Visual Structural Inspection Report

Watford Bridge

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Prepared for:
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IEPC ENGINEERING SERVICES

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I. Introduction

1. IEPC were appointed by the Ministry of Public Works, Government of Bermuda to carry out a visual structural inspection of the underside of Watford Bridge.

2. A visual non-intrusive inspection using a drone was carried out on the 23rd of February 2024. This report summarizes the observations during this inspection and provides recommendations along with the next steps.

3. Project Stakeholders
   a) Ministry of Public Works, Government of Bermuda - the "Client"
   b) iEPC Limited - the "Engineer"

II. Existing Staircase

A. Site Location

1. Watford Bridge connects Watford and Boaz Island to Somerset.

B. Existing Structure

1. The bridge has 7 spans with an approximate overall length of 500 feet and a width of 30 feet.

2. The existing bridge is a steel plate girder bridge, with a reinforced concrete deck, which supports the roadway surface for vehicular traffic. There are 4no. plate girders spanning the length of the bridge on top of 6no. reinforced concrete piers.

3. The original girders appear to be coated; however, the specification and thickness of the original coating is unknown.

III. Observations/discussions

A. General

1. After a comprehensive review of the drone photographs, which captured various components such as the abutments, piers, bearings and plate girders, the overall condition of the bridge is assessed to be fair to good. Whilst the inspection was conducted remotely, through the analysis of drone images, it revealed areas requiring maintenance and recoating. However, the structural integrity and operational viability of the bridge remain satisfactory, suggesting an overall favorable condition for continued use.
2. The following location keys in Figures 1 and 2 provide a reference for the structural elements mentioned herein the report.

Figure 1 – Location Key 1

Figure 2 – Location Key 2

B. Abutments

1. Abutments A1 and A2 appear to be in good condition. No significant signs of structural distress, such as substantial cracking, spalling or displacements were observed on the visible surfaces of the inspected elements. The concrete surfaces exhibited minimal deterioration, with no apparent indications of significant corrosion or erosion.

C. Bearings

2. The bridge bearings were generally observed to be in fair condition. However, in quite a few instances the steel plate girders above the bearings appeared to have excessive local corrosion and/or the supporting concrete bearing plinths exhibited signs of distress, including crushing or cracking.

    a. Bearings B3, B9, B10, B12, B13, B14, B15, B16 and B31 show visible signs of concrete plinth cracking/crushing and/or excessive localized corrosion of the supported steel plate girder above, as shown in Appendix A.
    b. It is recommended that the affected plate girder steel be cleaned and coated as per the coating specification.
    c. It is recommended that the concrete bearing plinths be repaired or replaced as required.

D. Plate Girders

1. The overall condition of the plate girders appear to be in fair to good condition. However, it is recommended that approximately 20% of the plate girder flanges undergo recoating to prevent further corrosion and preserve their structural integrity. The recoating process should be carried out in accordance with the approved coating specification.

2. All splice plate connections should be recoated and prior to this undergo a close distance touching inspection to further assess the bolt condition. Any deteriorated coating should be removed, and the connections recoated in accordance with the coating specification. Additionally, bolts showing signs of corrosion or excessive wear should be replaced as necessary to ensure the integrity of the connections.

I. Appendix A – Photographs

Span 1:

Photograph 1 – Abutment A1 – Elevation.

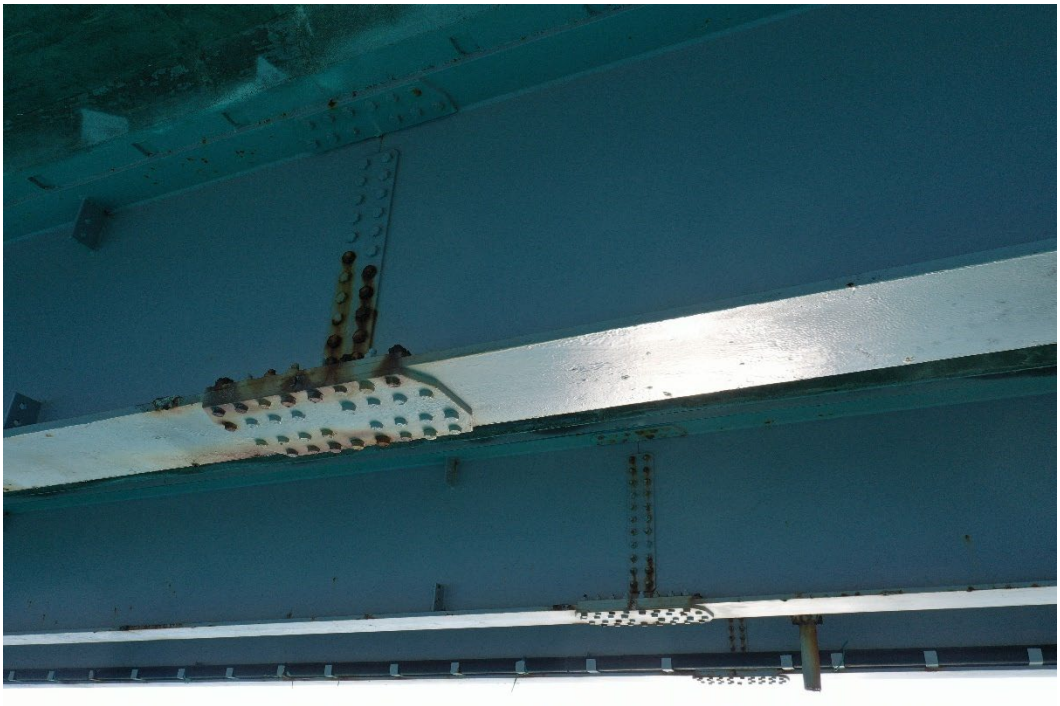
Photograph 2 – Span 1 main girders.

