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Asset Management Challenges Blue Water Bridge

MEA Workshop Nov 17, 2023

AM CHALLENGES

Asset Management Challenges for Large Bridges

- Defining Corporate Asset Management
- “If you have seen one bridge”
- Bridge Component Hierarchy Numbering System
- Developing GIS “Standards” for representing Large Bridges

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Corporate vs Tactical Asset Management

In February 2021 – FBCL Created a new Asset Management Division

FBCL already does Asset Maintenance & Engineering well

We understand the specific needs and technical solutions

We deliver safe functional bridges

This is “Tactical” or “Technical” Asset Management

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Corporate vs Tactical Asset Management

Corporate Asset Management Ensures
that the Tactical Service Delivery
Is
Affordable & Sustainable
for the Long Term

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Corporate vs Tactical Asset Management

Corporate Asset Management:

- Improves Asset Life Cycle Analysis
- Develops Data Driven Decision Making
- Creates a 40 Year – “Long Range” Financial Planning approach
- Coordinates and Aligns Asset Works across our 4 International Crossings

Provides Digital Tools – GIS / Work Orders / Analytics

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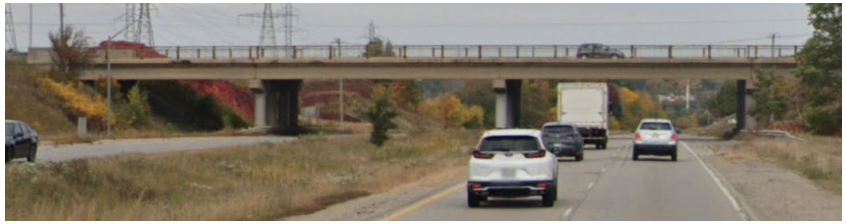
One Bridge Paradigm ?

If you have Seen One Bridge… You have seen them All

ANY CITY or TOWN

Sarnia HWY 402

Ottawa



London

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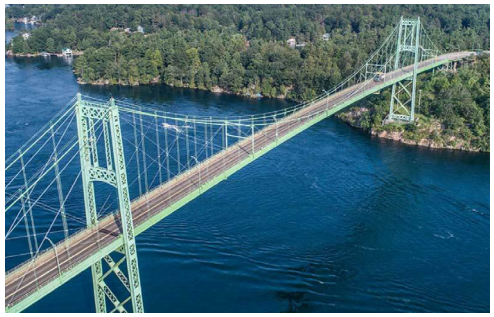
BUT for Large FBCL Bridges it was Believed



If you have seen
ONE BRIDGE
You have seen
ONE BRIDGE

OR Have You….. Maybe Not??

We need to Compare and Analyze Uniquely Different Assets in a Common Way

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Asset Value & Life Cycles

Municipal Bridges

- Most are < $20 Million
- Life Cycles of 75 to 100 Years

Municipal Bridges Considered As Singular Assets

FBCL Large Bridges > $2 Billion

- Main Components > $20 Million
- Major Life Cycles >150 Years
- Minor Life Cycles 50 to 75 Years

Large Bridges Considered As Multiple Component Assets

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Bridge Component Challenges

FBCL's Digital Transformation started with a Full Inventory in GIS

But how do we show Large Bridges in a GIS?

What Components do we need to analyze as "Assets"?

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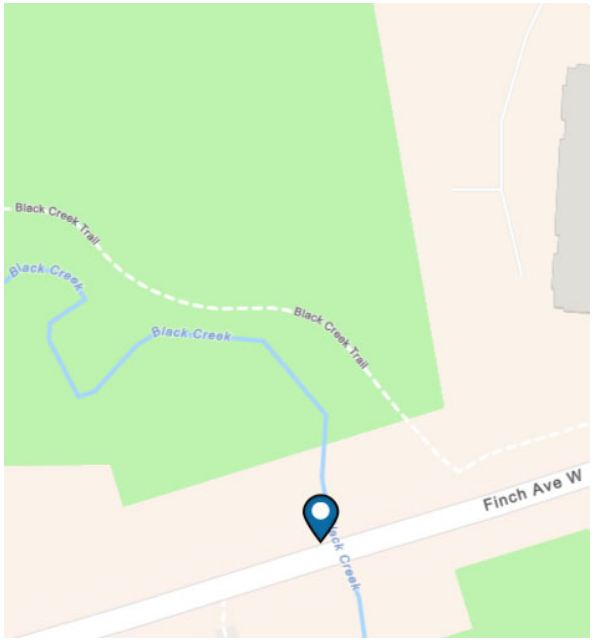
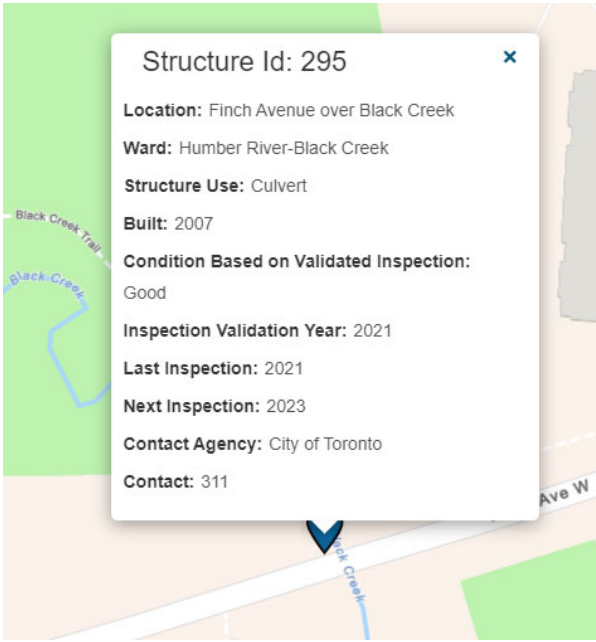
Consider a Municipal GIS

