TABLE OF CONTENTS

PURPOSE 3
SCOPE AND APPLICABILITY 3
PROCESS 4
1. GENERAL 4
1.1. Summary 4
2. GENERAL REQUIREMENTS 5
2.1. Access and Control 5
2.2. Outage and Connection Requests 5
2.3. Communication Security 6
3. GENERAL INSPECTION PROCEDURES 6
3.1. Concrete Member Inspection - General 6
3.2. Timber Member Inspection - General 12
3.3. Structural Steel Element Inspection – General 14
4. SPECIFIC ELEMENT INSPECTION PROCEDURES 17
4.1. Steel Deck Elements 17
4.2. Bridge Bearings 19
4.3. Roadside Hardware or Safety Features 21
4.4. Fracture-Critical & Fatigue Sensitive Members 22
5. DELVERABLES 23
APPENDIX A: JAY JAY RAILROAD BRIDGE 26
APPENDIX B: HAULOVER CANAL BRIDGE 52
(To be included in the future) 52
APPENDIX C: BANANA RIVER BRIDGE 53
(To be included in the future) 53
APPENDIX D: INDIAN RIVER BRIDGE (SOUTH SPANS) 54
(To be included in the future) 54
APPENDIX E: INDIAN RIVER BRIDGE (NORTH SPANS) 55
(To be included in the future) 55
APPENDIX F: KENNEDY PARKWAY (703005) 56
(To be included in the future) 57
APPENDIX G: KENNEDY PARKWAY (703006) 57
(To be included in the future) 58
RECORDS 59
ROLES & RESPONSIBILITIES 59
REFERENCE DOCUMENTS 60
ACRONYMS 60
DEFINITIONS 61
REVISION RECORD 61
DOCUMENT APPROVALS 62

PURPOSE

The purpose of this document is to provide a comprehensive set of guidelines, procedures and requirements for the safe and thorough inspection of the various bridge stock at Kennedy Space Center (KSC) conducted by qualified internal Base Operations and Spaceport Services (BOSS) Contract personnel.

SCOPE AND APPLICABILITY

- Perform a structural and safety inspection of all highway and rail bridges at KSC, including the above-water (as applicable) substructure, superstructure and deck; as described in detail throughout the remainder of this document.
- All components and attachments to the bridges will be inspected as part of this biennial inspection. If for any reason a specific component or member of a bridge cannot be inspected at the time, it must be noted in the bridge inspection report.
- Prepare a comprehensive bridge inspection report containing the following items:

    1. Executive Summary containing:

        a) Superstructure System Description
        b) Substructure System Description
        c) Deck System Description
        d) Photographic Record with location details
        e) Summary of Work Performed

    2. General Inspection Review Findings, containing discussion and findings for:

        a) Fracture Critical Members
        b) Substructure
        c) Bridge Approaches
        d) Superstructure
        e) Deck
        f) Appurtenances
        g) Ancillary Structures
        h) Mechanical Equipment
        i) Electrical Equipment

    3. Fracture Critical Members & Fatigue Sensitive Details

    4. Detailed Deficiency Findings

The following items are outlined in the detailed bridge-specific format found in the relevant appendices of this document:

- Detailed structural analysis and bridge rating evaluation based on the current state of each bridge as inspected and including any historical construction and design information as may be applicable.
- Cathodic Protection Measurements with historical comparison between previous inspection reports.
- Mechanical equipment inspection report
- Electrical equipment inspection report
- Span balance report
- Inspection field notes

PROCESS

1. GENERAL

1.1. Summary

This document is intended to be used in conformance with the following:

- Recording and Coding Guide for the Structure Inventory and Appraisal Rating of the Nation's Bridges, Federal Highway Administration (FHWA) Report
- Bridge Inspector's Reference Manual, FHWA Publication
- Manual for Bridge Element Inspection, American Association of State Highway and Transportation Officials (AASHTO) Publication
- American Railway Engineering and Maintenance-of-Way Association (AREMA),
- Code of Federal Regulations, 49 Code of Federal Regulations (CFR) Part 237, Subpart E as required for Safety Inspection of Railway Bridges
- Florida Administrative Code Rule 14-48-0011 for Safety Inspection of Bridges, as applied to the Jay Jay Railroad Bridge (Facility No. H2-1198)

It also contains the guidelines, procedures, and requirements necessary for the completion of a biennial inspection of the different highway and rail bridges located at KSC.

Completion of these inspections is required to be performed on a biennial basis by internal BOSS personnel. These biennial inspections must be completed by Certified Bridge Inspector (CBI)-certified personnel, as per current FDOT records.

Alternate year inspections are to be performed by external contractors.

2. GENERAL REQUIREMENTS

2.1. Access and Control

Exclusive use or control of any area will not be allowed. Maintain access for the Government, National Aeronautics and Space Administration (NASA), and NASA contractors to all areas at all times.

Schedule all work around operational constraints.

2.2. Outage and Connection Requests

Do not interrupt existing power services to any facilities in the project area unless pre-authorized and pre-approved.

Schedule and coordinate Utility Outage Request and Connection Requests that affect existing systems, at the convenience of the Government and NASA. This may require scheduling work outside of regular working hours or on weekends.

State the system(s) involved, area involved, approximate duration of the outage, and the nature of work involved for each Utility Outage and Connection Request.

Utility Outage and Connection Request Requirements:

- A written request for a utilities outage (electricity, communication, domestic water, waste water, compressed air, gas, steam, air conditioning, etc.) and/or lane closures shall be submitted to the relevant facility managers. Approval is required prior to scheduling any outage. Carefully observe any limitations noted on the approved outage authorization. A utilities outage without prior approval and coordination is prohibited.
- Since many systems are critical to facility operations keep to an absolute minimum the number and duration of any utility outages. Coordinate all work and provide sufficient manpower, materials, and equipment to complete the work within the authorized outage duration.
- Schedule the interruption of utility services at a time of minimum demand on the utility and convenience to the Government and NASA.
- Make all necessary arrangements to schedule and provide connections to existing utilities and to cause minimum interruption to system operations, temporary utility hook-ups and disconnects. Immediately prior to the outage occurring conduct a ‘Pre-Op’ meeting with all relevant employees to be working on the affected system(s) during the outage.

2.3. Communication Security

NASA/United States Air Force (USAF) telecommunications networks are continually subject to interception by hostile/unfriendly intelligence organizations. Therefore, the monitoring and recording of both landline and cellular telephone calls to or from NASA/USAF installations is conducted. Ensure frequent dissemination of this information to all employees dealing with official information.

3. GENERAL INSPECTION PROCEDURES

3.1. Concrete Member Inspection - General

Due to the nature of the construction and maintenance processes for concrete, there are many variables that require routine visual inspection of the structural elements to ensure their integrity and safety. It is the responsibility of the inspector to be familiar with common issues and potential defects possible in concrete members.

In all cases photographic records will be taken of all defects, and where possible hand sketches that clearly identify the deficiency.

Typical defects, issues and inspection requirements of concrete members are as follows:

Visual Inspection of Concrete Cracks:

Concrete cracking is extremely common and not necessarily a sign of a structural deficiency. However, while the orientation, depth and width of a crack is an indicator of its significance, the determination of the cause and necessary follow-up action to cracks must be made by the Team Leader (TL). It is the responsibility of the inspector to identify the locations and take physical measurements of all cracks.

Cracks in concrete are due to a localized tensile failure in which the concrete separates into two or more parts. This is due to the relatively low tensile strength of the concrete.

In identifying the orientation of the crack, the following rules are established:

- Longitudinal cracks occur parallel to the length of the structural member
- Transverse cracks occur normal (perpendicular) to the length of the structural member
- Diagonal cracks occur at an angle roughly between 10º and 75º measured with respect to the length of the structural member

There are two types of concrete cracks, structural and non-structural. Structural cracks are significant cracks that potentially affect the safety and load carrying capacity of the member. Non-structural cracks do not have an immediate impact on load carrying capacity but may also be significant in that they create the potential for issues such as

alkali attack to exposed reinforcement and must therefore be addressed as a routine maintenance item.

There are four types of structural cracks:

1. Flexural cracks – these cracks begin on the tension face of the member and usually terminate close to the compression face. Flexural cracks typically run diagonally with the first crack running at approximately 45º with adjacent cracks at increasing angles until they become nearly vertical (transverse) and then decrease in angle. At the position where flexural cracks are nearly vertical (transverse) is usually the point of maximum flexural stress.
2. Shear cracks – these cracks typically occur only close to supports and will be oriented diagonally, typically at 45º. Shear cracks that extend through the member from tension face to compression face are critical signs of impending failure.
3. Flexural-Shear cracks – these cracks typically occur at a location between maximum shear and maximum flexure and are usually an indicator that the internal shear reinforcement is in distress. These cracks usually begin developing in a vertical (transverse) direction and transition to a diagonal crack. Flexural-shear cracks can usually be identified by location on the member and by their orientation.
4. Longitudinal cracks – these cracks are identified by their orientation where they run along the length of the structural member. Typically, these cracks will occur in line with the internal reinforcement or in a geometric discontinuity such as the transition from the web to the top or bottom flange of a prestressed “I” girder. Longitudinal cracks at the level of the reinforcement indicate that the internal reinforcement is severely compromised. Longitudinal cracks at geometric discontinuities are typically indicators of manufacturer defects and/or impact damage.

