THE BRIDGE AUTHORITY
In conjunction with
THE MINISTRY OF PUBLIC WORKS

A Bridge To Paradise

Refurbishment Of East Paradise Island Bridge, Nassau, Bahamas

ISLAND SITE DEVELOPMENT

PARSONS

Refurbishment Of East Paradise Island Bridge

Speakers –

Robert Mouzas (C.Eng MICE) - Ministry of Public Works, Bahamas – Deputy Director/Senior Engineer

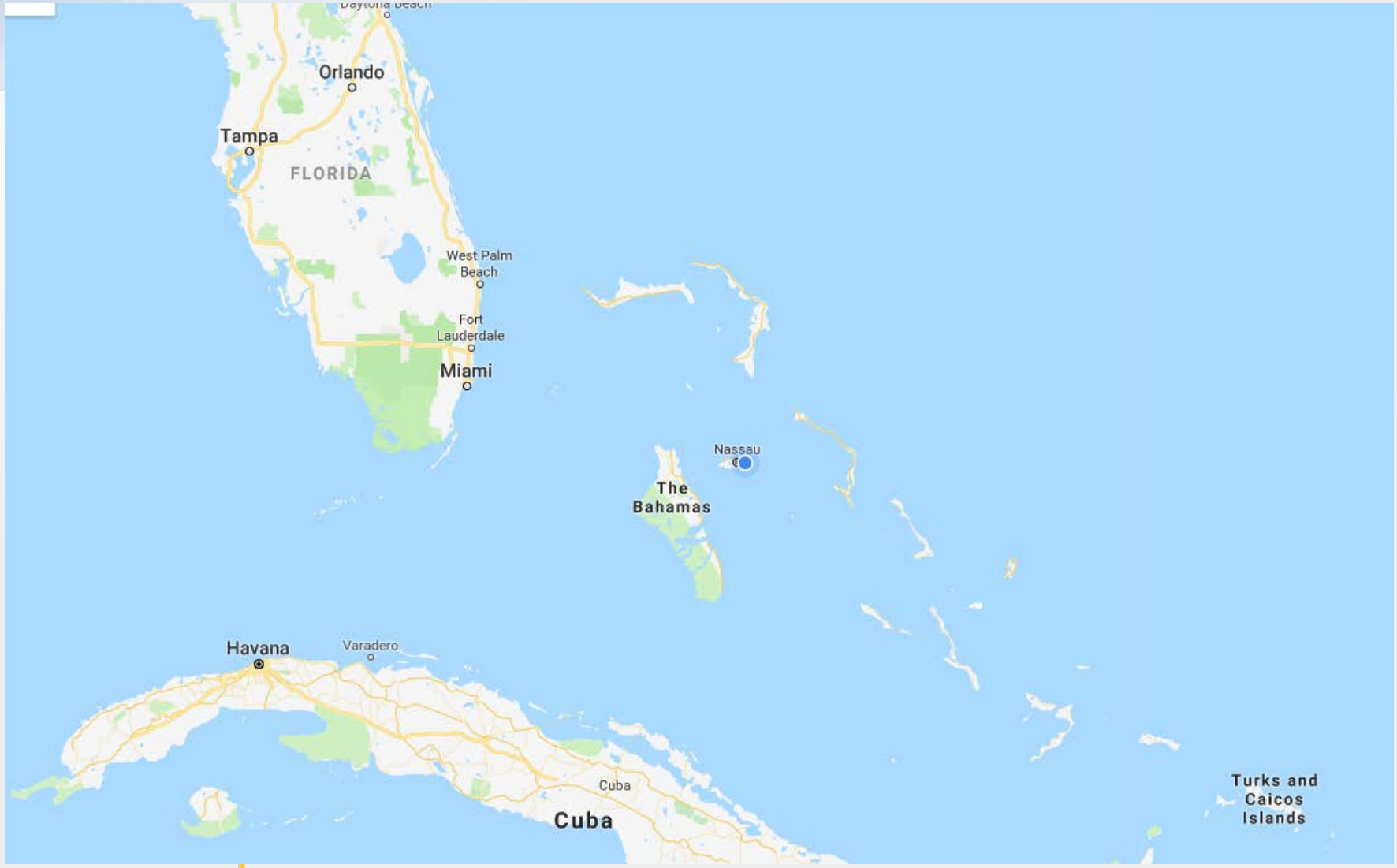
Lambert Knowles (PE) – Engineering Technical Services, Bahamas – CEO