Bridges considered as a Singular Asset and shown as a “Dot” in the GIS

Clicking the “Dot” accesses the Asset Database





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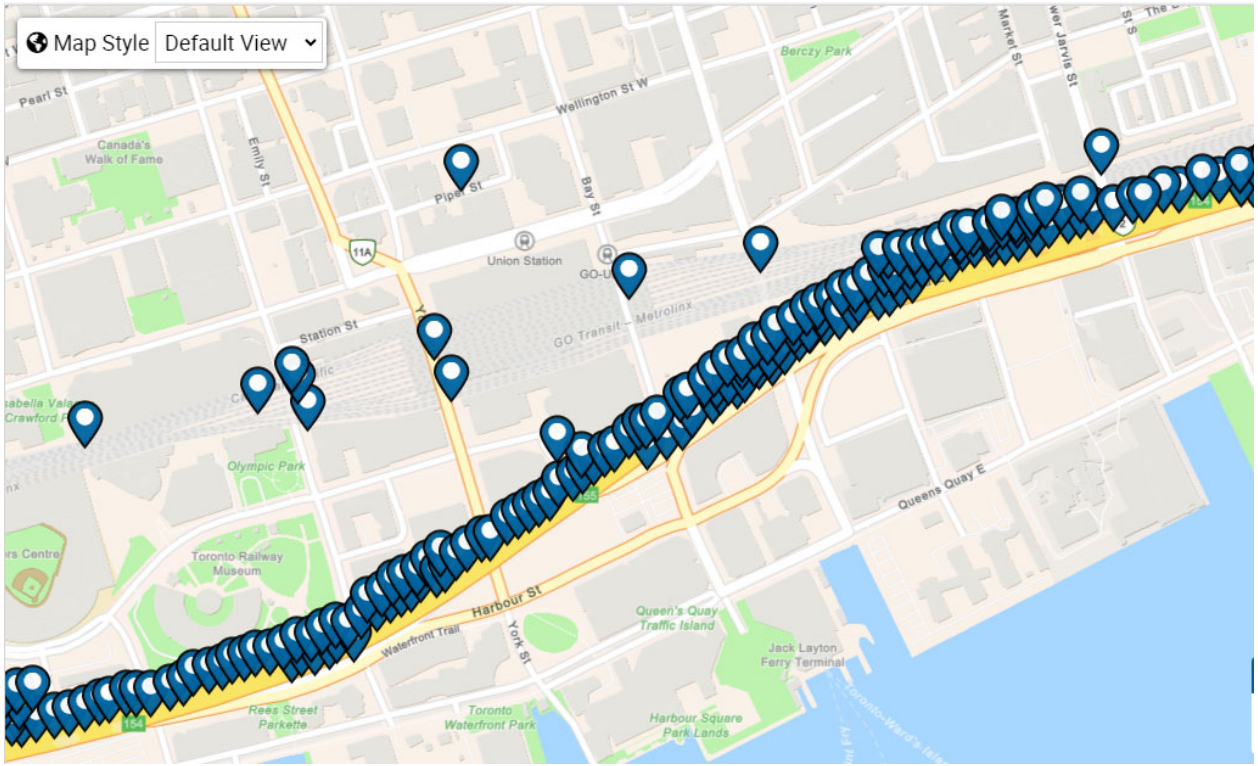
GIS for Large Bridges?

Toronto Gardiner Expressway

Multiple “Bridge” Components

Shown as 350+ Singular “Dots”



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Gardiner Expressway Example

Each Span Component is a “Bridge” within the City Inventory

What about the Piers?

