Inspection and Maintenance Manual

for

FRP Composite Structures

March 30, 2021

GArch GBeam GDeck

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STATEMENT OF PURPOSE

The purpose of this manual is to assist owners, end users, engineers, and others tasked with conducting Field Inspection (FI) and Preventive Maintenance (PM) of fiber-reinforced polymer (FRP) bridge structural elements engineered and manufactured by AIT Bridges, a division of Advanced Infrastructure Technologies, Inc. This manual, in conjunction with referenced FRP and bridge industry standards, is intended to satisfy the needs of the Bridge Maintenance Engineer or Inspection Engineer for the purposes of long-term evaluation and condition tracking of their FRP bridge assets.

The intended use of this document is to augment existing agency or owner inspection and maintenance procedures of bridges. The frequency for routine inspection and reporting requirements of GArch and GBeam Bridge Systems and components should be consistent with existing agency requirements for bridges.

TERMS, DEFINITIONS, AND ABBREVIATIONS

AASHTO - American Association of State and Highway Transportation Officials

ACMA - American Composites Manufacturers Association

Braid - A structural material used as reinforcement in composite arches.

B-FRP - Basalt FRP

CCT – Certified Composites Technician

CIP - Cast-in-Place

Core - Foam, balsa, or honeycomb core material used for separating structural laminates.

Crosslinking - The chemical reaction and process that forms covalent bonds between polymer chains.

C-FRP - Carbon FRP

FHWA - Federal Highway Administration

FRP - Fiber Reinforced Polymer - A thermoset composite material consisting of a polymer matrix with fiber reinforcing.

GPR - Ground Penetrating Radar - A methodology of NDE that utilizes Ground Penetrating Radar.

G-FRP - Glass FRP

Initiator - An additive to the resin matrix that begins the crosslinking reaction (also referred to as catalysts)

IRT - Infrared Thermography - A methodology of NDE that utilizes infrared thermography.

Laminate - An FRP component composed of layers of reinforcements arranged in a prescribed architecture as determined by engineered mechanical properties to achieve a desired structural capacity.

Matrix - The hardened form of the cross-linked resin and initiator mixture.

MEKP - Methyl Ethyl Keytone Peroxide - An initiator for the resin matrix.

MSE - Mechanically Stabilized Earth

NBIS - National Bridge Inventory Standards

NDE - Non-Destructive Evaluation - A methodology by which material characteristics can be determined using equipment or processes that do not require destruction of the material.

PET - Polyethylene Terephthalate - A type of closed cell foam used as a core material.

Pigment - A liquid additive, approximately 3% by weight, used to color the resin used for part infusion.

Pot Life - The length of time an initiated resin system remains in liquid form at a constant temperature.

Resin - The matrix material that binds all the reinforcements together to create the laminate.

SCC – Self-Consolidating Concrete

Specific Strength - A materials strength divided by its density.

Thixotropic Additive - A material added to the resin matrix to increase its viscosity and prevent it from thinning over time. This is particularly important in wet layup fabrication when resin is applied to a vertical surface.

UT - Ultrasonic Testing - A methodology of NDE that utilizes ultrasonics.

UV - Ultraviolet Light – The spectrum of light that may cause long term damage to FRP components.

Veil - A fiber surface layer integral with the laminate structure used for protection against UV exposure, abrasion, and/or for aesthetic appearance.

INTRODUCTION TO COMPOSITES

Composites, in their most basic form, are created by joining two or more different materials to form a new material with unique properties. The resulting material typically exhibits some of the desired properties from each of the individual materials. Reinforced concrete is an example of this general definition of a composite material because it combines the ductility of reinforcing steel with the high compressive resistance of concrete. A more acute definition of composites, as it relates to infrastructure or structural components, is fiber reinforced polymer (FRP) matrix materials engineered for the specific load applied. These composite materials are well known for being equally as strong as steel while remaining much lighter. In the world of FRP composites, there are two types of materials that come together to form a finished product: the reinforcement and the matrix. The reinforcement provides the load carrying capability, while the matrix provides the means to distribute the loads to the reinforcements. The fibers provide the strength and stiffness, while the matrix acts as a binding material to allow these fibers to work in unison. The matrix material, reinforcements, and manufacturing method can all contribute to the surface quality of the finished product. Reinforcements can vary widely but typically fall into one of four categories: glass, aramid, basalt, and carbon fiber. The most common reinforcements used in infrastructure applications are glass and carbon fiber, but basalt fiber is likely to increase over time. Aramid fibers tend to be avoided due to their high degradation response to UV light. Common matrix materials are polymer type resin systems such as polyesters, polyurethanes, epoxies, or a hybrid system like epoxy-vinyl-esters.

Composites are broadly classified as Consumer, Industrial, and Advanced and have grown to encompass markets including Petroleum and Chemical Industries, Aerospace, Military, Performance Automotive, and recently Infrastructure.

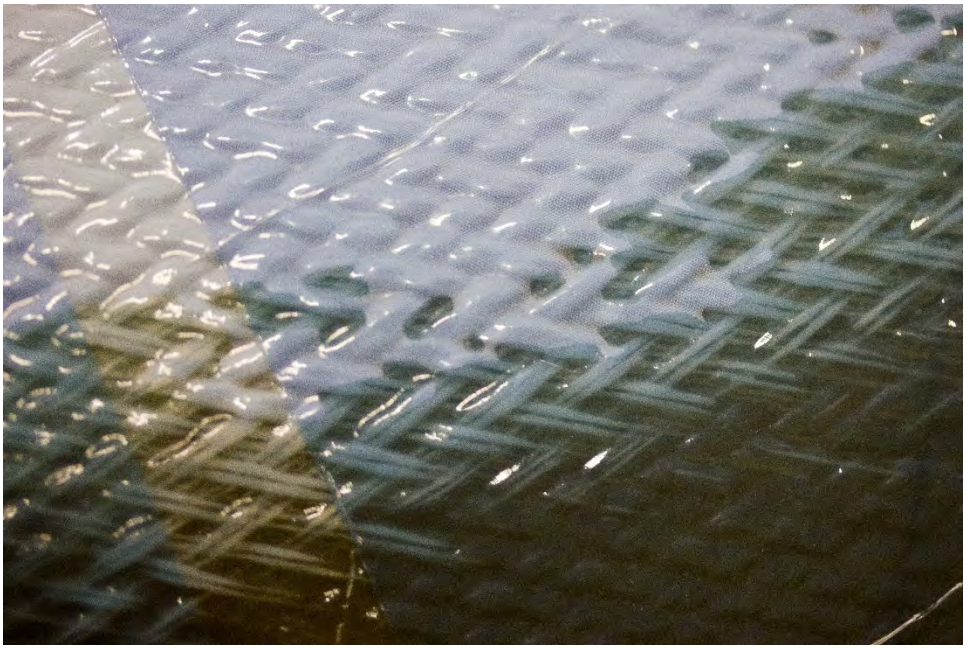


Figure 1: GArch Infusion Flow Front during Infusion

Consumer composites were first introduced into the industry in the 1950's. Some of these products, such as boats, swimming pools, bath ware, sporting goods equipment, and automotive equipment, have played a large role in the consumer acceptance of composites. The durable, lightweight, and repeatable nature of these parts led many to look at other industries that could benefit from these characteristics.

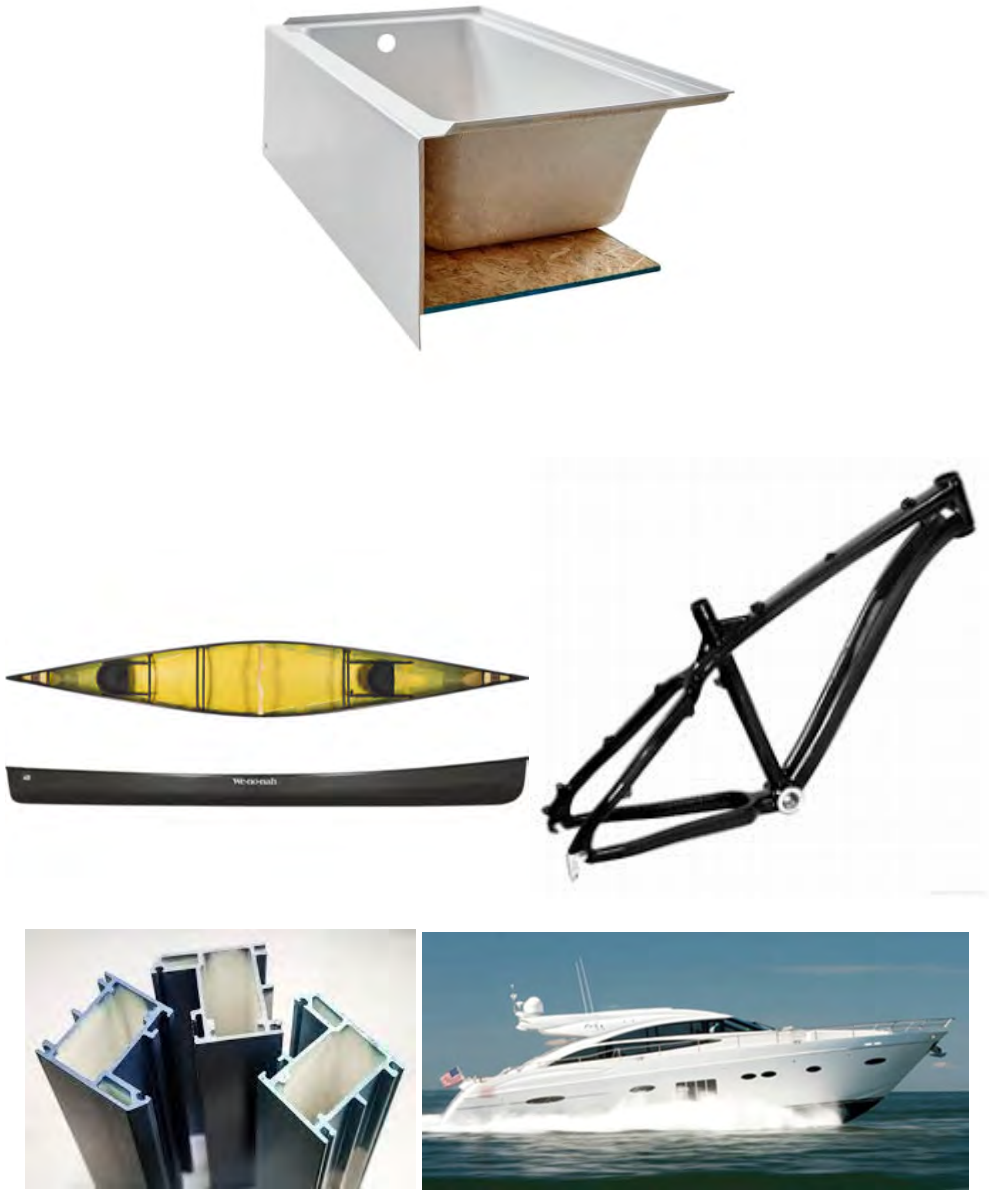


Figure 2: Examples of Consumer Composites

Industrial Composites include applications that require chemical and corrosion resistance and performance in adverse environments. These include chemical process piping, underground fuel storage tanks, pressure vessels, and hundreds of other products where durability and specific strength

are primary characteristics. Typically, these products are exposed to highly acid or highly basic materials as well as high temperatures and pressure. These applications also need materials that exhibit excellent corrosion resistance, high strength-to-weight ratio, high stiffness-to-weight ratio, as well as providing an extended service life.

Figure 3: Examples of Industrial Composites

Advanced Composites are manufactured using the highest performance fiber reinforcement materials and resin systems, where the specific strength has been optimized all the while reducing weight and increasing aesthetic characteristics. Low maintenance is another key component for many of these highly technical and demanding products.

Figure 4: Examples of Advanced Composites

Composites for Infrastructure include GFRP, BFRP, and CFRP reinforcement bars, externally bonded reinforcement systems such as column wraps or CFRP strips, as well as AIT Bridges GArch and GBeam

Structural Composite Bridge Systems. The focus of this manual will be to provide guidance on the products and systems that AIT Bridges and AIT Manufacturing design and supply. The products discussed later in detail include GArch, GBeam, GBar, GDeck, GBolt, and GWall.

These applications demand low maintenance, high durability, high specific strength, and stiffness as well as corrosion resistance. Lightweight, sustainability, and resilience are bonus characteristics that these materials provide to the infrastructure market. Below are some examples of the applications mentioned.

Figure 5: GBeam System Hampden, ME

Figure 6: GArch System Duvall, WA

What differentiates composites from other structural materials? Metals are isotropic materials having identical properties in all directions where composites are anisotropic materials, meaning properties are directionally dependent. Composites are specifically engineered to provide strength and stiffness

properties in the directions needed. This is a key component which allows a designer to optimize a structural member to perform in a way that utilizes capacity where demand requires it and reduces it where it is not needed. FRP composites consist of reinforcements in different orientations to optimize the response of the structure. The most commonly used fabric is unidirectional, meaning fibers in one direction, and the next most commonly used fabric is biaxial, meaning fibers in two different directions like 0°/90° or +/- 45°. If a component is in primarily tension or compression it will most likely be predominantly unidirectional fabric. If a component is primarily in shear, it would usually be reinforced with +/- 45° biaxial fabric. If a component is subjected to a mixture of stresses, the laminate typically has a mixture of unidirectional and biaxial reinforcements.

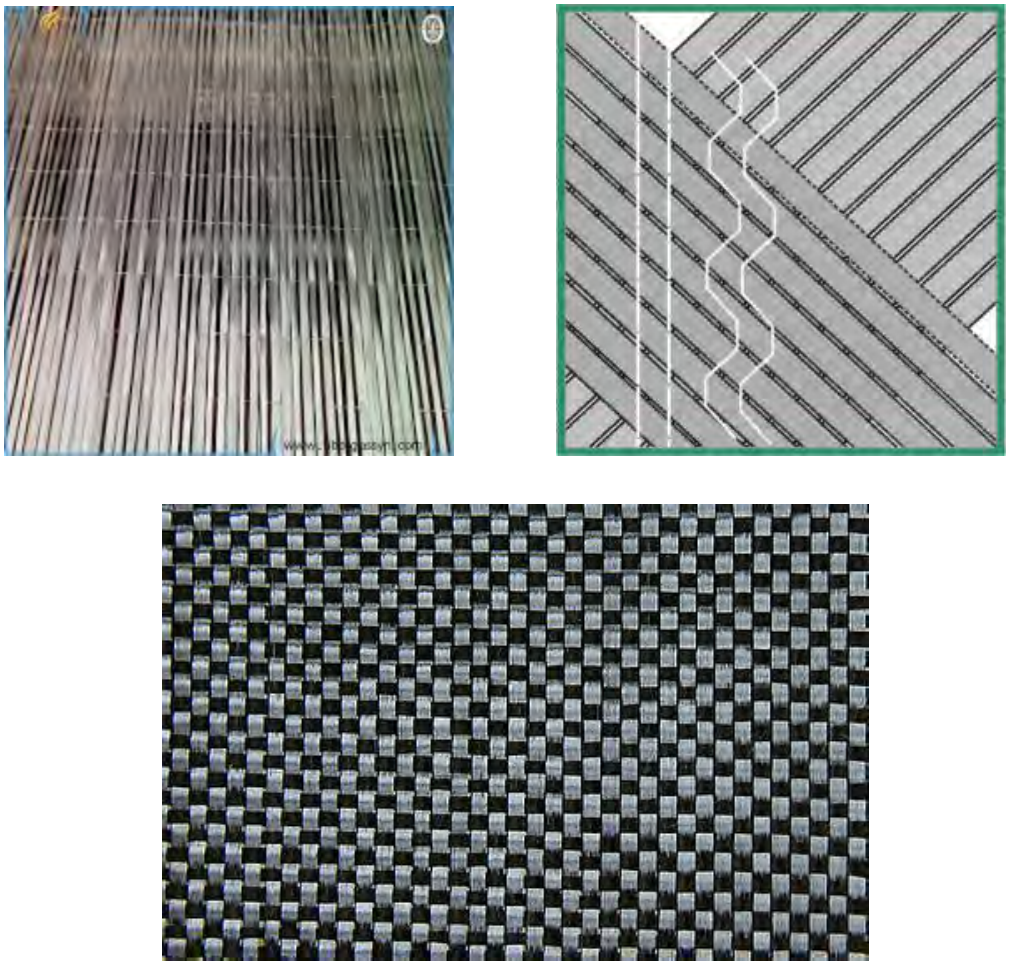


Figure 7: Example Composite Reinforcement Orientations

Fiber reinforcements are joined together using resin systems. Resin, also known as the matrix, is the binder that ties all the fibers together through the laminate stack. This matrix provides many characteristics, some of which may vary by formulation. These characteristics are strength and toughness, chemical, heat, UV, and abrasion resistance. Different resin systems provide varying results when it comes to these properties.

Another factor in determining a resin system is the process in which it is being applied to the laminate (e.g. wet layup, vacuum infusion, resin transfer, prepreg, etc.). These processes will require certain resin

properties that will allow it to be applied correctly. For example, a wet layup will require a resin system with thixotropic properties, allowing it to be worked into and saturating the fibers and not run back out during the curing process. For vacuum infusion, the resin needs to have a low enough viscosity and long enough pot life to allow the fibers to absorb it fully before setting up and not leaving any fibers dry or with voids in the laminate.

The resins used in these applications are classified as thermoset resins. Thermoset resins are resin systems that utilize an initiator, sometimes called a catalyst, to initiate a chemical reaction called crosslinking. This process is irreversible unlike thermoplastic resins where heat is applied, and the material is molded or formed into shape and cooled. When reheated thermoplastics can be remolded and reused, but do not offer the durability and heat resistance that thermoset resins offer.

INSPECTION

1. What to Inspect

The first and easiest inspection method is a thorough and systematic visual inspection of the entirety of each component. This will identify areas for further investigation. General photographs of the structure should be taken to document the condition as well as photographs of any observed concern.

If areas of concern are identified a physical examination can be undertaken. This can include feeling the suspected area by hand or with a probe and/or tapping to determine potential damaged area from distinct variations in sound.

In cases where structural damage is suspected, but unable to be detected or definitively determined by visual or physical methods, NDE methods should be employed. See list of NDE methodologies below in the section titled Inspection Methods.

2. Structural Components

a) Substructure

i. Types of Substructure

Cast in Place Reinforced Concrete Foundation

Precast Concrete Segmental Foundations

Deep Foundations (H-pile, Precast pile, micropile supported)

The substructure condition should be inspected, rated, and coded in accordance with standard practice given NBIS; FHWA Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges.

Figure 8 Precast Concrete Foundation for GArch System

Figure 9 Precast Driven Pile Deep Foundation System for GArch

Figure 10 Cast-in-Place Concrete Foundation for GArch System

b) Substructure to Superstructure Connections

The GArch system is embedded a minimum of 12 inches along the spine of the arch. The GDeck panel is typically embedded at least one inch along the spine of the arch into the substructure. This creates a fixed-fixed bearing condition where bending moment is translated into the foundation system. Special attention should be given to the area surrounding the arch and decking during inspection.

The GBeam system is usually placed on laminated elastomeric bearing pads or plain elastomeric bearing pads. Typically, there is a reinforced concrete end diaphragm that runs transverse to the bridge's longitudinal axis that encases the ends of the girder.

c) Headwalls

i. Types of Headwalls

Composite Panel or Sheet Pile Though Tied or MSE Supported

Precast Modular Gravity

Precast MSE Panel or Block

Cast-in-Place Reinforced Concrete

Precast Cantilevered

Precast Through-Tied

Figure 11: Precast Through-Tied Headwall

Figure 12: Precast MSE Panel Headwall

Figure 13: Precast Modular Gravity Headwall

Figure 14: Precast Cantilevered Headwall

Figure 15: Precast MSE Block Headwall

Figure 16: Cast-in-Place Headwall

Headwall elements that utilize reinforced concrete (either precast or cast-in-place elements) should be inspected with methods appropriate for concrete. The headwalls systems that utilize FRP should be inspected in a manner similar to the methods described below for the GArch and GBeam.

Headwalls should be inspected for creep and excessive deflections. Comments should be recorded about any visually noticeable deviations: bulges, deformations, creep, or settlement.

Location and measurements should be recorded if possible. Plumbness can be measured with a digital level and bulges can be measured as deviation from a straight stringline.

For headwalls with exposed connections such as bolt heads or bearing plates, these elements should be inspected for snugness and possible deterioration.

The area where the headwall connects to the structure at the base should be examined. Observations regarding the condition of the connection should be recorded and photographed.

The inspection and repair methods for the pultruded composite headwall are the same as for the GArch and GBeam as described below.

Since the headwalls are more susceptible to UV exposure than the superstructure elements, FRP components of the headwall should be inspected more closely for fiber bloom. Fiber blooming occurs over time when the matrix material deteriorates, and the surface fibers are exposed through the face of the laminate creating an optically or tactically inconsistent surface texture. This is typically not a structural concern and can be quickly treated with the re-application of a surface coat of resin or paint. Another way this is addressed, is by using surface veils when making the laminate. These surface veils protect the structural layers below by providing a sacrificial coating similar to a galvanized or metalized coating on steel protects the material below. It is not uncommon for FRP components to experience color fading over time as well due to exposure to UV light. This is not a structural concern and should be distinguished from fiber blooming.

d) Superstructure

i. GArch System

SCC Concrete Filled FRP Arch Tubes
Inspection points for the SCC Concrete Filled FRP Tubes include the surface applied paint system and remaining mil thickness, surface bulging or blistering, cracking, or delamination of arch laminate surface. The surface of the tube may also be tested auditorily using a tap hammer to ensure no delamination within the composite or at the interface of the SCC concrete and FRP tube.

Corrugated FRP Decking
Inspection points include delamination or separation at decking joints between arches. Each bay between arches should be thoroughly inspected. Depending on the decking product chosen for the design different surface finishes are possible. Some bridges will have been constructed with a concrete overlay on the soil side of the deck and the FRP decking is not structural in these applications. The most common type of damage to look for on the FRP Decking is abrasions, scratches, or cracking. Check for exposed fibers or delamination.

The decking is a pultruded composite product and will have a more consistent surface appearance than the arches. It should be smooth and free of the types of damage listed for arches.

The repair methods for the pultruded composite decking are the same as for the arches as described below.

Shear Studs (Skewed structures over 15 degrees typically)
Inspection points include exposure of stud length between deck at arch surface. The purpose of these studs is to ensure that the FRP Decking is working in composite action with the FRP Arches. It is not uncommon for the deck and arch to shift slightly during the backfilling sequence of the structure. This may cause some of the shear studs to slightly separate from the arch. If the shear studs continue to separate from the arch surface after the backfill sequence is complete, then composite action and diaphragm action of the deck may be limited. Document with photos and measurements to see if the separation has changed over time.

Precast Concrete Fascia
Precast Concrete fascia are nonstructural elements intended to aesthetically cover the interaction of the arch, decking, and headwall connection, but they also add a level of lateral protection to the upstream arches from debris flowing down stream.

Inspection of these units should be consistent with inspection of precast concrete and attention to the connection points into the arch should be considered, as well as end bearing on foundation and arch apex bearing at top center of the structure.

Some concrete fascia is cast in place and have differing types of concrete to arch interface and connection (e.g. doweled in rebar into arch prior to casting, epoxy anchored after casting, etc.). The contract drawings should be consulted for clarification of system installed and methods of attachment.

ii. GBeam System

GBeams
Inspection points for the GBeams include the visual inspection of the surface for bulging, blistering, cracking, or delamination of the laminate. The surface of the beam may also be tested auditorily using a tap hammer to ensure no delamination within the composite. GBeams are manufactured with a surfacing veil on the exterior of the laminate. It is important to distinguish any damage or degradation observed in this material as it is not a structural layer.

Concrete Decks (CIP, Precast Concrete Full Depth, Precast Concrete Partial Depth)
The deck condition should be inspected, rated, and coded in accordance with standard practice given NBIS; FHWA Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. The Partial Depth Precast Concrete Deck is considered a stay-in-place form for the CIP portion above. Its condition and

rating may not impact the structural integrity of the CIP deck provided that the shear connection extends sufficiently into the CIP portion of the deck.