Greg Illig (PE) - Sika - District Manager – Caribbean

Refurbishment Of East Paradise Island Bridge

- General Introduction
- Bridge Inspections
- Load Evaluation/Load Testing /Life Cycle Study on Bridge
- Competitive Tender Exercise, Tender Evaluation and Award of Contract
- Refurbishment Contract
- Concrete Repair Materials

Refurbishment Of East Paradise Island Bridge – General Information



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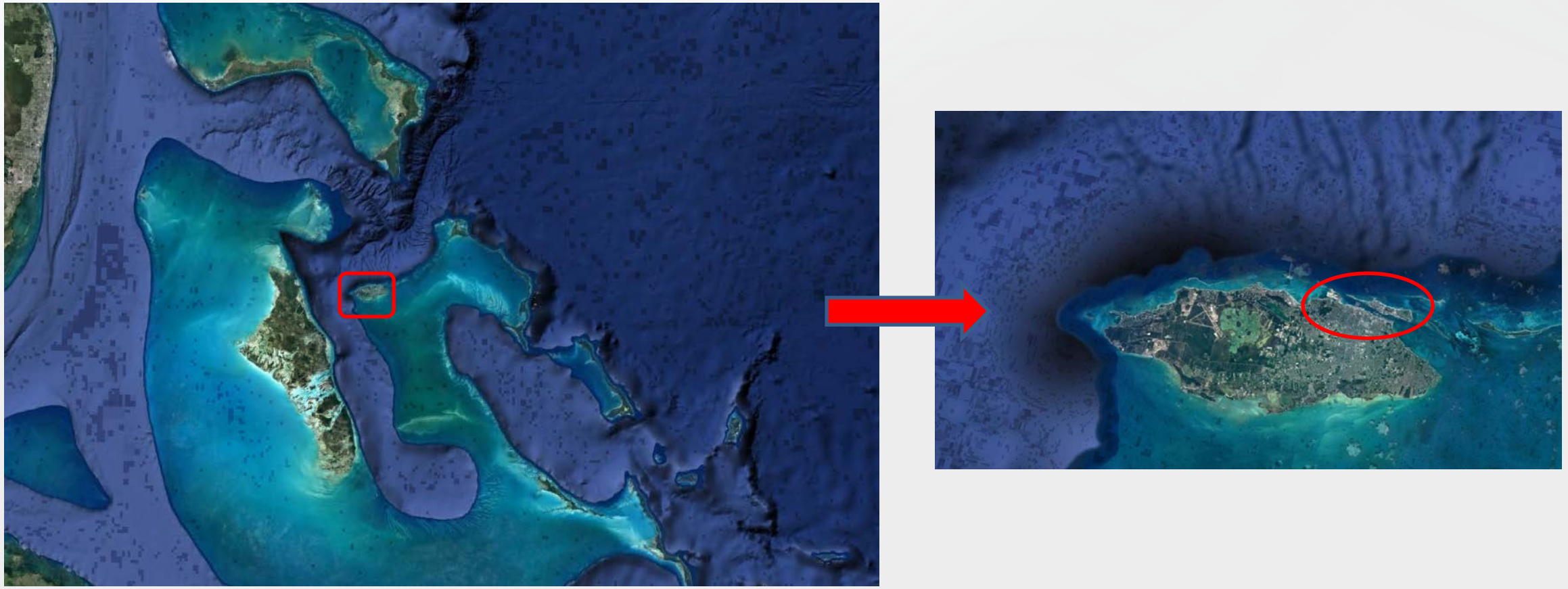