Each “Bridge” is an **Inverted “L”**

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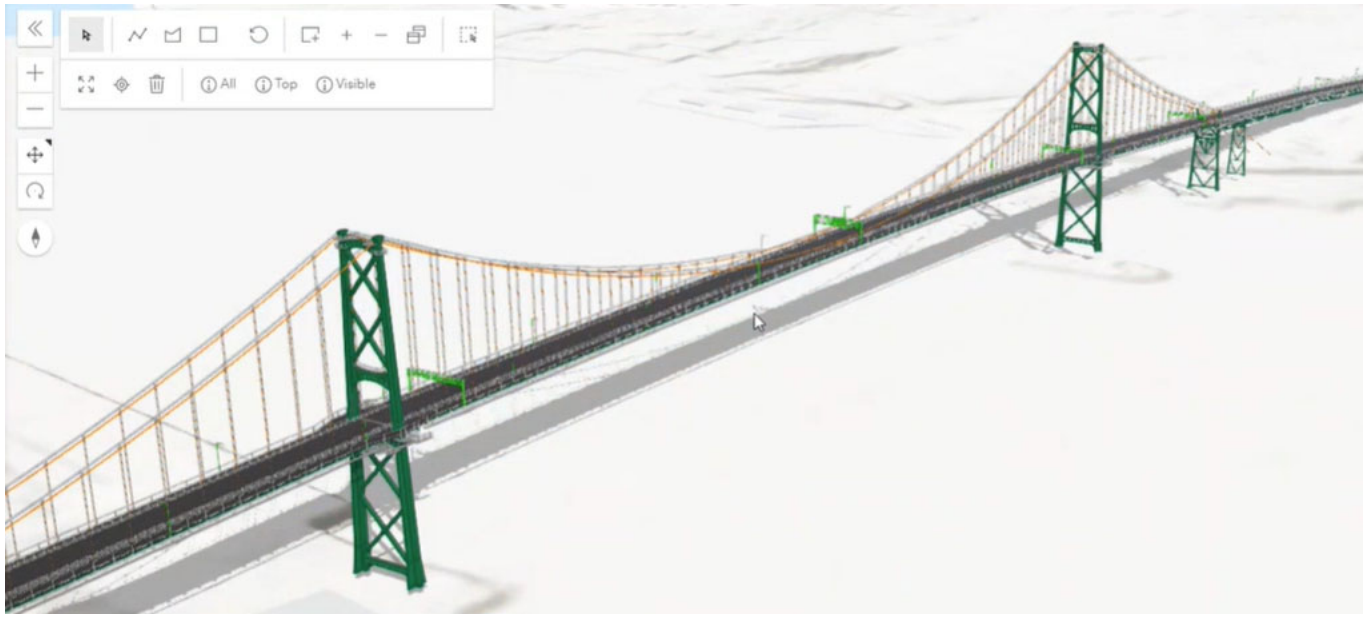
Halifax Harbour Bridges

- First of its Kind
- Digital Scan Model
- Full 3D GIS
- Inventory of Elements
- NOT its Components



Every Beam, Girder, Tie, Bearing, Plate, Cable Included in Model

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Able to Zoom

in to see

Element Level Detail

Able to Slice

through & see

Inside Hidden Elements

and MORE !!

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FBCL Challenge

Find an Affordable 2D GIS Compromise

The Two Blue Water Bridges – Outline in GIS

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Less is More….

For FBCL Bridges, analyzing “Component Assets” was used

A singular “dot” and singular asset analysis was not enough

Full 3D Modeling of every element is desirable but was too much

What Components does the Bridge Industry Commonly Consider?

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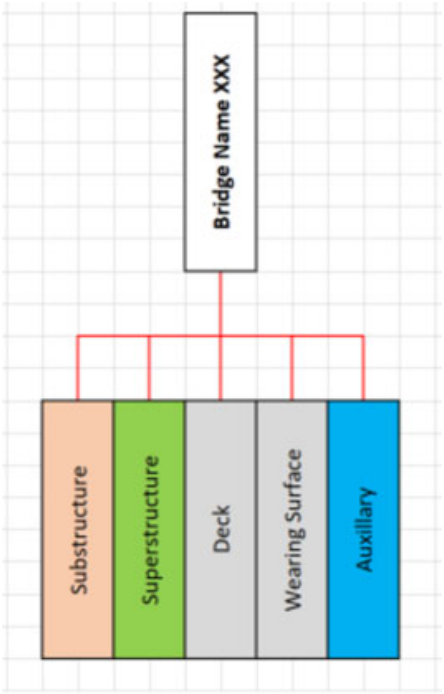
FBCL Initial Policy

- 5 Basic Component Groups
- Did not adequately identify Major & Minor Assets
- Did not adequately address the Useful Lives of Assets
- Did not effectively match the historical inspection records
- Did not reflect the Bi-National Component Definitions