Shear Connections
The shear connection is the interface between the GBeam and the deck. This connection may be composed of steel or FRP bolts with or without an intentionally roughened top flange surface of the GBeam. The contract drawings should be consulted to determine which shear connection was utilized.

In projects where the surface of the top flange of the GBeam was smooth, it is assumed that the steel bolt is in shear and is bearing against the top flange. The area around the bolt should be inspected for bulging, blistering, cracking, or delamination of the laminate. Note any signs of corrosion of the steel bolt. Maintenance may include cleaning and applying a galvanized repair coating to the exposed surface of the bolt.

In projects where the surface of the top flange of the GBeam was intentionally roughened, it is assumed that the bolt is in tension and the shear force is carried by the ridges of the top flange and corresponding ridges within the concrete deck. In this instance the FRP bolts should be inspected for any sings of bulging, blistering, cracking, or delamination. If a steel bolt was used, note any signs of corrosion. Maintenance may include cleaning and applying a galvanized repair coating to the exposed surface of the bolt.

In some projects there may also be utility connections either by plates bolted to the web of the GBeam or an extension of the shear connection. The area around these connection points should be inspected for bulging, blistering, cracking, or delamination of the laminate.

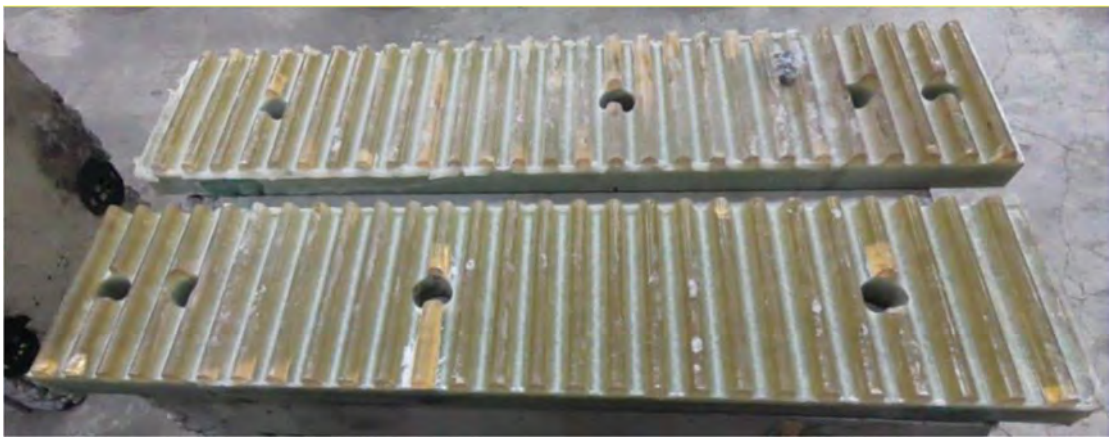


Figure 17: Example GBeam Top Flange with Sinusoidal Roughening

Figure 18: Corresponding Concrete Roughened Surface

CLASSIFYING OBSERVATIONS

The following categories of damage or deterioration are expounded upon to give further instruction to bridge inspectors to help classify their field observations. All of the following categories are considered potential maintenance items and are repairable. A qualified composites technician should be involved in all repair work. ACMA Certified Composites Technicians (CCT) have the necessary expertise to repair any of the following categories. Damage beyond the extent of the following categories shall be considered serious and shall be assessed by a licensed Professional Engineer experienced in composites engineering. In most cases, even severe damage can be repaired following composites industry guidelines.

1. Surface Discoloration / Fading

Discoloration and fading are not structural issues on their own. but they can be indicators that there is potential damage. Some early GArch bridges utilized a sacrificial veil layer known as bleeder cloth which provides a resin-rich surface that protects the reinforcing fibers below. A number of projects have also utilized a UV-resistant paint or resin pigment; however, UV exposure may still cause color fading. Discoloration can indicate abrasion damage, which if significant could be cause for maintenance or repair.

Figure 19: Example of Fading and Discoloration after UV Exposure

2. FRP Fiber Exposure and Abrasion

Typically, abrasion or fiber exposure is a result of improper handling or storage of materials prior to installation. Abrasion damage can be the result of exposure to water or other non-aggressive, but persistent physical contact. Abrasion that affects only the protective resin coat with no exposure of fibers is non-structural and can be repaired by recoating with a UV-resistant resin coat. If the source of abrasion is identified and cannot be avoided the composite should be coated with a resin with abrasion resistant fillers. A reinforcement or additional veil layer may be added for additional protection. If exposed fibers are left untreated, they can form into cracks or delamination over time with exposure to freeze-thaw cycles or moisture absorption. A simple repair of recoating the fibers with resin should alleviate future concerns.

Figure 20: Examples of Fiber Exposure or Abrasion

3. Delamination

These can be small single layer external blemishes caused by high impact small projectiles or hand tools or larger area encompassing deeper multi-layer separations caused by higher momentum carry loads (e.g. over height loads carried by over the road trucking and freight carriers). Classifying these types of material defects can be done by visual inspection augmented with auditory tap testing. Delamination can be a result of an internal void space continuing to expand and may be difficult to see as it may not always migrate to the surface. Auditory tap testing can quickly determine if a void or delamination is present beneath the surface, but the extent of depth may require the use of ultrasonic technology, infrared thermography, or ground penetrating radar. Signal penetrating equipment and technologies such as these typically require special training that is material specific.

Figure 21: Example of Delamination around a Drilled Hole

4. Subsurface Scratches

Scratches can occur from multiple sources such as high velocity water flow carrying floating or suspended debris such as tree branches or ice, improper material handling or storage, improper construction sequence leading to overstress, or non-natural causes like vandalism. Subsurface scratch damage differs from abrasion and fiber exposure in that the fibers are typically damaged.

Any damage to the fibers represents structural damage. Since composites are a mixture of many fibers and a matrix binder, oftentimes minor scratches are simply repaired by recoating with resin. Any damage larger than one square inch in size should be inspected closely to determine the extent of damage. Damage affecting a significant amount of the fibers should be repaired with additional fiber reinforcement using industry standards with materials equal to or better than the fibers that have been damaged. The repair method will depend on the severity and extent of damage to the fibers, but all work performed should be done by a Certified Composites Technician.

Figure 22: Examples of Subsurface Scratching

5. Laminate Penetration and Gouges

Large laminate penetrations and gouges that extend through the thickness of the laminate represent severe damage and should be repaired immediately by a Certified Composite Technician. Any penetration through the entire laminate larger than 1" in square should be

repaired with additional fiber reinforcement. Certain penetrations have been designed into the laminate such as holes for utility connections, vent or drainage holes, or holes for shear bolts. These laminate penetrations are not structurally damaging as they we planned during the design, but they should be inspected visually to ensure no bulging, delamination, scratching, or fiber exposure.

In the GArch system, if the damage resulted in the loss of concrete the void space must be filled with resin or grout.

GBeam laminates are similar in material to GArch laminates, but typically much thicker. For example, an arch may contain as few as two layers and have a laminate thickness around 0.10" and as many as five layers with a total laminate thickness around 0.25". GBeams vary in thickness from bottom flange to web to top flange and are topped over with but not filled with concrete. The laminate thickness of the GBeam can be as little as 0.50" thick to over 2" thick solid FRP. The laminates for the GBeam typically consist of a combination of C-FRP and G-FRP layering. The webs consist of a layer of PET Foam Core and G-FRP biaxial face sheets anywhere from 0.25" thick to 0.50" thick, meaning that the total web thickness can be anywhere from 1.00" to 2.50" thick.

Figure 23: Example of Laminate Penetration

Figure 24: Example of Laminate Gouging

6. Cracking

Cracking may occur from impacts from vehicles, in-stream debris, or improper storage and handling. Cracking differs from delamination and subsurface scratching in that it is typically through-thickness and over a larger area. Cracking also differs from gouges or penetrations in that the cracking is usually dispersed to a greater area and not concentrated like a gouge or penetration.

It is also possible that cracking may appear in areas with high resin content, or resin rich areas, where fiber volume fraction is low, and area may be locally brittle. The bottom radius of the GBeam where the webs transition into the bottom flange is a commonly resin rich area. Cracks in areas that have low fiber volume fraction are not as concerning as those in high fiber volume fraction. In all cases, cracks should be repaired with additional fiber reinforcement using industry standards with materials equal to or better than the fibers that have been damaged. This work should be performed by a CCT.

7. Bulging or Blistering

Blistering or bulging is common in FRP members that utilize a gelcoat or painted surface finish. Blistering occurs when moisture gets trapped between the laminate and the surface coating. These blisters are not likely to cause structural concerns but are potential sources for future issues is the bridge member is located in an environment that experiences freeze-thaw cycles. Blisters should be removed and sanded flush with the surrounding area and recoated with a surface coat of resin or paint.

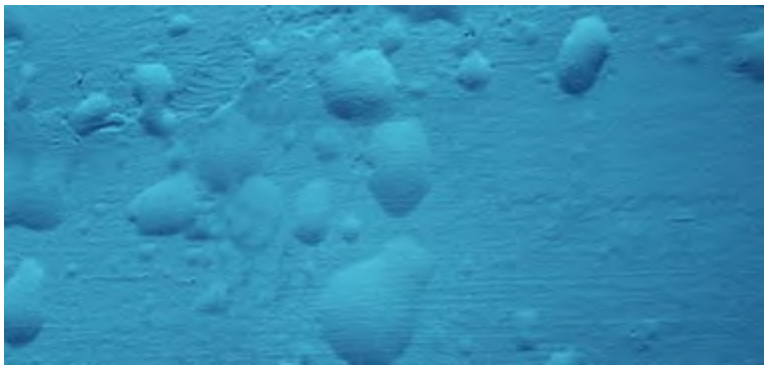


Figure 25: Example of Blistering or Bulging

INSPECTION METHODS

1. Visual Inspection

Visual Inspection is the primary means of evaluating FRP members for damage or deficiencies. Visual inspection can be performed with a drone or high-resolution camera in areas that are difficult to access. It may be helpful to have a flashlight, tape measure, feeler gage set, and magnifying glass to aid in visual inspection. Any areas of potential damage should be marked, classified, documented, and evaluated to see if repair is necessary.

2. Non-Destructive Evaluation

a) **Tap Test**
This test consists of tapping the FRP with a large coin or small tap hammer and listening for a difference in sound. Clear, sharp ringing sound indicates a laminate that is sound and free of defect. If the sound is dull or hollow, that usually indicates either a delamination or void under the surface. It is important to review the contract plans prior to auditory tap testing to distinguish between potential voids and areas of the laminate that contain foam core. It is possible to mistake the foam core material as a void within the laminate. The feel of the impact can also indicate whether the material below is free of defect. If the material rebounds the impact well; it indicates that the material is free of void or delamination. If the rebound is lessened or deadened, it usually indicates that the material below is not sound or free of defects. Further NDE can then be focused on these areas.

b) **Ground Penetrating Radar**
Ground Penetrating Radar utilizes high frequency radio waves and can be used for determining subsurface characteristics of FRP or FRP to concrete interface to check for disbands or voids between materials. Typically, GPR is calibrated to the material because each material exhibits a different response to the electromagnetic waves due to differing permittivity of materials. This inspection method is gaining popularity in FRP inspection, but still requires large equipment and specialized training. It may be difficult to get large equipment to the areas in need of further inspection.

c) **Ultrasonic**

Ultrasonic testing is similar to GPR in that it uses high frequency sound waves to analyze the material, but a key advantage is the equipment can be handheld. This allows for a more localized surface and subsurface examination of FRP components. This technology can be used to determine delamination as well as subsurface cracking given the right resolution. The ultrasonic unit and transducer and may require a couplant gel. The inspector will need UT training on the equipment being utilized and will need to understand the wave characteristics of FRP materials as the response is different from traditional materials. Additionally, differences in the laminate architecture will produce varied readings, for example the bottom flange of a GBeam typically is made up of both carbon and glass reinforcing layers.

Figure 26 Ultrasonic Testing Equipment with Handheld Transducer and Output Display

d) **Infrared Thermography**

Infrared thermography involves applying an external heat source to the FRP material and utilizing an infrared imaging sensor to observe and record any gradient in the material. High density material will absorb heat and take longer to heat up but will retain the heat longer than low density materials. This change in temperature gradient can identify areas of delamination, cracking, presence of moisture, or voids and requires relatively little training to interpret results.

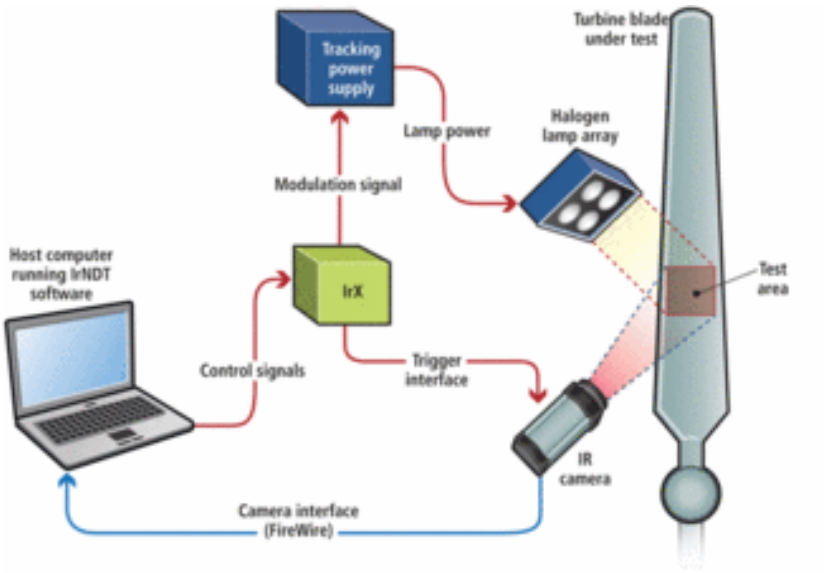


Figure 27 Infrared Thermography Schematic

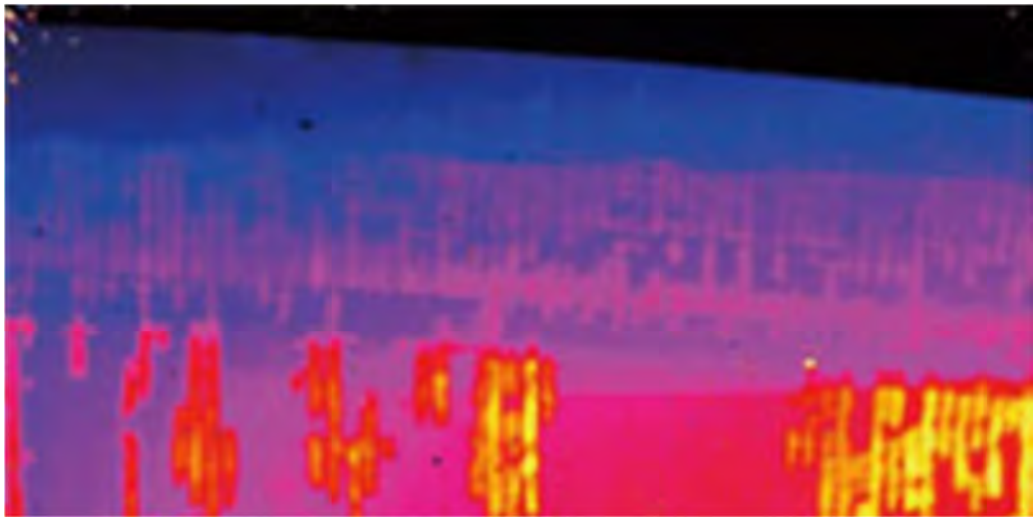


Figure 28 Heat Map Display Indicating Temperature Differential at the Sample Surface

MAINTENANCE

1. Preventative Maintenance

One of the advantages of FRP materials is that they are corrosion resistant. However, like most structures they are not immune to impact damage or other forms of weakening from exposure to harsh environments if not monitored and maintained properly. Prior to determining if preventative maintenance is required, the FRP may need to be cleaned thoroughly.

A pressure washer is excellent for removing most types of soil or staining on FRP surfaces. To prevent damaging the FRP, the pressure washer should not exceed 2000 psi. When washing, keep the spray tip at least 12 inches away from the FRP.

A damp cloth, broom, or compressed air will remove most light to moderate dust or soil. Wipe, scrub, or blow off the dust.

Soap and water along with rags, a soft bristle brush, or a broom can be used to remove slightly heavier soil. Common household mild detergents should be used. Apply the soap and water then scrub. Rinse with clean water.

Preventative maintenance is expected to be repair that does not constitute a structural repair. This may include recoating the surface finish with resin or paint if fading or discoloration is present, repairing blistering, exposed fibers, abrasion, or minor scratches with resin. Preventative maintenance does not require special training or certification.

2. Minor Repairs

A minor repair is classified as a delamination, subsurface scratch, penetration, gouge, or surface crack that does not extend more than half the depth of the laminate and does not require engineering of the repair. The repair should be performed by a CCT. ACMA can provide a list of certified individuals and companies that have the necessary expertise to repair minor damage.

The procedure for minor repairs involves removing, or scarfing out, damaged material until undamaged laminate is found. As material is being removed, care should be taken to not extend the area that is damaged, and the direction of the reinforcement fabric should be noted. The repair area is then determined by tapering the removed material at a slope of 30:1 in all directions. For example, if a laminate is 1.0" thick and has a gouge that extend 0.25" into the laminate, the material at the gouge would be removed to just over 0.25" deep. Then the surrounding material would then be removed at a taper over a length of 7.5" to the full thickness of the laminate. The repair area would then be repaired with equal or better material cut to fit the tapered area and placed in the same orientation as the existing material. The repair method may be wet layup or vacuum infusion depending on the difficulty for access and extend of damage.

The Project Layup Schedule provided with the Quality Control Report should be consulted for specific reinforcement properties, for example one layer may be a Vectorply vendor nomenclature EBX-2400 which is a 24 ounce per square yard +/-45 glass fiber reinforcement, while the next layer may be Hexcel vendor nomenclature FCIM321 indicating a 24K tow carbon fiber reinforcement 595 grams per square meter oriented in the "0" direction or "UNI" direction which is the longitudinal direction of the girder. The layup schedule specifies the material as it is placed into the mold during production of the girder prior to vacuum infusion. The material as shown in the layup schedule is numbered from 1 to the total number of layers placed into the mold, where layer number 1 is the outermost layer as viewed from the outside surface of the

girder. Each successive layer is placed inside the previously numbered layer until the final layer is placed being the innermost layer number or the last number on the layup schedule.

Figure 29: Wet Layup Process

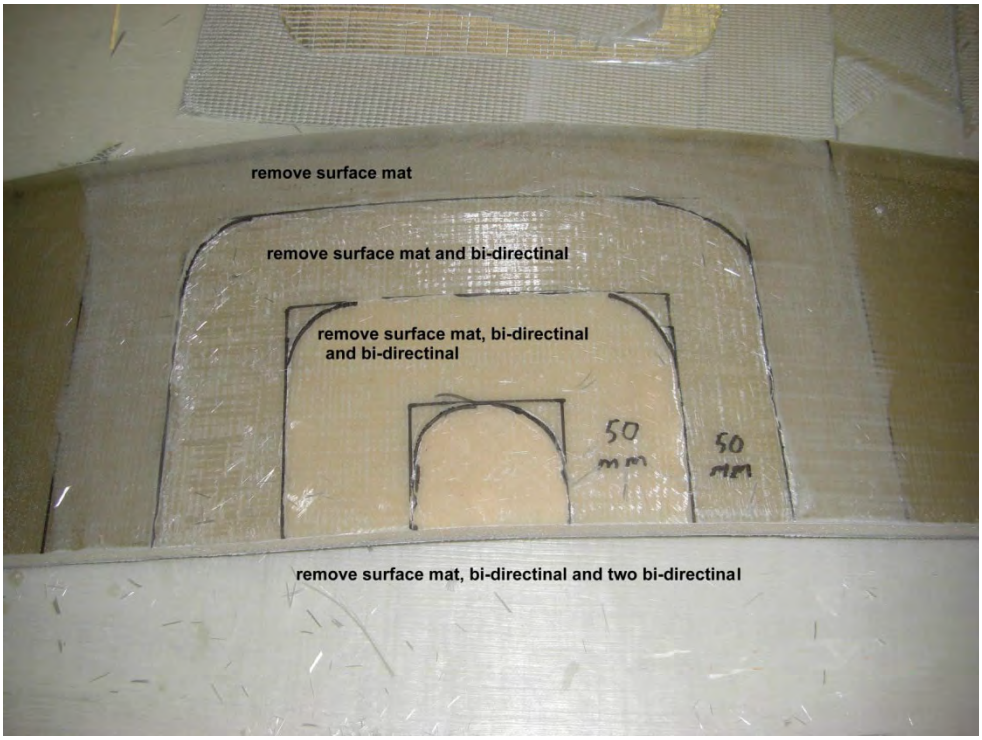


Figure 30: Example of Repair Mapping

3. Major Repairs

A major repair is classified as a delamination, subsurface scratch, penetration, gouge, or surface crack that extends more than half the depth of the laminate and requires engineering of the

repair. The repair should be performed by a CCT. ACMA can provide a list of certified individuals and companies that have the necessary expertise to repair major damage.

The procedure for major repairs involves removing, or scarfing out, damaged material until undamaged laminate is found. As material is being removed, care should be taken to not extend the area that is damaged, and the direction of the reinforcement fabric should be noted. The repair area is then determined by engineering design and may need to be larger than 30:1 or utilize specific materials. Once the repair area is engineered, the CCT would be provided with a laminate schedule and material specification to carry out the repair. The repair method may be wet layup or vacuum infusion depending on the difficulty for access, extend of damage, and quality of repair method.

