visiting the site, photographing the structures, and reporting on their stability. Preliminary recommendations on stabilization, bracing, demolition and burying of the structures is also included. Structure areas are organized by letter as shown in Figure 1.

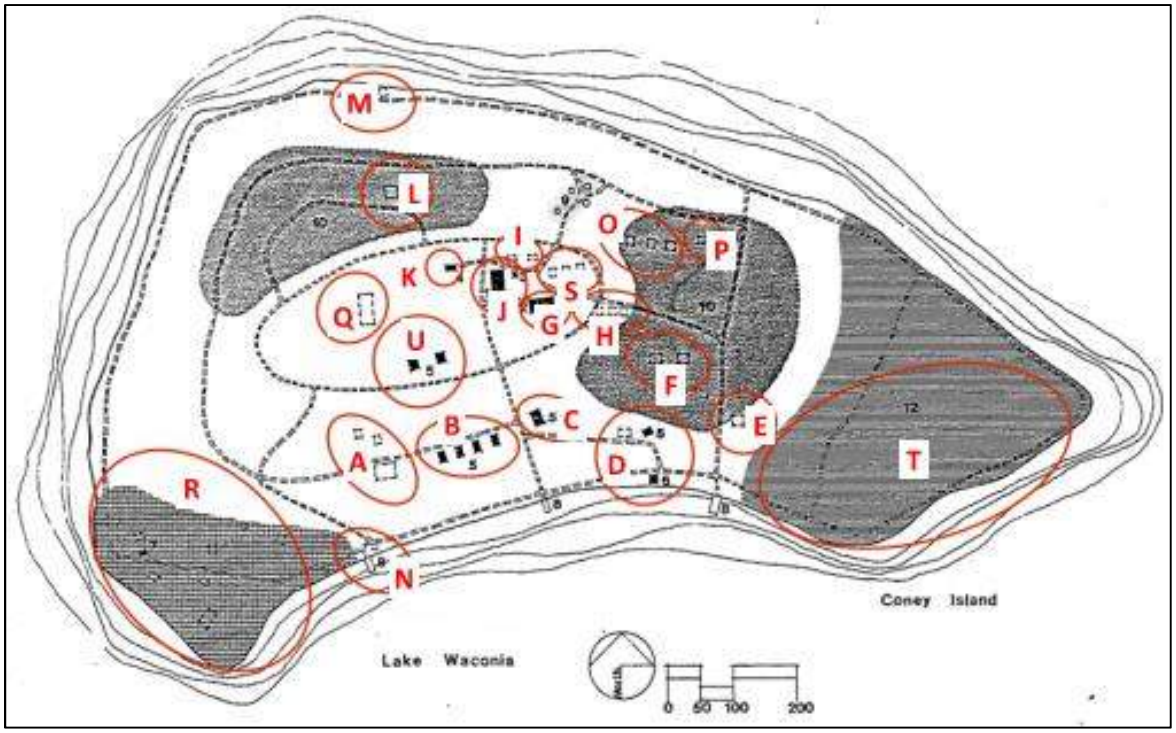

Figure 1 - Coney Island Map

General Considerations

Approximately 45 separate building structures have previously been identified on the island. During the site visit, WSB observed approximately 30 structures. Of these observed remnants, approximately 14 have concrete or masonry foundation elements that are freestanding or are retaining earth and therefore have a structural function. Many of the structures have timber portions that have collapsed. According to Steven Blondo, the County has no plans to salvage or restore the timber portions. Accordingly, timber construction is not considered in this report.

Significant Foundation Structures

This report will focus on the remnant foundations that have a structural function (i.e., freestanding or retaining earth). These are selected because, if left as-is, they will continue to degrade and, in most cases, will eventually fail. Since these structures retain soil they also have a safety function.

The existing foundation wall construction varies from building to building and, in some cases, there are multiple construction types within a structure. Foundation materials consist of unreinforced cast-in-place (CIP) concrete, unreinforced clay masonry units (brick), unreinforced concrete masonry units (CMU) and grouted boulders. In one case reinforcing steel was observed, but this is an exception.

The foundation structures were reviewed for potential stabilization. This general review is preliminary and intended for planning purposes. For final construction, each foundation that performs a structural function should undergo an analysis by a registered engineer according to applicable standards (i.e., MN State Building Code, IBC, NCMA).