There are basically four types of non-structural cracks identified as follows:

1. Temperature cracks –these cracks occur when a significant temperature differential occurs within only a portion of the structure resulting in volumetric changes within the structural member and ensuing tension stresses. Typically temperature cracks are very fine in thickness and will appear in a “spider-web” fashion.
2. Shrinkage cracks – these cracks occur at the time of construction and are a result of rapid loss of moisture during the curing process. Shrinkage cracks are also very fine in thickness and will appear in a “spider-web” fashion.
3. Creep cracks – these cracks occur as a result of high levels of load being placed on a member for an excessive period of time, usually on the order of years. Creep cracks occur due to elastic shortening of the structural member and will appear initially as fine cracks that become deeper over time, with the adjacent concrete turning into a fine powder.

4. Weathering cracks – these cracks are typically due to freeze/thaw cycles, however they can also occur as a result of alkali attack caused by wet/dry cycles in salt or brackish water environments. In this case the alkali allows changes in the internal moisture content of the concrete. These cracks are usually very fine and over time will result in the loss of the smooth surface of the member.

Visual Inspection of Other Typical Concrete Distress:

1. Scaling – Scaling is the flaking of surface mortar usually accompanied by the loosening of surface aggregates and is usually caused by wet/dry cycles. Scaling occurs only on the surface of a concrete member.
2. Honeycombing – Honeycombing is voids left in the concrete due to failure of the mortar to completely fill the spaces among the coarse aggregate particles. Typically honeycombing is caused by poor construction conditions, reinforcement details that create congestion within the formwork, poor consolidation, etc. Honeycombing is easily seen when located on the surface of the concrete member. However, when the surface finish covers a honeycomb, it can be revealed by hammer sounding.
3. Delaminations & Spalls – Delamination and spalls are the breaking loose of pieces of concrete from the surrounding member. These pieces typically initiate close to the top of the reinforcing steel and are a result of large tensile stresses within the concrete, usually caused by corrosion of the internal reinforcement.

   Quantification of the size of spalls is as follows:

   a) Minor – less than 4 ½” in diameter and less than 1” in depth.
   b) Moderate – greater than 4 ½” and less than 7 ½” in diameter and less than 1” in depth.
   c) Severe – greater than 7 ½” in diameter OR greater than 1” in depth.
4. Surface abrasion – Surface abrasion is the wearing away of the member surface by rubbing and/or friction usually in a uniform pattern and includes both the cement and aggregates.
5. Exposed steel reinforcement – Exposed steel reinforcement occurs when the protective concrete cover over the reinforcement has been compromised and is exposed to atmospheric conditions. In this situation the corrosion process is uninhibited and will lead to either to a local or system failure depending on the location and purpose of the reinforcement. Additionally, exposed reinforcement on the top of the deck can lead to delamination of the reinforcement bar from the surrounding concrete thereby becoming a road hazard to passing traffic.
6. Vehicular impact – Vehicular impact can manifest in several ways. Most commonly, the defect is the result of traffic abrasion or wheel-track rutting. In the presence of armored expansion joints or concrete-to-steel deck transitions, a bump or point of impact may be created. Other impact damage can result in cracked or

compromised members. For inspection, regarding a bump in the travel lanes, a change in elevation exceeding ½" is considered significant and remedial action is to be recommended by the inspector.

7. Settlement – Settlement refers to global movement of the structure resulting from vertical settlement, sliding and/or rotation of the foundation members. Settlement issues must be closely monitored as they are one of the primary indicators that a major deficiency has occurred or will occur soon. Settlement is also a potential failure mechanism that can manifest in scour-critical conditions.
8. Exposure to aggressive chemicals – Aggressive chemical exposure can cause the concrete's chemical makeup to be altered resulting in changes to its mechanical properties. This type of exposure can soften, disintegrate, or discolor the concrete depending on the type of chemical. Typical aggressive chemicals with negative effects on concrete include acids, salt solutions including environmental salt spray, alkaline solutions, etc. The exposure can occur naturally, as in the example of salt spray, or through accidental spills resulting from vehicular collisions.

Physical Inspection of Concrete Elements:

Various methods for physical inspection and quantification of concrete deficiencies are required as follows:

Concrete Crack Measurements:

Detailed mapping of cracks in concrete members is not usually required. Instead, it is required that the cracks be marked by pencil and photographed with relevant field notes identifying the extent of the cracks (length and area affected), average crack width, and largest width of crack in the area under consideration. The best practice is to provide a hand sketch of the cracked area. Marking of one side of an exterior girder is usually sufficient assuming that the problem is consistent throughout the other girders for that span. Cracks should be marked on the surface of the member with the extent marked and dated.

Concrete cracks are measured using a Crack Comparator gauge or calibrated feeler gauge with preference given to the use of the industry standard Crack Comparator. Crack measurements are to be taken of both the width as well as the offset, if any, of each side of the crack at the point of initiation of the crack.

In the case of shear cracks the following guidelines will be followed:

c) When a shear crack exceeds 0.040" AND has a lateral offset exceeding 0.030", a follow-up inspection must be conducted annually.

d) When a shear crack exceeds 0.040” AND the length of the crack has grown more than 3” from the previous inspection a follow-up inspection must be conducted annually.

e) All other shear cracks must be inspected on the normal biennial basis.

Hammer Sounding:

Hammer sounding is the striking of the surface of a concrete member with a sounding hammer and listening for changes in resulting sounds. Defective concrete, especially at locations of delamination, spalling or honeycombing will provide a distinctive hollow sounding “puck”, while non-defective concrete will provide a “ping” type sound. The extent of delamination can easily be identified by striking the sounding hammer at several locations until the sounding returns a “ping” sound.

While hammer sounding is a very low cost and accurate method for identification of problematic areas, it is also very time consuming and should not be used impractically, as in the case for concrete decks.

Chain Dragging:

Chain dragging is similar to hammer sounding but covers a much larger surface in a shorter period of time. Essentially a steel chain is dragged across the concrete surface, typically a deck. As the chain is dragged a distinctly different sound is heard when it crosses over an area of delamination. Chain dragging cannot be applied to vertical surfaces or to the underside of structural members.

Dimensional Measurements:

All physical measurements should be made using a convenient and accurate measurement device such as a tape measure, dial caliper, crack comparator, ruler, string line, level or plumb bob, etc.

The inspector will identify all tools necessary for the recording of measurements for the bridge inspection.

Critical Findings:

Critical findings are either structural or safety related deficiencies that require immediate follow-up inspection and/or prompt remedial action. Upon identifying a potential critical finding, immediately report the deficiency verbally to the TL. The TL is required to provide an immediate verbal report to the BOSS Lead Design Engineer (LDE) and provide hardcopy documentation. This will include, as may be necessary, the extent of the deficiency, field notes, photographs, sketches, drawings, measurements, potential causes, and initial recommendations for repair.

Temporary actions to be determined by the BOSS LDE include:

- Load posting
- Traffic restrictions
- Speed restrictions
- Temporary lane closure
- Temporary shoring
- Complete bridge closure

Typical critical findings for concrete members include:

a) Section loss (thru-hole) subject to continued enlargement by vehicular traffic, or deep spalls with exposed rebar in danger of holing through, creating a potential safety hazard to passing traffic.

b) Prestressed concrete girders with spalling and associated broken strands, or 100% deterioration at critical high-stress areas.

c) Concrete girders or pier caps with spalling and broken main reinforcement or 100% deterioration, with more than one bar/strand affected at the same location in the girder.

d) Loss of bearing area making the element subject to settlement.

e) Columns with spalling and reinforcement section loss causing the column to be subject to failure.

f) Collision damage of primary structural elements compromising the overall structural capacity.

g) Pier columns or caps with significant structural cracking supporting a fracture-critical element.

h) Falling, delaminated, or partially detached concrete that is anticipated to fall, presenting a safety hazard to under-passing motorists and/or pedestrians.

i) Severely deteriorated bearing seats.

j) Damaged sidewalk structural supports or walking surfaces presenting a hazardous condition to pedestrians.

k) Severe scour or undermining of the substructure causing instability to the structure.

3.2. Timber Member Inspection - General

Structural timber elements are in use primarily at the Jay Jay Railroad Bridge as the rail crossties. Damage to timber elements typically ranges from minor discolorations caused by fungi, chemical exposure, or the more serious decay, including insect damage. While timber can usually outperform most other materials when maintained properly, exposure to aggressive environments can seriously reduce the long-term performance of the material.