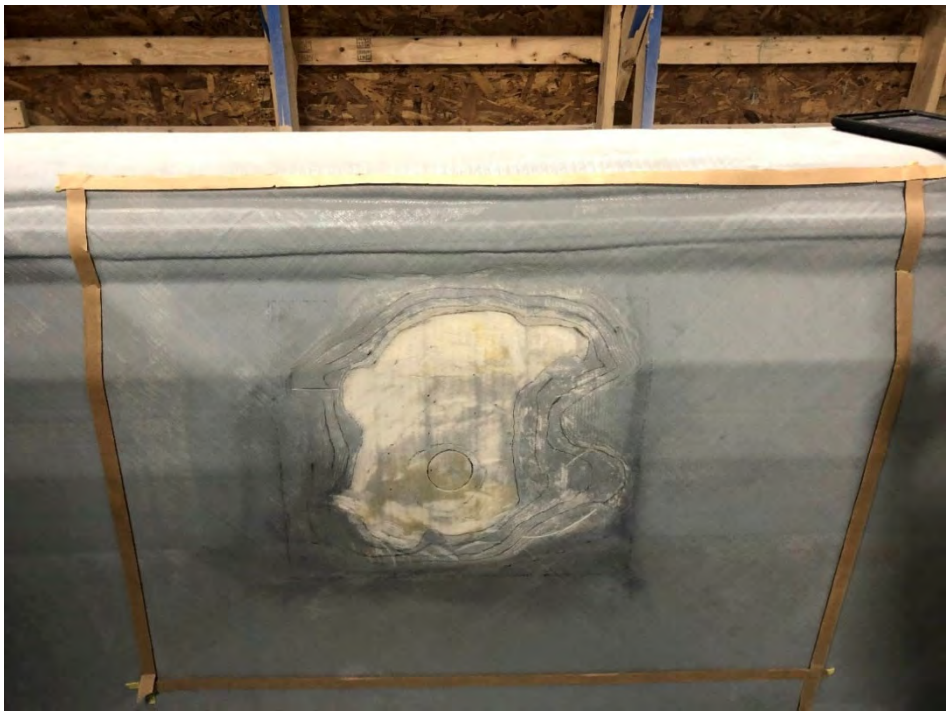


Figure 31: Major Repair Preparation and Material Removal

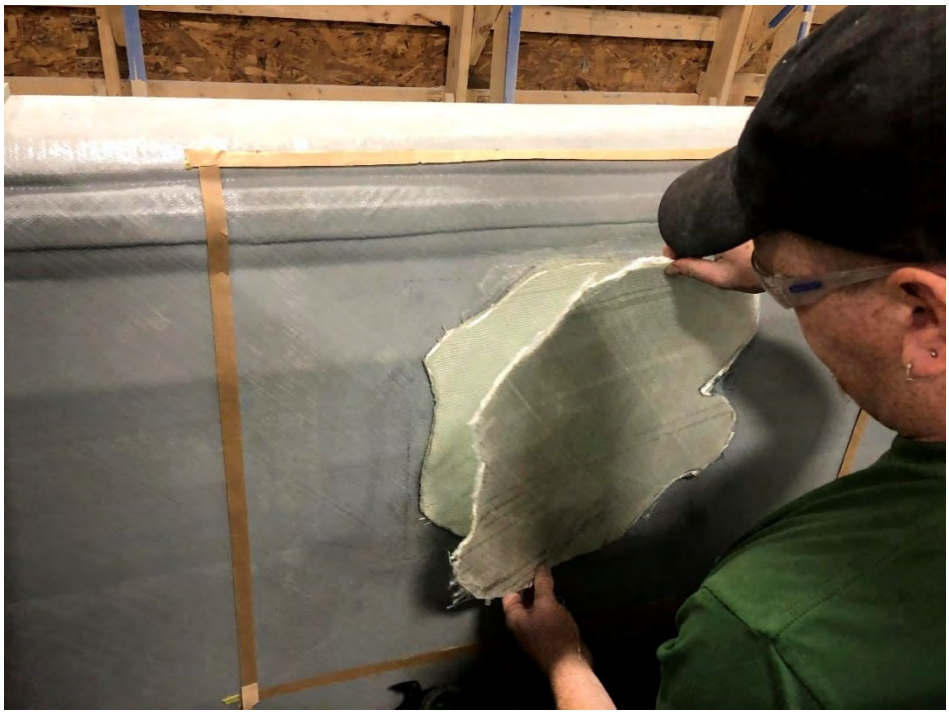


Figure 32: Repair Layup Following Material and Layer Specifications

Figure 33: Repair Infusion

Figure 34: Completed Major Repair

USEFUL RESOURCES

1) *Bridge Inspector's Reference Manual* (BIRM), U.S. Department of Transportation – Federal Highway Administration, National Highway Institute, Publication No. FHWA NHI 12-049 December, 2012 https://www.fhwa.dot.gov/bridge/nbis/pubs/nhi12049.pdf
2) *Composite Materials Handbook, Volume 3 Polymer Matrix Composites Materials Usage Design, and Analysis* https://www.sae.org/publications/books/content/r-424/
3) Lee County Port Authority, Skyplex Boulevard Bridge Inspection
4) Highway Bridge Inspection Report, McGee Bridge, Anson, ME
5) PennDOT Bridge Maintenance Manual https://www.dot.state.pa.us/public/PubsForms/Publications/PUB%2055.pdf
6) PennDOT Bridge Safety Inspection Manual https://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20238.pdf
7) Link to American Composites Manufacturers Association ACME https://acmanet.org/
8) *Field Inspection of In-Service FRP Bridge Decks*, National Cooperative Highway Research Program (NCHRP) Report 564, 2006 http://www.trb.org/Publications/Blurbs/156715.aspx

Highway Bridge Inspection Report

BR# 3171

TIDE MILL NO. 2

US 1

Over

CRANE MILL STREAM

Town:
Edmunds Twp

Inspection Date: 08/13/2020
7:36:00 PM

Inspected By: Harris,Steve

Inspection Type(s): Routine

Location Map

Latitude: 44.83005

Longitude: -67.16227

National Bridge Inventory

Status: 0 - ND Bridge Name: **TIDE MILL NO. 2** Sufficiency Rating: 80.3

Inspections

(90) INSPECTION DATE	& (91) DESIGNATED INSPECTION FREQUENCY	24	08/13/2020
(92) CRITICAL FEATURE INSPECTION	& (93) CFI DATE		
(92A) FRACTURE CRITICAL DETAIL		N	
(92B) UNDERWATER INSPECTION		N	
(92C) OTHER SPECIAL INSPECTION		N	

Identification

(1) STATE CODE	231 - Maine
(8) STRUCTURE NUMBER	3171
(5) INVENTORY ROUTE	
(5A) RECORD TYPE	1: Route carried "on" the structure
(5B) ROUTE SIGNING PREFIX	3 - STATE HIGHWAY
(5C) DESIGNATED LEVEL OF SERVICE	1 - MAINLINE
(5) INVENTORY ROUTE	1
(5) INVENTORY ROUTE	0 - NOT APPLICABLE
(2) HIGHWAY AGENCY DISTRICT	04 - Eastern
(3) COUNTY CODE	029 Washington
(4) PLACE CODE	22750
(6) FEATURES INTERSECTED	CRANE MILL STREAM
(7) FACILITY CARRIED	US 1
(9) LOCATION	2 MI. N.E. WHITING
(11) MILEPOINT	275.821
(12) BASE HIGHWAY NETWORK	Inventory Route is on the Base Network
(13) LRS INVENTORY ROUTE, SUBROUTE	
(13A) LRS INVENTORY ROUTE	000000001X
(13B) SUBROUTE NUMBER	00
(16) LATITUDE	44.83005
(17) LONGITUDE	-67.16227
(98A) BORDER BRIDGE CODE	
(98B) PERCENT RESPONSIBILITY	0
(99) BORDER BRIDGE STRUCT NO.	n/a

Structure Type and Material

(43) STRUCTURE TYPE, MAIN	
(43A) KIND OF MATERIAL/DESIGN	1 - Concrete
(43B) TYPE OF DESIGN/CONSTR	19 - Culvert (includes frame culverts)
(44) STRUCTURE TYPE, APPROACH SPANS	
(44A) KIND OF MATERIAL/DESIGN	0 - Other
(44B) TYPE OF DESIGN/CONSTRUCTION	00 - Other
(45) NUMBER OF SPANS IN MAIN UNIT	1
(46) NUMBER OF APPROACH SPANS	0
(107) DECK STRUCTURE TYPE	N - Not Applicable
(108) WEARING SURFACE/PROTECTIVE SYSTEMS	
(108A) WEARING SURFACE	N - NA
(108B) DECK MEMBRANE	N - NA
(108C) DECK PROTECTION	N - NA

Age of Service

(27) YEAR BUILT	2016
(106) YEAR RECONSTRUCTED	0
(42) TYPE OF SERVICE	
(42A) TYPE OF SERVICE ON BRIDGE	1 - Highway
(42B) TYPE OF SERVICE UNDER BRIDGE	5 - Waterway
(28) LANES	
(28A) LANES ON THE STRUCTURE	02
(28B) LANES UNDER THE STRUCTURE	00
(29) AVERAGE DAILY TRAFFIC	1546
(30) YEAR OF AVERAGE DAILY TRAFFIC	2016
(109) AVERAGE DAILY TRUCK TRAFFIC	5
(19) BYPASS DETOUR LENGTH	100

Geometric Data

(48) LENGTH OF MAXIMUM SPAN (ft.)	40
(49) STRUCTURE LENGTH (ft.)	60
(50) CURB/SIDEWALK WIDTHS	
(50A) LEFT CURB SIDEWALK (ft.)	00
(50B) RIGHT CURB SIDEWALK (ft.)	00
(51) BRDG RDWY WIDTH CURB-TO-CURB (ft.)	0000
(52) DECK WIDTH, OUT-TO-OUT (ft.)	0000
(32) APPROACH ROADWAY WIDTH (ft.)	29.0
(33) BRIDGE MEDIAN	0 - No median
(34) SKEW (deg.)	0
(35) STRUCTURE FLARED	0 - No flare
(10) INV RTE, MIN VERT CLEARANCE (ft.)	327.76
(47) TOTAL HORIZONTAL CLEARANCE (ft.)	23.0
(53) VERTICAL CLEARANCE OVER BRIDGE ROADWAY (ft.)	327.76
(54) MIN VERTICAL UNDERCLEARANCE	
(54A) REFERENCE FEATURE	N - Feature not a highway or railroad
(54B) MIN VERTICAL UNDERCLEARENCE (ft.)	0
(55) MIN LATERAL UNDER CLEARANCE RIGHT	
(55A) REFERENCE FEATURE	N - Feature not a highway or railroad
(55B) MIN LATERAL UNDER CLEARANCE RIGHT (ft.)	327.76
(56) MIN LATERAL UNDER CLEARANCE (ft.)	99.9

Classification

(112) NBIS BRIDGE LENGTH	Yes
(104) HIGHWAY SYSTEM OF THE INVENTORY ROUTE	0 - Structure/Route is NOT on NHS
(26) FUNCTIONAL CLASSIFICATION OF INVENTORY ROUTE	06 - Rural - Minor Arterial
(100) STRAHNET HIGHWAY DESIGNATION	Not a STRAHNET route
(101) PARALLEL STRUCTURE DESIGNATION	N - No parallel structure
(102) DIRECTION OF TRAFFIC	2-way traffic
(103) TEMP STRUCTURE	
(105) FEDERAL LANDS HIGHWAYS	Not Applicable
(110) DESIGNATED NATIONAL NETWORK	Inventory route not on network
(20) TOLL	3 - On Free Road
(21) MAINTENANCE RESPONSIBILITY	01 - State Highway Agency
(22) OWNER	01 - State Highway Agency
(37) HISTORICAL SIGNIFICANCE	5 - Not eligible

Condition

(58) DECK	N - Not Applicable
(59) SUPERSTRUCTURE	N - Not Applicable
(60) SUBSTRUCTURE	N - Not Applicable
(61) CHANNEL & CHANNEL PROTECTION	9 - No noticeable deficiencies
(62) CULVERT	8 - No noticeable or noteworthy deficiencies

Load Rating and Posting

(31) DESIGN LOAD	B - Greater than HL 93
(63) METHOD USED TO DETERMINE OPERATING RATING	8 - Load and Resistance Factor Rating (LRFR) rating report by rating factor (RF) method using HL-93 loadings.
(64) OPERATING RATING	1.32
(65) METHOD USED TO DETERMINE INVENTORY RATING	8 - Load and Resistance Factor Rating (LRFR) rating report by rating factor (RF) method using HL-93 loadings.
(66) INVENTORY RATING	1.02
(70) BRIDGE POSTING	5 - Equal to or above legal loads
(41) STRUCTURE OPEN/POSTED/CLOSED	A - Open

Appraisal

(67) STRUCTURAL EVALUATION	8
(68) DECK GEOMETRY	N
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71) WATERWAY ADEQUACY	8 - Bridge Above Approaches
(72) APPROACH ROADWAY ALIGNMENT	8 - Equal to present desirable criteria
(36) TRAFFIC SAFETY FEATURE	
36A) BRIDGE RAILINGS:	0 - Does not meet acceptable standards/safety feature is required
36B) TRANSITIONS:	0 - Does not meet acceptable standards/safety feature is required
36C) APPROACH GUARDRAIL	0 - Does not meet acceptable standards/safety feature is required

36D) APPROACH GUARDRAIL ENDS	0 - Does not meet acceptable standards/safety feature is required
(113) SCOUR CRITICAL BRIDGES	8 - Stable for scour conditions

Proposed Improvements

(75) TYPE OF WORK	
(75A) TYPE OF WORK PROPOSED	
(75B) WORK DONE BY	
(76) LENGTH OF STRUCTURE IMPROVEMENT (ft.)	
(94) BRIDGE IMPROVEMENT COST (SK)	
(95) ROADWAY IMPROVEMENT COST (SK)	
(96) TOTAL PROJECT COST	
(97) YEAR OF IMPROVEMENT COST ESTIMATE	
(114) FUTURE ADT	2319
(115) YEAR OF FUTURE ADT	2036

Navigation Data

(38) NAVIGATION CONTROL	0 - No navigation control on waterway (bridge permit not required)
(111) PIER OR ABUTMENT PROTECTION	
(39) NAV VERT CLEARANCE	0
(116) MIN NAVIGATION VERT CLEARANCE, VERT LIFT BRIDGE	0
(40) NAV HORIZONTAL CLEARANCE	0

Inspection Notes

Structure Number: 3171 Town: Edmunds Twp

Structure Name: TIDE MILL NO. 2

Structure Notes

2016 Single span buried filled tube arches on concrete footings with corrugated composite deck

Wearing Surface

Deck **NBI Item 58:** N

Superstructure **NBI Item 59:** N

Substructure **NBI Item 60:** N

Culvert **NBI Item 62:** 8

Single span buried filled tube arches on concrete footings with corrugated composite deck.
Deck panels are leaking with resulting staining on tube arches and footings.
No cracking, delaminating or spalling footings.
Concrete retaining head walls with no issues noted.
Large rip-rap in angular and unstable at this time but there is no banking erosion

Channel **NBI Item 61:** 9

Other

Special Inspection

Monitoring

Pontis Notes

Element Inspection

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
243 - Other Culvert	3 - Mod.	60	ft.	55	5	0	0
824 - Prefabricated Concrete Wall	3 - Mod.	160	ft.	160	0	0	0

Over Limit Report

Bridge #:	3171	Town1:	Edmunds Twp
Bridge Name:	TIDE MILL NO. 2	Town2:	
Owner:	01 - State Highway Agency	Maintainer:	01 - State Highway Agency
Co-Owner:	N Not applicable	Co-Maintainer:	N Not applicable
Region:	04 - Eastern		

Vertical Clearance - Under

Left, Center, and Right is based on the direction of travel

Roadway - Heading North or East

	Actual Heights in Feet-Inches Left	Center	Right	Posted		Date Measured: Deficient Sign
Main: CRANE MILL STREAM	-	-	-	☐ Main	-	
Other:	-	-	-	☐ Other	-	
Ramps:	-		-	☐ Ramp	-	

Roadway - Heading South or West

	Actual Heights in Feet-Inches Left	Center	Right	Posted		Date Measured: Deficient Sign
Main: CRANE MILL STREAM	-	-	-	☐ Main	-	
Other:	-	-	-	☐ Other	-	
Ramps:	-		-	☐ Ramp	-	

Vertical Clearance - Portal

Roadway: US 1

Heading North or East

Actual Heights in Feet-Inches Left	Center	Right	Posted		Date Measured: Deficient Sign
-	-	-	☐ Portal	-	

Heading South or West

Actual Heights in Feet-Inches Left	Center	Right	Posted		Date Measured: Deficient Sign
-	-	-	☐ Portal	-	

Permitting

Pointer

☐ Red Flag Comments

Heading North Height:	-	
Heading South Height:	-	
Left Ramp Height:	-	
Right Ramp Height:	-	
Portal North Height:	-	2050162-BRDG
Portal South Height:	-	2050162-BRDG
Other Road Height:	-	
Bridge Width:	0000 ft	
Roadway Width:	29.0 ft	

Underclearance heights are signed if less than 14 ft 6 in

Check with Maine Turnpike Authority for load heights over 13 ft 6 in

Always check 511

Load Restrictions

Posted	False	tons	Date posted:
Posted One Truck at aTime			
Posted for 4 axle only			
Operating Load Rating	1.32		
Permit Load Ratings		axles	
		axles	
		axles	

Underwater Dive Inspection Report

Structure Number: 3171

Bridge Name: TIDE MILL NO. 2

Town 1: 29804 - Edmunds Twp

Town 2:

Division: Ellsworth

DiveID: 2930

☐ Tidal:

Location: 2 MI. N.E. WHITING

Tide Information:

Photos:

Dive Entry Location:

Scour:

Comments/Hazards:

Streambed Description:

Channel Description:

Substructure Description:

Inspection Team:

Role:

Dive Conditions:

Time: Entry: AM/PM

Time: Exit: AM/PM

Water Temp:

Visibility (ft):

Max Depth (ft):

Current:

Weather:

Underwater Inspection Date:

Channel Condition:

Substr/Culvert Condition:

Inspection Cycle:

Ratings Comments:

Pictures

PHOTO 1

Description Roadway looking South

PHOTO 2

Description Roadway pavement above Bridge

Pictures

PHOTO 3

Description Guard Rail View

PHOTO 5

Description Barrel View looking West

Pictures

PHOTO 6

Description South Footing View

PHOTO 7

Description North Footing View

Pictures

PHOTO 8

Description West Composite Tube - Staining on bottom

PHOTO 9

Description Interior tubes - Staining at bottom

Pictures

PHOTO 10

Description Staining of East Tube

Maintenance Work Items

Structure Number: 3171 **Structure Name:** TIDE MILL NO. 2

Town: 29804 **Owner:** Harris,Steve

Type	Work Item	Priority	Notes

MaineDOT NBIS Bridge Safety Inspection JSA

Structure Number: 3171

Inspector: Harris,Steve

Structure Name: TIDE MILL NO. 2

Team Lead: Steve Harris

Town: Edmunds Twp

Additional Team Members/Visitors:

1.)
2.)
3.)
4.)
5.)
6.)
7.)
8.)
9.)

Job being performed:

Bridge Inspection

Potential Hazard:	Controls:
☑ Exposure to traffic	☑ Parked off road with strobe ☑ Less than 1 hour on bridge ☑ Wear standard reflective clothing and hard hat ☐ Spotter ☐ Traffic Control Crew
☑ Steep slopes and uneven working areas (rip rap, mud, loose fill, etc)	☑ Wear appropriate, prudent footwear ☐ Rope or fall protection
☑ Chipped Concrete or Steel (hand tools only)	☑ Wear appropriate, prudent eye/hand protection
☑ 6' Vertical drops	☑ Stay away from areas
☑ Water Hazards ☐ Water depth under 1 foot ☐ Water depth 1 to 4 feet ☑ Water depth over 4 feet ☐ Water flow calm/slow moving ☐ Water flow visible/not rapid ☐ Water flow rapid with some short falls ☑ Tidal Water	☑ Evaluate Water Hazard conditions ☑ Use/Wear appropriate PPE ☐ Buddy System
☑	☑

Insects, Poision Ivy, or other environmental hazards	Apply insect repellant and/or sunscreen ☑ Protect skin with appropriate, prudent clothing
Potential Hazard:	Controls:
☑ Lead paint and Avian excrement	☑ Wear gloves, do not scrape
Potential Hazard:	Controls:
☐ Heavy Manual Lifting	☐ Ask for assistance in donning dive gear, lifting equipment
Potential Hazard:	Controls:
☐ DCS, Lung Expansion	☐ Ascend slowly, user computers, Safety Stops (15' mark for 3 min.)
Potential Hazard:	Controls:
☐ Entanglement U/W	☐ Use knife, Comm gear
Potential Hazard:	Controls:
☐ Boat Traffic	☐ Fly Dive Flag, user spotter, contact bridge on Chan. 13
Potential Hazard:	Controls:
☐ Cold Water	☐ Use adequate dry suit underwear for water temperature
Potential Hazard:	Controls:
☐ Live Boating	☐ Keep track of divers, avoid powering during drop-off/pick-up
Other Potential Hazards:	Other Controls:
Loose rip rap	Ensure footing

Safety Equipment Required:

☑ ☑ ☐

Emergency Action Plan:

☑

Hard hat	Sunscreen	Throw Ring	Call 911
☑ Vest	☑ First Aid	☐ Throw Rope	☑ First Aid Kit
☑ Glasses	☐ O2	☐ Positioning Device	☐ Fall Rescue Plan
☑ Gloves	☐ AED		☐ Water Rescue Plan
☑ PFD	☐ Comm Gear		☐ Dan 1-919-684-9111
☐ Rain Gear	☑ Cell Phone		☐ USCG 741-5465
☐ Bug Spray	☐ Boat		

Other Safety Equipment:

Other Emergency Action Plan:

I certify that the MaineDOT NBIS Bridge Safety Inspection JSA has been completed according to all proper procedures required by the Maine Department of Transportation.

☑ Complete Steve Harris

Bridge Components

Bridge #:	3171	Town1:	Edmunds Twp
Bridge Name:	TIDE MILL NO. 2	Town2:	
Owner:	01 - State Highway Agency	Maintainer:	01 - State Highway Agency
Co-Owner:	N Not applicable	Co-Maintainer:	N Not applicable
Region:	04 - Eastern		

Deck

Joint Seal Type/MFG:

- [ ] Emseal
- [ ] V Seal
- [ ] Watson Bowman
- [ ] Hot Rubber
- [ ] Pour-in-Place
- [ ] DS Brown

Joint Types:

- [ ] Finger
- [ ] Asphaltic Plug
- [ ] Compression
- [ ] Modular
- [ ] Gland
- [ ] Waybo Crete
- [ ] Sliding
- [ ] Transflex
- [ ] Open

Joint HDR Mat:

- [ ] Concrete
- [ ] Delcrete
- [ ] Elastomeric
- [ ] LP Concrete
- [ ] Phoscrete
- [ ] Plycrete

Other:

- [ ] Curtain
- [ ] Troughs
- [ ] Armor

Rebar Type:

Superstructure

Left Side Rail:

Material	Steel	[ ] Retrofit
Shape	Rectangular	[ ] Safety Walk
Attached To	Beam	[ ] Pales
Number of Bars	2	[ ] Snow Fence
Extra Height	N	

Right Side Rail:

Material	Steel	[ ] Retrofit
Shape	Rectangular	[ ] Safety Walk
Attached To	Beam	[ ] Pales
Number of Bars	2	[ ] Snow Fence
Extra Height	N	

Bearing Type Quantity:

- [ ] Disk
- [ ] Pot
- [ ] Roller
- [ ] Elastomeric
- [ ] Rocker
- [ ] Sliding Plate

Other:

- [ ] Pin Quantity
- [ ] Pin and Link Quantity

Fatigue Prone Detail:

- [ ] Narrow Cover Plate - Sq End Welded
- [ ] Narrow Cover Plate - Sq End w/o Weld
- [ ] Wide Cover Plate - Sq End Welded
- [ ] Wide Cover Plate - Sq End w/o Weld
- [ ] Lateral Connection Plate - Welded
- [ ] Narrow Cover Plate - Tapered End Welded
- [ ] Narrow Cover Plate - Tapered End w/o Weld
- [ ] Longitudinal Stiffener - Welded with Radius
- [ ] Longitudinal Stiffener - Welded w/o Radius
- [ ] Hoan Detail

Substructure

- [ ] Pier Collars
- [ ] Abutment Collars
- [ ] Wood Piles
- [ ] Steel Piles
- [ ] Blocked Bridge

Retaining Wall Type:

Precast Concrete Block Gravity

Other

Confined Space

- [ ] Bridge Lighting
- [ ] Cat Walk
- [ ] Navigational Lighting
- [ ] Signs Attached

General Notes

Bridge Preservation

Bridge #:	3171	Town1:	Edmunds Twp
Bridge Name:	TIDE MILL NO. 2	Town2:	
Owner:	01 - State Highway Agency	Maintainer:	01 - State Highway Agency
Co-Owner:	N Not applicable	Co-Maintainer:	N Not applicable
Region:	04 - Eastern		

Deck

NBI Deck Information:

Deck Type	N - Not Applicable
Deck Protection	N - NA
Membrane Type	N - NA

Wearing Surface:

Type	N - NA
Last Date	
Lifespan (Yrs)	
Next Date Est.	0
Mill & Fill Date	

Superstructure

Beam Ends Paint:	Bearings Paint:	Bearings Lubrication:
Last Date	Last Date	Last Date
Next Date Est.	Next Date Est.	Next Date Est.
Beam Ends Fluid Film:	**Bearings Fluid Film:**	**Treatment:**
Last Date	Last Date	☐ Core 10
Next Date Est.	Next Date Est.	☐ Galvanized
		☐ Metalized

Substructure

Common Preservation

Paint Information:

Type	
Last Date	
Lifespan (Yrs)	
Next Date Est.	2002

Anodes:

- ☐ Installed
- ☐ Detached
- ☐ Replace

Concrete-Silane:	Washing:
Last Date	☐ Required
Next Date Est.	☐ UBIT
Concrete-Linseed	
Last Date	
Next Date Est.	

☐ Alkali-Silica reactivity

General Notes

BRIDGE RECORD

BRIDGE NUMBER: 124142
BRIDGE NAME: SKYPLEX BLVD BRIDGE

BRIDGE RECORD CONTENTS

I. Inspection Reports - This section contains periodic bridge inspection reports, bridge repair work orders, and accident reports.