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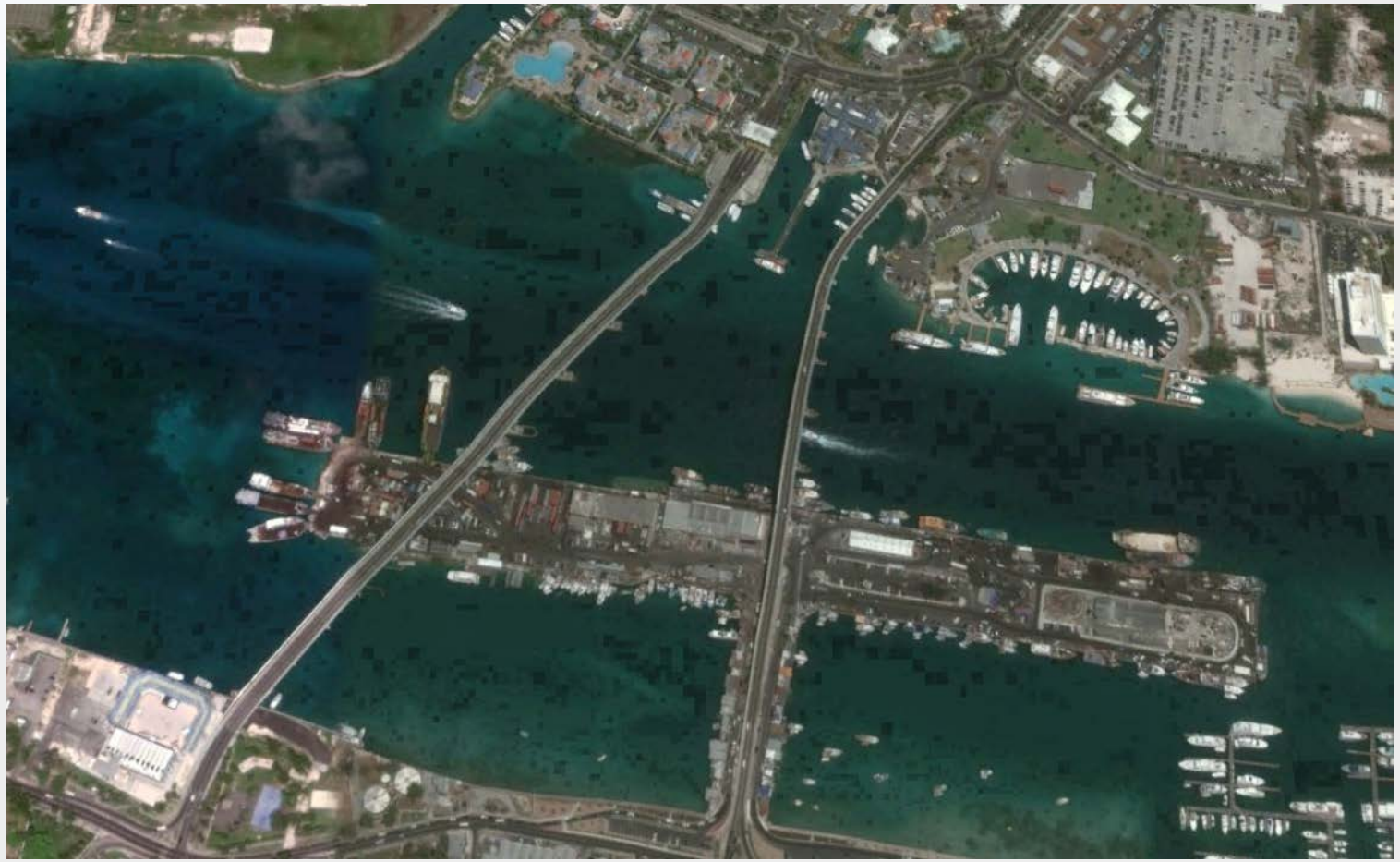


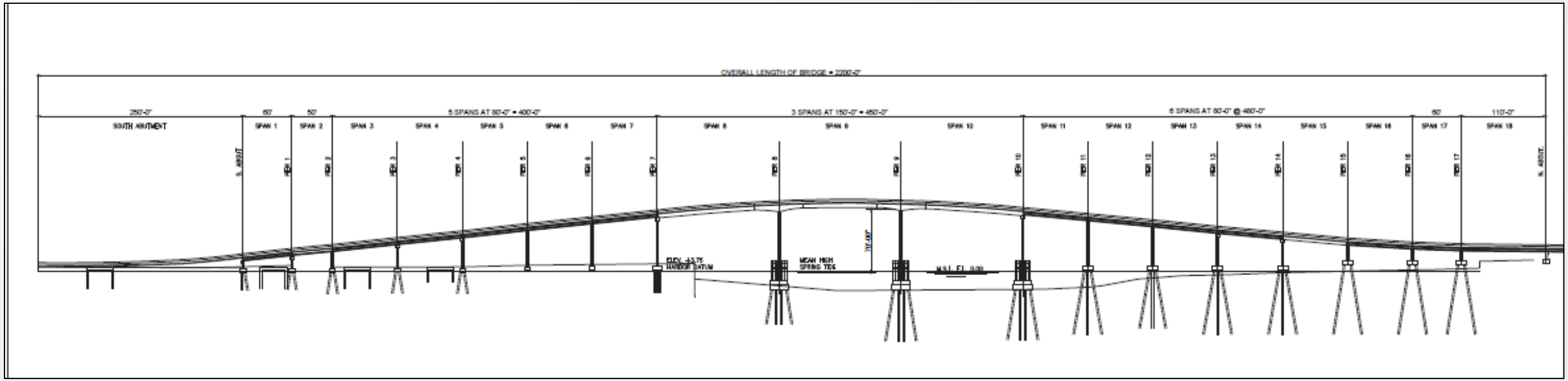
Refurbishment Of East Paradise Island Bridge – General Information