Conditions that result in a grade differential should also be reviewed for pedestrian safety and fall protection (this risk assessment is not included in the scope of this report). For final planning, these safety factors should be considered along with structural, archeological and aesthetic factors. Depending on final configurations, some conditions may require a guardrail or fence.

Many of the foundation walls were originally intended to resist soil loads by spanning from basement level to the timber floor. As the timber floors degraded and collapsed, the resistance provided was removed causing the foundation wall to rotate inward or collapse. In addition, without the weather protection of a building above, they have been subjected to water intrusion and freeze/thaw cycles. See Figure 2.

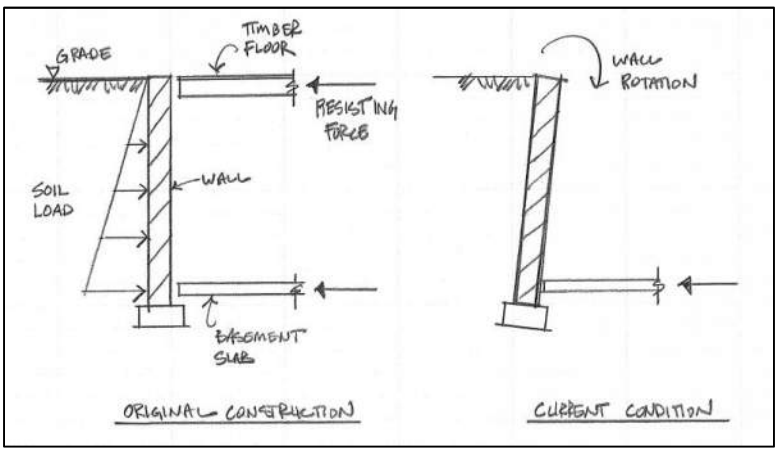

Figure 2 - Wall Forces

Possible methods to stabilize the walls are categorized as follows. Opinions of cost are for planning purposes only and not for construction.

0. Do nothing.
1. Minimal repair and fill, minimal portion of wall exposed to view.
2. Partial repair and fill, portion of wall exposed to view.
3. Extensive repair, majority of wall exposed to view.

General stabilization methods are described below.

Stabilization Option 1, Minimal

- Remove trees and plants within a distance equal to the existing exposed wall height or four feet, whichever is greater.
- Infill low side of wall leaving a difference in grade no more than the wall thickness. Use filter fabric and granular fill within one foot of wall.
- Demolish or repair the visible portion of wall above grade leaving no more than a wall thickness in height above grade. Estimated cost to repair wall is $50 to $100 per square foot of exposed wall.
- See Figure 3.
- Figure 4 shows an example of level 1 stabilization that exists in area “R”.

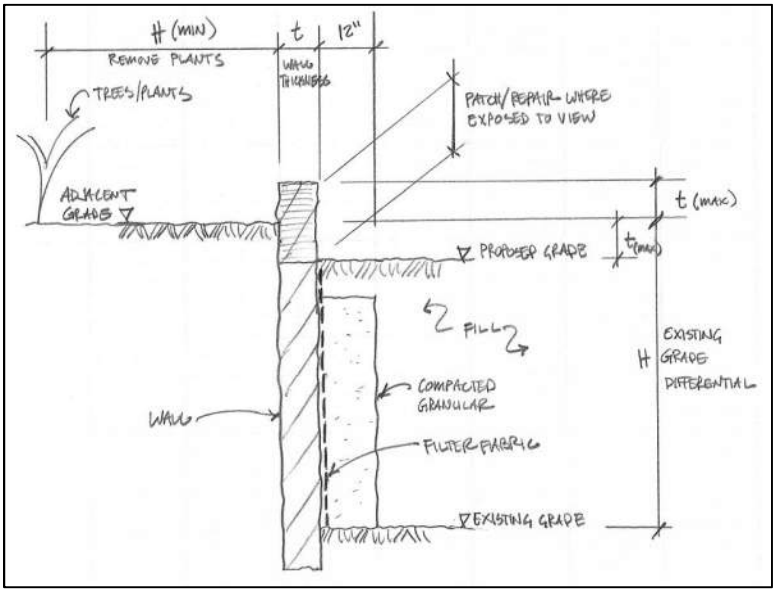

Figure 3 - Stabilization Option 1

Figure 4 - Example of Level 1 Stabilization

Stabilization Option 2, Partial

- Remove trees and plants within a distance equal to the existing exposed wall height or four feet, whichever is greater.
- Infill low side of wall leaving a difference in grade no more than the twice the wall thickness.
- Provide a drainage swale, drain tile or other drainage detail on high soil side.
- Provide filter fabric and one foot of granular fill on both sides of wall.
- Patch and repair the wall to a depth of twice the wall thickness below proposed grade, both sides of wall. Estimated cost to repair wall is $50 to $100 per square foot of wall.
- Provide a masonry or grout cap at top of wall.
- See Figure 5.