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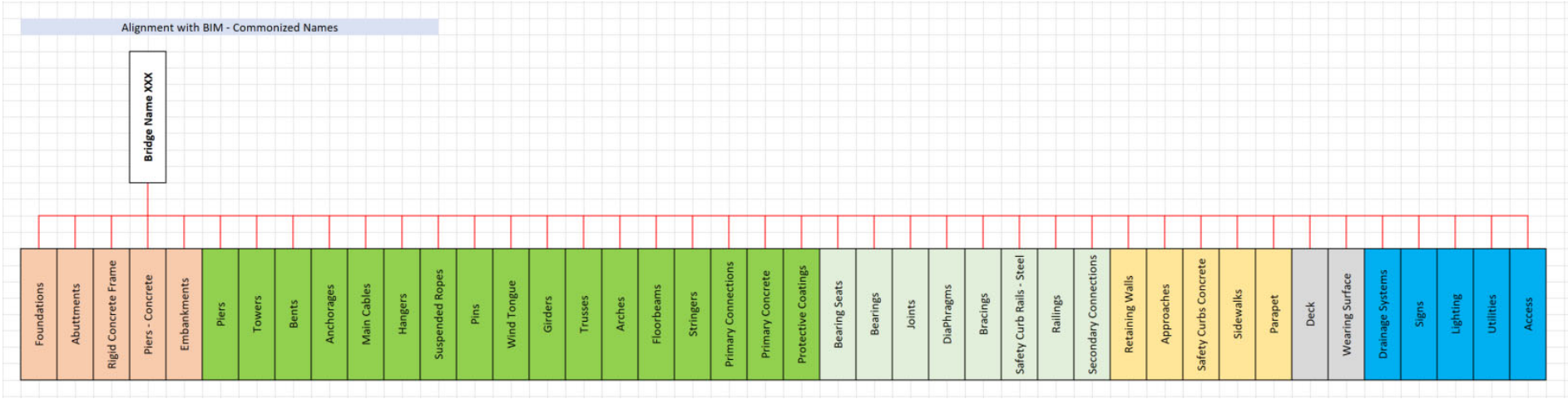
Canadian BIM – 42 commonly used Components (similar to OSIM)



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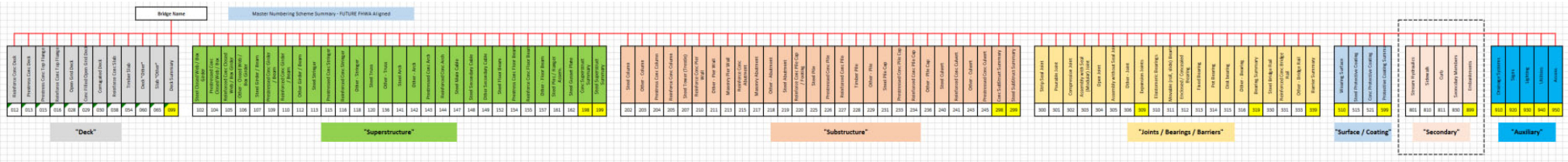
USA Federal Highway Administration (AASHTO) – 87 Commonly used Components



Both National systems were too complex

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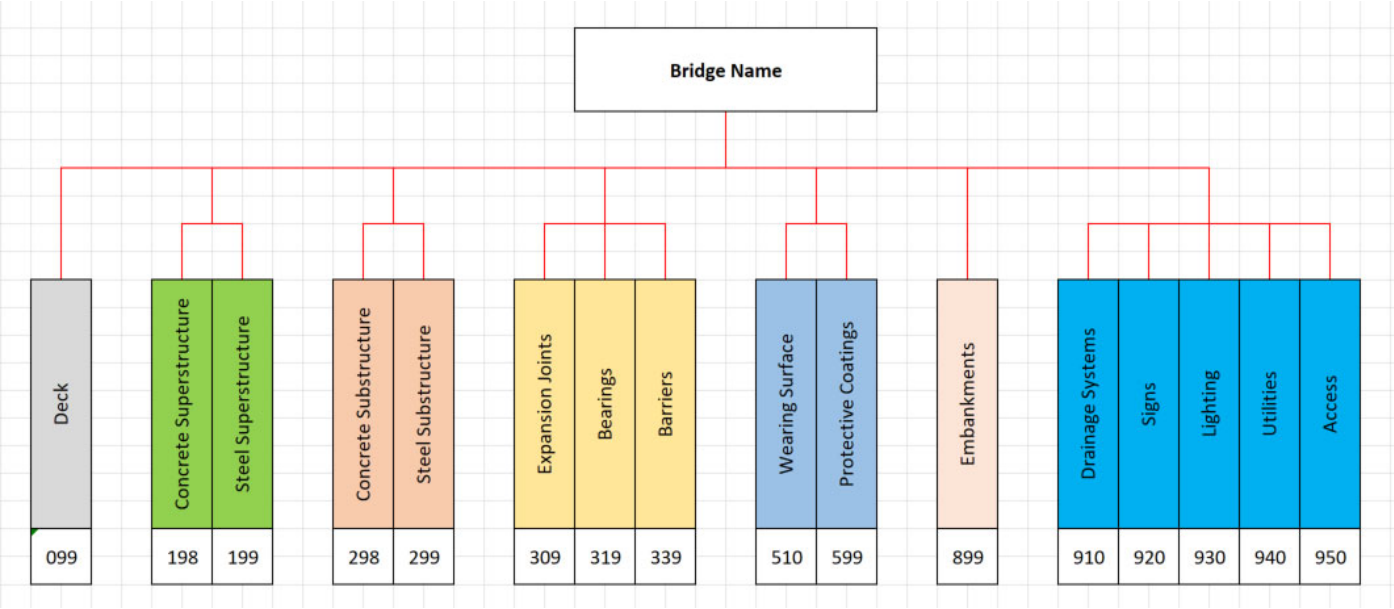
FBCL Recommended – 16 Components