II. Inventory – This section contained the following bridge information: photographs, location map, detailed data, history, load carrying capacity, inspection preparation, and drawings.

III. Communications – This section contains correspondence such as letters, memorandums, and notices directly related to this bridge.

SECTION I

BRIDGE INSPECTION REPORTS

I. INSPECTION REPORTS

BRIDGE NUMBER: 124142
BRIDGE NAME: SKYPLEX BLVD BRIDGE

DOCUMENT LOG	
Type of Inspection Report or Document	Date Inspected
Initial Inspection Report	01/30/2020

BRIDGE INSPECTION REPORT

PREPARED FOR: FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE OWNER: LEE COUNTY PORT AUTHORITY

DBi

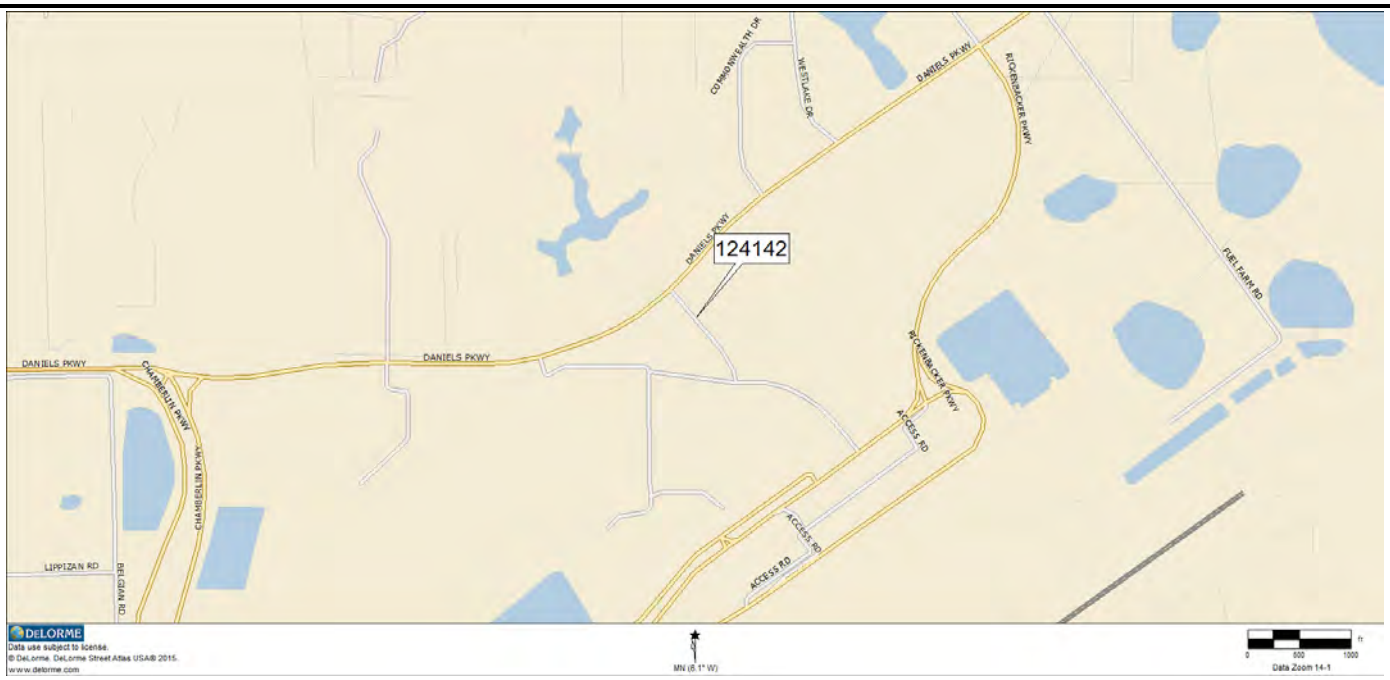
INSPECTED BY:
MARLIN ENGINEERING

BRIDGE NO. 124142 **CONTENTS OF REPORT** **INSPECTION DATE:** 01/30/2020

	BrM Report	*	U/W Inspection Report
	CIDR	*	Fracture Critical Data
	Scour Elevation (Profile)	*	Load Rating Analysis Summary
*	Addendum (Element Notes & Photos/Sketches)		

*This section is not included in this report.

SKYPLEX BLVD BRIDGE **300 FT S/O CR-876**



FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Inspection

Structure ID: 124142

DISTRICT: D1 - Bartow **INSPECTION DATE: 1/30/2020 TZAV**

BY:	Marlin Engineering, Inc.	STRUCTURE NAME:	SKYPLEX BLVD BRIDGE
OWNER:	25 Other Local Agencies	YEAR BUILT:	2020
MAINTAINED BY:	25 Other Local Agencies	SECTION NO.:	12 000 000
STRUCTURE TYPE:	0 Other - 11 Arch-Deck	MP:	0.000
LOCATION:	300 FT S/O CR-876	ROUTE:	00000
SERV. TYPE ON:	1 Highway	FACILITY CARRIED:	SKYPLEX BLVD
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	ARTIFICIAL LAKE

☐ FUNCTIONALLY OBSOLETE ☐ STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Regular NBI

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 1/30/2020 UNDERWATER: N/A

SUFFICIENCY RATING: 95.8
HEALTH INDEX: 100

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Inspection

Structure ID: 124142

DISTRICT: D1 - Bartow **INSPECTION DATE: 1/30/2020 TZAV**

BY:	Marlin Engineering, Inc.	STRUCTURE NAME:	SKYPLEX BLVD BRIDGE
OWNER:	25 Other Local Agencies	YEAR BUILT:	2020
MAINTAINED BY:	25 Other Local Agencies	SECTION NO.:	12 000 000
STRUCTURE TYPE:	0 Other - 11 Arch-Deck	MP:	0.000
LOCATION:	300 FT S/O CR-876	ROUTE:	00000
SERV. TYPE ON:	1 Highway	FACILITY CARRIED:	SKYPLEX BLVD
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	ARTIFICIAL LAKE

☐ THIS BRIDGE CONTAINS FRACTURE CRITICAL COMPONENTS

☐ THIS BRIDGE IS SCOUR CRITICAL

☐ THIS REPORT IDENTIFIES DEFICIENCIES WHICH REQUIRE PROMPT CORRECTIVE ACTION

☐ FUNCTIONALLY OBSOLETE ☐ STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Regular NBI

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 1/30/2020 UNDERWATER: N/A

OVERALL NBI RATINGS:

DECK:	N N/A (NBI)	CHANNEL:	8 Protected
SUPERSTRUCTURE:	8 Very Good	CULVERT:	N N/A (NBI)
SUBSTRUCTURE:	8 Very Good	SUFF. RATING:	95.8
PERF. RATING:	Performance Rating Not applicable or not calculable.	HEALTH INDEX:	100

FIELD PERSONNEL / TITLE / NUMBER: **INITIALS**

Ryan, William - Bridge Inspector (CBI# 00497) (lead) _____

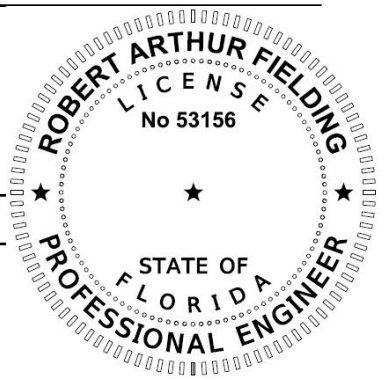
Jasper, Andrew - Bridge Inspection Technician _____

REVIEWING BRIDGE INSPECTION SUPERVISOR:

Gassman, Edward - Struct Operations Manager (PE# 48513) _____

CONFIRMING REGISTERED PROFESSIONAL ENGINEER:

Fielding, Robert - Senior Project Engineer (PE #53156) Marlin Engineering, Inc.
1907 N US Highway 301, Suite 160-C
Certificate of Authorization #6104
Tampa Florida 33619



SIGNATURE: _____

DATE: _____

The official record of this package has been electronically signed and sealed by Robert A. Fielding, P.E. on the date adjacent to the seal as required by Rule 61G15-23.004, F.A.C.. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Inspection

Structure ID: 124142

DISTRICT: D1 - Bartow **INSPECTION DATE: 1/30/2020 TZAV**

All Elements

MISCELLANEOUS : Channel

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	8290 / 3	Channel	1	100	0	.	0	.	0	.	1 (EA)

Element Inspection Notes:

8290/3 _

MISCELLANEOUS : Other Elements

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	8478 / 3	MSE Walls	328	100	0	.	0	.	0	.	328 ft

Element Inspection Notes:

8478/3 NOTE: This element represents the arch copings, all retaining walls and 30ft. past the angle break at all four corners of the structure.

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	220 / 3	Re Conc Pile Cap/Ftg	228	100	0	.	0	.	0	.	228 ft

Element Inspection Notes:

220/3 NOTE: This element represents the footings and the 24 rebar tie-backs between footings at the arch ribs. Design plans show piling under each rib.

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	8396 / 3	Other Abutment Slope Protection	1920	100	0	.	0	.	0	.	1920 (SF)

Element Inspection Notes:

8396/3 NOTE: This element represents the rock rubble slope protection 30ft. east and west of the structure.

SUPERSTRUCTURE : Superstructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	142 / 3	Other Arch	114	100	0	.	0	.	0	.	114 ft

Element Inspection Notes:

142/3 NOTE: This element represents the 24 concrete-filled fiber reinforced polymer (FRP) arches with corrugated fiber reinforced polymer decking between the arches. The top of the structure is covered by brick pavers and a median, and is earth filled.

CS1: The FRP corrugated decking and arches have areas of corrosion staining from an unknown source, primarily at the decking splices.

SUPERSTRUCTURE : Superstructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Inspection

Structure ID: 124142

DISTRICT: D1 - Bartow **INSPECTION DATE: 1/30/2020 TZAV**

Structure Unit 1	333 / 3	Other Bridge Railing	64	100	0	.	0	.	0	.	64 ft

Element Inspection Notes:

333/3 NOTE: This element quantifies the aluminum handrail with stainless steel cables mounted over the structure only.

CS1: Intermittent hand rail bolts are either too short to fully engage the nuts or have skewed bolts. The connections are tight.

The approach sidewalk hand rail baseplates have gaps up to 1/2in. intermittently throughout. Refer to Photo 1. REPAIR

The 2nd hand rail cable from top for the right hand rail over arch has excessive slack. Refer to Photo 2. REPAIR

Total Number of Elements*: 6
*excluding defects/protective systems

Structure Notes

BRIDGE OWNER: LEE COUNTY PORT AUTHORITY

Structure inventoried from south to north.

TRAFFIC RESTRICTIONS: According to the load rating analysis dated 1/18/19, posting is not required. This structure is not posted.

Fill depth above crown= 2ft.

INSPECTION NOTES: TZAV 1/30/2020

Sufficiency Rating Calculation Accepted by knmeiwr at 3/3/2020 3:04:39 PM

LOAD CAPACITY EVALUATION:
The load rating dated 01/18/2019 applies to the current condition of this bridge.

NOTE: NBI (Item 47) horizontal clearance is 106ft. BrM does not accept input greater than 99.9ft. at the time of this report.

This is an initial inspection.

NON-STRUCTURAL ITEMS:

LIGHTING:
The exterior face of the decorative lighting pillars at all four corners have protruding bolts and the northeast pillar is missing a light fixture and has exposed wires. Refer to Photos 3 and 4. REPAIR

SIDEWALKS:
The concrete sidewalk curbs for the hand rail have intermittent transverse cracks up to 1/32in.

The sidewalks have areas of water ponding.

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Inspection

Structure ID: 124142

DISTRICT: D1 - Bartow **INSPECTION DATE: 1/30/2020 TZAV**

Photo 1 - Element 333/3 Other Bridge Railing

Gap in left approach sidewalk hand rail baseplate. Typical.

REPAIR RECOMMENDATION:
Repair gaps for approach sidewalk hand rail baseplates.

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Inspection

Structure ID: 124142

DISTRICT: D1 - Bartow **INSPECTION DATE: 1/30/2020 TZAV**

Photo 2 - Element 333/3 Other Bridge Railing

Slack in 2nd hand rail cable from top for the right hand rail over arch.

REPAIR RECOMMENDATION:
Tighten 2nd hand rail cable from top for the right hand rail over arch.

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Inspection

Structure ID: 124142

DISTRICT: D1 - Bartow **INSPECTION DATE: 1/30/2020 TZAV**

Photo 3 - Inspection Notes

Protruding bolts at northeast pillar. Typical.

REPAIR RECOMMENDATION:
None.

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Inspection

Structure ID: 124142

DISTRICT: D1 - Bartow **INSPECTION DATE: 1/30/2020 TZAV**

Photo 4 - Inspection Notes

Missing light fixture with exposed wires at northeast pillar.

REPAIR RECOMMENDATION:
Install light fixture at northeast pillar.

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report

REPORT ID: INSP005 | **CIDR** | **DATE PRINTED: 3/18/2020**

Structure ID: 124142

Description

Structure Unit Identification

Bridge/Unit Key: 124142 1
Structure Name: SKYPLEX BLVD BRIDGE
Description: 32ft. x 9.5ft. ARCH BRIDGE
Type: M - Main

Roadway Identification

NBI Structure No (8): 124142
Position/Prefix (5): 1 - Route On Structure
Kind Hwy (Rte Prefix): 8 Other (incl toll rds)
Design Level of Service: 1 Mainline
Route Number/Suffix: 00000 / 0 N/A (NBI)
Feature Intersect (6): ARTIFICIAL LAKE
Critical Facility: Not Defense-crit
Facility Carried (7): SKYPLEX BLVD
Mile Point (11): 0
Latitude (16): 026d32'56.6" Long (17): 081d45'31.1"

Roadway Traffic and Accidents

Lanes (28): 4 Medians: 1 Speed: 35 mph
ADT Class:
Recent ADT (29): 2350 Year (30): 2020
Future ADT (114): 2938 Year (115): 2040
Truck % ADT (109): 3
Detour Length (19): 1.1 mi
Detour Speed: 35 mph
Accident Count: Rate:

Roadway Classification

Nat. Hwy Sys (104): 0 Not on NHS
National base Net (12): 0 - Not on Base Network
LRS Inventory Rte (13a): 12 000 000 Sub Rte (13b): 00
Functional Class (26): 19 Urban Local
Federal Aid System: OFF
Defense Hwy (100): 0 Not a STRAHNET hwy
Direction of Traffic (102): 2 2-way traffic
Emergency: [X]

Roadway Clearances

Vertical (10): 99.99 ft Appr. Road (32): 58 ft
Horiz. (47): 99.9 ft Roadway (51): 58 ft
Truck Network (110): 0 Not part of natl netwo
Toll Facility (20): 3 On free road
Fed. Lands Hwy (105): 0 N/A (NBI)
School Bus Route: [ ]
Transit Route: [X]

NBI Project Data

Proposed Work (075A):
Work To Be Done By (075B): Unknown (NBI)
Improvement Length (076): 0 ft

Improvement Cost (094):
Roadway Improvement Cost (095):
Total Cost (096):
Year of Estimate (097):

NBI Rating

Channel (61): 8 Protected
Deck (58): N N/A (NBI)
Superstructure (59): 8 Very Good
Substructure (60): 8 Very Good

Culvert (62): N N/A (NBI)
Waterway (71): 8 Equal Desirable
Unrepaired Spalls:
Review Required: [X]

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report

REPORT ID: INSP005 | **CIDR** | **DATE PRINTED: 3/19/2020**

Structure ID: 124142

Structure Identification

Admin Area: Lee County
District (2): D1 - Bartow
County (3): (12)Lee
Place Code (4): Fort Myers
Location (9): 300 FT S/O CR-876
Border Br St/Reg (98): Not Applicable (P) Share: 0 %
Border Struct No (99):
FIPS State/Region (1): 12 Florida Region 4-Atlanta
NBIS Bridge Len (112): Y - Meets NBI Length

Parallel Structure (101): No || bridge exists
Temp. Structure (103): Not Applicable (P)
Maint. Resp. (21): 25 Other Local Agencies
Owner (22): 25 Other Local Agencies
Historic Signif. (37): 5 Not eligible for NRHP

Geometrics

Spans in Main Unit (45): 1
Approach Spans (46): 0
Length of Max Span (48): 34 ft
Structure Length (49): 34 ft
Total Length: 34 ft
Deck Area: 3740 sqft
Structure Flared (35): 0 No flare

Age and Service

Year Built (27): 2020
Year Reconstructed (106): 0
Type of Service On (42a): 1 Highway
Under (42b): 5 Waterway
Fracture Critical Details: Not Applicable

Structure Type and Material

Curb/Sidewalk (50): Left: 14.7 ft Right: 14.7 ft
Bridge Median (33): 2 Closed Med w/o Barrier
Main Span Material (43A): 0 Other
Appr Span Material (44A): Not Applicable (P)
Main Span Design (43B): 11 Arch-Deck
Appr Span Design (44B): Not Applicable (P)

Deck Type and Material

Deck Width (52): 0 ft
Skew (34): 0 deg
Deck Type (107): 9 Other
Surface (108): 9 Other
Membrane: 0 None
Deck Protection: 9 Other

Appraisal

Structure Appraisal

Open/Posted/Closed (41): A Open, no restriction
Deck Geometry (68): 5 Above Tolerable
Underclearances (69): N Not applicable (NBI)
Approach Alignment (72): 8-No Speed Red thru Curv
Bridge Railings (36a): 0 Substandard
Transitions (36b): 0 Substandard

Approach Guardrail (36c): 0 Substandard
Approach Guardrail Ends (36d): 0 Substandard
Scour Critical (113): 8 Stable Above Footing

Navigation Data

Navigation Control (38): Permit Not Required
Nav Vertical Clr (39): 0 ft
Nav Horizontal Clr (40): 0 ft
Min Vert Lift Clr (116): 0 ft
Pier Protection (111): Not Applicable (P)

NBI Condition Rating

Sufficiency Rating: 95.8
Health Index: 100
Structural Eval (67): 8 Equal Desirable Crit
Deficiency: Not Deficient

Minimum Vertical Clearance

Over Structure (53): 99.99 ft
Under (reference) (54a): N Feature not hwy or RR
Under (54b): 0 ft

Minimum Lateral Underclearance

Reference (55a): N Feature not hwy or RR
Right Side (55b): 0 ft
Left Side (56): 0 ft

Schedule

Current Inspection

Inspection Date: 01/30/2020
Inspector: KNMEIWR - William Ryan
Bridge Group: E1N92
Alt. Bridge Group:
Primary Type: Regular NBI
Review Required: [X]

Next Inspection Date Scheduled

NBI: 01/30/2022
Element: 01/30/2022
Fracture Critical:
Underwater:
Other/Special:
Inventory Photo Update Due: 01/30/2030

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005 — **Inspection/CIDR/Bridge Profile Report**

Structure ID: 124142 — **CIDR** — DATE PRINTED: 3/18/2020

Schedule Cont.

Inspection Types Performed NBI [X] Element [X] Fracture Critical [ ] Underwater [ ] Other Special [ ]

Inspection Intervals	Required (92)	Frequency (92)		Last Date (93)		Inspection Resources	
Fracture Critical	[ ]	mos				Crew Hours:	3
Underwater	[ ]	mos				Flagger Hours:	0
Other Special	[ ]	mos				Helper Hours:	0
NBI		24 mos	(91)	01/30/2020	(90)	Snooper Hours:	0
						Special Crew Hours:	0
						Special Equip Hours:	0

Bridge Related

General Bridge Information

Parallel Bridge Seq:
Channel Depth: 2.5 ft
Radio Frequency:
Phone Number:
Exception Date:
Exception Type:
Accepted By Maint:
Warranty Expiration: 00/00/0000
Performance Rating: Performance Rating Not applicable or not calculable.

Bridge Rail 1: Combination not defined
Bridge Rail 2: Not applicable-No rail
Electrical Devices: Roadway lighting only
Culvert Type: Not applicable
Maintenance Yard: Not FDOT Maintained
FIHS ON / OFF: No Routes on FIHS
Previous Structure:
2nd Previous Structure:
Replacement Structure:

Permitted Utilities: Power [ ] Water [ ] Gas [ ] Fiber Optic [ ] Sewage [ ] Other [ ]

Bridge Load Rating Information

Inventory Type (065): 3 LRFR Load & Res. Fact
Operating Type (063): 3 LRFR Load & Res. Fact
Original Design Load (031): HL 93
Date: 01/18/2019
Initials: ZU
Load Rating Rev. Recom.: No
Load Rating Plans Status: Built

Inventory Rating (066): 36.4 tons
Operating Rating (064): 47.2 tons
FL120 Permit Rating: 60.6 tons
HS20/FL120 Max Span Rating: 60.6 tons
Dynamic Impact in Percent: 18 %
Governing Span Length: 32.0 ft
Minimum Span Length: 32.0 ft
Distribution Method: Refined Analysis (RA)

Load Rating Notes:

LEGAL LOADS

SU2: -1.0 tons
SU3: -1.0 tons
SU4: -1.0 tons
C3: -1.0 tons
C4: -1.0 tons
C5: -1.0 tons
ST5: -1.0 tons
Posting (070): 5 At/Above Legal Loads
Open/Posted/Closed (041): A Open, no restriction

POSTING

Recom. SU Posting: 99 tons
Recom. C Posting: 99 tons
Recom. ST5 Posting: 99 tons
Actual SU Posting: 99 tons
Actual C Posting: 99 tons
Actual ST5 Posting: 99 tons
Actual Blanket Posting: 99 tons
Emergency Vehicle: 1 EV inapplicable

FLOOR BEAM (FB) FB Present: No

FB Span Length, Gov: 0.0 ft
FB Spacing, Gov: 0.0 ft
FB OPR Rating: 0.0 tons
FB SU4 OPR Rating: 0.0 tons
FB FL120 Rating: 0.0 tons

SEGMENTAL (SEG)

SEG Wing-Span: -1.0 ft
SEG Web-to-Web Span: -1.0 ft
SEG Transverse HL93 Operating: -1.00 RF

Bridge Scour and Storm Information

Pile Driving Record: No pile driving records
Foundation Type: Foundation details
Mode of Flow: Riverine
Rating Scour Eval: Not Applicable
Highest Scour Eval: Not Applicable
Scour Evaluation Method: Unknown – Eval Not Comp

Scour Recommended I: No recommendation
Scour Recommended II: No recommendation
Scour Recommended III: No recommendation
Scour Elevation: 99 ft
Action Elevation: 99 ft
Storm Frequency: 100

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005 **Inspection/CIDR/Bridge Profile Report**

Structure ID: 124142 **CIDR** **DATE PRINTED: 3/18/2020**

Elements

Inspection Date: 01/30/2020 **TZAV**

MISCELLANEOUS : Channel

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	8290 / 3	Channel	1	100	0	.	0	.	0	.	1 (EA)

MISCELLANEOUS : Other Elements

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	8478 / 3	MSE Walls	328	100	0	.	0	.	0	.	328 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	220 / 3	Re Conc Pile Cap/Ftg	228	100	0	.	0	.	0	.	228 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	8396 / 3	Other Abutment Slope Protection	1920	100	0	.	0	.	0	.	1920 (SF)

SUPERSTRUCTURE : Superstructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	142 / 3	Other Arch	114	100	0	.	0	.	0	.	114 ft

SUPERSTRUCTURE : Superstructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
Structure Unit 1	333 / 3	Other Bridge Railing	64	100	0	.	0	.	0	.	64 ft

Total Number of Elements*: 6
*excluding defects/protective systems

Inspection Information

Inspection Date: 01/30/2020 **Type:** Regular NBI

Inspector: KNMEIWR - William Ryan

Inspection Notes: Sufficiency Rating Calculation Accepted by knmeiwr at 3/3/2020 3:04:39 PM

LOAD CAPACITY EVALUATION:
The load rating dated 01/18/2019 applies to the current condition of this bridge.

NOTE: NBI (Item 47) horizontal clearance is 106ft. BrM does not accept input greater than 99.9ft. at the time of this report.