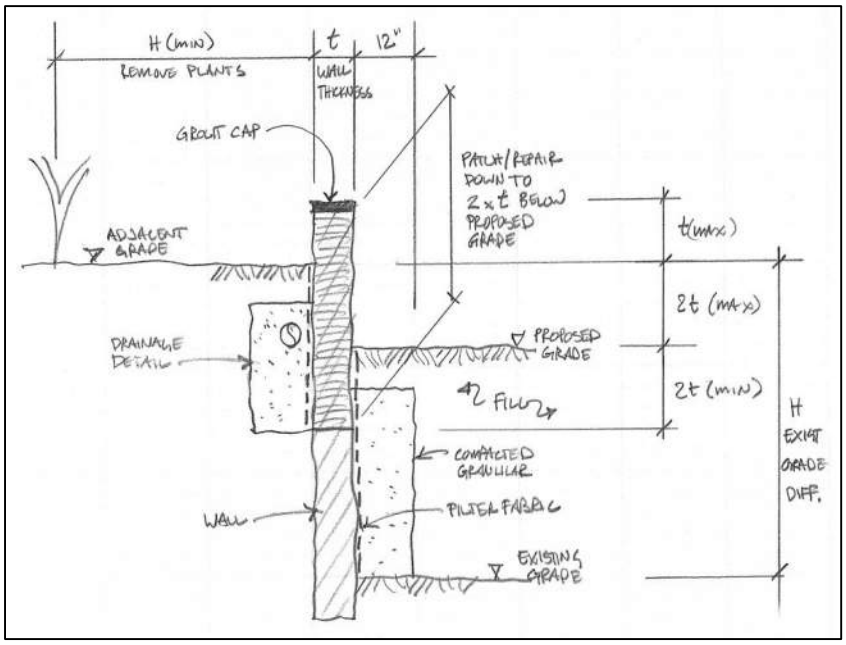

Figure 5 - Stabilization Option 2

Stabilization Option 3, Extensive

- Remove trees and plants within a distance equal to the existing exposed wall height or four feet, whichever is greater.
- Provide a drainage swale, drain tile or other drainage detail on high soil side.
- Provide filter fabric and one foot of granular fill on back side of wall, full depth.
- Patch, repair or rebuild the wall full depth, both sides. Estimated cost to repair wall is $50 to $100 per square foot of wall.
- Provide a masonry or grout cap at top of wall.
- Brace top of wall with galvanized steel. These braces would essentially replace the original timber floor or roof. Bracing would take the form of either diagonal braces to grade or a series of braces from wall to wall. Steel grating may be added for fall protection.