- The East Paradise Island Bridge is owned, operated and maintained by The Bridge Authority, as a toll facility and provides a one-way egress from Paradise Island to New Providence.
- The Paradise Island Bridge East is the older of two bridges that span from Nassau on New Providence Island to Paradise Island.
- It was designed by Howard, Needles, Tammen, and Bergendorf (HNTB) in 1966 to support H-15-44 live load. Construction was completed in 1967 and opened to traffic on April 3, 1967.
- In 1999, the bridge underwent a B$4.9 million rehabilitation scheme. These was the last works undertaken on the structure until now.
- The Bridge currently has a single load-posting of 15 tons.

Refurbishment Of East Paradise Island Bridge – General Information

- The bridge has an overall width of 36 feet and carries two lanes of traffic, along with a sidewalk on each side of the carriageway.
- It is 1,560 feet in overall length and consists of fifteen concrete approach spans and three high elevation main channel spans.
- The concrete approach spans vary from 50 feet in length (span 2) to 80 feet (span7), have an eight inches thick cast in-place concrete deck and are supported by four prestressed AASHTO Type III concrete beams.
- Each of the main channel spans (spans 8, 9 & 10) are 150 feet in length with a cast in-place concrete deck supported by five AASHTO Type IV concrete modified beams.
- Beams bear onto concrete columns topped with a cast-in-place concrete pier cap onto a cast in-place concrete pile cap.

Refurbishment Of East Paradise Island Bridge – General Information



Refurbishment Of East Paradise Island Bridge – Bridge Inspections 2012

- Engineering Technical Services /Parsons engaged by the Ministry of Works to undertake:-
  - Bridge Inspection,
  - Load Evaluation,
  - and Life Cycle Analysis.

- The inspection found that the structure was in generally good condition.

- However, several of the bridge components exhibit varying levels of deterioration which require some localized rehabilitation.

- This includes localized areas of concrete deterioration mainly due to reinforcement corrosion.

- The “current” condition was evaluated in 2015 before the finalization of the repair contract.

Refurbishment Of East Paradise Island Bridge – Condition of Bridge before Contract

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Refurbishment Of East Paradise Island Bridge – Load Assessment/Load Test on Bridge

- Unable to undertake complete Load Evaluation due to the original drawings not being available.
- For this reason, a detailed member by member capacity check could not be fully completed.
- This means that areas of specific concern, such as the dapped ends, could not be verified due to insufficient information.
- While no signs of any distress have yet to have been reported it was decided to undertake a load test on the structure.
- In 2014 a load test was undertaken on the bridge to determine the capacity.
- The load test proved that there was adequate capacity in the bridge for vehicles that use the bridge

Refurbishment Of East Paradise Island Bridge – Life Cycle Study

- In August 2014, a financial life-cycle study was then carried out to determine the useful life of the bridge based on expected maintenance cost and functionality.

- The report evaluated the following options:-
  1. Do-nothing
  2. Replacement of the Bridge
  3. Refurbishment with regular maintenance

- The study concluded that the best option was the 3rd and thus recommended that the bridge undergo immediate repairs and subsequently be maintained regularly.

- The report also recommends that the bridge be replaced no later than 2042, depending on the traffic growth and bridge condition.

Refurbishment Of East Paradise Island Bridge – Competitive Tender

- Following a prequalification process, four tenderers were invited to tender for the project.
- Three contractors returning tender documents.
- Following a tender evaluation exercise, it was recommended that the works be undertaken by Island Site Development (ISD).
- The recommendation being based upon cost, experience and financial capabilities.
- The contract was signed on the 25th January 2016
- The signed contract being approximately $4.9M.
- The contract commenced on the 16th February 2016. The length of the contract is 42 weeks

Refurbishment Of East Paradise Island Bridge

Client: - The Bridge Authority

Lead Agency: - Ministry of Public Works

Contractor : Island Site Development (CEO: Naveen Gupta)

Lead Design Consultants : Engineering Technical Services (CEO: Lambert Knowles)
Parsons (Senior Principal: Sylvain Montminy)

