

THIS SCOPE IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND IS NOT TO BE USED TO DEVELOP COST PROPOSALS OR TO BE INCLUDED IN REPORTS. THE ACTUAL, BRIDGE SPECIFIC, MECHANICAL AND ELECTRICAL INSPECTION SCOPE-OF-WORK WILL BE PROVIDED THROUGH THE NJDOT PROJECT MANAGER.

SCOPE OF WORK FOR CONSULTANT INSPECTIONS

Type III-S (Current Date)

(State or County) Bridges

Group XXXX

State Job No. XXXXXXXX

3. For Movable Bridges

a) Mechanical Inspection

Structure XXXX-XXX

For movable bridges, perform a routine inspection of the items listed below and observe (during a trial opening) for smooth operation, uniform and regular movement, heavy seating and impact, excessive vibrations and uneven wear of bearing surfaces. Reference any applicable codes that may be affected by the condition, access, or layout of the equipment.

(3.a.1) Review previous inspection reports. Obtain and/or prepare the necessary drawings and other related data and services required in the mobilization for the inspection specified herein. Include the coordination of the inspection specified herein with the U.S. Coast Guard, Department forces, and County agencies. Include the notification of local police prior to performing any inspection/testing activity that may disturb vehicular traffic on the bridge. Inspection/testing activities that disturb vehicular traffic shall only be performed during off peak hours.

FOR SECURITY REASONS, A 72-HOUR NOTIFICATION MUST BE GIVEN PRIOR TO THE START OF THE ON-SITE INSPECTION. ACCESS TO THE BRIDGE WILL NOT BE ALLOWED WITHOUT THIS ADVANCE NOTIFICATION. THE FOLLOWING AGENCIES MUST BE NOTIFIED:

Structural Evaluation	609-530-3572
Movable Bridge Engineering	609-530-2163
Drawbridge Operations	732-528-9494
Traffic Operations North	201-797-3676
- or - Traffic Operations South	856-486-6650

(3.a.2a) For **Vertical Lift Spans**, the inspection shall include the following:

- a). Operating features which support the structure's dead load; such as counterweight, counterweight ropes, sheaves, and trunnions.
- b). Span locks.
- c). Observe operation of balance chain as span travels up and down.
- d). Buffer cylinders on piers and/or abutments.
- e). Strike plates and load shoes on piers and/or abutments.

- f). Centering devices on piers and/or abutments.
- g). Vertical alignment of towers, any evidence of tilt or movements and horizontal alignment between towers during operations

(3.a.2b) For **Bascule Spans**, the inspection shall include the following:

- a). Trunnions and trunnion bearings.
- b). Buffer cylinders.
- c). Load shoes and strike plates.
- d). Tail locks.
- e). Span locks.
- f). Centering guides.

(3.a.2c) For **Swing Spans**, the inspection shall include the following:

- a). Center bearing.
- b). Balance wheels or rim bearing tapered rollers.
- c). Wedges or Jacks.
- d). Centering devices.

(3.a.3) Prepare and submit a brief report of the mechanical inspection specified herein. The report shall include:

1. A description of the structure, its mechanical operating system, and all major equipment
2. A copy of this scope of work
3. A typed copy of all field notes
4. A summary of conclusions and recommendations
5. Cost estimates for recommended repairs
6. Final Mechanical Inspection Report in electronic form

*The dismantling of equipment, except as specifically stated elsewhere in this text, is not intended as part of this scope of work. However, if during the course of this inspection the consultant believes that dismantling of equipment is warranted, the consultant shall advise the Department of this fact. No payment for the dismantling of equipment will be made without prior approval.

Note: Any condition requiring immediate corrective action or priority repair shall be promptly reported, in writing, to the Department.