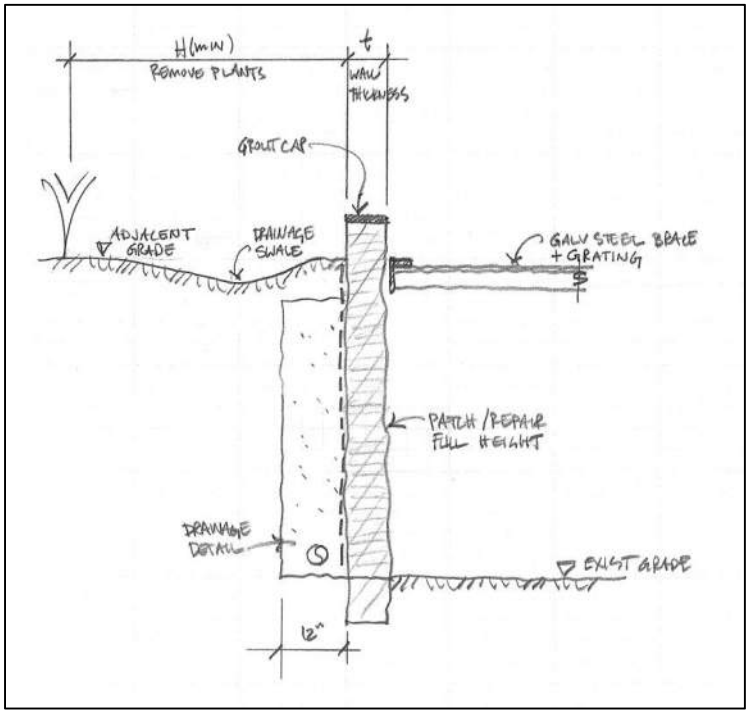

Figure 6 - Stabilization Option 3

Individual foundation structures are discussed below. Recommendations are based on practicality of stabilization.

A1, Hirschfield House

- Foundation materials: CMU and CIP concrete
- Foundation thickness: 8 inches
- Grade differential: estimated 7 feet
- Description: partially intact residential basement foundation wall. Some areas have completely failed inward. Occasional large cracks; some offset cracks.
- Discussion: Stabilization to level 3 would be expensive since it would be necessary to brace the top of walls. Stabilization to level 2 would include tuck pointing existing masonry and patch/repair of existing concrete. A brick chimney exists on the building interior. Stabilization of the chimney would require patch and repair of the brick and steel bracing down to grade.
- Recommendation: Stabilization option 1 or 2.
- See Figure 7.

Figure 7 - A1, Hirschfield House

C, Linder Cabin

- Foundation materials: brick
- Foundation thickness: 8 inches
- Grade differential: estimated 4 feet
- Description: residential foundation wall, walls rotating and deflecting inward, deteriorated mortar, many areas have failed, large cracks, offset cracks.
- Discussion: Stabilization to level 3 would be expensive since it would be necessary to brace the top of walls. Stabilization to level 2 would include tuck pointing and partially rebuilding existing brick wall. For stabilization levels 2 and 3, areas of wall that have significant deflection and/or rotation would need to be rebuilt.
- Recommendation: Stabilization option 1.
- See Figure 8.

Figure 8 – C, Linder Cabin

D1, Bruek Cabin

- Foundation materials: CMU
- Foundation thickness: 8 inches
- Grade differential: freestanding 5'-4" maximum above grade
- Description: foundation wall segments at corners of building, generally good condition, some loose CMU near tops of wall segments, segments are stabilized by virtue of their corner configuration
- Discussion: Stabilization to level 2 and 3 would include tuck pointing existing masonry and grouting of the CMU cores.
- Recommendation: Stabilization option 2 (1'-4" freestanding wall) or 3 (4'-0" freestanding wall)
- See Figure 9.

Figure 9 - D1, Bruek Cabin

D2, Latz Cabin

- Foundation materials: mortared rock
- Foundation thickness: 6 inches
- Grade differential: estimated 3 feet
- Description: areas of deteriorated mortar, many areas have failed, large cracks.
- Discussion: this short wall is similar to a natural feature and could possibly be treated as such.
- Recommendation: Stabilization option 2 or 3.
- See Figure 10.

Figure 10 - D2, Latz Cabin

D3, Latz Boathouse

- Foundation materials: mortared rock
- Foundation thickness: 10 inches
- Grade differential: estimated 7 feet
- Description: mortared rock wall with CIP concrete U-shaped ring at top/back of wall, condition is generally good.
- Discussion: Stabilization to level 3 would require bracing the top of walls.
- Recommendation: Stabilization option 2 or 3.
- See Figure 11.

Figure 11 - D3, Latz Boathouse

J, Main Hotel

- Foundation materials: mortared rock
- Foundation thickness: 8 inches
- Grade differential: estimated 4 feet
- Description: residential foundation wall, walls rotating and deflecting inward, deteriorated mortar, many areas have failed, large cracks.
- Discussion: Stabilization to level 3 would require bracing the top of walls. Stabilization to level 2 would include re-grouting and partially rebuilding existing rock wall. Areas of wall that have significant deflection and/or rotation would need to be completely rebuilt.
- Recommendation: Stabilization option 1.
- See Figure 12.