This is an initial inspection.

NON-STRUCTURAL ITEMS:

LIGHTING:
The exterior face of the decorative lighting pillars at all four corners have protruding bolts and the northeast pillar is missing a light fixture and has exposed wires. Refer to Photos 3 and 4. REPAIR

SIDEWALKS:
The concrete sidewalk curbs for the hand rail have intermittent transverse cracks up to 1/32in.

The sidewalks have areas of water ponding.

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FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report

REPORT ID: INSP005

Structure ID: 124142

CIDR

DATE PRINTED: 3/18/2020

Structure Notes

BRIDGE OWNER: LEE COUNTY PORT AUTHORITY

Structure inventoried from south to north.

TRAFFIC RESTRICTIONS: According to the load rating analysis dated 1/18/19, posting is not required. This structure is not posted.

Fill depth above crown= 2ft.

Schedule Notes

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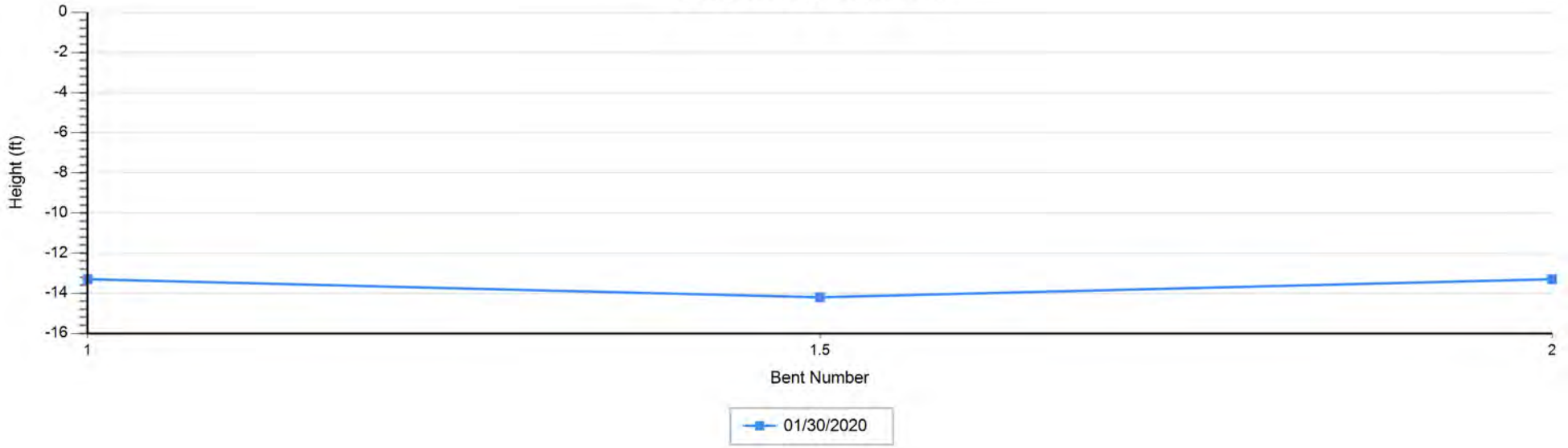
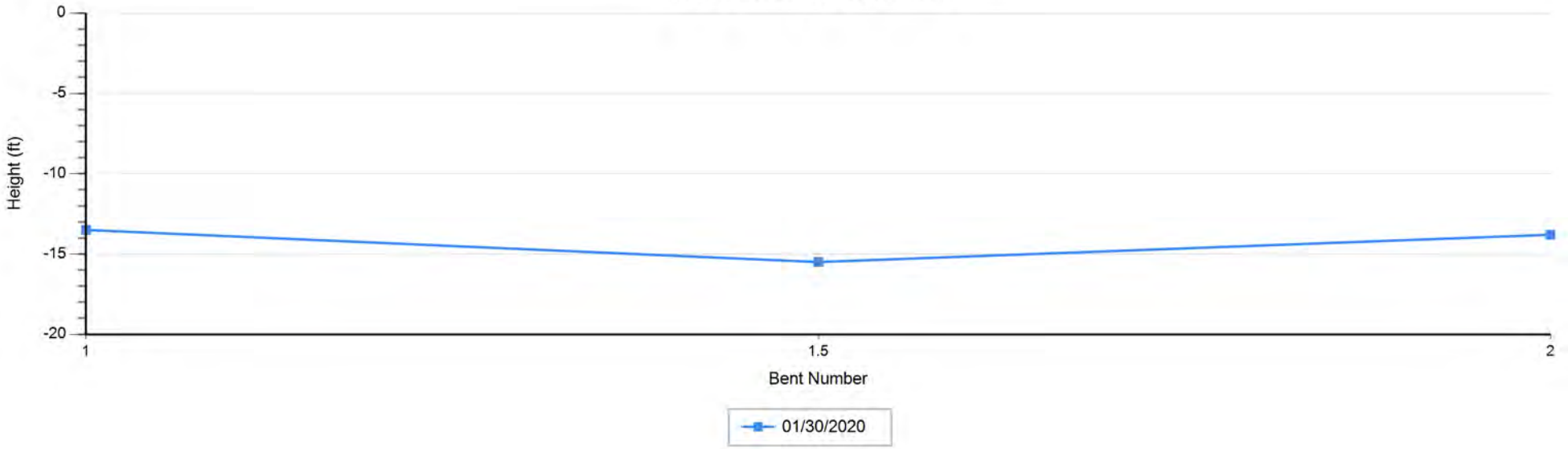
FLORIDA DEPARTMENT OF TRANSPORTATION BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Bridge Profile

DATE PRINTED: 3/18/2020 3:02:41 PM

Left Profile by Inspection



Right Profile by Inspection



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FLORIDA DEPARTMENT OF TRANSPORTATION BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Bridge Profile

DATE PRINTED: 3/18/2020 3:02:41 PM

Profile Data - Numerical Summary

Inspection Date and Key: 1/30/2020 TZAV

Bent #	Left Height	Right Height
1	13.30	13.50
1.5	14.20	15.50
2	13.30	13.80

(All Heights are in Feet)

Air Temp:

Profile Notes:

Measurements referenced to top of sidewalk coping.
Waterline taken at centerline of channel: Left and Right = 11.3ft.

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SECTION II

INVENTORY

II. INVENTORY

BRIDGE NUMBER: 124142
BRIDGE NAME: SKYPLEX BLVD BRIDGE

Inventory Topics

A. Photo Inventory

B. Location Map

** C. Condensed Inspection Data Report (SI&A)

D. Load Capacity Information

E. Bridge History

F. Field Preparation
1. Tools and Equipment
2. Services
3. Scheduling
4. Site Conditions

G. Bridge Description and Drawings

* H. Identification of Fracture Critical Components

I. Channel and Scour Information
1. Channel Profile
* 2. Scour Screening and In-Depth Scour Evaluation

*Not included in this report.
**Included with Inspection Report

TOPIC A

PHOTO INVENTORY

BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

BRIDGE NUMBER

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

SIDEWALK HANDRAIL

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

SOUTH APPROACH LOOKING NORTH

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

SOUTH APPROACH LOOKING SOUTH

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

NORTH APPROACH LOOKING SOUTH

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

NORTH APPROACH LOOKING NORTH

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

WEST ELEVATION

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

EAST ELEVATION

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

SUBSTRUCTURE

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

WEST CHANNEL

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

EAST CHANNEL

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TOPIC B

BRIDGE LOCATION MAP

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

LOCATION MAP

SKYPLEX BLVD BRIDGE

300 FT S/O CR-876

NOTE: DETOUR LENGTH = 1.1 MI

B1

TOPIC D

LOAD CAPACITY INFORMATION

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

Bridge No.	**Skyplex Boulevard Bridge**	**Analysis Method:** **LRFR-LRFD**	**FDOT Bridge Load Rating Summary Form (Page 1 of 1)**
Location	**Skyplex Boulevard Bridge, Ft. Myers, FL - Lee County Port Authority**		
Description	**Single Span FRP Composite Arch Bridge (32' Span)**		

Rating Type	Rating Type	Gross Axle Weight (tons)	Moment/Shear/Service		Dead Load Factor	Live Load Factor	Live Load Distrib. Factor (axles)	Rating Factor	Span No. - Girder No., Interior/Exterior, %Span-L	RF Weight (tons)
Level	**Vehicle**	**Weight**	**Member Type**	**Limit**	**DC**	**LL**	**LLDF**	**RF**	**Governing Location**	**RATING**
Inventory	HL93	36	Reinf. Concrete	Strength, Moment	1.25/0.90	1.75		1.010	Interior Arch, Node 24, 0.38L	36.4
Operating	HL93	36	Reinf. Concrete	Strength, Moment	1.25/0.90	1.35		1.310	Interior Arch, Node 24, 0.38L	47.2
Permit	FL120	60	Reinf. Concrete	Strength, Moment	1.25/0.90	1.35		1.010	Interior Arch, Node 26, 0.42L	60.6
Permit Max Span	FL120	60	Member Type	Limit Test	NA	NA		N/A		-1
Legal	SU2	17	Member Type	Limit Test	NA	NA				-1
	SU3	33	Member Type	Limit Test	NA	NA				-1
	SU4	35	Member Type	Limit Test	NA	NA				-1
	C3	28	Member Type	Limit Test	NA	NA				-1
	C4	36.7	Member Type	Limit Test	NA	NA				-1
	C5	40	Member Type	Limit Test	NA	NA				-1
	ST5	40	Member Type	Limit Test	NA	NA				-1

Original Design Load	HL93		Performed by:	Tim Kenerson	Date: 01/15/19
Rating Type, *Analysis*	LRFR-LRFD		Checked by:	Ken Sweeney	Date: 01/15/19
Distribution Method	Refined analysis		Sealed By:	Zeyn Uzman	Date: 01/17/19
Impact Factor	18.0%	(axle loading)	FL P.E. No.:	58874	
FL120 Gov. Span Length	32.0	(feet)	Cert. Auth. No.:	State Agency	
Recommended Posting	At/Above legal loads. Posting Not Required.		Phone & email:	610-320-2100, zeynu@aol.com	
Recommended SU Posting*	99	(tons)	Company:	Uzman Engineering	
Recommended C Posting	99	(tons)	Address:	305 Charleston Green, Malvern, PA 19355	
Recommended ST5 Posting	99	(tons)			
Floor Beam Present?	No				
Segmental Bridge?	No				
Project No. & Reason	NA	New Bridge			
Plans Status	Built				
Software Name, Version	AIT FEA - 2.1				

COMMENTS BY THE ENGINEER

Contents: summary, narrative, plans, calcs, check.

D1

TOPIC E

BRIDGE HISTORY

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

BRIDGE HISTORY

The structure was built in 2020 in Lee County.

The structure was designed by Advanced Infrastructure Technologies. The contractor was Thomas Marine Construction, Inc.

E1

TOPIC F

FIELD PREPARATION

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

TOPIC "F"
FIELD PREPARATION

Structure No.: 124142
Inspection Date: 1/30/2020

1. Tools and Equipment:

☒ Normal Inspection Tools ☐ Lift Barge
☐ Drone ☐ UB Access/Bucket Truck
☒ Jon Boat / Kayak ☐ Other: _

2. Services:

N/A

3. Scheduling: ☒ Daytime ☐ Nighttime

4. Site Conditions:

Provided / Estimated ADT:	2350		
Provided / Estimated % of Truck Traffic:	3%		
Mode of Flow:	☒Riverine	☐Tidal	☐Brackish
Embankment Conditions:	☒Good	☐Poor	
Vegetation Conditions:	☒Good	☐Poor	
Waterway:	☒Good	☐Poor	

5. Traffic Control Requirements:

☐ MOT ☐ Other: _

6. Underwater Inspection Requirements:

☐ SCUBA ☐ Surface Supplied Air ☒ N/A

Underwater Elements Inspected: N/A

7. Special Access Requirements:

Refer to Structure Notes in the report for information for Special Access, if any.

8. Manhours:

Travel to and from site: 2 hours x 2 people = 4
Inspection hours: 1.5 hours x 2 people = 3

