

OSWEGO CANAL CORRIDOR BOA

APPENDIX O: FORMER CYCLOTHERM SITE STRUCTURAL ASSESSMENT

NOVEMBER 2019

**Oswego Canal Corridor
Brownfield Opportunity Area
Step III Implementation Strategy
City of Oswego, New York**

**Former Cyclotherm Site
Retaining Structures/Wall
Condition Inspection and Structural Assessment**

**Prepared for:
Bergmann Associates
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2110 S. Clinton Avenue, Suite 1
Rochester, New York 14618
(585)223-3660

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PURPOSE

This Structural Assessment of the Cyclotherm site retaining structure/wall near 200 1st Street was conducted as part of the Oswego Canal Corridor, BOA Step III Implementation, for the City of Oswego, NY.

The purpose of this structural assessment is to assess structural conditions to help evaluate the viability of future development using these structures. The following tasks were undertaken for this report:

- Conduct structural/engineering analysis
- Provide conclusions and recommendations
- Provide cost estimates

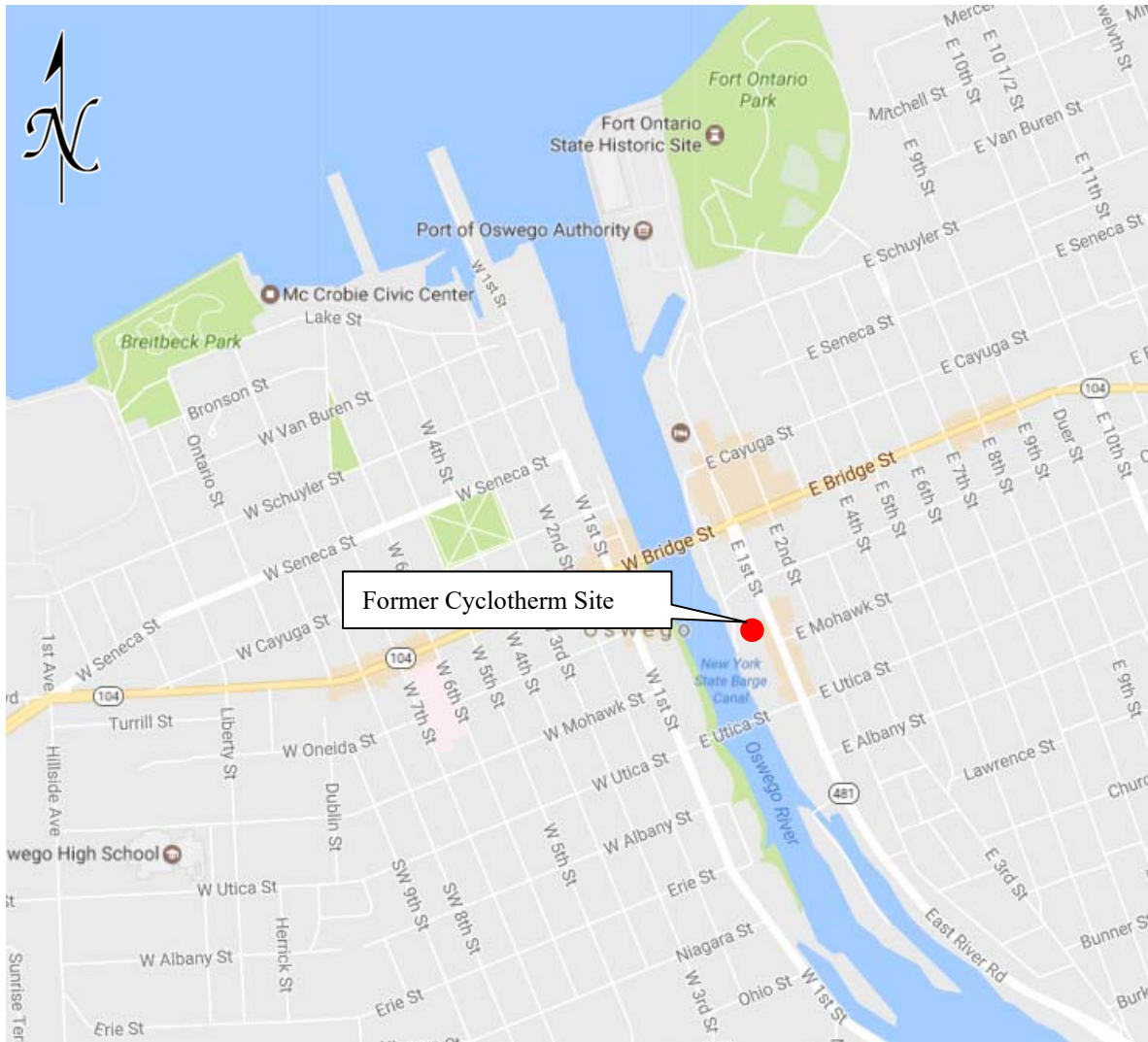
Based on a site visit and walking tour with the client, it is understood that the retaining wall at the former Cyclotherm Site is actually the eastern substructure of the Harbor Rail Trail Bridge over the Oswego River and Barge Canal in the City of Oswego, New York. Ravi Engineering & Land Surveying, P.C. performed an inspection of the East Abutment and East Pier of the Harbor Rail Trail Bridge.