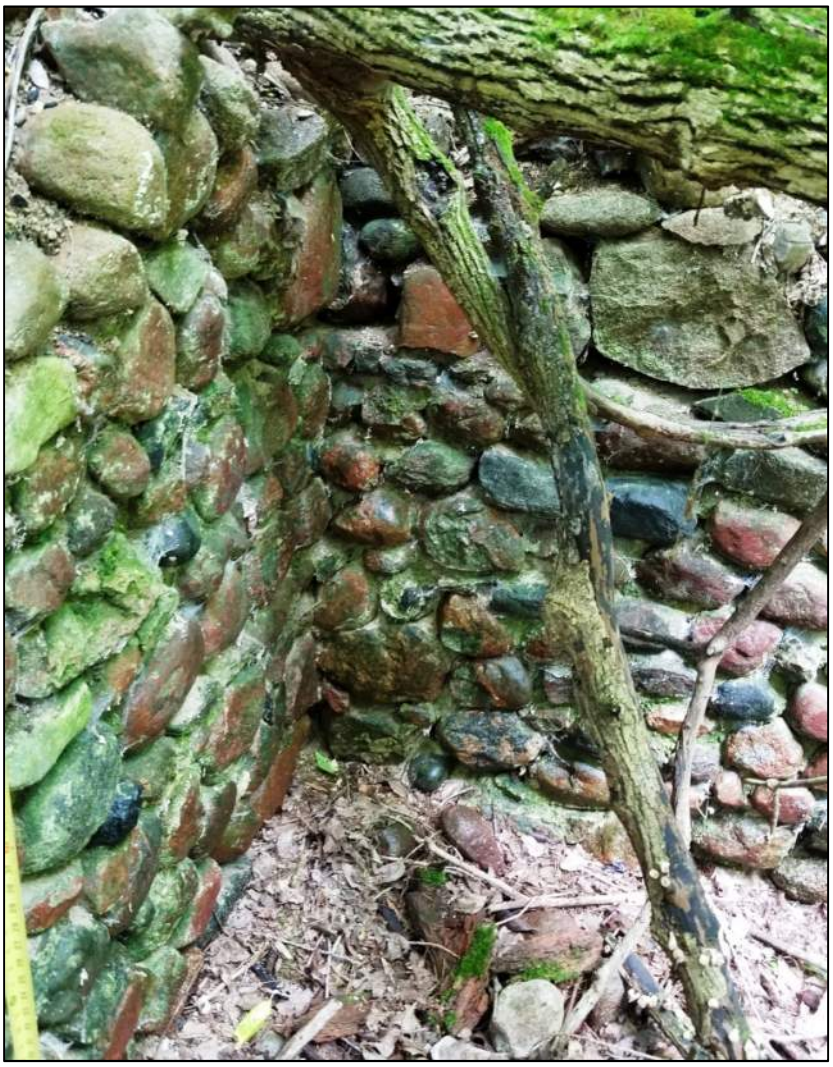

Figure 12 - J, Main Hotel

L, Orth Cabin

- Foundation materials: CIP concrete
- Foundation thickness: 8 inches
- Grade differential: estimated 3.5 feet
- Description: residential foundation wall, walls rotating, many areas have failed, large cracks.
- Discussion: Stabilization to levels 2 or 3 would require completely rebuilding the concrete wall to re-establish a plumb wall. In addition, for stabilization levels 2 and 3, top-of-wall bracing would be required.
- Recommendation: Stabilization option 1.
- See Figure 13.

Figure 13 - L, Orth Cabin

M, Orth Boathouse

- Foundation materials: CIP reinforced concrete
- Foundation thickness: 8.5 inches
- Grade differential: estimated 8 feet
- Description: boathouse foundation wall, 6” reinforced concrete roof slab, significant horizontal cracks and inward deflecting walls, roof has failed in back, exposed reinforcing in roof slab in front, twisted rebar and barb wire reinforcing observed, roof slab likely is not adequate to support pedestrian loads
- Discussion: Stabilization to level 3 would require bracing top of walls and roof slab. Stabilization to level 2 would include patching and repair of concrete. For stabilization levels 2 and 3, areas of wall that have significant deflection and/or rotation would need to be rebuilt.
- Recommendation: Stabilization option 1 or 2. Sloped compacted infill leaving 8” to 16” maximum wall exposed, demolish roof slab or completely fill and compact underneath.
- See Figure 14.