Aligns with Canadian & USA Component “Groups”

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Geo-Database Numbering – Bridges in GIS

Admin – Asset – Component - Element

ABC – DDD – EEE – FFF

Example 116 – 161 – 309 - 121

BWB – First Bridge – Expansion Joint – Joint #121 at Pier #121

The creation of Unique Identifiers was an essential task

BUT

Asset Numbering Hierarchies would be a topic for another day!

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GIS Standards for Bridge Components Do Not Exist

With the Component Assets Defined
and
The Numbering System & Geo-Database Created

GIS Graphics and Symbologies were needed

NEW GIS Graphics were created as a Proposed Standard

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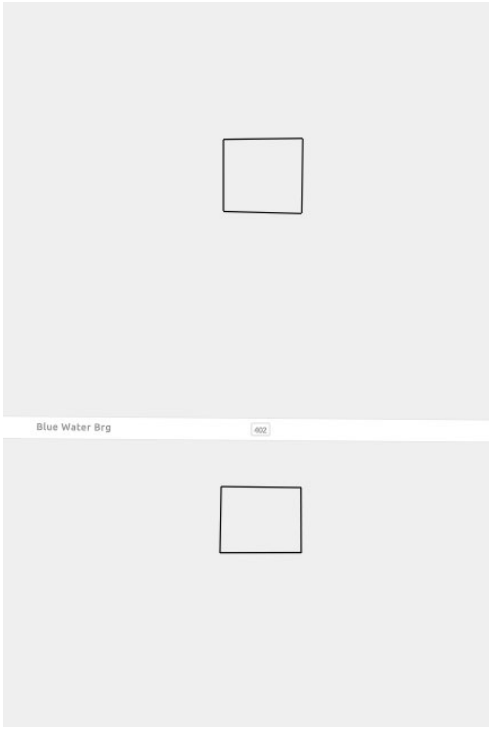
Concrete Substructure – “Foundations”



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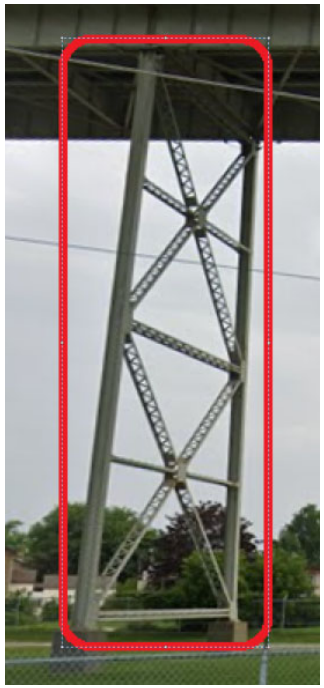
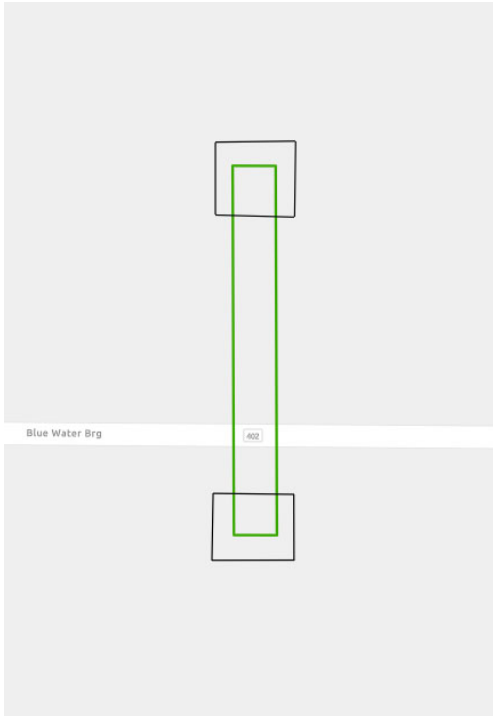
Steel Substructure – “Piers” or “Bents”