Timely maintenance of problematic areas must be undertaken as a corrective action in order to guarantee the life expectancy of timber members.

Damage to timber members most typically occurs through attack by an organism using the timber as either a food agent or habitation. Increased moisture, elevated temperature, and the amount of available oxygen are all factors that affect the likelihood of an attack. It is important to note that removal of any of these factors will prevent an attack by an organism.

Visual Inspection:

Timber bridge deck is present at the Jay Jay Railroad Bridge in the form of uniformly spaced and treated railroad crossties. Perform a visual inspection of all timber elements and attachments noting all deterioration, decay, and cracks.

Visually inspect the timber deck using the following criteria:

Top of Timber Deck Visual Inspection:

- Splitting in the timber planks
- Heavy abrasion
- Loose and protruding nails/spikes

At locations where this criterion is identified, probing or pick testing is required for additional inspection.

Soffit Side of Timber Deck Visual Inspection:

- Staining or discoloration indicates that members have been subjected to sustained water exposure and potentially high moisture content suitable for decay.
- Insect activity is visually characterized by holes, powder posting or other evidence. Insect activity may also indicate the presence of decay.
- Plant or moss growths in splits, cracks, or soil accumulations indicate that the adjacent timber has relatively high moisture content suitable for decay.

Bearing Areas:

- Check bearing areas for crushing near the bearing seat
- Investigate for decay and insect damage
- Verify the condition and operation of the bearing devices, if present
- Investigate the area near the support for the presence of horizontal shear cracking. Measure cracks for length, width and if possible, for depth.

Tension Zones:

- Examine the tension zone for section loss
- Examine the elements for excessive deflection or sagging

Fasteners and Connectors:

- Check for corrosion
- Inspect for loose or missing fasteners
- Check for moisture and decay around fastener holes

Physical Inspection:

At the locations identified during the visual inspection that require physical inspection, perform sounding, probing or pick testing as appropriate per the following guidelines:

- Sounding – Sound the wood surface by striking it with a hammer. Based on the tonal quality of the ensuing sound, dull or hollow sounds may indicate the presence of large interior voids or decay. Sounding will be used as the initial evaluation method at all locations indicated by the visual inspection. When suspected decay is encountered, or if the sounding is indeterminate, perform additional probing or pick testing.
- Probing – Probing is performed by applying pressure normal to the surface of the timber with the tip of an awl or knife. This will reveal excessive softness or a lack of resistance to the penetration of the probe. Care must be taken to differentiate between decayed wood and water softened wood in the identification process.
- Pick Testing – Pick testing is used when probe testing is inconclusive or cannot be completed. Pick testing involves the driving of a pointed pick, awl, or screwdriver a short distance into the timber and used to pry out a sliver of material. The break in the timber is examined to determine if the break is decayed (brash) or splintered (sound). Sound wood will maintain its fibrous structure and splinter when broken across the grain. Decayed wood will break across the grain abruptly or crumble into small pieces.

Critical Findings:

Critical findings are either structural or safety related deficiencies that require immediate follow-up inspection and/or prompt remedial action. Upon identifying a potential critical finding, immediately report the deficiency verbally to the TL. The TL is required to provide an immediate verbal report to the BOSS LDE and provide hardcopy documentation. This will include, as may be necessary, the extent of the deficiency, field notes, photographs, sketches, drawings, measurements, potential causes, and initial recommendations for repair.

Temporary actions to be determined by BOSS LDE include:

- Load posting
- Traffic restrictions
- Speed restrictions
- Temporary lane closure
- Temporary shoring
- Complete bridge closure

Typical critical findings for timber elements include:

- Through-loss in deck elements.
- Collision damage compromising the structural capacity.
- Multiple open cracks in high stress regions.
- Crushing/decay that may lead to settlement.

3.3. Structural Steel Element Inspection – General

Structural steel elements are employed in each of the bascule bridges due to the extremely high strength to weight ratio that is required. Primarily the structural steel is employed in the main span of the movable bridges as well as in the superstructure of the Jay Jay railroad bridge.

In each of the bascule spans a structural framework is present with a structural load path as follows: Live (transient) loads are applied to the steel grid deck which is supported directly by the stringers. The stringers transmit these loads to the floor beams, which transmit the load to the main girders. The main girders are supported by the substructure through the trunnion area where the loads are then transmitted to the foundation.

Note: a secondary but critical component of the structural steel elements is the coating system. The coating system is required to provide corrosion protection as well as an

appealing aesthetic appearance. It is critical to also examine the coating system during the inspection process.

Visual Inspection:

Visually inspect the structural steel members using the following criteria:

- Indicators of a failure in the coating system:
  a) Chalking, erosion, checking, cracking and wrinkling caused by too much paint (refer to ASTM D-3359).
  b) Blisters caused by painting over surface contaminants.
  c) Undercutting which occurs when surface rust advances under the paint. This is most common along scratches that have exposed the raw steel or along sharp edges allowing the paint to blister and peel.
  d) Pinpoint rusting caused by tiny, deep holes in the paint exposing the raw steel.
  e) Bacterial or fungi attack of biodegradable coatings.
  f) Alligatoring caused by internal stresses that develop in the coating during the drying process.
  g) Mudcracking typically caused when an inorganic zinc-rich coating is applied too thick or has been applied on a hot surface.
  h) Bleeding from the penetration of an undercoat pigment through the topcoat.
- Bent or deficient members. Determine the cause of deficiency by inspecting for proper alignment. Look for cracks, tears or gouges in these areas.
- Corrosion. Make note of any corrosion that could reduce the structural capacity through a decrease in the member cross section. Provide physical inspection of all corroded areas.
- Fatigue prone details. Fatigue prone details are identified and explained later in the relevant appendices of this document as specific to each bridge. In all cases, the procedure is to be followed when a fatigue crack is observed is as follows:
  a) Report the fatigue crack immediately to the TL.
  b) Determine visually the extent of the crack. Mark the ends and take physical measurements and include a photographic record.
  c) Examine all other identical details throughout the bridge for similar cracks.
  d) Schedule advanced inspection methods through the recommendations of the LDE.
- Stress related cracks. Determine the length, size, and location of all cracks in the structural steel.

- Points where a discontinuity or restraint is present. Example: at the end of all cover plate terminations.
- Loose members.
- Problematic details. Problematic details include but are not limited to welds, bolts, rivets, weep holes, areas that pond water, etc.
- Repairs with indiscriminate welding or cutting.
- Areas subject to excessive vibrations or twisting.

Physical Inspection:

The primary method of physical inspection at locations identified during the visual inspection is through measurement of the deficiency.

- Use an inspection hammer or wire brush to remove loose paint or rust flakes to take accurate measurements of the remaining cross section. Use of personal protective equipment must be taken to ensure that the inspector is protected against exposure to potentially hazardous materials.
- Cracks. In situations where cracks are suspected but may have been closed due to excessive hammering or brushing, apply the TEB method of crack inspection. The TEB method of crack inspection requires that the inspector wipe a thin layer of isopropyl alcohol or acetone to the area and observe the area for dark lines of the fluid that will accumulate at the crack because of pitot action.
- Section loss. The act of corrosion causing a loss of the member material is known as section loss. Measure section loss using a straight edge, tape measure and caliper. At locations where physical measurement is impossible, employ the use of an ultrasonic thickness gauge, also known as a “D-meter”.
- Coating failure. Coating failures are to be examined in accordance with document SSPC-Vis 2 “Standard Method for Evaluation Degree of Rusting on Painted Steel Surfaces”. This is a pictorial standard for the evaluation of the degree of rusting on painted steel surfaces.
- Mill scale. Use a knife to remove a small patch of paint in random areas inspecting the exposed surface for mill scale. Probe with a knife or other sharp object at weld spatters to check for corrosion. Re-coat areas where paint is removed with an appropriate material.
- Paint Adhesion. Apply ASTM standard D-3359 “Measuring Adhesion by Tape Test”, noting the amount of paint, if any, that is removed. Refer to ASTM D-3359 for rating criteria.

Critical Findings:

Critical findings are either structural or safety related deficiencies that require immediate follow-up inspection and/or prompt remedial action. Upon identifying a potential critical finding, immediately report the deficiency verbally to the TL. The TL is required to provide an immediate verbal report to the BOSS LDE and provide hardcopy documentation. This will include, as may be necessary, the extent of the deficiency, field notes, photographs, sketches, drawings, measurements, potential causes, and initial recommendations for repair.