9. Plans Available:

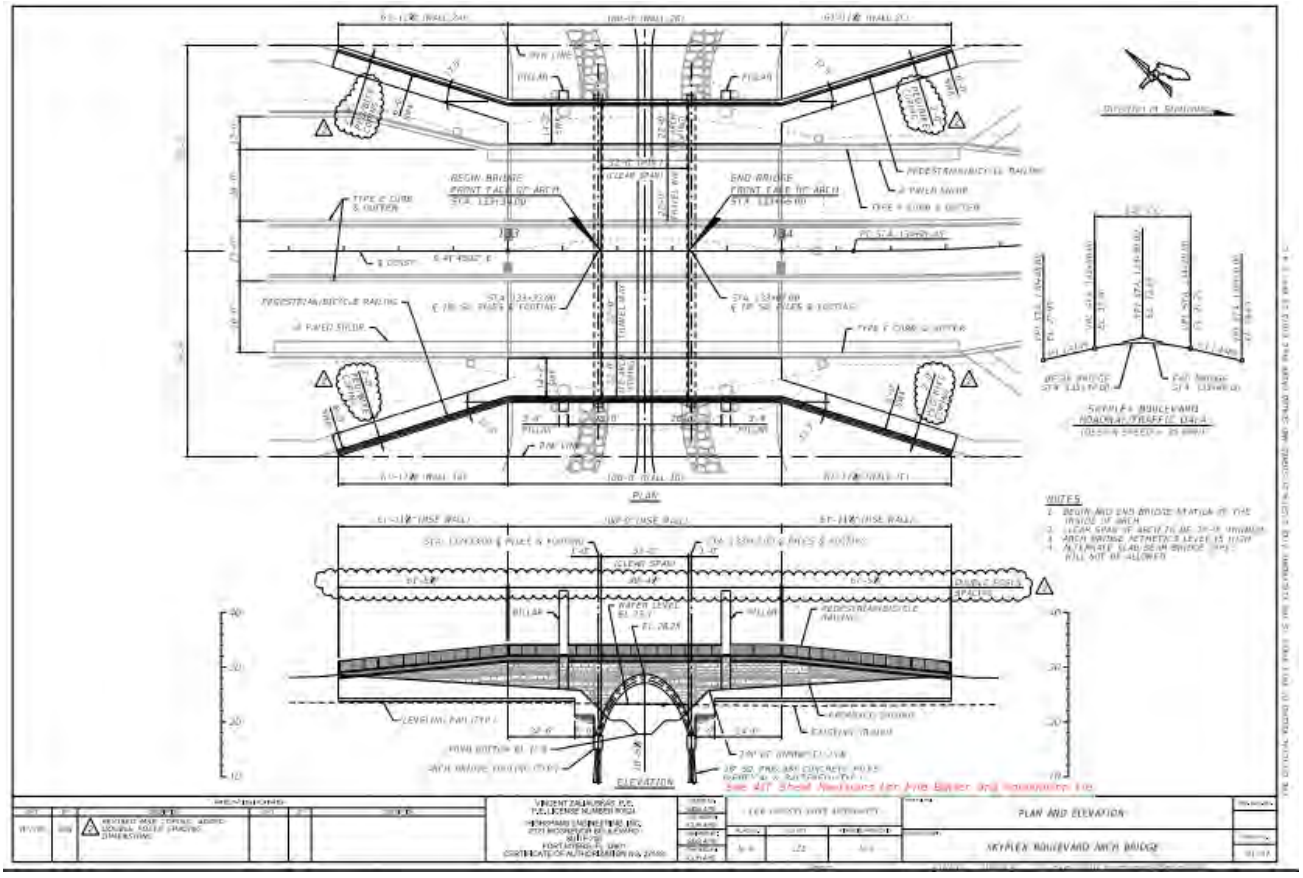
☒ Yes ☐ No

TOPIC G

BRIDGE DESCRIPTION AND DRAWINGS

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

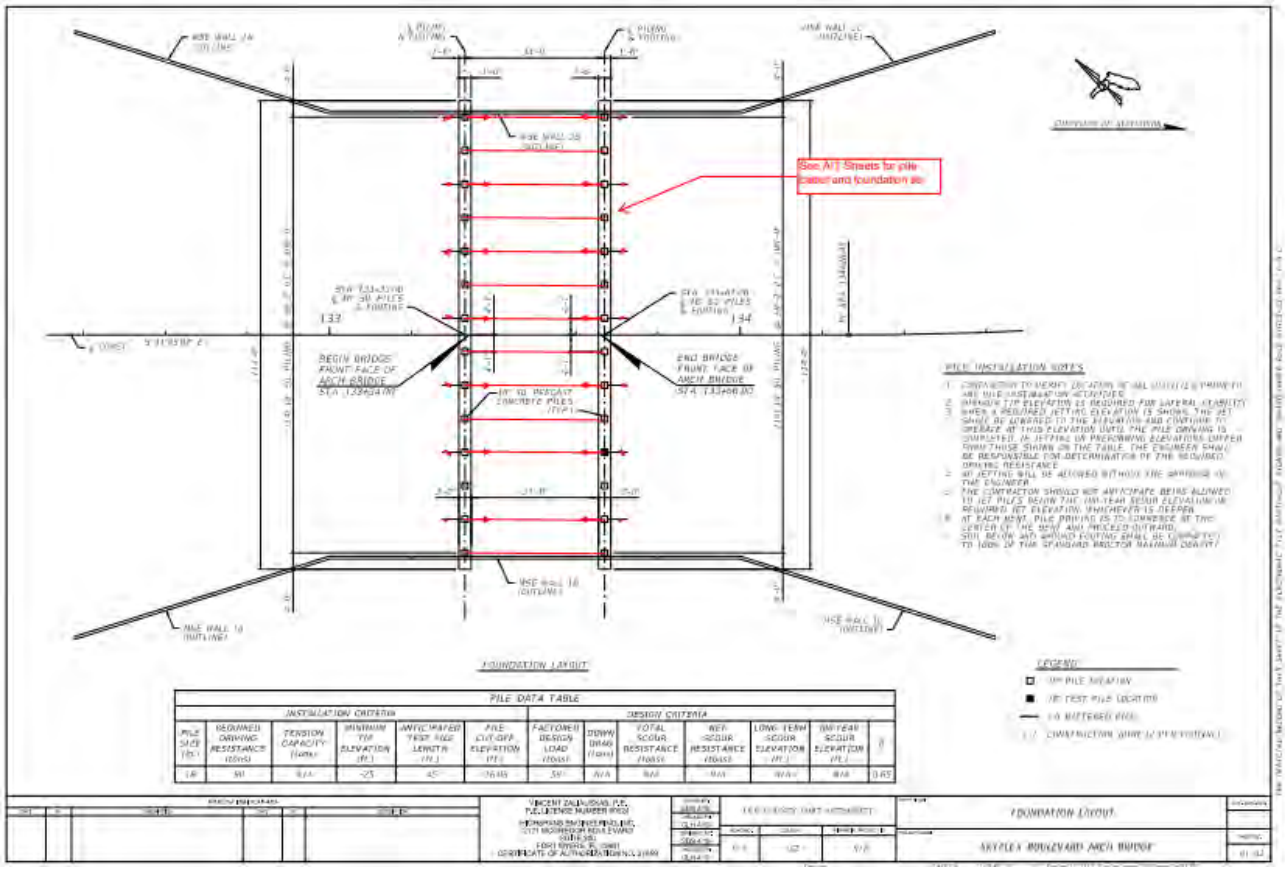


PLAN AND ELEVATION

G1

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

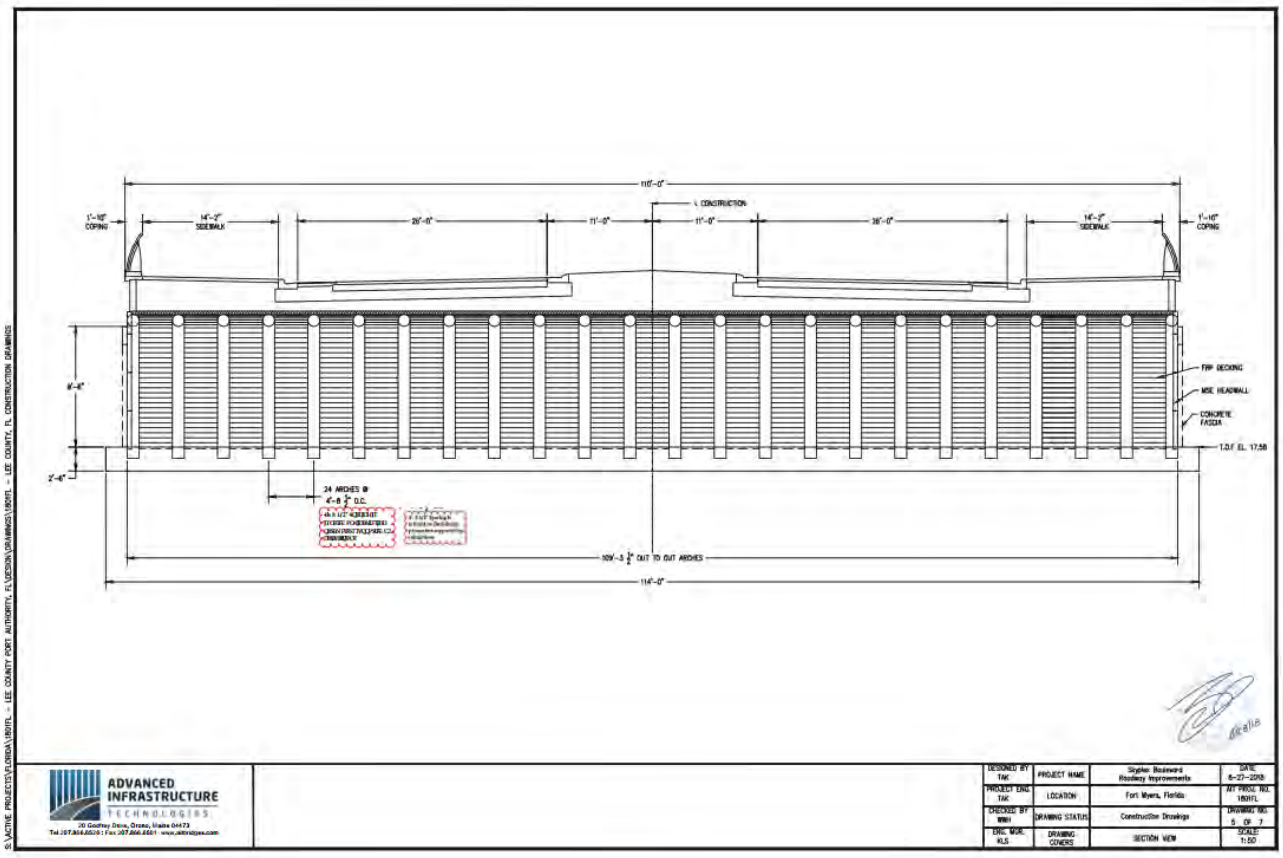


FOUNDATION LAYOUT

G2

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

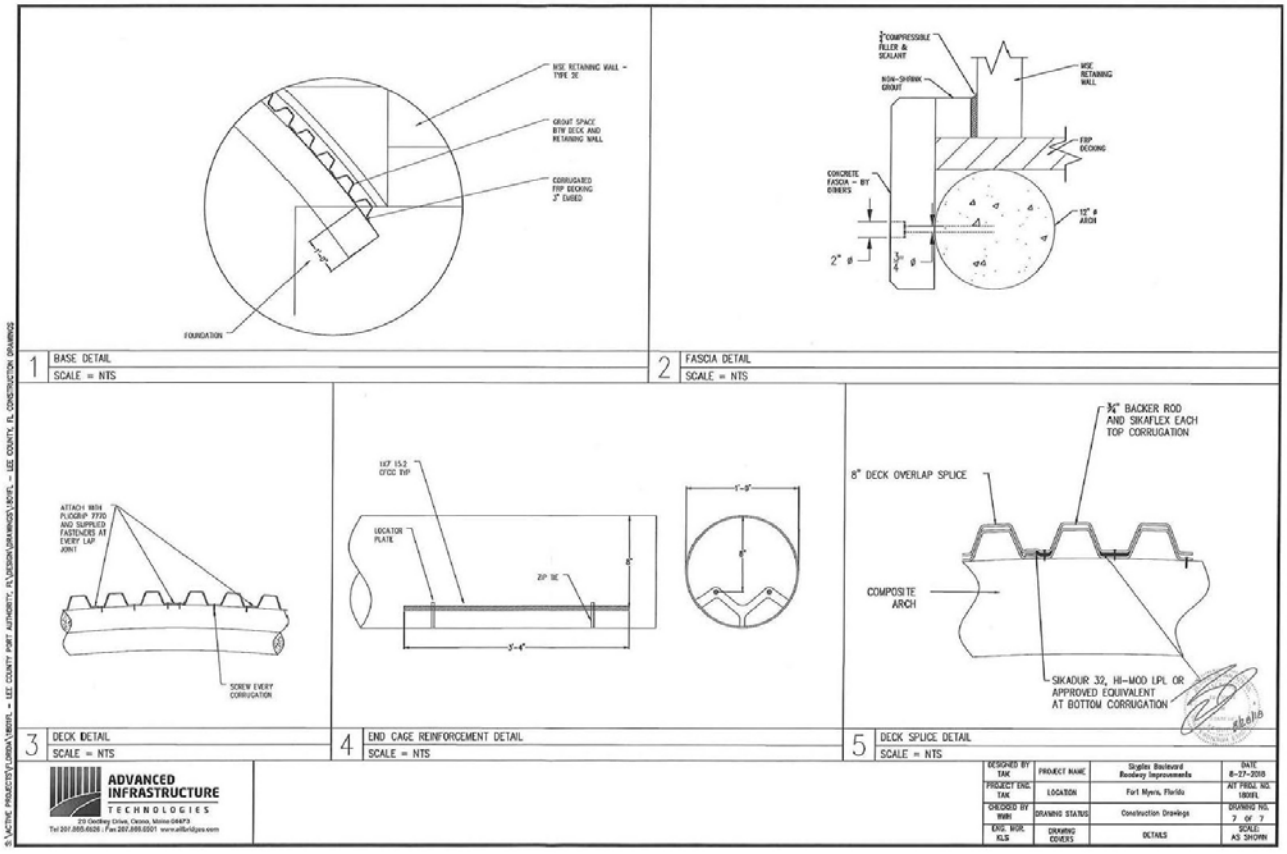


TYPICAL SECTION

G3

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

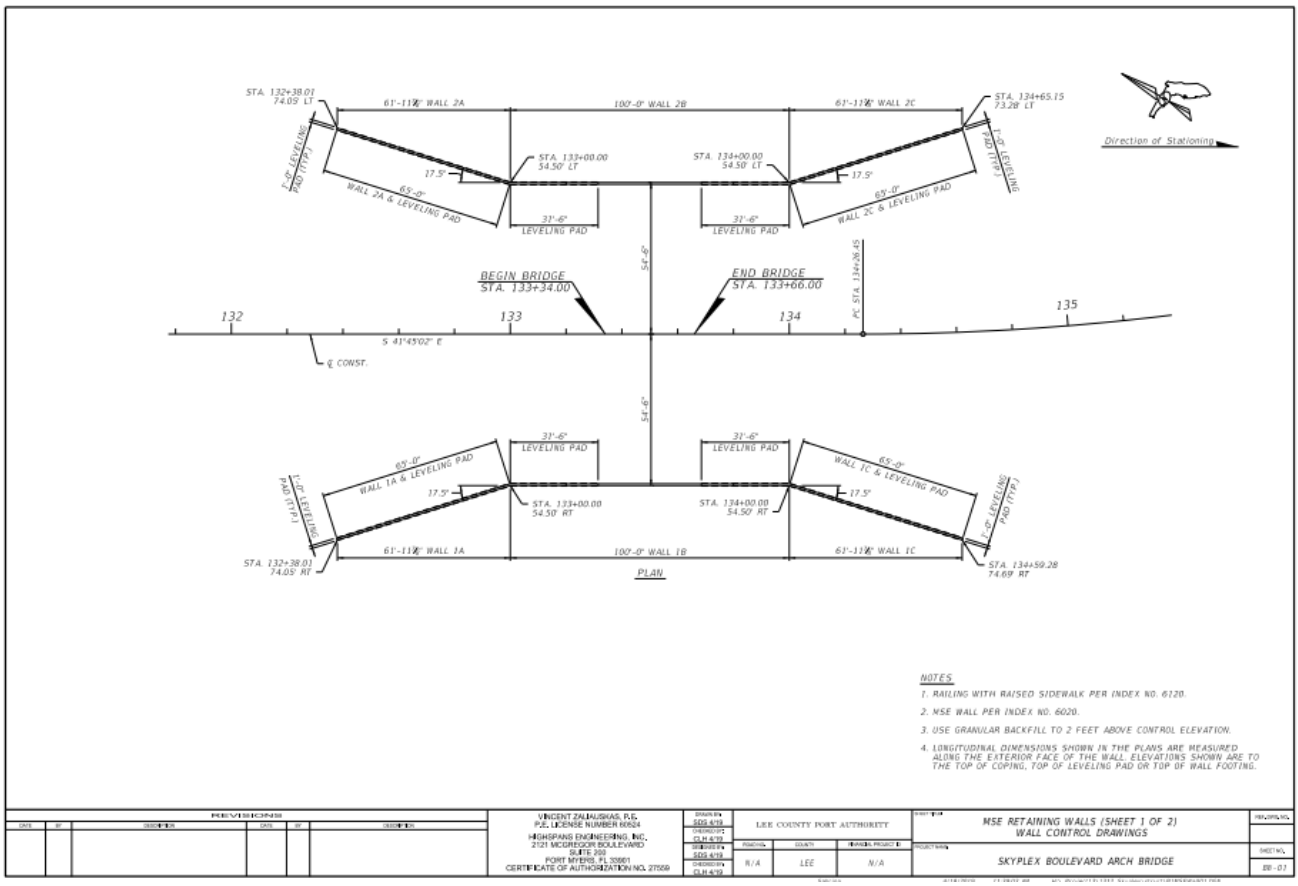


TYPICAL DETAILS

G4

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020



NOTES

1. RAILING WITH RAISED SIDEWALK PER INDEX NO. 6120.
2. MSE WALL PER INDEX NO. 6020.
3. USE GRANULAR BACKFILL TO 2 FEET ABOVE CONTROL ELEVATION.
4. LONGITUDINAL DIMENSIONS SHOWN IN THE PLANS ARE MEASURED ALONG THE EXTERIOR FACE OF THE WALL. ELEVATIONS SHOWN ARE TO THE TOP OF COPING, TOP OF LEVELING PAD OR TOP OF WALL FOOTING.

REVISIONS

VINCENT ZALAUSKAS, P.E.
P.E. LICENSE NUMBER 60624
HIGHSPANS ENGINEERING, INC.
2721 MCGREGOR BOULEVARD
SUITE 200
FORT MYERS, FL 33901
CERTIFICATE OF AUTHORIZATION NO. 27569

LEE COUNTY PORT AUTHORITY

MSE RETAINING WALLS (SHEET 1 OF 2)
WALL CONTROL DRAWINGS

SKYPLEX BOULEVARD ARCH BRIDGE

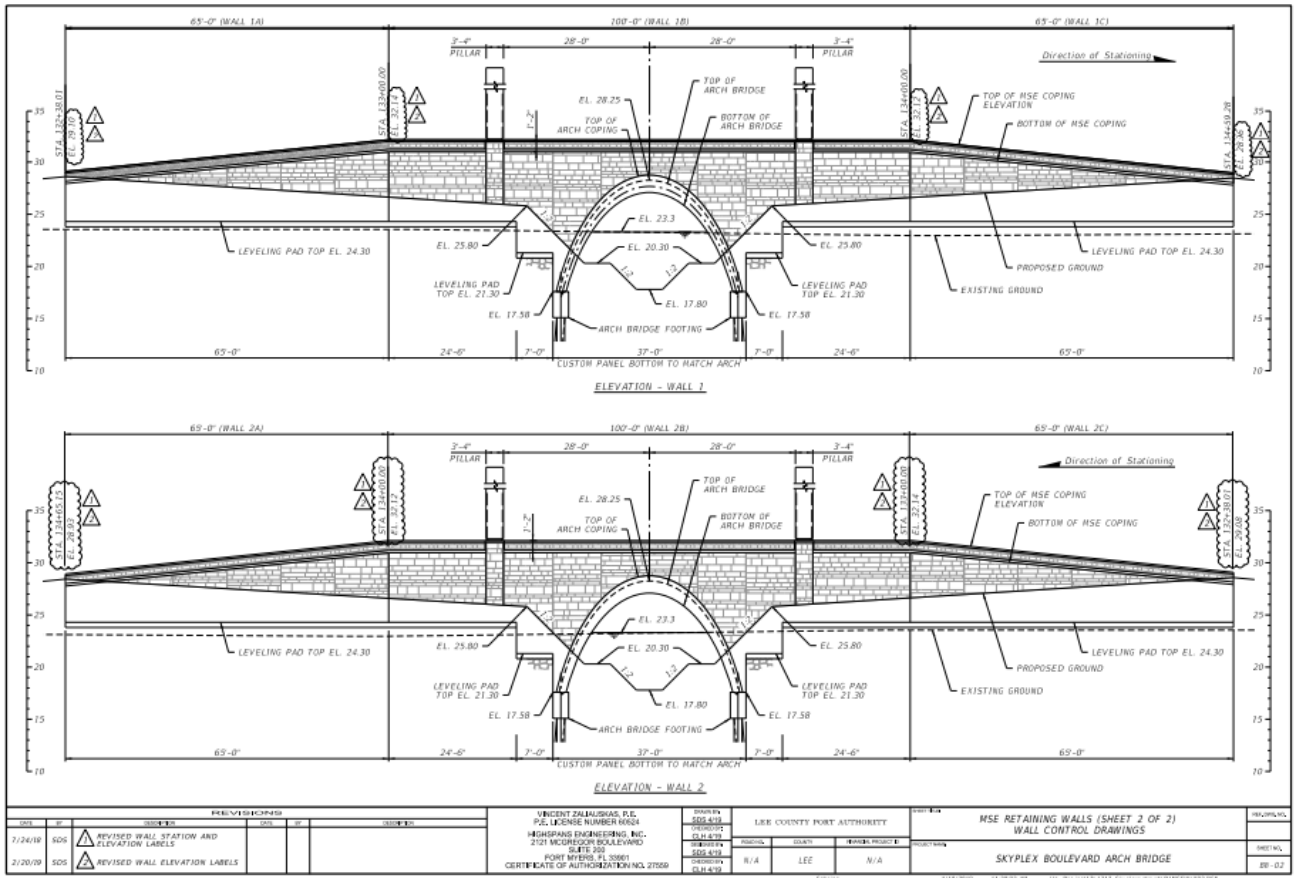
BB-03

MSE WALLS
PAGE 1 OF 2

G5

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020



REVISIONS							
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		
7/24/19	SDS	1 REVISED WALL STATION AND ELEVATION LABELS					
2/20/19	SDS	2 REVISED WALL ELEVATION LABELS					

VINCENT ZALIAUSKAS, P.E.
P.E. LICENSE NUMBER 60624
HIGHSPANS ENGINEERING, INC.
2121 MCGREGOR BOULEVARD
SUITE 200
FORT MYERS, FL 33901
CERTIFICATE OF AUTHORIZATION NO. 27559

DRAWN BY: SDS 4/19
CHECKED BY: CLH 4/19
DESIGNED BY: SDS 4/19
CHECKED BY: CLH 4/19

LEE COUNTY PORT AUTHORITY

REVIEWED | COUNTY | REVIEWED PROJECT #
N/A | LEE | N/A

MSE RETAINING WALLS (SHEET 2 OF 2)
WALL CONTROL DRAWINGS

SKYPLEX BOULEVARD ARCH BRIDGE

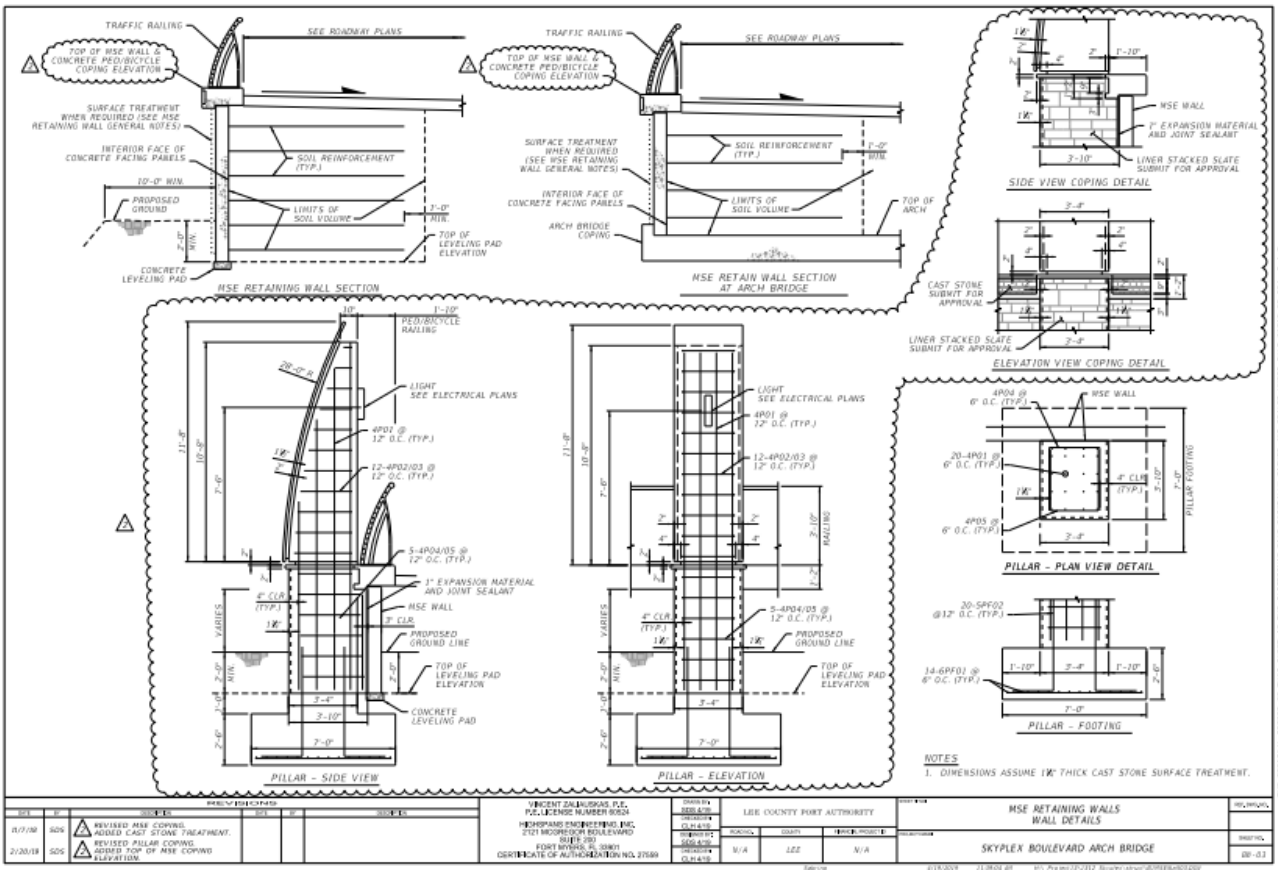
REV./SHEET NO.
SHEET NO.
BB-02

MSE WALLS
PAGE 2 OF 2

G6

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

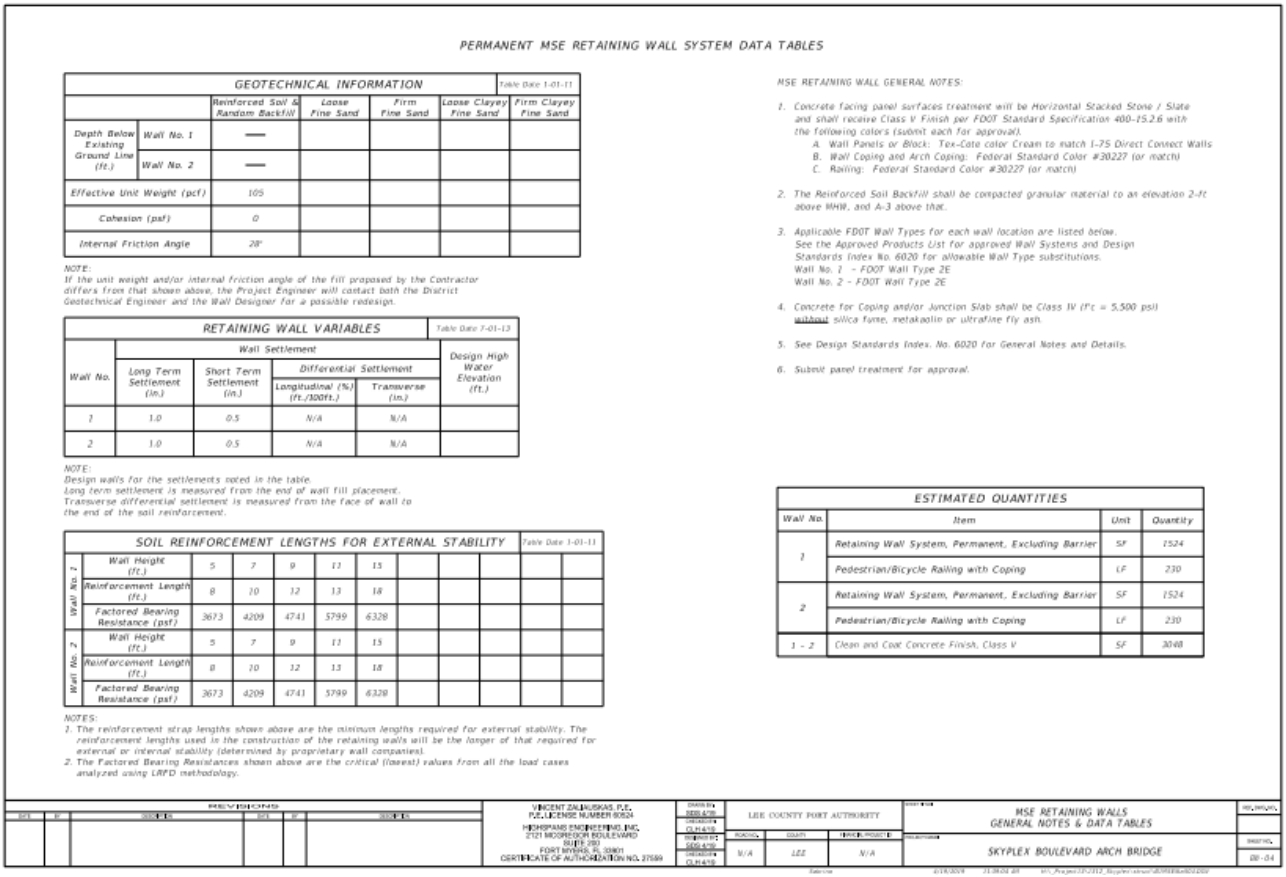
Bridge No.: 124142
Inspection Date: 01/30/2020



MSE WALLS DETAILS

G7

Bridge No.: 124142
Inspection Date: 01/30/2020



PERMANENT MSE RETAINING WALL SYSTEM DATA TABLES

GEOTECHNICAL INFORMATION — Table Date 1-01-11

		Reinforced Soil & Random Backfill	Loose Fine Sand	Firm Fine Sand	Loose Clayey Fine Sand	Firm Clayey Fine Sand
Depth Below Existing Ground Line (ft.)	Wall No. 1	—				
	Wall No. 2	—				
Effective Unit Weight (pcf)		105				
Cohesion (psf)		0				
Internal Friction Angle		28°				

NOTE:
If the unit weight and/or internal friction angle of the fill proposed by the Contractor differs from that shown above, the Project Engineer will contact both the District Geotechnical Engineer and the Wall Designer for a possible redesign.

RETAINING WALL VARIABLES — Table Date 7-01-13

Wall No.	Wall Settlement: Long Term Settlement (in.)	Wall Settlement: Short Term Settlement (in.)	Differential Settlement: Longitudinal (%) (ft./100ft.)	Differential Settlement: Transverse (in.)	Design High Water Elevation (ft.)
1	1.0	0.5	N/A	N/A	
2	1.0	0.5	N/A	N/A	

NOTE:
Design walls for the settlements noted in the table.
Long term settlement is measured from the end of wall fill placement.
Transverse differential settlement is measured from the face of wall to the end of the soil reinforcement.

SOIL REINFORCEMENT LENGTHS FOR EXTERNAL STABILITY — Table Date 1-01-11

Wall No. 1	Wall Height (ft.)	5	7	9	11	15					
	Reinforcement Length (ft.)	8	10	12	13	18					
	Factored Bearing Resistance (psf)	3673	4209	4741	5799	6328					
Wall No. 2	Wall Height (ft.)	5	7	9	11	15					
	Reinforcement Length (ft.)	8	10	12	13	18					
	Factored Bearing Resistance (psf)	3673	4209	4741	5799	6328					

NOTES:
1. The reinforcement strap lengths shown above are the minimum lengths required for external stability. The reinforcement lengths used in the construction of the retaining walls will be the longer of that required for external or internal stability (determined by proprietary wall companies).
2. The Factored Bearing Resistances shown above are the critical (lowest) values from all the load cases analyzed using LRFD methodology.

MSE RETAINING WALL GENERAL NOTES:

1. Concrete facing panel surfaces treatment will be Horizontal Stacked Stone / Slate and shall receive Class V Finish per FDOT Standard Specification 400-15.2.6 with the following colors (submit each for approval).
   A. Wall Panels or Block: Tex-Cote color Cream to match I-75 Direct Connect Walls
   B. Wall Coping and Arch Coping: Federal Standard Color #30227 (or match)
   C. Railing: Federal Standard Color #30227 (or match)
2. The Reinforced Soil Backfill shall be compacted granular material to an elevation 2-ft above MHW, and A-3 above that.
3. Applicable FDOT Wall Types for each wall location are listed below. See the Approved Products List for approved Wall Systems and Design Standards Index No. 6020 for allowable Wall Type substitutions.
   Wall No. 1 - FDOT Wall Type 2E
   Wall No. 2 - FDOT Wall Type 2E
4. Concrete for Coping and/or Junction Slab shall be Class IV (f'c = 5,500 psi) without silica fume, metakaolin or ultrafine fly ash.
5. See Design Standards Index. No. 6020 for General Notes and Details.
6. Submit panel treatment for approval.