Photograph 3 – Span 1 Plate girder splice connection.

Photograph 4 – Span 1 Plate girder splice connection (1).

Span 2:

Photograph 5 – Span 2 plate girder splice connection.



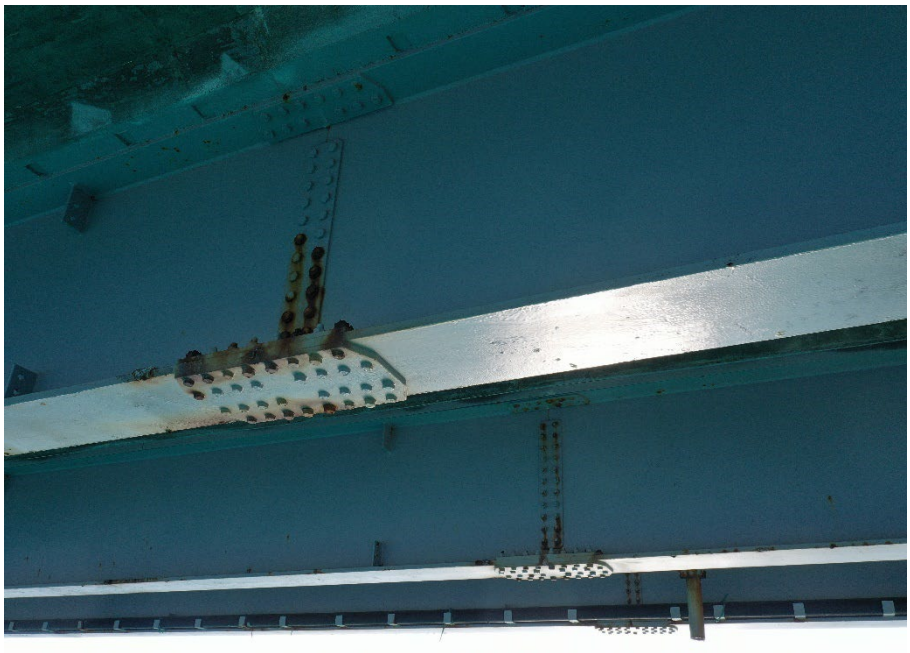
Photograph 6 – Span 2 plate girder splice connection (1).

Photograph 7 – Bearing B9 showing vertical and diagonal cracking.

Photograph 8 – Bearing B10 showing a diagonal crack.

Photograph 9 – Bearing B12 showing local cracking on the edge of concrete plinth.

Span 3



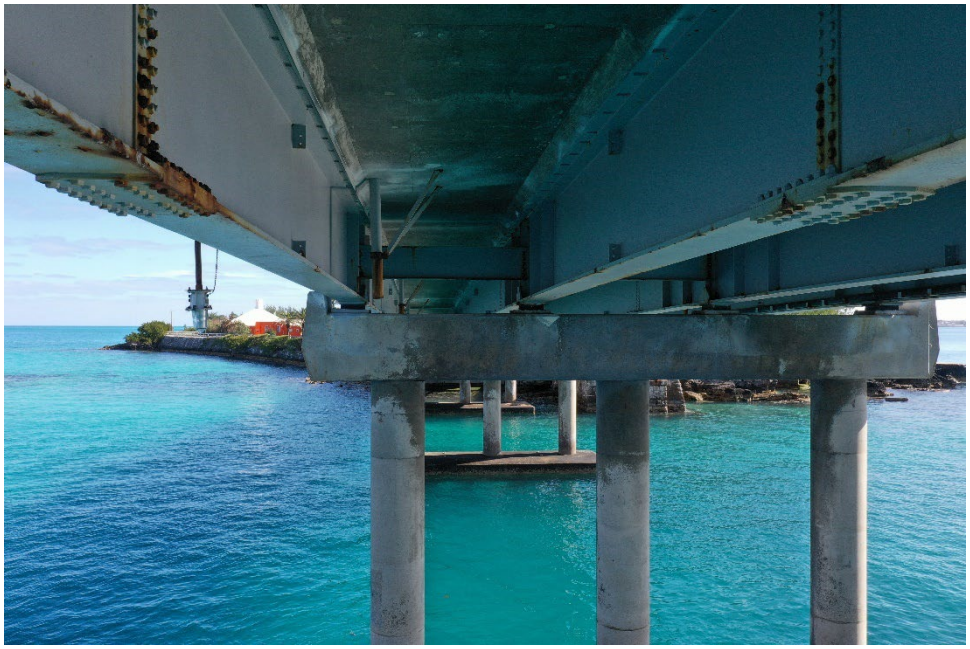
Photograph 10 – Span 3 splice connection corrosion.

Photograph 11 – Bearings 13 and 14 showing cracking of the concrete plinths.

Photograph 12 – Bearings 15 and 16 showing cracking of the concrete plinths

Span 4

Photograph 13 – Span 4 Main Girders.



Photograph 14 – Span 4 Main Girder Splice Connections

Span 5

Photograph 15 – Span 5 Main girders.

Span 6

Photograph 16 – Span 6 Main girders and splice connections.

Span 7

Photograph 17 – Span 7 Main girders and splice connections.

Photograph 18 – Span 7 Main girders and splice connections(1).

Photograph 19 – Abutment A2.

Photograph 20 – Bearing B31 showing corrosion of steel plate girder above.