Figure 14 - L, Orth Boathouse

N1, Hirschfield Boathouse

- Foundation materials: CMU
- Foundation thickness: 8 inches
- Grade differential: estimated 12 feet
- Description: boathouse foundation wall, significant horizontal cracks and inward deflecting walls, concrete slab roof in back, roof slab likely is not adequate to support pedestrian loads
- Discussion: Stabilization to level 3 would require bracing top of walls and roof slab. Stabilization to level 2 would include patching and repair of CMU. For stabilization levels 2 and 3, areas of wall that have significant deflection and/or rotation would need to be rebuilt.
- Recommendation: Stabilization option 1 or 2. Sloped compacted infill leaving 8” to 16” maximum wall exposed, demolish roof slab or completely fill and compact underneath.
- See Figure 15.

Figure 15 - N1, Hirschfield Boathouse

N2, Boathouse on South Shore

- Foundation materials: mortared rock
- Foundation thickness: 15 inches
- Grade differential: estimated 7 feet
- Description: boathouse foundation wall, significant vertical cracks, some undermining
- Discussion: Stabilization to level 3 would require bracing top of walls.
- Recommendation: Stabilization option 2 or 3.
- See Figure 16.

Figure 16 - N2, Boathouse on South Shore

R, Seawall

- Foundation materials: brick and mortared rock
- Foundation thickness: 8 inches
- Grade differential: estimated 4 feet
- Description: retaining wall near water edge, significant cracks, areas of significant rotation and deterioration
- Discussion: For stabilization level 3, wall segments that have significant deflection and/or rotation would need to be completely rebuilt or reoriented.
- Recommendation: Stabilization option 2 or 3 depending on segment condition. Recommend abandoning and fencing off segments that have significant deflection and/or rotation. Fill on the front, low side of wall should be rip rap.
- See Figure 17.

Figure 17 - Seawall

R1, Amblard Villa/Cabin

- Foundation materials: CIP concrete
- Foundation thickness: 8 inches
- Grade differential: estimated 3.5 feet
- Description: residential foundation wall, walls rotating, areas have failed, large cracks.
- Discussion: Stabilization to levels 2 or 3 would require completely rebuilding the concrete wall to re-establish a plumb wall. In addition, for stabilization levels 2 and 3, top-of-wall bracing would be required.
- Recommendation: Stabilization option 1.
- See Figure 18.

Figure 18 - R1, Amblard Villa/Cabin

R2, Amblard Villa/Cabin

- Foundation materials: CMU
- Foundation thickness: 8 inches
- Grade differential: estimated 10 feet
- Description: residential foundation wall, significant cracks and inward deflecting walls
- Discussion: Stabilization to level 3 would require bracing top of walls. Stabilization to level 2 would include patching and repair of CMU. For stabilization levels 2 and 3, areas of wall that have significant deflection and/or rotation would need to be rebuilt.
- Recommendation: Stabilization option 1 or 2. Sloped, compacted infill leaving 8” to 16” maximum wall exposed.
- See Figure 19.

Figure 19 - R2, Amblard Villa/Cabin

R3, Amblard Villa/Cabin

- Foundation materials: CMU and brick
- Foundation thickness: 8 inches
- Grade differential: estimated 5 feet
- Description: residential foundation wall, walls deflecting inward, deteriorated mortar, many areas have failed, large cracks, offset cracks.
- Discussion: Stabilization to level 2 would include tuck pointing and partially rebuilding existing brick wall. For stabilization levels 2, areas of wall that have significant deflection and/or rotation would need to be rebuilt.
- Recommendation: Stabilization option 1. Sloped, compacted fill leaving 8" maximum wall exposed.
- See Figure 20.

Figure 20 - R3, Amblard Villa/Cabin

Summary and Conclusion

The existing foundation wall elements, being originally part of a cohesive building system, were stable when initially constructed. With their timber floors and roofs absent, they have lost stability and deteriorated. Since these walls were not originally intended to retain earth on their own, they have rotated, collapsed and deteriorated.

In general, a practical stabilization method that does not further degrade the wall is backfilling and repairing the visible portion of wall as outlined in stabilization options 1 and 2. In general, stabilization options 1 and 2 should be economical, help protect the wall and allow interpretation of the original structure.

Please let me know any questions or if I can be of further assistance.

Sincerely,

WSB & Associates, Inc.

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Dean Smith, PE
Senior Project Manager, Structural