Temporary actions to be determined by the BOSS LDE include:

- Load posting
- Traffic restrictions
- Speed restrictions
- Temporary lane closure
- Temporary shoring
- Complete bridge closure

Typical critical findings for structural steel elements include but are not limited to:

- Deterioration in areas that have failed in buckling or crippling
- More than 10% of the connectors in a connection are missing
- Secondary structural members (diaphragms, bracing, etc.) with extensive section loss
- Fracture-critical members subject to impact damage
- Collision damage that compromises the structural capacity of the member
- Primary structural members with a fracture in their tension zone
- Tension flange cover plates with cracked welds at the end of a partial length welded cover plate

4. SPECIFIC ELEMENT INSPECTION PROCEDURES

Due to their unique or specialized configuration the elements included in this section require a specific procedure of inspection in addition to the general procedures as detailed in Section 3.

4.1. Steel Deck Elements

Two types of steel grid decks are utilized in the bascule bridges at KSC: open and closed steel grid decks.

The first type is an open steel grid deck in which a multi-bar grating, with ribs running parallel and normal to the direction of traffic, is used across the main spans of the bascules. This type of deck is used to reduce the total amount of permanent weight, minimize wind resistance and allow free drainage. The system allows for items such as hair clips, cuff links, pens, tiny rodents, small hand tools and occasionally cellular phone devices to freely pass between the bars while retaining sufficient rigidity to support vehicular traffic. Great care must be taken when pouring liquids onto the surface of open grids, as the surface will almost certainly be incapable of retaining such liquid and therefore, it should be expected that most such liquids will become sacrificial.

The second type is a closed steel grid deck in which the same multi-bar grating system is used as in the open steel grid, but the voids between the bars are all filled solid with concrete.

Visual Inspection:

Steel grid decks have several potential problem areas that require examination during the inspection process:

- Skid Resistance – Both open and closed steel grid decks are subject to decreased skid resistance over time. In the case of a closed steel grid deck the concrete can develop “cupping” or wear away and expose the grid bars to direct wheel loads thereby creating a riding condition similar to that of the open deck. This significantly reduces skid resistance in wet weather conditions.
- Attachment Connection – Due to the significant number of welds required to attach the steel grid deck to the supporting stringers, and with the continuous beam span articulation of the main deck bars, prying action and deterioration of the weld are common problems. Over time, these welded connections will break down and have a reduced fatigue life.
- Corrosion of grid bars – All grid bars and supporting internal members are subject to direct exposure of environmental contaminants and road chemicals creating a potential for accelerated corrosion.
- Loss of protective coating – All steel grid decks in service at KSC are treated with hot-dipped galvanizing. Sharp metal contact from installation, repair work, vehicular impact and long-term wear can cause a loss of this protective coating in localized areas allowing for an acceleration of corrosion to occur.

Visually inspect the deck for the following:

- Bearing and shear areas – Examine the main bearing bars for buckling, cracked welds, broken fasteners or missing bars.
- Areas exposed to traffic – Examine the top surface for wheel ruts or wear. Verify that any deteriorated bars will not damage vehicle tires.

- Tension areas – Check positive and negative moment regions on the main bearing bars looking for breaks, bends, fatigue cracks or other stress-related cracks and missing bars.
- Signs of corrosion.
- Connections – Examine for broken connections, listen for rattling as vehicular traffic passes over the deck.
- Filled grid decks – Inspect for expansion at joints and bridge ends. Examine the condition of the concrete.
- Previous repair areas – Document location and condition of any repair plates and connections to the deck.

Provide field notes including location and photographic record of each location receiving a Condition State of 2 or higher. Provide Physical Inspection for all Condition States of 2 or higher.

Physical Inspection:

Physical Inspection of steel grid decks includes the measurement of deficiencies using a dial caliper, ruler or other appropriate measuring device. Measurement of identical non-corroded grid close to the damaged area can be used to establish a baseline measurement if necessary.

Broken or cracked welds and connections can be found by for unusual or clanking noises as vehicles drive across the steel grid deck. Locations of the cracked welds and connections can be pin pointed through the use of hammer sounding.

4.2. Bridge Bearings

The operation of bridge bearings is critical to the safety, longevity, and load-carrying capacity of the bridge. Bridge bearings generally consist of four basic elements: 1 – Sole Plate, 2 – Bearing or Bearing Device, 3 – Masonry Plate, 4 – Anchor Bolts.

These elements are defined as follows:

1. Sole Plate – this is the element responsible for distributing forces from the superstructure to the bearing device. Typically, it is a tapered steel plate attached to the bottom of a girder or beam. In the case of concrete members, the bottom flange typically functions as the sole plate.
2. Bearing or Bearing Device – The bearing or bearing device is attached to the sole plate and is responsible for transmitting the forces from the sole plate to the masonry plate. The bearing or bearing device will either resist or transmit rotation and/or translation depending on its specific type.

3. Masonry Plate – The masonry plate is a steel plate attached to the bearing seat of the substructure and is used to distribute the reactions from the bearing or bearing device.
4. Anchor Bolts – Anchor bolts are used to connect the bearing to the substructure.

Visual Inspection:

Visual inspection of bearings is separated into three categories based on type:

1. General (all bearing types):

- Determine if the bearing is a fixed or movable type. If the bearing was designed to allow either translation or rotation of the superstructure then it is a moveable bearing, otherwise it is a fixed bearing.

- Check for horizontal and vertical alignment.

- Check for bearing surfaces to be clean and in full contact with each other.

- Record the ambient air temperature at the time of the inspection. Due to the thermal expansive and contractive nature of bridges their bearings must be permitted to be either in the maximum expanded position for temperatures exceeding the original design temperatures or the maximum contracted position for temperatures less than the original design temperature. Typically, the design temperature will be 68º F, unless noted otherwise on the record drawings.

2. Steel Bearings:

- Use a wire brush, grinder or hammer to remove any loose, corroded or flaked steel.

- Check all bearing elements for any pitting, section loss, deterioration or debris build-up. These deficiencies can cause the bearing to bind up or freeze, essentially rendering it incapable of movement.

- Check for bent, broken or missing anchor bolts.

- Looseness – Typically, loose bearings are identified by noise at the bearing, or through visually observing movement, under loading.

- Examine bearings for longitudinal misalignment. If the ambient air temperature is at the design temperature (typically 68º F UNO), the top and bottom of the sliding plate and the bearing should be aligned. Any offset from this position indicates a potential issue with the expansion or contraction of the bearing.

3. Elastomeric Bearings:

- Inspect for excessive bulging, (greater than approximately 15% of the bearing thickness)
- Inspect for any splitting or tearing
- Verify that the pad has not “walked” out of position from under the beam or girder

Physical Inspection:

Physical Inspection of all bearing types includes the measurement of deficiencies using a dial caliper, ruler or other appropriate measuring device.

Record the ambient air temperature at the time all such measurements are made.

4.3. Roadside Hardware or Safety Features

The following deficiencies constitute examples of critical findings, and are to be treated in the same manner as critical findings for Timber, Concrete or Structural Steel as outlined in Section 3 of this document:

- Bridge railing with damage or deterioration that may prevent containment and/or redirection of errant vehicles traveling at the posted speed limit.
- Pedestrian railing that is missing or detached, that may allow pedestrians to fall off the structure.
- Guardrail connections to bridge railing, concrete barrier reinforcement or guardrail that is detached in proximity or projecting into traffic with potential for impact.
- Load posting or vertical clearance signs that are missing, damaged, improperly located, or visually obstructed.
- Signs, traffic signals, or poles presenting a safety hazard to passing motorists or pedestrians due to extensively damaged, split or buckled sections, cracked welds at member/base connections or member/member connections.
- Signs, traffic signals, or poles with one or more loose anchor nuts presenting a safety hazard to passing motorist and/or pedestrians.
- Signs with deteriorated or missing panel connectors.
- Expansions joints that are deteriorated, damaged, or loose.
- Excessive debris and/or sediment buildup at the hydraulic opening for scour critical bridges.

4.4. Fracture-Critical & Fatigue Sensitive Members

Fracture-critical members are defined as structural steel members either in tension or with tension element(s), whose failure would cause a portion of, or the entire structure to collapse suddenly.

Fatigue sensitive members are members that tend to fail at a stress level below their yield stress due to being subject to cyclical loading. Fatigue is the primary cause of failure in fracture-critical members.

Fracture-critical & fatigue sensitive elements are identified in the checklists specific to each bridge in the relevant appendices of this document.

Visual and physical inspection methods for fracture critical & fatigue sensitive elements are the same as the general methods for structural steel.

Where there is evidence of a deficiency to the specific members then advanced inspection techniques are required.

These include, but are not limited to:

- Acoustic emission testing
- Corrosion sensors
- Dye penetrant
- Magnetic particle testing
- Radiography testing
- Ultrasonic testing
- Eddy current testing

When deficiencies are identified in these members the following will be recorded:

- Method of inspection
- Dates of initial detection, confirmed and reexamined
- Type of deficiency
- Location of deficiency
- Detailed sketches including location, shape, and size of deficiency
- Dimensions and details of the member containing the deficiency including sketches and photographs
- Opening and closing of any cracks as vehicular traffic traverses the bridge

- Changes in shape or geometry of any adjacent elements
- Presence of corrosion or accumulation of dirt and debris at the deficiency
- Current weather conditions

Additionally, the inspector is required to report the deficiency in the same manner as noted for other critical findings as outlined in Section 3.