ESTIMATED QUANTITIES

Wall No.	Item	Unit	Quantity
1	Retaining Wall System, Permanent, Excluding Barrier	SF	1524
	Pedestrian/Bicycle Railing with Coping	LF	230
2	Retaining Wall System, Permanent, Excluding Barrier	SF	1524
	Pedestrian/Bicycle Railing with Coping	LF	230
1 - 2	Clean and Coat Concrete Finish, Class V	SF	3048

REVISIONS

VINCENT ZALINUSKAS, P.E.
P.E. LICENSE NUMBER 60524
HIGHSPANS ENGINEERING, INC.
2121 MCGREGOR BOULEVARD
SUITE 200
FORT MYERS, FL 33901
CERTIFICATE OF AUTHORIZATION NO. 27599

LEE COUNTY PORT AUTHORITY

ROADWAY	COUNTY	FINANCIAL PROJECT ID
N/A	LEE	N/A

MSE RETAINING WALLS
GENERAL NOTES & DATA TABLES

SKYPLEX BOULEVARD ARCH BRIDGE

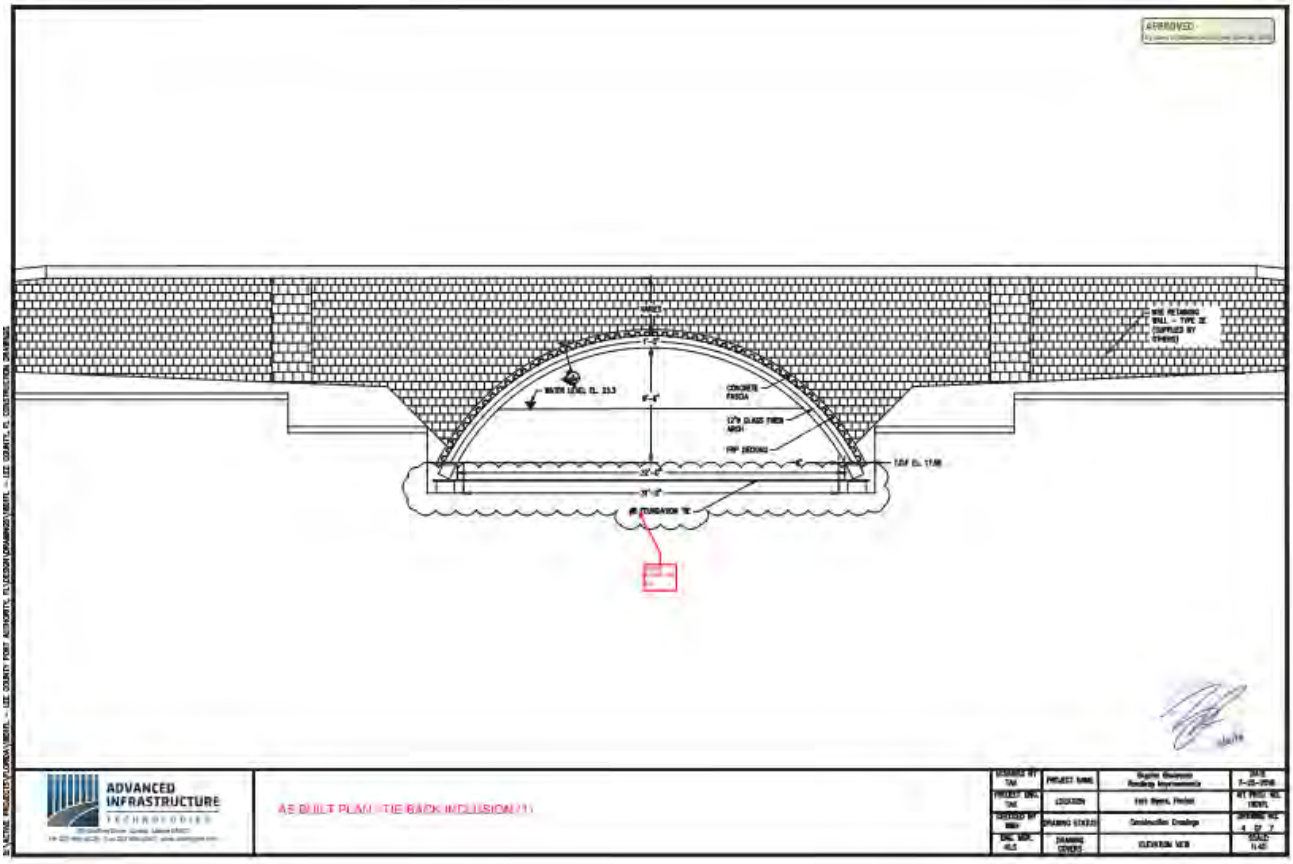
08-04

MSE WALL GENERAL NOTES AND DATA TABLES

G8

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

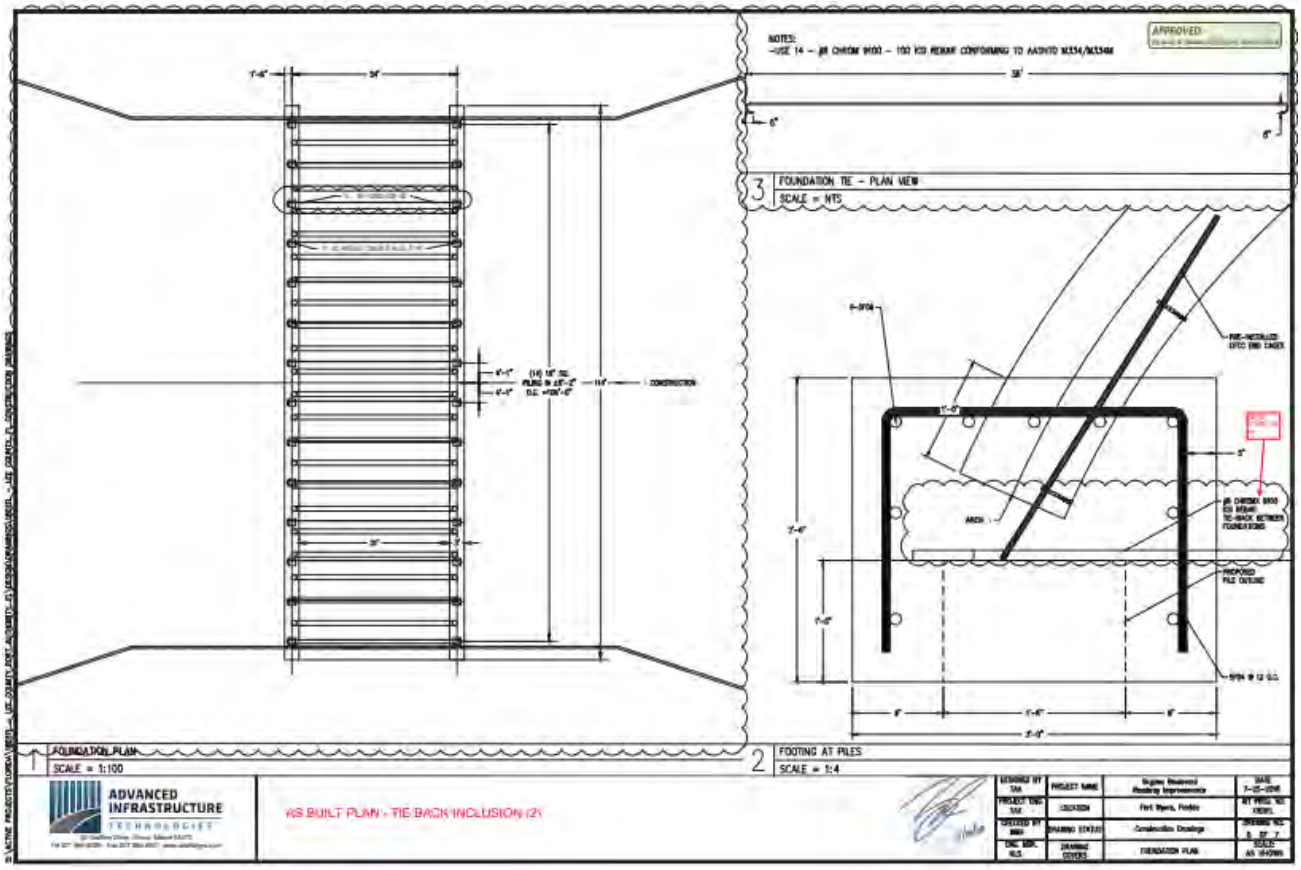


TIE BACK INCLUSION
PAGE 1 OF 2

G9

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020

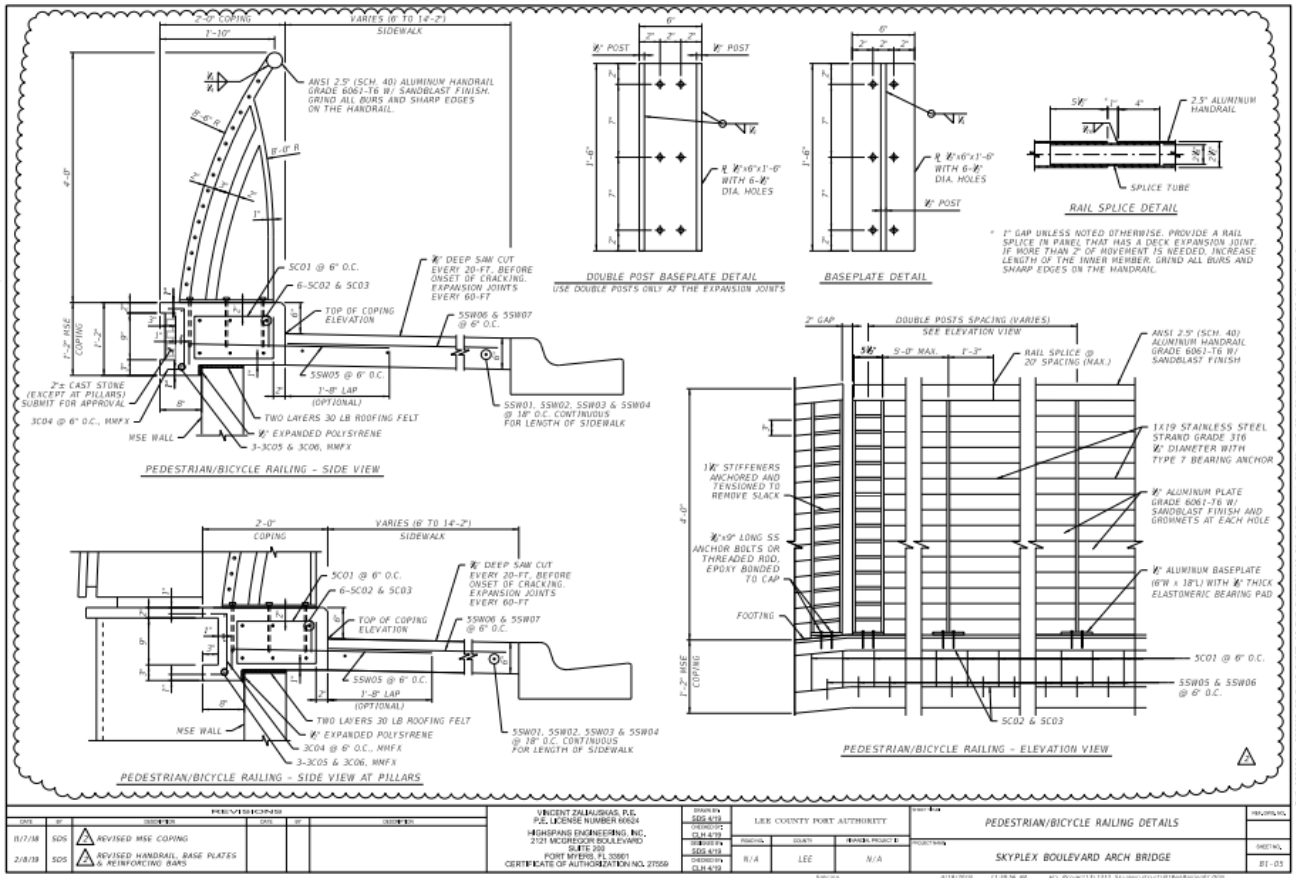


TIE BACK INCLUSION
PAGE 2 OF 2

G10

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No.: 124142
Inspection Date: 01/30/2020



PEDESTRIAN RAILING DETAILS

G11

TOPIC I

CHANNEL AND SCOUR INFORMATION

BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

WEST CHANNEL

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BRIDGE ID : 124142

Structure Inventory Photo Due Date : 01/30/2030

EAST CHANNEL

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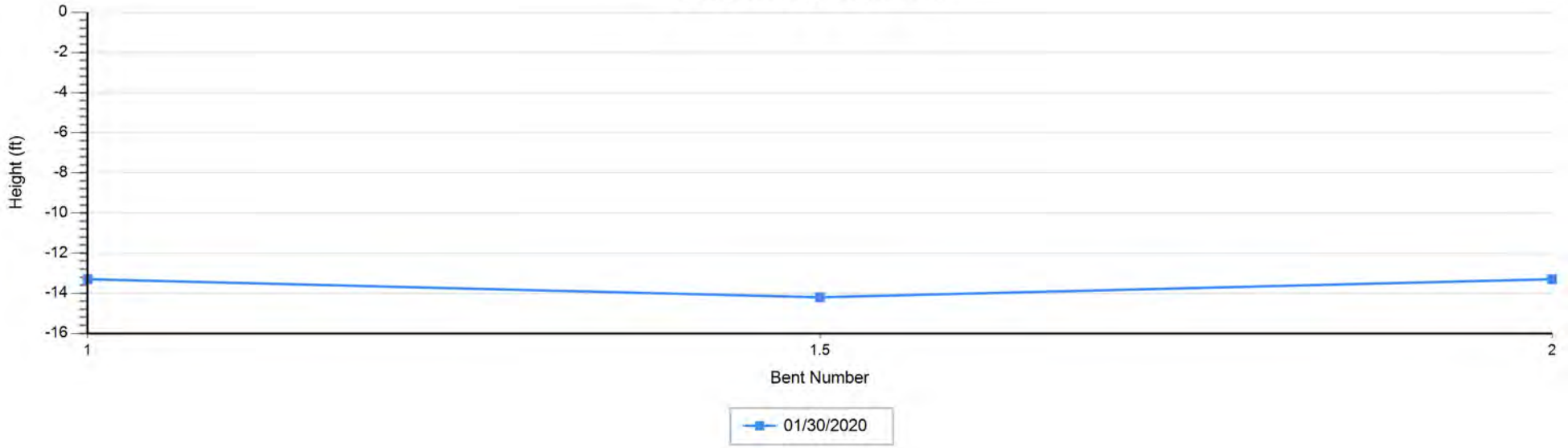
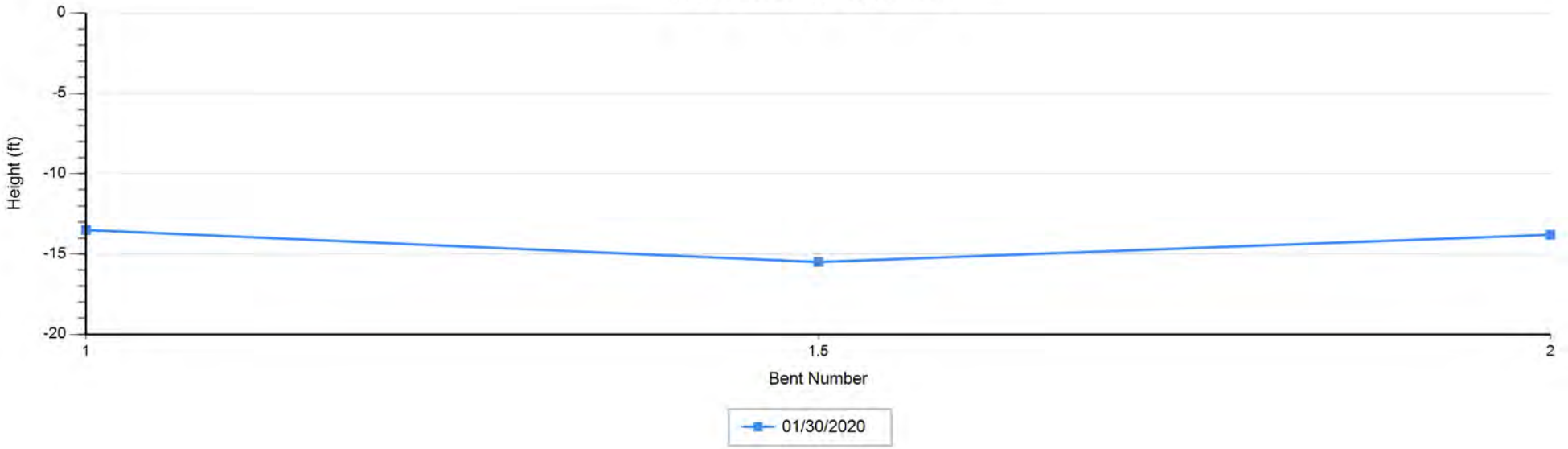
FLORIDA DEPARTMENT OF TRANSPORTATION BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Bridge Profile

DATE PRINTED: 3/18/2020 3:02:41 PM

Left Profile by Inspection



Right Profile by Inspection



This report contains information relating to the physical security of a structure and depictions of the structure. This information is confidential and exempt from public inspection pursuant to sections 119.071(3)(a) and 119.071(3)(b), Florida Statutes. Only the cover page of this report may be inspected and copied.

FLORIDA DEPARTMENT OF TRANSPORTATION BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report
Bridge Profile

DATE PRINTED: 3/18/2020 3:02:41 PM

Profile Data - Numerical Summary

Inspection Date and Key: 1/30/2020 TZAV

Bent #	Left Height	Right Height
1	13.30	13.50
1.5	14.20	15.50
2	13.30	13.80

(All Heights are in Feet)

Air Temp:

Profile Notes:

Measurements referenced to top of sidewalk coping.
Waterline taken at centerline of channel: Left and Right = 11.3ft.

This report contains information relating to the physical security of a structure and depictions of the structure. This information is confidential and exempt from public inspection pursuant to sections 119.071(3)(a) and 119.071(3)(b), Florida Statutes. Only the cover page of this report may be inspected and copied.

SECTION III

COMMUNICATIONS

III. COMMUNICATIONS

BRIDGE NUMBER: 124142
BRIDGE NAME: SKYPLEX BLVD BRIDGE

DOCUMENT LOG	
Type of Communication	Date Published
MEMO: Bridge Number Assignment Memorandum	12/09/2019
MEMO: Initial Inspection Request Form 2009	12/19/2019

MEMORANDUM

Districts 1 & 7 Structures Maintenance Office
2916 Leslie Road, Tampa, FL 33619
(813) 975-7570 • Fax: (813) 975-7590

DATE: December 9, 2019

TO: Vince Zaliauskas, P.E.; HighSpans Engineering, Inc. 2121 McGregor Blvd. #200, Fort Myers, FL 33901

FROM: Tara Rodrigues, P.E., Engineering Section Manager

COPIES: Tara Rodrigues, P.E., Engineering Section Manager, Nico Antona, DBi; Vicki Griswold Hitch, DBi; Bridge Number Log

SUBJECT: **Bridge Number Assignment**

Your request for a Bridge Number Assignment has been granted as follows:

FINANCIAL PROJECT ID: **N/A** OWNER: **COUNTY** **(Ex: State, County, City Name, Other [specify])**
EOR name; Design firm, address: **Vince Zaliauskas, P.E.; HighSpans Engineering, Inc. 2121 McGregor Blvd. #200, Fort Myers, FL 33901**

COUNTY: **Lee** SECTION/SUBSECTION: **12000000** **(Refer to SLD's)** BEGIN M.P.: **N/A**(APPOX.)
COUNTY ROAD NO.: **N/A** U.S./SR ROAD NO.: **N/A** **(Example: I-75/SR 93)**
YEAR BUILT - PROPOSED: **2020** OR ACTUAL: _____ (if already built)
(Year Built (Proposed or Actual) pertains to the New Bridge Structure)

Bridge Character Description (please check):

COMPOSITE: ✓ LEFT: _____ RIGHT: RAMP:
(Composite means two way traffic. "Left" or "Right" means - Facing Station Ahead: South to North/West to East)

LENGTH: **32 ft** WIDTH: **114 ft**
(The Length and Width Dimensions are for the New Bridge Structure. Bridge Culvert Length is parallel with Roadway)

BRIDGE NAME: **Skyplex Blvd. Bridge**
LOCATION: **309ft south of CR 876 Daniels Parkway [26°32'56.41"N / 81°45'31.10"W]**
(Example: 1.5 miles North of SR 64 [optional: In addition to description use map software to provide Lat./Long.])

Bridge Over (please check): RAILROAD: _____ WATER: ✓ ROADWAY:

STRUCTURE TYPE: **2** (see options below)
(Based on Vertical under clearance)
1. OVERPASS
2. LOW (<20.0ft)
3. MEDIUM LEVEL (≥20.0ft – 45.0ft)
4. HIGH LEVEL (>45.0ft)
5. MOVEABLE SPAN
6. RAILROAD
7. OTHER (explain) _____
(i.e: Bridge Culvert, Segmental Cable Stay, Precast Box Culvert)

FA _____ NFA ✓

Note: 08, 09, & 19 = NFA

FUNCTIONAL CLASSIFICATION OF INVENTORY ROUTE CODE: **19** (see options below)

Code	Description
	Rural
01	Principal Arterial – Interstate
02	Principal Arterial – Other
06	Minor Arterial
07	Major Collector
08	Minor Collector
09	Local
	Urban
11	Principal Arterial – Interstate
12	Principal Arterial – Other Freeways or Expressways
14	Other Principal Arterial
16	Minor Arterial
17	Collector
19	Local

EXISTING BRIDGE NUMBER TO BE REPLACED: **N/A**
NEW BRIDGE NUMBER ASSIGNED: **124142**

DATE: 12/19/19

TO: James J. Jacobsen, P.E., District 1 and 7 Structures Maintenance Engineer;

FROM: **Vince Zaliauskas, P.E. Principal Engineer HighSpans Engineering, Inc.**

COPIES: Tara Rodrigues, P.E., Engineering Section Manager, Doug Schallmoser, E.I., Structures Project Manager

SUBJECT: **REQUEST FOR INITIAL BRIDGE INSPECTION**

Please complete this form for each bridge or culvert with a total length of 20 feet or greater on your project. The Initial Inspection date should be requested after the structure is substantially complete, preferably before the contractor leaves the job site. However, the Initial Inspection must be done, before the bridge or culvert is opened to traffic.

The Engineer of Record must confirm that the Design Load Rating is still applicable or produce a revised As-Built Load Rating in accordance with CPAM 10.11.4 if any changes made during construction affect the capacity of the structure. If the Design Load Rating is still applicable, a signed and sealed As-Built Letter and a new load rating summary sheet specifying the load rating origination field as "As-Built" must be submitted. However, if an As-Built Load Rating is produced, such must be submitted as an "As-Built Load Rating" and the load rating origination field on the load rating summary sheet shall also be specified as "As-Built" with the accompanying new backup calculations.

BRIDGE INFORMATION:

BRIDGE NUMBER: 124142 BRIDGE NAME: Skyplex Blvd. Bridge

BRIDGE LOCATION: 309ft south of CR 876 Daniels Parkway [26°32'56.41"N / 81°45'31.10"W]

COUNTY: Lee

SECTION/SUBSECTION: 12000000 (refer to SLDs)

ROAD NUMBER: N/A M.P. AND/OR STATION: N/A

BRIDGE OVER: RAILROAD: ☐ WATER: ☒ ROADWAY: ☐

PROJECT INFORMATION:

FPN or SPN: N/A SCHEDULED COMPLETION DATE: 2020

SCHEDULED FINAL CONSTRUCTION INSPECTION DATE: 1/07/2020

	YES	NO
HAS ALL CONCRETE AND STEEL BEEN PLACED?	◉	○
ARE ALL SURFACES AVAILABLE FOR INSPECTION? (FREE OF DEBRIS, FORMS, MATERIALS)	◉	○
EQUIPMENT/MATERIAL HAS BEEN REMOVED OVER AND UNDER STRUCTURE TO FACILITATE INSPECTION?	◉	○
ARE ALL TRAFFIC BARRIERS / RAILINGS PLACED?	◉	○
ARE BOTH APPROACH SLABS PLACED?	◉	○

HAVE ALL OTHER ITEMS REQUIRED BY CONSTRUCTION PLANS BEEN COMPLETED?	◉	○

IF NO, WHAT ITEMS ARE STILL PENDING?

Bridge # not painted on the coping yet; contract plans to paint 2" #s in black paint.

SPECIAL INSPECTION REQUIREMENTS*:*
Concrete-filled CFRP arches with rebar tie between footings. Tie inspection may require hand digging under water. Maintaining agency is **Lee County Port Authority**

DESIRED INITIAL INSPECTION DATE: 1/30/2019
(IF POSSIBLE ALLOW A MINIMUM 45 DAY NOTICE)

CONSTRUCTION PLANS, "AS-BUILT" LOAD RATINGS, AND APPLICABLE SHOP DRAWINGS MUST BE SUBMITTED WITH INITIAL INSPECTION REQUEST. SUBMIT AVAILABLE PILE DRIVING RECORDS.