BACKGROUND

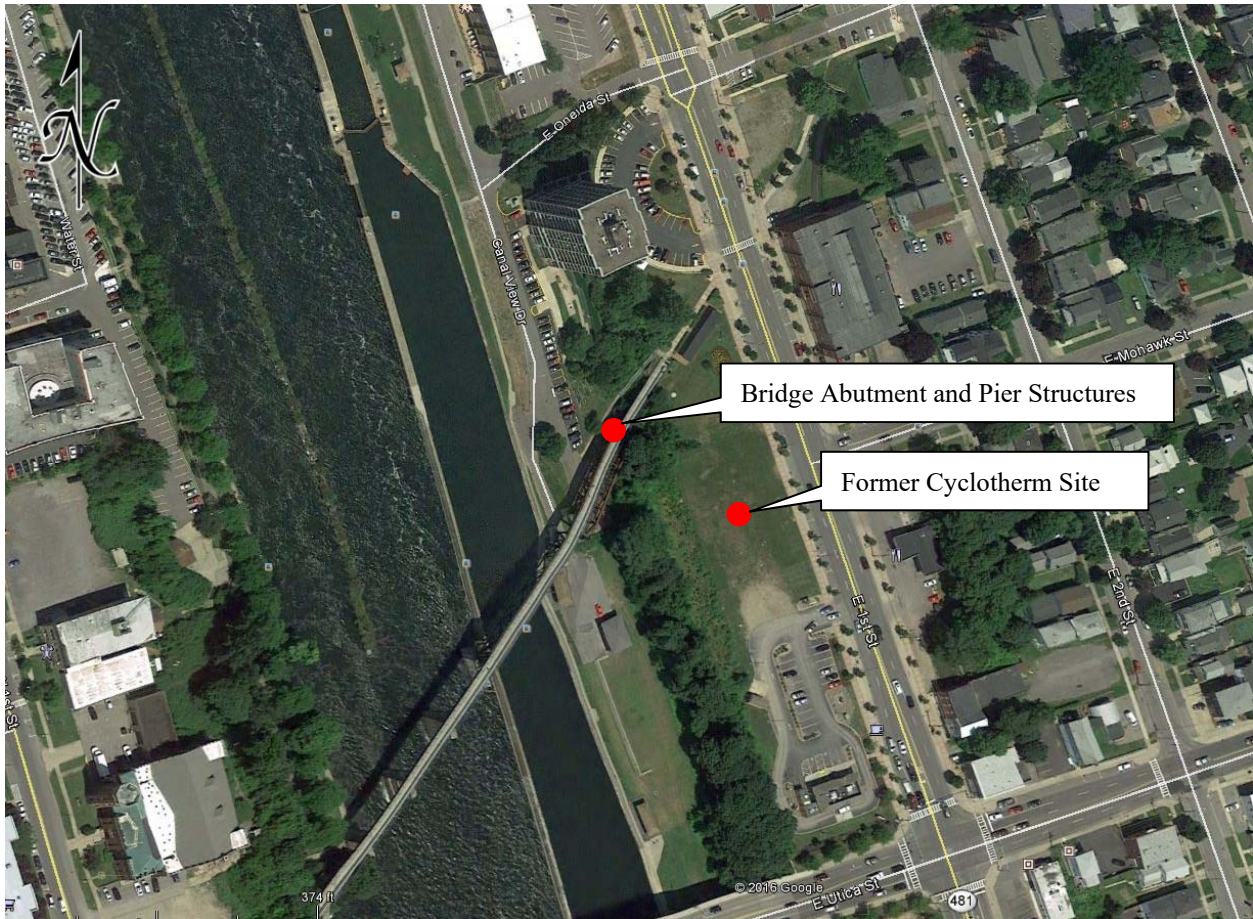
The subject bridge was constructed from 1912 through 1914 by the New York Central Railroad, replacing an older bridge built in 1876 on the same alignment. The concrete substructures were constructed by the Rosser Engineering & Construction Company, and the superstructure was constructed by the Phoenix Bridge Company. Record plans were not available.