5. DELVERABLES

Submit a report for the bridge that minimally contains the following:

1 – Executive Summary:

- Location – Identification of the bridge by its National Bridge Inventory (NBI) number, common name and KSC grid number. Include a brief description of the bridge including the facility carried and map attached as a figure.
- Superstructure system description
- Substructure system description – Identify the type of substructure(s) inspected, e.g. “Cast in place concrete pier substructure with 14’-0” clearance above average ground elevation…”
- Provide a basic photographic record of the bridge as it appears, including: 1 – an overall elevation view, 2 – roadway elevation views from both ends, 3 – main span elevation, 4 – general underside view of the main span.
- Summary of work performed

2 – General Inspection Review Findings – Discussion of the inspection process and findings including a verbal condition assessment of each system per the applicable bridge coding guide.

Include as separate headings:

- Fracture critical & fatigue sensitive members
- Substructure
- Approaches
- Superstructure
- Deck
- Appurtenances
- Ancillary structures
- Mechanical equipment

Electrical equipment

Complete photographic records are to be included in order to substantiate the current condition ratings. Additionally, numbering and identification of all bridge elements are to follow the descriptions provided for in the bridge record/as-built drawings.

3 – Fracture critical & fatigue sensitive members – provide an itemized checklist of all fracture critical & fatigue sensitive members, elements or components. Include in the checklist the corresponding AASHTO fatigue category and identify the type and location.

All such members must be inspected and reported on regardless of whether a deficiency is identified or not.

4- Detailed deficiency findings – Include an itemized list of all deficiencies identified by the inspector at the time of inspection as follows:

- Include the assigned member number, accompanying photographic records, sketches (as required) and field notes for each deficiency.
- Clearly identify the location of each deficiency in such a way that those carrying out future corrective action can easily and accurately locate the deficiency.
- Include recommendations for any corrective action.
- Include a cost estimate of items recommended for repair for items that must be addressed within the next two years and that may affect the future load rating of the bridge using a standard, industry-accepted cost assessment tool.

5 – Structural Analysis – Provide a PE-certified analysis of the bridge in the form of a load rating using the ASD method. Identify the analytical tools used in determination of the provided load rating. The load rating provided shall incorporate the current state of the bridge as detailed in the inspection report.

Provide the following tabulated data at a minimum:

- Final Operating and Inventory Ratings (in tons)
- Clear identification of the controlling member and its location in the structure
- Identification of whether any posting is required
- Sufficiency Rating calculation
- Flexural capacity calculation of the controlling member in kip-ft.
- For rail bridges load rating for Design Inventory, Design Operating and evaluation of the AREMA Cooper vehicle design load using the ASD method.

6 – Appendices – appendices must include at a minimum:

- Structure Inventory and Appraisal Sheet
- Cathodic protection measurements (as applicable), with historical comparison between previous inspection reports
- Most recent mechanical equipment Inspection report
- Most recent electrical equipment Inspection report
- Most recent span balance report
- Most recent underwater inspection report (for scour-critical bridges)
- Inspection field notes from the inspection

APPENDIX A: JAY JAY RAILROAD BRIDGE

BOSS	**Jay-Jay Bridge H2-1198 – Field Inspection Sketch**	
	Span Number:	**Date:**
	Inspected By:	**Checked By:**
	Weather Conditions:	

Jay-Jay Railroad Bridge Routine Inspection:

The structure site orientation is established as shown in the figures of the Appendix. The existing structure site orientation will not be altered. Identification of specific elements must conform to the nomenclature specified here.

Specific element inspection diagrams are included in the Appendix and will be used as necessary to clearly identify specific inspection notes.

It is essential that the inspection be performed in a consistent manner as per this document, completing the inspection of each member in a continuous comprehensive manner.

The routine inspection elements are grouped in three basic categories; Deck & Attachments, Superstructure, and Substructure.

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Deck/Attachments

Element 31 - Bare Timber Deck

The decking component consists of Element 31 "Bare Timber Deck" and is comprised of railroad cross-ties and timber decking used on the walkway on the north side of the bridge. Prior inspections report the following quantities and condition states which must be updated with each subsequent inspection report:

ELEMENT 31: Bare Timber Deck (20,000 sf.)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)		20,000		
QUANTITY (2003)		20,000		
QUANTITY (2007)		20,000		
QUANTITY (2009)		20,000		
QUANTITY (2011)	20,000			
QUANTITY (2013)	19,975	25		

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 332 – Timber Bridge Rail
This element includes the wood pedestrian railing on the North side of the structure
Prior inspections report the following quantities and condition states which must be updated with each subsequent inspection report:

ELEMENT 332: Timber Bridge Rail (1920 lf.)			
CONDITION STATE	1	2	3
QUANTITY (2000)	1375	467	78
QUANTITY (2003)	1375	467	78
QUANTITY (2007)	1375	467	78
QUANTITY (2009)	1790		130
QUANTITY (2011)	1920		
QUANTITY (2013)	1920		

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 334 – Metal Coated Bridge Rail
This element includes the metal rails in Bascule Pier 31, Rest Pier 32, East fender platforms adjacent to Rest Pier 32 and in the East fender. Prior inspection reports are shown below and must be updated with each subsequent year:

ELEMENT 334: Metal Coated Bridge Rail (258 lf.)					
CONDITION STATE	1	2	3	4	5
QUANTITY (2000)	516				
QUANTITY (2003)	413	77		26	
QUANTITY (2007)	413	77		26	
QUANTITY (2009)					258*
QUANTITY (2011)	258				
QUANTITY (2013)	258				

*258 If Metal Coated Bridge Rail was removed at the west fender between 2007 and 2009.

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Superstructure Inspection

There are three significantly different components to the Superstructure; approach spans, bascule span and the control tower. Additionally within the "superstructure" category are specific components such as; bearings, access ladders, and various other components related to the movable classification of the bridge.

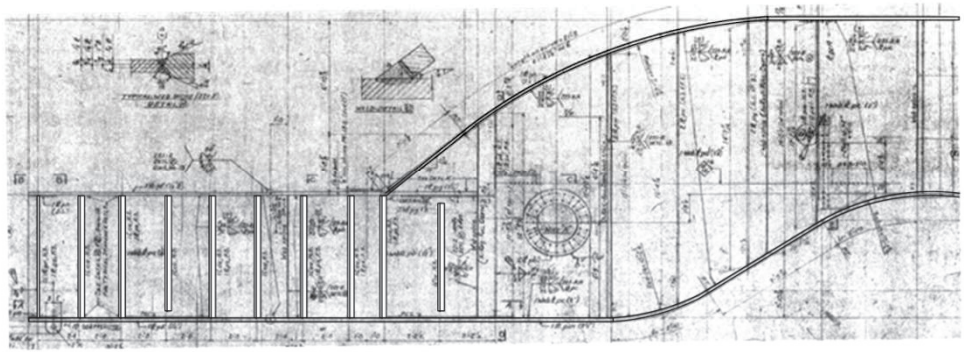
Element 107 – Painted Steel Open Girder

The painted steel open girder element includes the approach span beams and the bascule span main girders. Additional field sketch detail sheets to be used in field recording are attached.

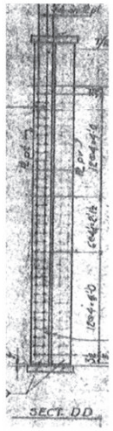
ELEMENT 107: Painted Steel Open Girder (4015 lf.)					
CONDITION STATE	1	2	3	4	5
QUANTITY (2000)	218	3255	271	271	
QUANTITY (2003)	218	3255	271	271	
QUANTITY (2007)	218	3255	271	271	
QUANTITY (2009)	218	3255	242	300	
QUANTITY (2011)		3958	56	1	
QUANTITY (2013)		1	55	3959	

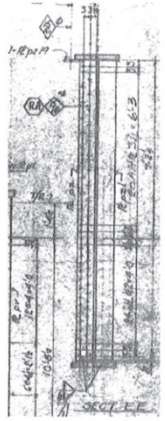
Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Girder Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