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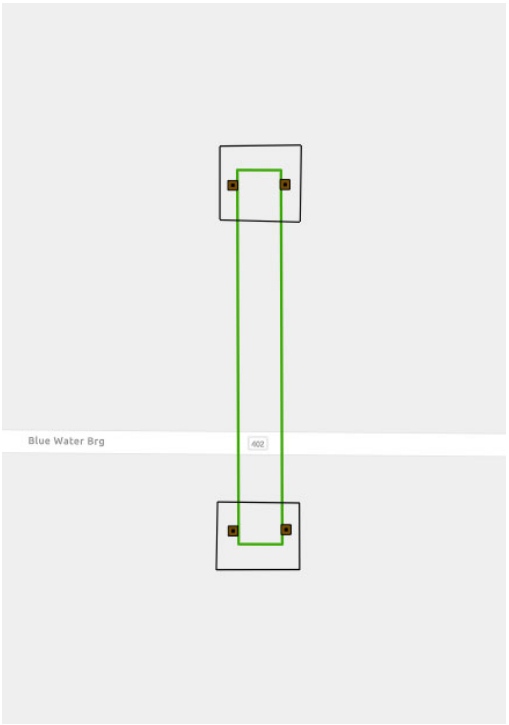
Bearings



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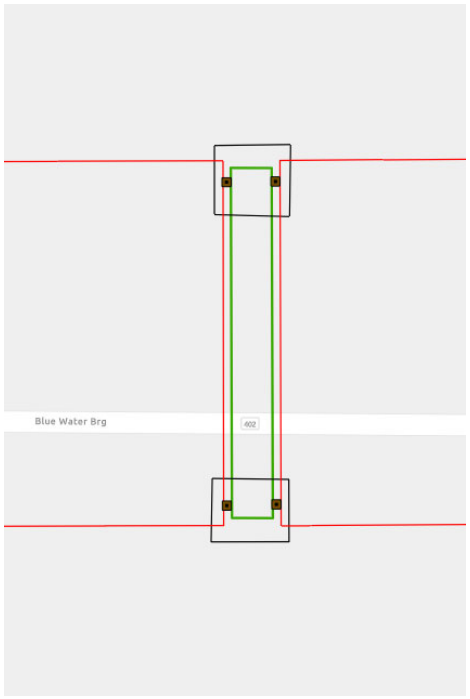
Steel Superstructure – “Spans”



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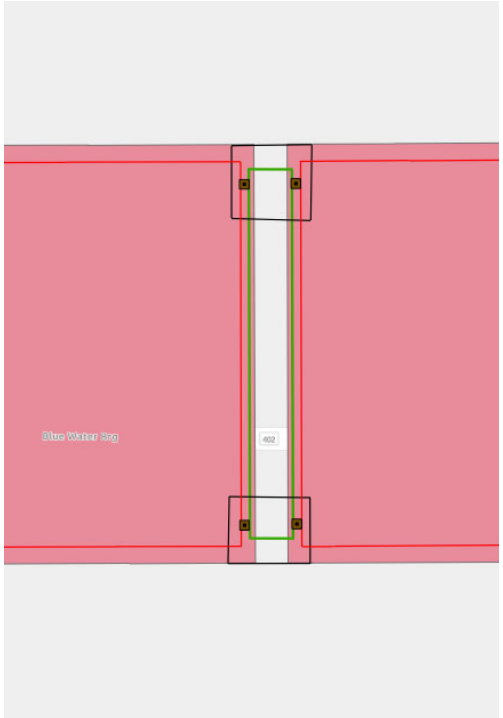
Deck