Railroad traffic was discontinued in 1976. In 2001, the railroad bridge was converted to a pathway as part of the federally-funded O&W Railroad Promenade and Bikeway Project. The pathway is currently referred to as the Harbor Rail Trail.

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Location Map - Road



Location Map - Aerial

INSPECTION FINDINGS:

The purpose of this inspection was to assess structural conditions to help evaluate the viability of future development using these structures. The field work was done by Glenn Klein, PE, and Andrew Machaby on December 21, 2016. Site photos from the inspection are included in Appendix A, and the existing Plan and Elevation Sketch is included at the end of the Inspection Findings section.

Bridge Abutment:

The abutment appears to be a conventional concrete gravity structure. The footings are entirely below grade and the foundation type is unknown. The abutment measures 39' wide and the north wing wall is 12' long. The south wing wall extends below grade and its length is unknown.

The concrete is in fair structural condition, especially considering its age. There is widespread minor cracking, surface spalling, and hollow-sounding areas affecting approximately 50% of

the exposed surfaces. These are mainly cosmetic defects and do not appear to affect the performance of the structure in a negative way at this time.

At the north side of the abutment, the wing wall construction joint is separated up to 1" at the top of the wall. This appears to be indicative of minor settlement of the wing wall foundation, which may have occurred due to normal settlement shortly after construction. The wall appears stable.

The concrete abutment seat and bearings were reconstructed during the trail conversion project in 2001, and these components remain in good condition. The unused portion of the abutment seat on the south side was not reconstructed, and the original concrete is covered with dirt and debris.

There is a 3.25' wide x 17' long x 1.5' thick concrete pad immediately in front of the abutment stem. This appears to have been placed as a jacking pad for temporary shoring of the girders during the trail conversion project in 2001. An insignificant amount of subgrade erosion has undermined the front edge of the pad; however this has no effect on the abutment.