NOTES





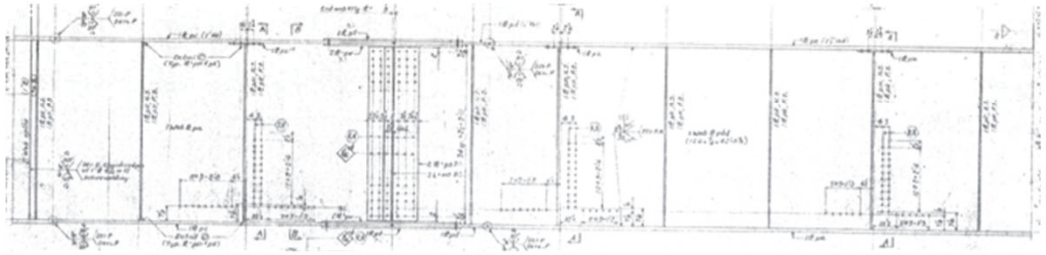


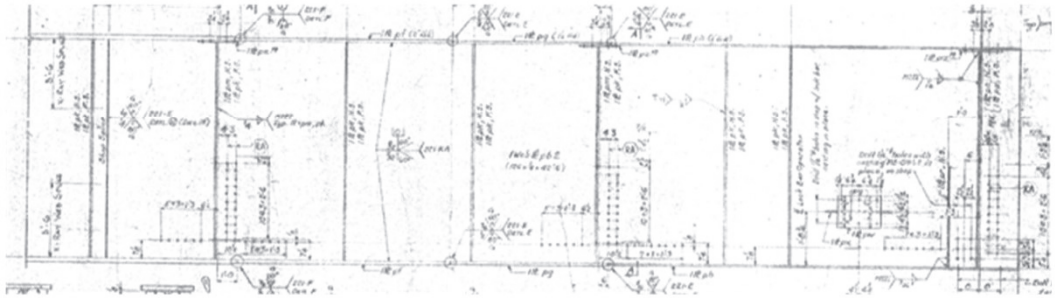


Element 107: Painted Steel Open Girder – Bascule Main Girder (sheet 1)

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Girder Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

NOTES

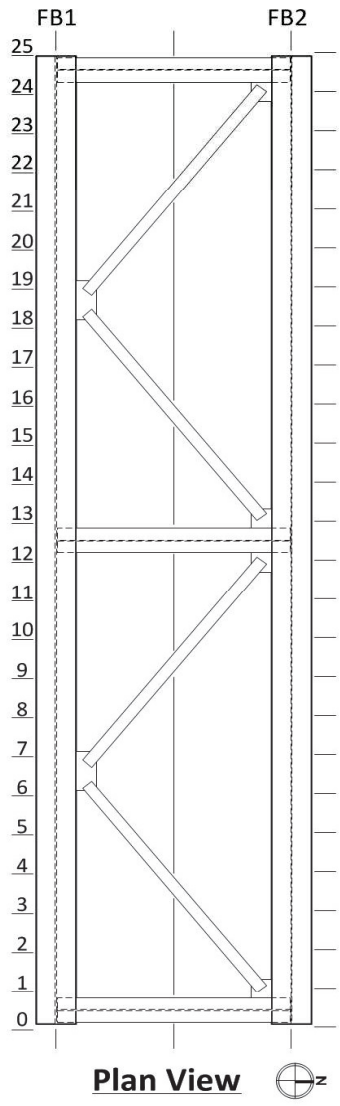




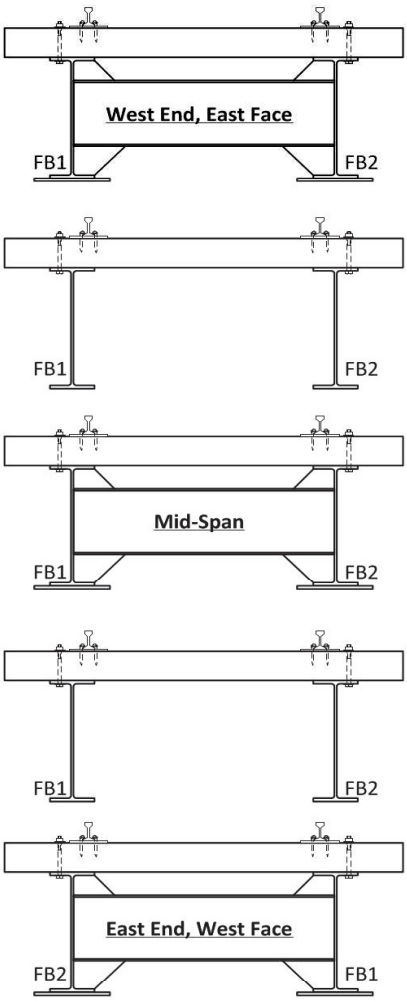
Element 107: Painted Steel Open Girder – Bascule Main Girder (sheet 2)

Jay-Jay Bridge H2-1198 – Field Inspection Sketch

Span Number:	**Date:**
Inspected By:	**Checked By:**
Weather Conditions:	



Plan View



NOTES

Element 107: Painted Steel Open Girder

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	**Date:**
Inspected By:	**Checked By:**
Weather Conditions:	

Element 113 – Painted Steel Stringer:

This section includes the stringer elements in the bascule span and attached secondary components including the gusset plates and lateral bracing.

ELEMENT 113: Painted Steel Stringer (275 lf.)					
CONDITION STATE	1	2	3	4	5
QUANTITY (2000)	206	69			
QUANTITY (2003)	206	69			
QUANTITY (2007)	206	69			
QUANTITY (2009)	206	69			
QUANTITY (2011)	237		20	18	
QUANTITY (2013)	179		66	30	

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	**Date:**
Inspected By:	**Checked By:**
Weather Conditions:	

Element 152 - Painted Steel Floor Beams:

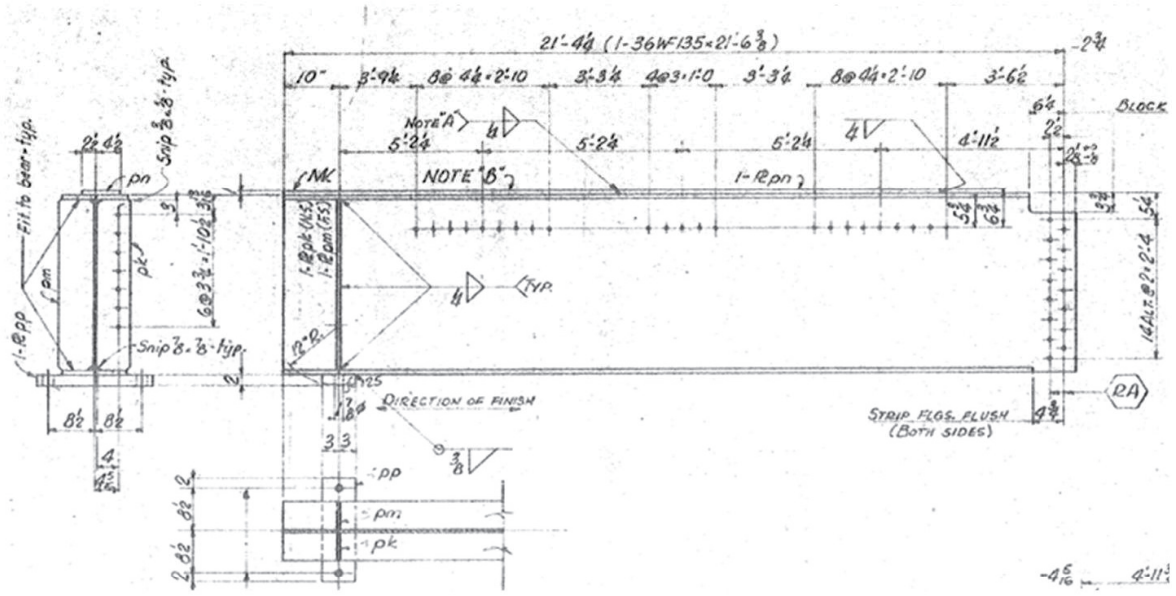
This section includes the Cross Girder and Floor Beams in the bascule span and associated secondary elements. See Appendix for Element 152: Painted Steel Floor Beam for additional field sketch details.

ELEMENT 152: Painted Steel Floorbeam (220 lf.)					
CONDITION STATE	1	2	3	4	5
QUANTITY (2000)	142	48			
QUANTITY (2003)	142	48			
QUANTITY (2007)	142	48			
QUANTITY (2009)	141		48	1	
QUANTITY (2011)	108		79	3	
QUANTITY (2013)*	102	2	12	104	

*An additional quantity of 30’ of length of the cross girder in BP31 is included in this section effective 2013.