Refurbishment Of East Paradise Island Bridge – Contract Works

- The construction works to be undertaken can be summarized as follows:
  - Repairs to concrete elements such as abutments, beams, piers, columns and deck.
  - Repairs to bridge railings, lights and signage.
  - Repairs and replacement of steel bearing plates and deck joints.
  - Underwater repairs to pile caps.
  - Repairs and/or replacement of portions of the timber fender systems.
  - Repairs and/or replacement of drainage system.
  - Supply of maintenance platform
  - Application of protective coatings to concrete

Refurbishment Of East Paradise Island Bridge – General

Refurbishment Of East Paradise Island Bridge – Bridge Inspection Equipment

Procure and supply an aluminum bridge access platform

A Bridge To Paradise

The Problem….

The Problem…

The Problem.....

Access

Floating work platform for column repairs

Access

Hydra Platform for beam repairs under deck

Surface Preparation

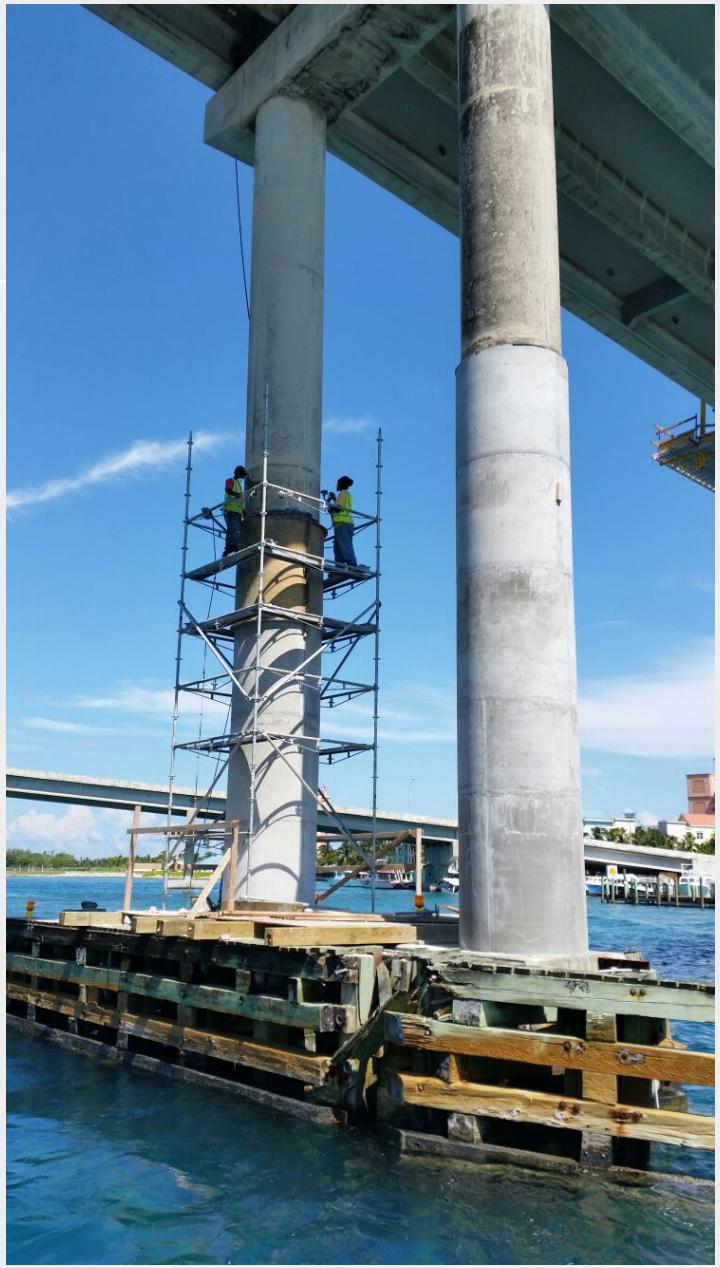
Rebar Corrosion Protection

Column Repair – Isolated Form & Pour Repairs

Using self-consolidating concrete (SCC) with integral corrosion inhibitor and polymer modification.

Column Repair – Column Encapsulation

6” of Self-Consolidating Concrete (SCC) with integral corrosion inhibitor creates increased cover for rebar.



Protect

Polymer-modified cementitious protective coating to reduce salt and water penetration into concrete elements.

Pier Cap Repairs

BEFORE

AFTER

Column Repairs

BEFORE

AFTER

Underside of Deck

BEFORE

AFTER

Abutment Repairs

BEFORE

AFTER

Pile Cap Repairs

BEFORE

AFTER

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