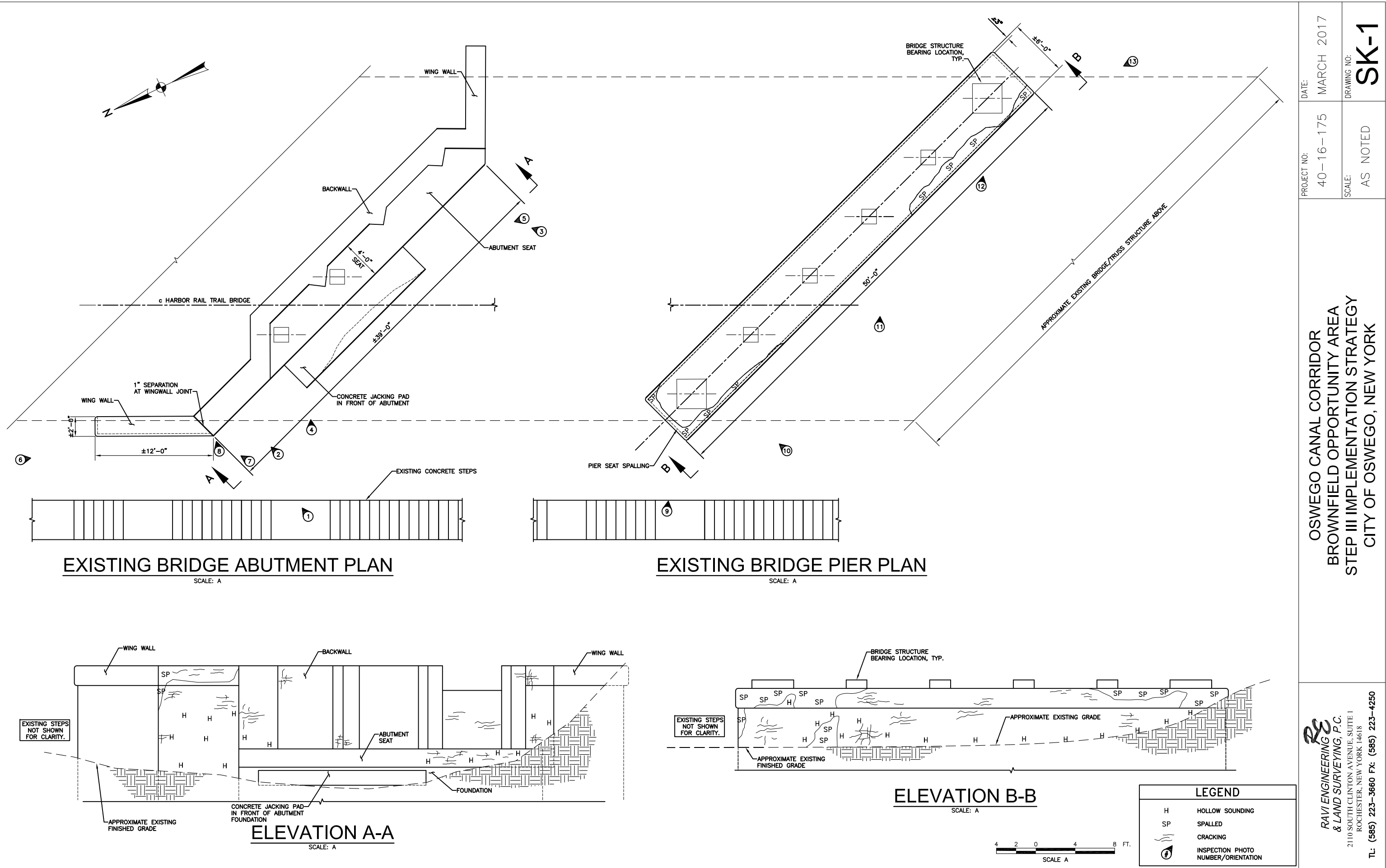
Abutment photos are included in Appendix A.

Bridge Pier:

The concrete pier is 50' long x 6' wide. The pier is located at the bottom of the steep embankment slope. The west face is exposed up to 6' vertically, but the east face is almost completely buried with embankment material spilling onto the top of the pier. The footings are entirely below grade and the foundation type is unknown.

The concrete is in fair to poor condition. There is widespread cracking, spalling, and hollow-sounding areas affecting approximately 70% of the exposed surfaces. The top corner of the seat is spalled 2" to 6" deep along the north end and most of the west side. The concrete remains solid beneath the superstructure bearings, and there is no structural cracking or distress.

Bridge Pier inspection photos are included in Appendix A.