Notes:

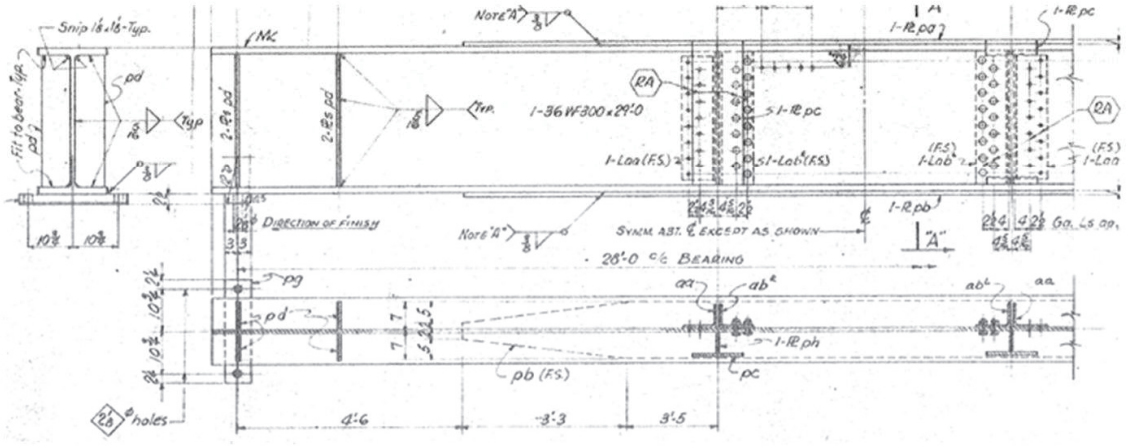
	Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
	Span Number:	**Date:**
	Inspected By:	**Checked By:**
	Weather Conditions:	



NOTES

Element 152: Painted Steel Floorbeam – Floor Beam

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	**Date:**
Inspected By:	**Checked By:**
Weather Conditions:	



NOTES

Element 152: Painted Steel Floorbeam – Cross Girder

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 311 – Movable Bearing Element

This section includes the movable (non-fixed) bearings in the approach spans. Check sliding plate bearings for longitudinal alignment.

ELEMENT 311: Movable Bearing (150 ea.)			
CONDITION STATE	1	2	3
QUANTITY (2000)		150	
QUANTITY (2003)		150	
QUANTITY (2007)		150	
QUANTITY (2009)		150	
QUANTITY (2011)	146	4	
QUANTITY (2013)	146	4	

Element 313 – Fixed Bearing Element

This section includes the fixed bearings in the approach spans.

ELEMENT 313: Fixed Bearing (150 ea.)			
CONDITION STATE	1	2	3
QUANTITY (2000)		150	
QUANTITY (2003)		150	
QUANTITY (2007)		150	
QUANTITY (2009)		144	6
QUANTITY (2011)	137	13	
QUANTITY (2013)	137	13	

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 562 – Counterweight Supports

ELEMENT 562: Counterweight Supports (2 ea.)					
CONDITION STATE	1	2	3	4	5
QUANTITY (2000)	NA				
QUANTITY (2003)	NA				
QUANTITY (2007)	NA				
QUANTITY (2009)	1				
QUANTITY (2011)	1	1			
QUANTITY (2013)	1			1	

Notes:

Element 563 – ACC Ladders and Platforms

ELEMENT 563: ACC Ladders & Platforms (10 ea.)					
CONDITION STATE	1	2	3	4	5
QUANTITY (2000)	NA				
QUANTITY (2003)	NA				
QUANTITY (2007)	NA				
QUANTITY (2009)			9	2	
QUANTITY (2011)	8	1		2	
QUANTITY (2013)	8	1		1	

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 564 – Counterweight

ELEMENT 564: Counterweight (1 ea.)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	NA			
QUANTITY (2003)	NA			
QUANTITY (2007)	NA			
QUANTITY (2009)		1		
QUANTITY (2011)			1	
QUANTITY (2013)			1	

Notes:

Element 571 – Submarine Cable
Submarine cable runs down from both pier walls and into rock rubble.

ELEMENT 571: Submarine Cable (1 ea.)			
CONDITION STATE	1	2	3
QUANTITY (2000)	NA		
QUANTITY (2003)	NA		
QUANTITY (2007)	NA		
QUANTITY (2009)			3
QUANTITY (2011)	3		
QUANTITY (2013)	1		

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 580 – Navigation Lights
This section includes the navigation lights on the bridge (2), fender system (6), clearance gauge lights (2) and signal lights (2) for a total of 12 lights.

ELEMENT 580: Navigation Lights (1 ea.)			
CONDITION STATE	1	2	3
QUANTITY (2000)	NA		
QUANTITY (2003)	NA		
QUANTITY (2007)	NA		
QUANTITY (2009)	NA		
QUANTITY (2011)	1		
QUANTITY (2013)	1		

Notes:

Element 581 – Operator Facilities
This section includes the operator housing structure.

ELEMENT 581: Operator Facilities (1 ea.)			
CONDITION STATE	1	2	3
QUANTITY (2000)	NA		
QUANTITY (2003)	NA		
QUANTITY (2007)	NA		
QUANTITY (2009)		1	
QUANTITY (2011)		1	
QUANTITY (2013)		1	

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Substructure Inspection

Substructure includes all piles, bents and retaining structures. Summary element field note sheets are included in the Appendix.

Element 201 - Unpainted Steel H-Pile

Inspect all (8) steel piles used as crutch supports encased in concrete at Bents 10 and 47.

ELEMENT 201: Unpainted Steel H-Pile (8ea)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	NA			
QUANTITY (2003)	NA			
QUANTITY (2007)	NA			
QUANTITY (2009)		8		
QUANTITY (2011)		8		
QUANTITY (2013)		8		

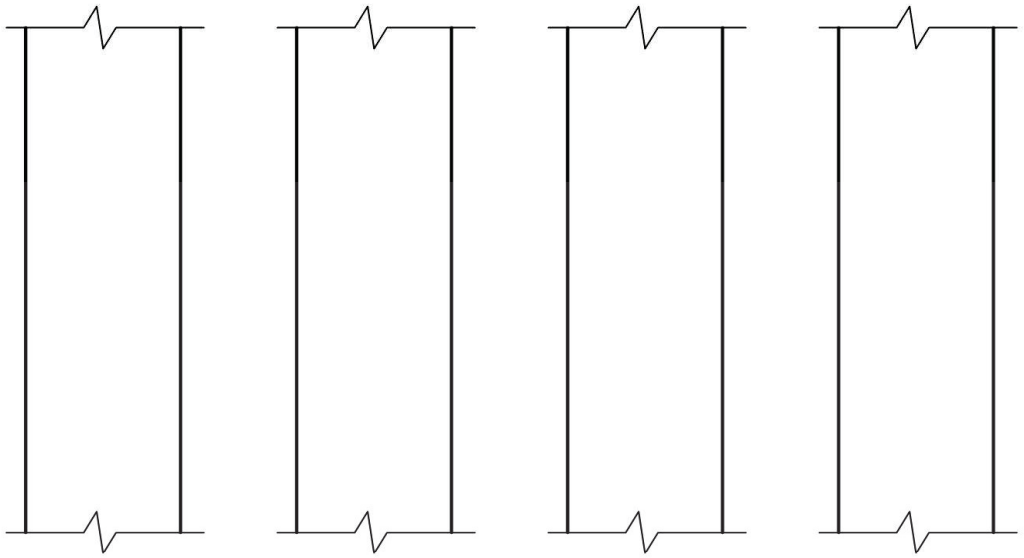
Notes:

Element 204 – P/S Concrete Pile

This element includes all prestressed concrete piles, including those piles with supplementary protective jackets.

ELEMENT 204: P/S Conc Pile (247 ea)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	148	24	70	10
QUANTITY (2003)	148	24	70	10
QUANTITY (2007)	155	19	71	7
QUANTITY (2009)	181	11	60	
QUANTITY (2011)	185	17	45	
QUANTITY (2013)	177	23	47	

Jay-Jay Bridge H2-1198 – Field Inspection Sketch		
Bent Number:	**Pile ID:**	**Date:**
Inspected By:		**Checked By:**
Weather Conditions:		



North Face *East Face* *South Face* *West Face*

NOTES

Element 204: P/S CONC PILE

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 210 – R/Conc Pier Wall

This element includes the reinforced concrete pier wall at Bascule Pier 31 and East Pier 32.

ELEMENT 210: R/CONC Pier wall (79 lf)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	12	63	4	
QUANTITY (2003)	12	63	4	
QUANTITY (2007)	12	63	4	
QUANTITY (2009)		58	21	
QUANTITY (2011)		56	24	
QUANTITY (2013)		32	47	

Notes:

Element 215 – R/Conc Abutment

This element includes the reinforced concrete abutments at Bent 1 and Bent 76.

ELEMENT 215: R/CONC Abutment (26 lf)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)		26		
QUANTITY (2003)		26		
QUANTITY (2007)		26		
QUANTITY (2009)	26			
QUANTITY (2011)	26			
QUANTITY (2013)	26			

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 220 – R/Conc Pile Cap/Footing

This element includes the reinforced concrete footing at Pier 32.

ELEMENT 220: R/Conc Pile Cap/Footing (1 ea)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)			1	
QUANTITY (2003)			1	
QUANTITY (2007)			2	
QUANTITY (2009)		2		
QUANTITY (2011)	1		1	
QUANTITY (2013)			1	

Notes:

Element 234 – R/Conc Cap

This element includes the reinforced concrete pile caps over piles.

