

Structural Review of Box Culvert

Westfield Road
Winnebago, Illinois

Project Number: 24-125 – PH04

July 8, 2024

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INTRODUCTION

At the request of the Village of Winnebago a visual review of the existing box culvert under Westfield Road was performed.

BACKGROUND

Fehr Graham staff performed a visual field assessment of the above-mentioned structure on May 30, 2024. Settlement has been observed in the roadway over the box culvert. Photographic documentation from the field assessment is included in Appendix A. Original drawings for the structure were not available for reference.

STRUCTURAL REVIEW

Headwall Condition

Abrasion was observed throughout most of the headwall, exposed aggregate was prominent along the exterior face of the headwall.

Barrel Condition

The barrel appeared to be in sufficient condition. Abrasion was present along the water line for the entire length of the barrel. A shear crack was observed at the southeast corner of the barrel. There did not appear to be any signs of differential settlement.

Roadway Condition

There was minor settlement observed in the roadway above the box culvert. Alligator cracking was present along the edges of the roadway. Longitudinal and transverse cracks are seen throughout the entire width of the roadway. There is approximately one foot of cover from the top of the headwall to the crown of the roadway. The clear distance from the edge of pavement to the face of headwall is 2 ft and 3 ft for the east and west ends respectively. There are no roadside barriers on either end of the box culvert.

RECOMMENDATIONS

Roadway & Base Repair

As a temporary solution to resolve settlement issues in the roadway above the culvert, the existing pavement and base course shall be removed and replaced. The existing roadway shall be sawcut to the extents of the culvert headwall. Upon removal of existing pavement and base course, the culvert top slab shall be assessed for structural deficiencies. If no deficiencies are observed the base course and pavement shall be replaced in compliance with IDOT roadway guidelines.

Culvert Replacement & Guardrail Installation

To comply with IDOT roadside barrier guidelines, guardrail shall be installed along both the east and west ends of the culvert. This guardrail shall extend past the culvert wingwalls. The existing roadway will need to be widened so that there is a minimum of 4 ft from the edge of shoulder to the face of the guardrail. Guardrail posts should be spaced to avoid interference with the culvert top slab. To accommodate the widened roadway, we recommend that the existing structure is removed and replaced with a precast culvert and cast-in-place wingwalls. The proposed widened roadway shall be constructed in accordance with IDOT guidelines.

Conclusion

We recommend that the Village of Winnebago pursues complete culvert replacement and guardrail installation. Repairing the existing roadway resolves settlement issues but would not allow for the installation of a roadside barrier to comply with IDOT regulations. Considering the age of the existing structure, complete replacement is the most practical solution.

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APPENDIX A



Photo 1: Roadway Over Culvert Looking North



Photo 2: Roadway Over Culvert Looking South



Photo 3: West Headwall Looking North



Photo 4: West Headwall Looking South



Photo 5: West End of Barrel Looking East



Photo 6: East End of Barrel Looking West



Photo 7: East Headwall Looking Northwest



Photo 8: East Headwall Looking South

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