CONFIRM CONSTRUCTION PLANS, "AS-BUILT" LOAD RATINGS, AND APPLICABLE SHOP DRAWINGS

ATTACHED BY: **Vince Zaliauskas, P.E.** **11/22/19**
NAME DATE

CONTACT INFORMATION:

COMPANY: **HighSpans Engineering, Inc.**

OFFICE PHONE: **239-433-3000**

NAME: **Vince Zaliauskas, P.E.**

TITLE: **Principal Engineer**

CELL PHONE: **239-443-7010**

EMAIL: **VinceZ@highspans.com**

NOTE: The initial inspections are not punch lists and the Project Manager must not depend on the initial inspections to complete a project. Initial inspections intent are to verify the current condition of the bridge and to establish parameters for future inspections. CEI services shall have adequate personnel to evaluate the structure and determine any deficiencies. The Contractor performing the initial inspections may select to provide a list of findings. However, they are not responsible for the punch list or corrections needed thereafter. Initial inspections shall be performed after all elements of the structure have been installed with the intent being to establish parameters for future inspections.

Highway Bridge Inspection Report

BR# 0077

ROYAL RIVER

OLD DANVILLE RD

Over

ROYAL RIVER

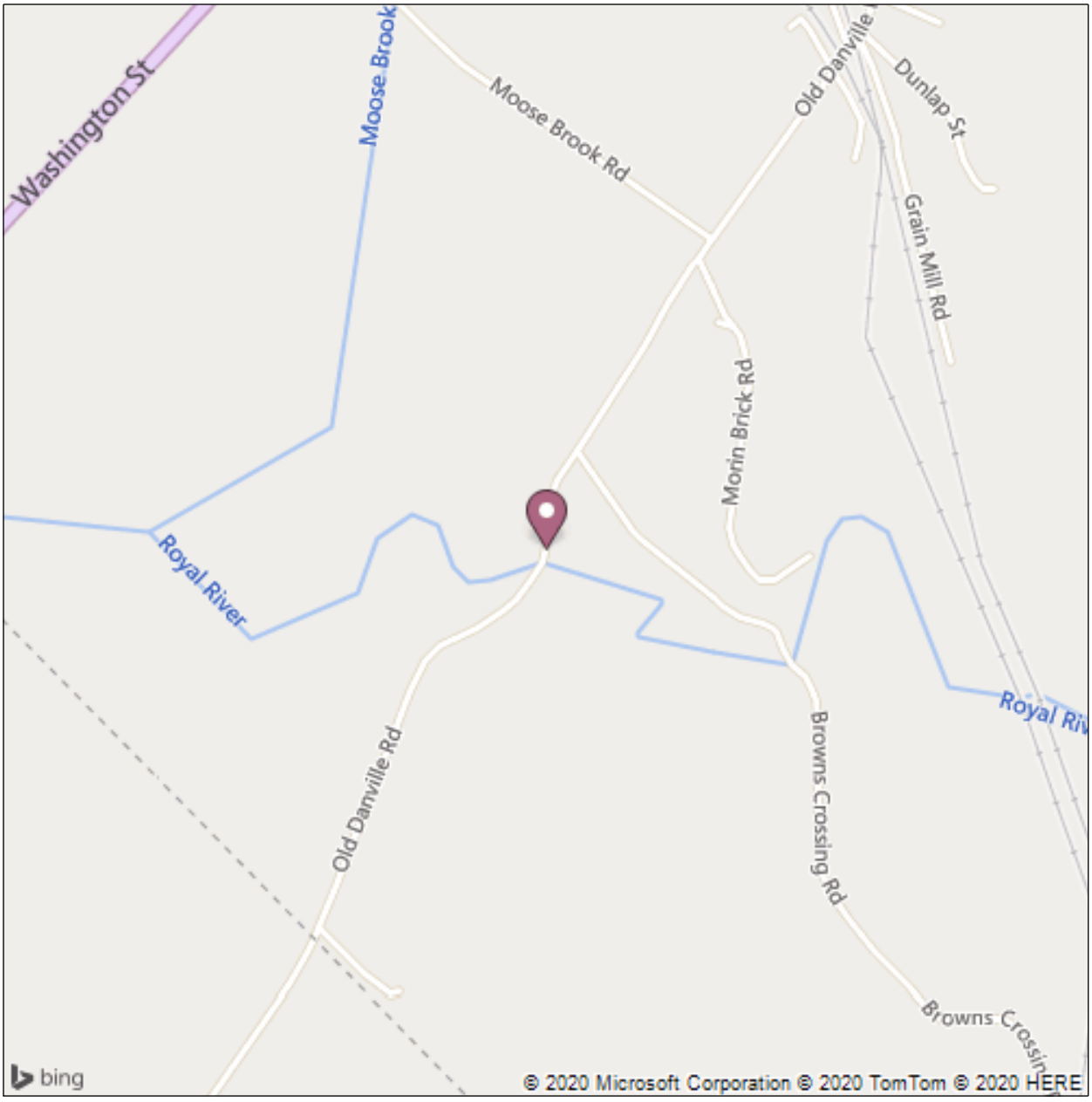
Town:
Auburn

Inspection Date: 11/13/2020

Inspected By: Kleinfelder,Kleinfelder

Inspection Type(s): Routine

Location Map



Latitude: 44.01493

Longitude: -70.27187

National Bridge Inventory

Status: 0 - ND Bridge Name: **ROYAL RIVER** Sufficiency Rating: 97.0

Inspections

(90) INSPECTION DATE & (91) DESIGNATED INSPECTION FREQUENCY		24	11/13/2020
(92) CRITICAL FEATURE INSPECTION & (93) CFI DATE			
(92A) FRACTURE CRITICAL DETAIL	N		
(92B) UNDERWATER INSPECTION	N		
(92C) OTHER SPECIAL INSPECTION	N		

Identification

(1) STATE CODE	231 - Maine
(8) STRUCTURE NUMBER	0077
(5) INVENTORY ROUTE	
(5A) RECORD TYPE	1: Route carried "on" the structure
(5B) ROUTE SIGNING PREFIX	5 - CITY STREET
(5C) DESIGNATED LEVEL OF SERVICE	0 - None
(5) INVENTORY ROUTE	0
(5) INVENTORY ROUTE	0 - NOT APPLICABLE
(2) HIGHWAY AGENCY DISTRICT	01 - Southern
(3) COUNTY CODE	001 Androscoggin
(4) PLACE CODE	02060
(6) FEATURES INTERSECTED	ROYAL RIVER
(7) FACILITY CARRIED	OLD DANVILLE RD
(9) LOCATION	1.8 MI N RT 5 202 /100/4
(11) MILEPOINT	0
(12) BASE HIGHWAY NETWORK	Inventory Route is not on the Base Network
(13) LRS INVENTORY ROUTE, SUBROUTE	
(13A) LRS INVENTORY ROUTE	0000110290
(13B) SUBROUTE NUMBER	00
(16) LATITUDE	44.01493
(17) LONGITUDE	-70.27187
(98A) BORDER BRIDGE CODE	
(98B) PERCENT RESPONSIBILITY	0
(99) BORDER BRIDGE STRUCT NO.	n/a

Structure Type and Material

(43) STRUCTURE TYPE, MAIN	
(43A) KIND OF MATERIAL/DESIGN	0 - Other
(43B) TYPE OF DESIGN/CONSTR	19 - Culvert (includes frame culverts)
(44) STRUCTURE TYPE, APPROACH SPANS	
(44A) KIND OF MATERIAL/DESIGN	0 - Other
(44B) TYPE OF DESIGN/CONSTRUCTION	00 - Other
(45) NUMBER OF SPANS IN MAIN UNIT	1
(46) NUMBER OF APPROACH SPANS	0
(107) DECK STRUCTURE TYPE	N - Not Applicable
(108) WEARING SURFACE/PROTECTIVE SYSTEMS	
(108A) WEARING SURFACE	N - NA
(108B) DECK MEMBRANE	N - NA
(108C) DECK PROTECTION	N - NA

Age of Service

(27) YEAR BUILT	2010
(106) YEAR RECONSTRUCTED	0
(42) TYPE OF SERVICE	
(42A) TYPE OF SERVICE ON BRIDGE	1 - Highway
(42B) TYPE OF SERVICE UNDER BRIDGE	5 - Waterway
(28) LANES	
(28A) LANES ON THE STRUCTURE	02
(28B) LANES UNDER THE STRUCTURE	00
(29) AVERAGE DAILY TRAFFIC	210
(30) YEAR OF AVERAGE DAILY TRAFFIC	2016
(109) AVERAGE DAILY TRUCK TRAFFIC	5
(19) BYPASS DETOUR LENGTH	1

Geometric Data

(48) LENGTH OF MAXIMUM SPAN (ft.)	38.0
(49) STRUCTURE LENGTH (ft.)	38.0
(50) CURB/SIDEWALK WIDTHS	
(50A) LEFT CURB SIDEWALK (ft.)	0
(50B) RIGHT CURB SIDEWALK (ft.)	0
(51) BRDG RDWY WIDTH CURB-TO-CURB (ft.)	0
(52) DECK WIDTH, OUT-TO-OUT (ft.)	0
(32) APPROACH ROADWAY WIDTH (ft.)	26.0
(33) BRIDGE MEDIAN	0 - No median
(34) SKEW (deg.)	15
(35) STRUCTURE FLARED	0 - No flare
(10) INV RTE, MIN VERT CLEARANCE (ft.)	328.05
(47) TOTAL HORIZONTAL CLEARANCE (ft.)	28.0
(53) VERTICAL CLEARANCE OVER BRIDGE ROADWAY (ft.)	327.76
(54) MIN VERTICAL UNDERCLEARANCE	
(54A) REFERENCE FEATURE	N - Feature not a highway or railroad
(54B) MIN VERTICAL UNDERCLEARENCE (ft.)	0
(55) MIN LATERAL UNDER CLEARANCE RIGHT	
(55A) REFERENCE FEATURE	N - Feature not a highway or railroad
(55B) MIN LATERAL UNDER CLEARANCE RIGHT (ft.)	327.76
(56) MIN LATERAL UNDER CLEARANCE (ft.)	99.9

Classification

(112) NBIS BRIDGE LENGTH	Yes
(104) HIGHWAY SYSTEM OF THE INVENTORY ROUTE	0 - Structure/Route is NOT on NHS
(26) FUNCTIONAL CLASSIFICATION OF INVENTORY ROUTE	19 - Urban - Local
(100) STRAHNET HIGHWAY DESIGNATION	Not a STRAHNET route
(101) PARALLEL STRUCTURE DESIGNATION	N - No parallel structure
(102) DIRECTION OF TRAFFIC	2-way traffic
(103) TEMP STRUCTURE	
(105) FEDERAL LANDS HIGHWAYS	Not Applicable
(110) DESIGNATED NATIONAL NETWORK	Inventory route not on network
(20) TOLL	3 - On Free Road
(21) MAINTENANCE RESPONSIBILITY	01 - State Highway Agency
(22) OWNER	01 - State Highway Agency
(37) HISTORICAL SIGNIFICANCE	4 - Not determinable

Condition

(58) DECK	N - Not Applicable
(59) SUPERSTRUCTURE	N - Not Applicable
(60) SUBSTRUCTURE	N - Not Applicable
(61) CHANNEL & CHANNEL PROTECTION	9 - No noticeable deficiencies
(62) CULVERT	8 - No noticeable or noteworthy deficiencies

Load Rating and Posting

(31) DESIGN LOAD	9 - HS 25 or greater
(63) METHOD USED TO DETERMINE OPERATING RATING	8 - Load and Resistance Factor Rating (LRFR) rating report by rating factor (RF) method using HL-93 loadings.
(64) OPERATING RATING	1.61
(65) METHOD USED TO DETERMINE INVENTORY RATING	8 - Load and Resistance Factor Rating (LRFR) rating report by rating factor (RF) method using HL-93 loadings.
(66) INVENTORY RATING	1.24
(70) BRIDGE POSTING	5 - Equal to or above legal loads
(41) STRUCTURE OPEN/POSTED/CLOSED	A - Open

Appraisal

(67) STRUCTURAL EVALUATION	8
(68) DECK GEOMETRY	N
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71) WATERWAY ADEQUACY	8 - Bridge Above Approaches
(72) APPROACH ROADWAY ALIGNMENT	6 - Equal to present minimum criteria
(36) TRAFFIC SAFETY FEATURE	
36A) BRIDGE RAILINGS:	0 - Does not meet acceptable standards/safety feature is required
36B) TRANSITIONS:	0 - Does not meet acceptable standards/safety feature is required
36C) APPROACH GUARDRAIL	0 - Does not meet acceptable standards/safety feature is required

36D) APPROACH GUARDRAIL ENDS	0 - Does not meet acceptable standards/safety feature is required
(113) SCOUR CRITICAL BRIDGES	8 - Stable for scour conditions

Proposed Improvements

(75) TYPE OF WORK	
(75A) TYPE OF WORK PROPOSED	
(75B) WORK DONE BY	
(76) LENGTH OF STRUCTURE IMPROVEMENT (ft.)	
(94) BRIDGE IMPROVEMENT COST (SK)	
(95) ROADWAY IMPROVEMENT COST (SK)	
(96) TOTAL PROJECT COST	
(97) YEAR OF IMPROVEMENT COST ESTIMATE	
(114) FUTURE ADT	336
(115) YEAR OF FUTURE ADT	2036

Navigation Data

(38) NAVIGATION CONTROL	0 - No navigation control on waterway (bridge permit not required)
(111) PIER OR ABUTMENT PROTECTION	
(39) NAV VERT CLEARANCE	0
(116) MIN NAVIGATION VERT CLEARANCE, VERT LIFT BRIDGE	0
(40) NAV HORIZONTAL CLEARANCE	0

Inspection Notes

Structure Number: 0077 Town: Auburn

Structure Name: ROYAL RIVER

Structure Notes

44' Single span bridge in a backpack. Reinforced fiberglass concrete filled tube arches. Composite formed concrete slab over. Pile supported concrete footings. Buried structure.

Wearing Surface

Deck **NBI Item 58:** N

Superstructure **NBI Item 59:** N

Substructure **NBI Item 60:** N

Culvert **NBI Item 62:** 8

Culvert in very good condition with scattered minor cracking and efflo stains in footings , Arch fascia and cast in place portion of walls.

Channel **NBI Item 61:** 9

No problems noted. Well centered channel

Other

Special Inspection

Monitoring

Pontis Notes

Element Inspection

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
243 - Other Culvert	2 - Low	70	ft.	70	0	0	0
824 - Prefabricated Concrete Wall	2 - Low	140	ft.	140	0	0	0

Over Limit Report

Bridge #:	0077	Town1:	Auburn
Bridge Name:	ROYAL RIVER	Town2:	
Owner:	01 - State Highway Agency	Maintainer:	01 - State Highway Agency
Co-Owner:	N Not applicable	Co-Maintainer:	N Not applicable
Region:	01 - Southern		

Vertical Clearance - Under

Left, Center, and Right is based on the direction of travel

Roadway - Heading North or East

	Actual Heights in Feet-Inches Left	Center	Right	Posted		Date Measured: Deficient Sign
Main: ROYAL RIVER	-	-	-	☐ Main	-	
Other:	-	-	-	☐ Other	-	
Ramps:	-		-	☐ Ramp	-	

Roadway - Heading South or West

	Actual Heights in Feet-Inches Left	Center	Right	Posted		Date Measured: Deficient Sign
Main: ROYAL RIVER	-	-	-	☐ Main	-	
Other:	-	-	-	☐ Other	-	
Ramps:	-		-	☐ Ramp	-	

Vertical Clearance - Portal

Roadway: OLD DANVILLE RD

Heading North or East

Actual Heights in Feet-Inches Left	Center	Right	Posted		Date Measured: Deficient Sign
-	-	-	☐ Portal	-	

Heading South or West

Actual Heights in Feet-Inches Left	Center	Right	Posted		Date Measured: Deficient Sign
-	-	-	☐ Portal	-	

Permitting

Pointer

☐ Red Flag Comments

Heading North Height:	-
Heading South Height:	-
Left Ramp Height:	-
Right Ramp Height:	-
Portal North Height:	-
Portal South Height:	-
Other Road Height:	-
Bridge Width:	0 ft
Roadway Width:	26.0 ft

Underclearance heights are signed if less than 14 ft 6 in
Check with Maine Turnpike Authority for load heights over 13 ft 6 in
Always check 511

Load Restrictions

Posted		tons	Date posted:
Posted One Truck at aTime			
Posted for 4 axle only			
Operating Load Rating	1.61		
Permit Load Ratings		axles	
		axles	
		axles	

Pictures

PHOTO 1

Description Approach looking north

PHOTO 2

Description Approach looking south

Pictures

PHOTO 3

Description Guardrail damage

PHOTO 4

Description Guardrail damage upstream rail

Pictures

PHOTO 5

Description Downstream Elevation View

PHOTO 6

Description Upstream Elevation View

Pictures

PHOTO 7

Description Channel typical, well centered and protected

PHOTO 8

Description Small cracks in arch fascia concrete

Pictures

PHOTO 9

Description Small cracks in concrete arch fascia

PHOTO 10

Description Small crack and leaking in arch fascia concrete

Pictures

PHOTO 11

Description Typical footing and rib interface

PHOTO 12

Description Footing and arch rib connection

MaineDOT NBIS Bridge Safety Inspection JSA

Structure Number: 0077

Inspector: Kleinfelder,Kleinfelder

Structure Name: ROYAL RIVER

Team Lead: Michael Falla

Town: Auburn

Additional Team Members/Visitors:

1.) Tim Merrithew
2.)
3.)
4.)
5.)
6.)
7.)
8.)
9.)

Job being performed:

Routine bridge inspection.

Potential Hazard:	Controls:
☑ Exposure to traffic	☑ Parked off road with strobe ☑ Less than 1 hour on bridge ☑ Wear standard reflective clothing and hard hat ☐ Spotter ☐ Traffic Control Crew
☑ Steep slopes and uneven working areas (rip rap, mud, loose fill, etc)	☑ Wear appropriate, prudent footwear ☐ Rope or fall protection
☑ Chipped Concrete or Steel (hand tools only)	☑ Wear appropriate, prudent eye/hand protection
☑ 6' Vertical drops	☑ Stay away from areas
☑ Water Hazards ☐ Water depth under 1 foot ☑ Water depth 1 to 4 feet ☐ Water depth over 4 feet ☑ Water flow calm/slow moving ☐ Water flow visible/not rapid ☐ Water flow rapid with some short falls ☐ Tidal Water	☑ Evaluate Water Hazard conditions ☑ Use/Wear appropriate PPE ☑ Buddy System

☐ Insects, Poision Ivy, or other environmental hazards

Potential Hazard:

☐ Apply insect repellant and/or sunscreen
☐ Protect skin with appropriate, prudent clothing

Controls:

☐ Lead paint and Avian excrement

Potential Hazard:

☐ Wear gloves, do not scrape

Controls:

☐ Heavy Manual Lifting

Potential Hazard:

☑ Ask for assistance in donning dive gear, lifting equipment

Controls:

☐ DCS, Lung Expansion

Potential Hazard:

☐ Ascend slowly, user computers, Safety Stops (15' mark for 3 min.)

Controls:

☐ Entanglement U/W

Potential Hazard:

☐ Use knife, Comm gear

Controls:

☐ Boat Traffic

Potential Hazard:

☐ Fly Dive Flag, user spotter, contact bridge on Chan. 13

Controls:

☐ Cold Water

Potential Hazard:

☐ Use adequate dry suit underwear for water temperature

Controls:

☐ Live Boating

Other Potential Hazards:

☐ Keep track of divers, avoid powering during drop-off/pick-up

Other Controls:

Safety Equipment Required:

☑ ☐ ☐

Emergency Action Plan:

☑

Hard hat	Sunscreen	Throw Ring	Call 911
☑ Vest	☐ First Aid	☐ Throw Rope	☑ First Aid Kit
☑ Glasses	☐ O2	☐ Positioning Device	☐ Fall Rescue Plan
☑ Gloves	☐ AED		☐ Water Rescue Plan
☑ PFD	☐ Comm Gear		☐ Dan 1-919-684-9111
☐ Rain Gear	☑ Cell Phone		☐ USCG 741-5465
☐ Bug Spray	☐ Boat		

Other Safety Equipment:

Other Emergency Action Plan:

I certify that the MaineDOT NBIS Bridge Safety Inspection JSA has been completed according to all proper procedures required by the Maine Department of Transportation.

☑ Complete Michael Falla

Bridge Components

Bridge #:	0077	Town1:	Auburn
Bridge Name:	ROYAL RIVER	Town2:	
Owner:	01 - State Highway Agency	Maintainer:	01 - State Highway Agency
Co-Owner:	N Not applicable	Co-Maintainer:	N Not applicable
Region:	01 - Southern		

Deck

Joint Seal Type/MFG:

- [ ] Emseal
- [ ] V Seal
- [ ] Watson Bowman
- [ ] Hot Rubber
- [ ] Pour-in-Place
- [ ] DS Brown

Joint Types:

- [ ] Finger
- [ ] Asphaltic Plug
- [ ] Compression
- [ ] Modular
- [ ] Gland
- [ ] Waybo Crete
- [ ] Sliding
- [ ] Transflex
- [ ] Open

Joint HDR Mat:

- [ ] Concrete
- [ ] Delcrete
- [ ] Elastomeric
- [ ] LP Concrete
- [ ] Phoscrete
- [ ] Plycrete

Other:

- [ ] Curtain
- [ ] Troughs
- [ ] Armor

Rebar Type:

Superstructure

Left Side Rail:

Material	Steel	[ ] Retrofit
Shape	Guardrail	[ ] Safety Walk
Attached To	Ground	[ ] Pales
Number of Bars	0	[ ] Snow Fence
Extra Height	N	

Right Side Rail:

Material	Steel	[ ] Retrofit
Shape	Guardrail	[ ] Safety Walk
Attached To	Ground	[ ] Pales
Number of Bars	0	[ ] Snow Fence
Extra Height	N	

Bearing Type Quantity:

- [ ] Disk
- [ ] Pot
- [ ] Roller
- [ ] Elastomeric
- [ ] Rocker
- [ ] Sliding Plate

Other:

- [ ] Pin Quantity
- [ ] Pin and Link Quantity

Fatigue Prone Detail:

- [ ] Narrow Cover Plate - Sq End Welded
- [ ] Narrow Cover Plate - Sq End w/o Weld
- [ ] Wide Cover Plate - Sq End Welded
- [ ] Wide Cover Plate - Sq End w/o Weld
- [ ] Lateral Connection Plate - Welded
- [ ] Narrow Cover Plate - Tapered End Welded
- [ ] Narrow Cover Plate - Tapered End w/o Weld
- [ ] Longitudinal Stiffener - Welded with Radius
- [ ] Longitudinal Stiffener - Welded w/o Radius
- [ ] Hoan Detail

Substructure

- [ ] Pier Collars
- [ ] Abutment Collars
- [ ] Wood Piles
- [ ] Steel Piles
- [ ] Blocked Bridge

Retaining Wall Type:

T-Wall

Other

Confined Space

- [ ] Bridge Lighting
- [ ] Cat Walk
- [ ] Navigational Lighting
- [ ] Signs Attached

General Notes

Bridge Preservation

Bridge #:	0077	Town1:	Auburn
Bridge Name:	ROYAL RIVER	Town2:	
Owner:	01 - State Highway Agency	Maintainer:	01 - State Highway Agency
Co-Owner:	N Not applicable	Co-Maintainer:	N Not applicable
Region:	01 - Southern		

Deck

NBI Deck Information:

Deck Type	N - Not Applicable
Deck Protection	N - NA
Membrane Type	N - NA

Wearing Surface:

Type	N - NA
Last Date	
Lifespan (Yrs)	
Next Date Est.	0
Mill & Fill Date	

Superstructure

Beam Ends Paint:	Bearings Paint:	Bearings Lubrication:
Last Date	Last Date	Last Date
Next Date Est.	Next Date Est.	Next Date Est.

Beam Ends Fluid Film:	Bearings Fluid Film:
Last Date	Last Date
Next Date Est.	Next Date Est.

Treatment:
- ☐ Core 10
- ☐ Galvanized
- ☐ Metalized

Substructure

Common Preservation

Paint Information:

Type	
Last Date	
Lifespan (Yrs)	
Next Date Est.	0

Anodes:
- ☐ Installed
- ☐ Detached
- ☐ Replace

Concrete-Silane:	Washing:
Last Date	☐ Required
Next Date Est.	☐ UBIT

Concrete-Linseed
Last Date
Next Date Est.

☐ Alkali-Silica reactivity

General Notes

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