ELEMENT 234: R/Conc Cap (962 lf)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	878	74	10	
QUANTITY (2003)	878	74	10	
QUANTITY (2007)	878	74	10	
QUANTITY (2009)*	858	90	41	
QUANTITY (2011)	880	78	4	
QUANTITY (2013)	882	60	20	

*An inconsistency exists in the 2009 report with Element 234 reporting a total quantity of 962 LF but the element quantity showing 989 LF.

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 298 – Pile Jacket Without Cathodic Protection

ELEMENT 298: Pile Jacket Without Cathodic Protection (29 ea)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	25	3	3	
QUANTITY (2003)	25	3	3	
QUANTITY (2007)	25	3	3	
QUANTITY (2009)	9	14	8	
QUANTITY (2011)	19	9	1	
QUANTITY (2013)	20	8	1	

Notes:

Element 299 – Pile Jacket With Cathodic Protection

ELEMENT 299: Pile Jacket With Cathodic Protection (99 ea)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	NA			
QUANTITY (2003)	NA			
QUANTITY (2007)	NA			
QUANTITY (2009)	54	1		
QUANTITY (2011)	98		1	
QUANTITY (2013)	97		2	

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

Element 387 – P/S Conc Fender System

ELEMENT 387: P/S Conc Fender System (384 lf)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	342	42		
QUANTITY (2003)	374	42		
QUANTITY (2007)	374	42		
QUANTITY (2009)	396		20	
QUANTITY (2011)	327	2	55	
QUANTITY (2013)	323	1	60	

Notes:

Element 389 – Timber Dolphin

ELEMENT 389: Timber Dolphin (24 lf)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	NA			
QUANTITY (2003)	NA			
QUANTITY (2007)	NA			
QUANTITY (2009)	NA			
QUANTITY (2011)		24		
QUANTITY (2013)		24		

Notes:

BOSS	Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
	Span Number:	Date:
	Inspected By:	Checked By:
	Weather Conditions:	

Element 475 – Wingwall/Retaining Wall

ELEMENT 475: Wingwall/Retaining Wall (122 lf)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)	NA			
QUANTITY (2003)	NA			
QUANTITY (2007)	NA			
QUANTITY (2009)	NA			
QUANTITY (2011)	NA			
QUANTITY (2013)	106	16		

Notes:

Element 396 Other Material Abutment Slope Protection

ELEMENT 396: Other Material Abutment Slope Protection (2100 sf)				
CONDITION STATE	1	2	3	4
QUANTITY (2000)		1785	315	
QUANTITY (2003)		1785	315	
QUANTITY (2007)		1785	315	
QUANTITY (2009)	2100		315	
QUANTITY (2011)	2100			
QUANTITY (2013)	2100			

Notes:

BOSS	Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
	Span Number:	Date:
	Inspected By:	Checked By:
	Weather Conditions:	

Fracture Critical Member Inspection

Inspect all Fracture Critical Members as identified below and provided in the Fatigue Sensitive Details Tables in this Appendix.

- Bascule Span - Main Girders
- Bascule Span Floor Beams – Welded Plate Beams
- Bascule Span Floor Beams – Rolled Beams
- Bascule Span - Stringers
- Flanking Span Cross Girder
- Approach Span Girders

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	**Date:**
Inspected By:	**Checked By:**
Weather Conditions:	

FRACTURE CRITICAL & FATIGUE SENSITIVE CHECKLIST

Fracture Critical & Fatigue Sensitive Element: FLANKING SPAN CROSS GIRDER
Construction: ROLLED BEAM
Total Number: 1 (Span 31)

FRACTURE CRITICAL/ FATIGUE SENSITIVE DETAIL		DETAIL LOCATION	CAT	INS	DEF
D1	Welded	Vertical stiffener to web and bottom flange	E		
D2	Bolted	Angle bolted to web	B		
D3	Welded	Stub stringer welded to web	E		
D4	Welded	Weld at end of full length cover plate on bottom flange	E		
D5	Welded	Bearing plate welded to bottom flange	E		

Notes:

Jay-Jay Bridge H2-1198 – Field Inspection Sketch	
Span Number:	Date:
Inspected By:	Checked By:
Weather Conditions:	

FRACTURE CRITICAL & FATIGUE SENSITIVE CHECKLIST

Fracture Critical & Fatigue Sensitive Element: BASCULE SPAN STRINGERS
Construction: ROLLED BEAM
Total Number: 14 (Span 31)

FRACTURE CRITICAL/ FATIGUE SENSITIVE DETAIL		DETAIL LOCATION	CAT	INS	DEF
F1	No FSD	Bottom flange and bottom half of web of rolled section	A		

Notes:

APPENDIX B: HAULOVER CANAL BRIDGE

(To be included in the future)

APPENDIX C: BANANA RIVER BRIDGE

(To be included in the future)

APPENDIX D: INDIAN RIVER BRIDGE (SOUTH SPANS)

(To be included in the future)

APPENDIX E: INDIAN RIVER BRIDGE (NORTH SPANS)

(To be included in the future)

APPENDIX F: KENNEDY PARKWAY (703005)

(To be included in the future)

APPENDIX G: KENNEDY PARKWAY (703006)

(To be included in the future)

RECORDS

The following records are retained by the organizations listed below:

Record	Responsible Organization	NRRS/Item#	Retention Period
N/A			

ROLES & RESPONSIBILITIES

BOSS Manager: Ensures BOSS compliance with the requirements stated in this document. Reviews, approves, or disapproves any waiver requests written against this document.

Division Manager: Ensures compliance within the Division to the requirements stated in this document.

Branch Manager: Ensures compliance at the Branch level to the requirements stated in this document.

Approver: The identified approval authority and OPR who approves publication of a document in its final form

Author: Creates documents using the appropriate templates.

Engineering: Generates the OPEN MEE Documentation Report.

REFERENCE DOCUMENTS

The following reference documents of issue are currently in effect on the date of issuance of this engineering document, and which contain the mandatory guidelines that govern the application of this document:

Document Number	Title
Code of Federal Regulations 49, Part 237, Subpart E	Bridge Inspection
American Association of State Highway and Transportation Officials (AASHTO)	AASHTO Guide Manual for Bridge Element Inspection
U.S. Department of Transportation/Federal Highway Administration (USDOT/FHWA)	Bridge Inspector's Reference Manual
Federal Highway Association (FHWA), FHWA-IP-86026	Inspection of Fracture Critical Bridge Members
Evaluation, and Maintenance Manual, AASHTO	Movable Bridge Inspection
Hydraulic Engineering Circular 18, FHWA-IP-90-017	Evaluating Scour at Bridges
FHWA-DP-80-01	Underwater Inspection of Bridges
Florida Department of Transportation (FDOT), Topic No. 850-010-030-g	Bridge and Other Structures Inspection and Reporting
American Railway Engineering and Maintenance-of-Way Association (AREMA), (2009 edition)	Manual for Railway Engineering
America Railway Engineering and Maintenance-of-Way Association	AREMA Bridge Inspection Handbook
Florida Administrative Code Rule 14-48-0011	Safety Inspection of Bridges

ACRONYMS

AASHTO – American Association of State Highway and Transportation Officials
AREMA – American Railway Engineering and Maintenance-of-way Association
BOSS – Base Operations and Spaceport Services
CBI – Certified Bridge Inspector
CFR – Code of Federal Regulations
FCM – Fracture Critical Member
FDOT – Florida Department of Transportation
FHWA – Federal Highway Administration
KSC – Kennedy Space Center
LDE – Lead Design Engineer
NASA – National Aeronautics and Space Administration
NBI – National Bridge Inventory

TL – Team Leader
USAF-United States Air Force

DEFINITIONS

Team Leader (TL) – An employee of BOSS registered as a Professional Engineer in the State of Florida in good standing, with five years of bridge inspection experience and have successfully completed an FHWA approved comprehensive bridge inspection training course.

Certified Bridge Inspector (CBI) – An employee of BOSS listed as being a qualified Certified Bridge Inspector by the Florida Department of Transportation (FDOT).

Lead Design Engineer (LDE) – An employee of BOSS responsible for performing load rating and structural capacity calculations.

Engineering Documents – Any documentation that is classified as either design, plans, specifications, drawings, prints, reports, or other similar instruments of service in connection with engineering services, or creative work, that have been prepared and issued by a professional engineer; or under their supervision, direction, or control.

Fracture Critical Member (FCM) – A fracture-critical member is defined as structural steel member either in tension or with tension element(s), whose failure would cause a portion of, or the entire structure, to collapse suddenly.

REVISION RECORD

The following revisions have been applied to this document:

Revision Number	Change Description	Date
0	Initial Release	05/14/14
1	Administrative change only. Document updated to remove branding of previous contract.	03/24/20
2	Engineering review. Minor administrative edits	02/12/24

DOCUMENT APPROVALS