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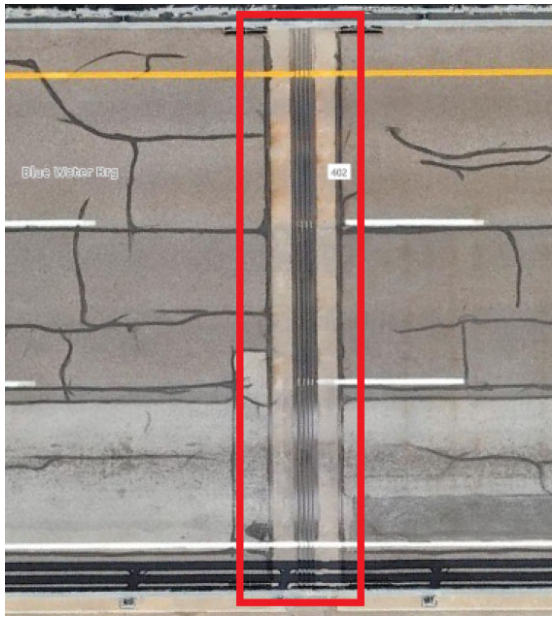
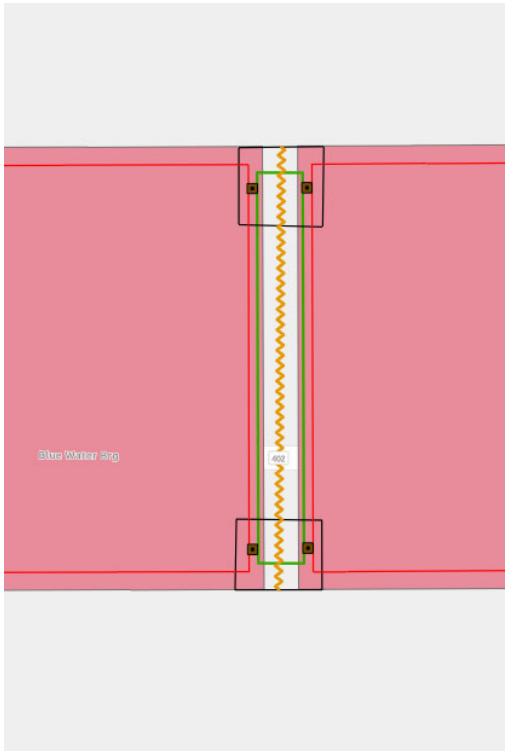
Expansion Joints





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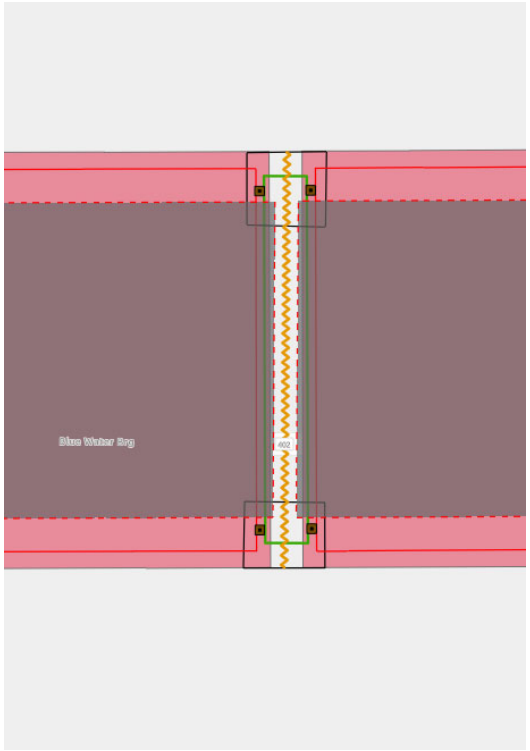
Wearing Surface – Waterproofing & Asphalt



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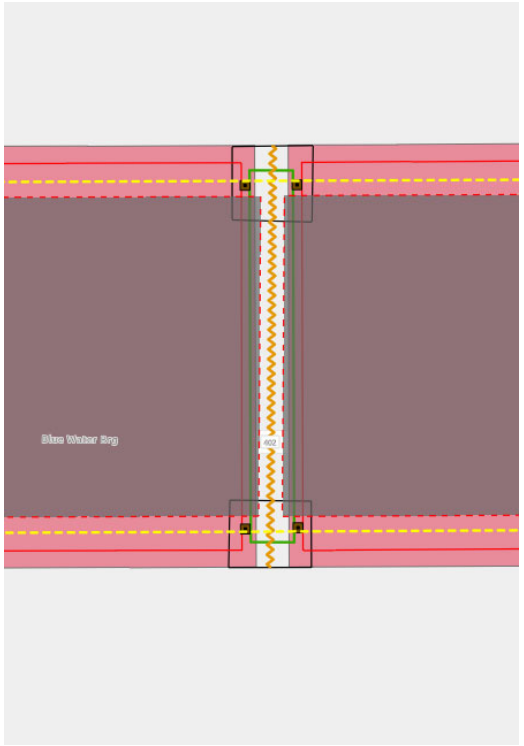
Barriers – Pedestrian & Vehicular