CONCLUSIONS:

The concrete bridge abutment and pier are in satisfactory structural condition and provide adequate support for the bridge superstructure. While there is widespread minor deterioration on the exposed concrete surfaces, at this time, the resulting damage is primarily cosmetic in nature and does not affect structural performance at this time.

The site has not been very well maintained. The area has an unkempt appearance from under brush and vines. The concrete structures are covered with dirt and other debris which has contributed to their deterioration.

Undermining of the concrete jacking slab in front of the abutment has no effect on the structure and does not require mitigation at this time.

RECOMMENDATIONS:

A. Feasibility of future construction and redevelopment on the Cyclotherm Site Area –

1. Based on the observations and analysis discussed above, the future use of this site's area at the base of the retaining wall is limited by the small acreage which is available for public use. The site is restricted to the North by a multistory residential property and to the South by what appears to be a commercial shop building structure.

B. Recommendations for future development on, adjacent to and around the Cyclotherm Site Area –

1. Although there do not appear to be structural limitations to the site, its small acreage may limit possible future development options to some type of covered, open "Rest Area" shelter with bike racks, picnic tables, and other type of seating.

C. Maintenance and Repair to be done –

1. For additional investigative work to be completed the removal of the dirt, debris, and vegetation from the bridge pier and abutment seats is required for further inspection and the verification of the findings in this report. This much needed maintenance will also reduce moisture infiltration to help slow future deterioration of the concrete structure.
2. Monitoring of the construction joint at the north side of the abutment is recommended to verify that there is no active movement occurring. If the current 1" wide joint gap increases progressively, this would be cause for concern. However, the joint gap may have occurred due to normal settlement shortly after construction, which would not be a structural concern.

3. It is recommended that the concrete surfaces be cleaned and concrete spalls be properly repaired. Following the concrete repair the application of a penetrating concrete sealer to reduce absorption is recommended as a preventative maintenance measure.
 4. Concrete spalling is attributed mainly to freeze-thaw action, and is expected to progressively worsen over time. Even surface concrete repairs discussed in item 3 above may have a relatively short-term durability. Gradual freeze-thaw damage in the original concrete substrate may begin to loosen patches within 10 to 20 years. A more permanent repair could be achieved by re-facing exposed surfaces with a 6" thickness of new reinforced concrete anchored to sound substrate.
 5. To prevent additional deterioration in the long-term, the concrete structures are recommended to be routinely monitored and regularly maintained. This is critical to avoid the potential spalling along the edge of the bridge pier seat and undermining of the bridge bearings. These concrete repair recommendations also provide an aesthetically pleasing appearance to the concrete structures which enhances the attractiveness the area.
- D. Planning level cost estimates for various alternatives to help understand development implications and expected return on investment (to be coordinated with other team members) –
1. Due to the small acreage of this site, it is reasonable to consider the removal of the dirt, debris, and vegetation from the bridge pier and abutment seats be completed by the City of Oswego Maintenance Department. An estimated cost for that work has not been included in this report.
 2. An opinion of estimated cost to clean and seal exposed concrete surfaces would be approximately \$15,000.
 3. An opinion of estimated cost for the concrete repair is:
 - a. For patching the surface defects, applying a penetrating silane sealer, and applying a concrete coating to blend in the repair areas, is estimated to cost approximately \$40,000.
 - b. The more permanent repair of refacing exposed surfaces with a 6" thickness of new reinforced concrete anchored to sound substrate is estimated to cost approximately \$150,000.

Appendix A

Inspection Photos



Photo 1 – Abutment, looking east



Photo 2 – North side of Abutment



Photo 3 – South side of abutment



Photo 4 – Abutment seat and jacking pad, looking south



Photo 5 – Abutment, looking north



Photo 6 – Wingwall and stairs at north side of abutment



Photo 7 – Separation at north wingwall construction joint



Photo 8 – Close-up of separation at north wingwall construction joint



Photo 9 – North and west face of pier, looking south



Photo 10 - West face of pier, below north truss bearing



Photo 11 - West face of pier, near middle



Photo 12 - West face of pier, near south end



Photo 13 – West face of pier, looking north