CONSULTANT'S MAN-HOUR PROPOSAL PER-TASK WORKSHEET

Fill in estimated time per task, and provide for review to the
 Movable Bridge Engineering Group
 Phone 609-530-2163 – Fax 609-530-4444

BRIDGE _____ GROUP _____ JOB # _____

TYPE II MECHANICAL INSPECTION

TASK ID	TASK DESCRIPTION	CONSUL. ESTIMATED HOURS
3.a.1	Mobilization - Review previous data, prepare forms, travel to & from site	
3.a.2a	Observe Vertical Lift Bridge Components	
3.a.2b	Observe Bascule Bridge Components	
3.a.2c	Observe Swing Bridge Components	
3.a.3	Prepare Brief Report - Include brief description of structure and machinery.	

TOTAL MECHANICAL HOURS

Estimated by _____ Date _____

(3.b.1) Review previous inspection reports. Obtain and/or prepare the necessary drawings and other related data and services required in the mobilization for the inspection specified herein. Include the coordination of the inspection specified herein with the U.S. Coast Guard, Department forces, and County agencies. Include the notification of local police prior to performing any inspection/testing activity that may disturb vehicular traffic on the bridge. Inspection/testing activities that disturb vehicular traffic shall only be performed during off peak hours.

FOR SECURITY REASONS, A 72-HOUR NOTIFICATION MUST BE GIVEN PRIOR TO THE START OF THE ON-SITE INSPECTION. ACCESS TO THE BRIDGE WILL NOT BE ALLOWED WITHOUT THIS ADVANCE NOTIFICATION. THE FOLLOWING AGENCIES MUST BE NOTIFIED:

Structural Evaluation	609-530-3572
Movable Bridge Engineering	609-530-2163
Drawbridge Operations	732-528-9494
Traffic Operations North	201-797-3676
- or - Traffic Operations South	856-486-6650

(3.b.2) Perform a visual inspection of the traffic safety equipment and associated components. Utilizing the checklist, EL-45S, identify and record any and all deficiencies, particularly those areas needing immediate corrective action in order to keep the bridge safely in service. Clean, remove and replace equipment inspection covers or enclosure panels, as required, to perform the inspections specified herein. Unless stated elsewhere herein, the Department's personnel will not be utilized for this purpose. Compare observations with Manual of Uniform Traffic Control Devices (MUTCD) guidelines to determine if any deficiencies exist. Record date, time and any condition that may affect inspection results at the time of testing. Reference any applicable codes that may be affected by the condition, access, or layout of the equipment. Record all nameplate information for all electrical equipment in the field notes. Detail the procedures and equipment used in field notes.

The traffic safety equipment inspection will include, but not necessarily be limited to, a detailed examination for smooth operation, uniform and regular movement, synchronization, interlock, mounting, slippage, engagement, applied tension, alignment, clearances, backlash, weather tightness, safety and signs of distress or pending distress with regards to the following components:

- Marine Navigation Lighting
- Aerial Navigation Lighting
- Warning Gongs
- Traffic Signal Fixtures
- Traffic Signal Pole
- Traffic Signal Operation
- Warning Gate Cabinets & Machinery
- Warning Gate Arms
- Warning Gate Lights
- Warning Gate Operation
- Barrier Gate Cabinets & Machinery
- Barrier Gate Arms
- Barrier Gate Lights
- Barrier Gate Operation
- Barrier Gate Locking Mechanisms

(3.b.3) Inspect the condition and operation of marine navigation lighting. Observe and check the physical condition of the navigation lighting, security of mountings, wiring to navigation lighting and aids, and internal wiring. Verify that upon operator's initialization, bascule, swing or lift bridge span navigation lighting turn green at bridge fully open position. Inspect the navigation lighting for proper luminance, lens condition, focus, clarity, and insect intrusion. Confirm proper visibility in accordance with United States Coast Guard (USCG) Standards stated in CFR title 33 section 118.65. Include conduit and wiring, light lens diameters, visibility to marine traffic, and number of fixtures. Provide a record of details and measurements. Any navigation lighting deficiency is to be considered a condition that requires immediate repair.