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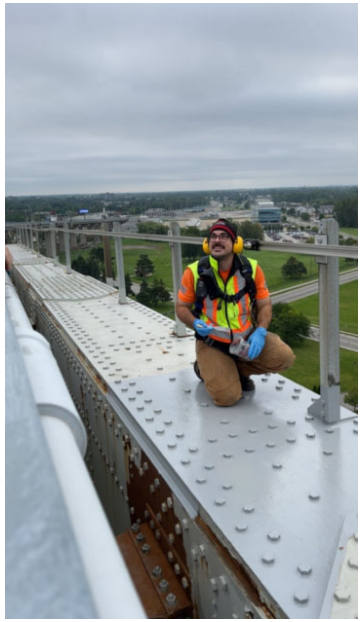
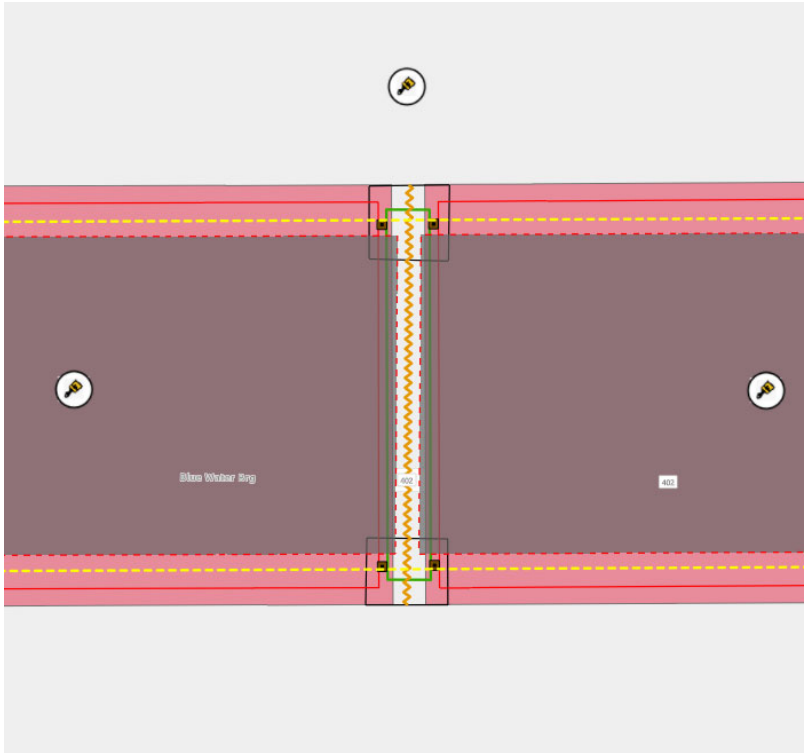
Protective Coatings – Paint or Sealers



Before / After High & Low



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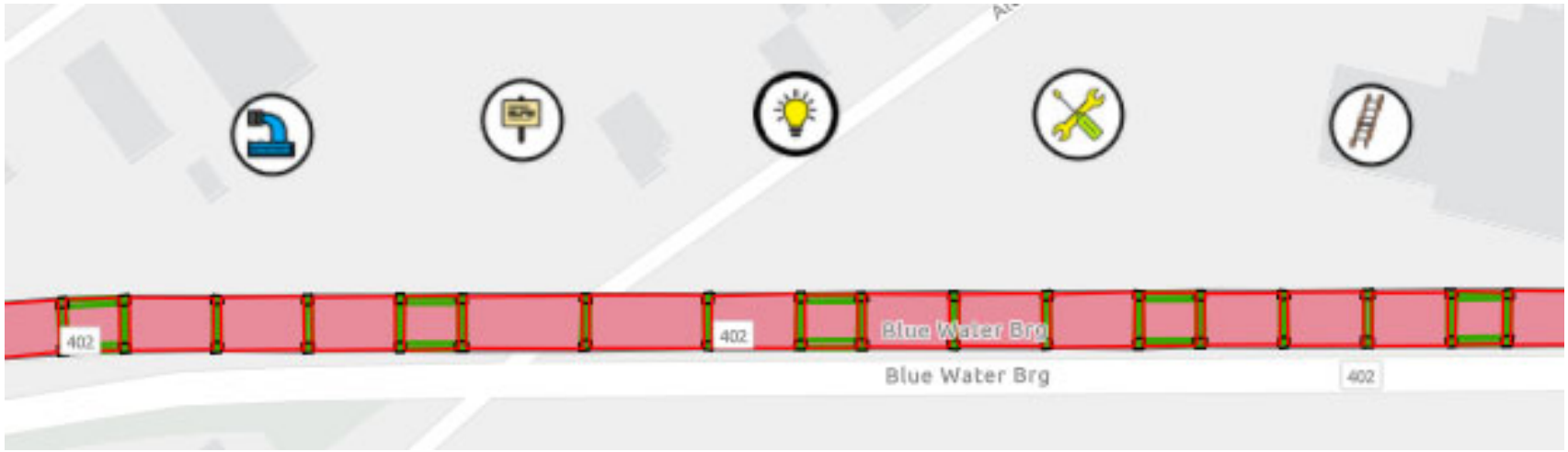
Auxiliary Components – Minor features considered as “systems” on the entire bridge

Drainage Signage Lighting Utilities Access



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Bridge Overview Graphic

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Asset Management for Large Bridges

Given the Component Assets & Numbering Hierarchy

and

Using these NEW GIS graphics

FBCL is now positioned to analyze all of its 10 Bridges

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FBCL is willing to Share the Proposed Standards

Thanks for Listening….

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For More Information

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