(3.b.4) Inspect the condition and operation of aerial navigation lighting. Observe and check the physical condition of the aerial navigation lighting, security of mountings, wiring to aviation lighting and aids, and internal wiring. Verify that the aviation lighting is proper color (Red) and flashing as required at the top of the bridge structure. Inspect the aviation lighting for proper luminance, lens condition, focus, clarity, and insect intrusion. Confirm proper visibility in accordance with United States Federal Aviation Administration (FAA) Standards stated in CFR title 33 section 118. Include conduit and wiring, light lens diameters, visibility to marine traffic, and number of fixtures. Provide a record of details and measurements. Any aviation lighting deficiency is to be considered a condition that requires immediate repair.

(3.b.5) Inspect for proper operation and proper physical condition of all warning gongs, poles, mountings, fixtures, and operation. Verify that upon operator's initialization, warning gongs repetitively sound at red traffic signal until the raising of the span or span lock release.

(3.b.6) Inspect condition and operation of the traffic signals. Observe and check the physical condition of the traffic signals, security of fixture mountings, wiring to traffic signal lights, and internal wiring. Verify that upon operator's initialization, the traffic signals switch from green to yellow to red. Record the time delay from yellow to red signal. Record the time delay from red signal to traffic gate permissive. Inspect the traffic signals for proper luminance, lens condition, focus, clarity, and insect intrusion. Include conduit and wiring, light lens diameters, visibility to traffic, and number of fixtures per approach. Provide a record of details and measurements.

(3.b.7) Inspect condition and operation of the traffic warning gates. Include mounting base condition, storage position, deployed position, gate arm length, motor condition and specifications, machinery, wiring, flashing light operation, operation timing (for lowering and raising), hand crank operation. Compare to previous data and report any changes. Provide a record of all details and measurements. Verify that upon operator's initialization, the traffic gates completely lower to stop traffic and raise to allow traffic to proceed.

(3.b.8) Inspect condition and operation of the barrier gates. Include mounting base condition, storage position, deployed position, gate arm length, motor condition and specifications, machinery conditions, wiring condition, flashing light operation, operation timing (for lowering and raising), hand crank operation, locking operation, and distance to traffic warning gates and movable span. Compare to previous data and report any changes. Provide a record of all details and measurements. Verify that upon operator's initialization, the barrier gates completely lower/close and lock across the whole roadway to block traffic and raise/open to allow traffic to proceed.

(3.b.9) Inspect safety interlocking circuits forward / upstream and reverse / downstream. Include observations of operation with scenarios listed below. Prepare and submit a concise interlock testing plan for approval before proceeding with this testing. Verify for all possible combinations that:

INTERLOCK TESTS ARE NOT TO BE ATTEMPTED WITHOUT MOVABLE SPAN AND GATES BEING COMPLETELY CLEAR OF ROADWAY TRAFFIC AND PEDESTRIANS.

Warning gates do not lower during a green signal

Barrier gates do not lower (or close) during a green signal or with any warning gate up

Barrier gates do not lower (or close) during a red signal with any warning gate up

Span locks do not pull during a green signal.

Span locks do not pull during a red signal, with any warning gate and/or barrier gate up/open

Span locks do not pull during a red signal, with warning gate down and any barrier gate up/open

Span does not lift with any gate up or traffic signal green.

All gates do not raise or open and/or traffic signal cannot turn green with span raised.

Span locks do not drive with span raised

Barrier gates do not raise (or open) with span locks pulled

Warning gates do not raise with any barrier gate down/closed and/or span locks pulled

Traffic signals cannot turn green with any gate down/closed and/or span locks pulled

Provide recommendations (if any) to improve the safety of the system. Identify and record any and all deficiencies that do not comply with the NJDOT Movable Bridge Engineering Group – Bypass and Interlocking Standards, particularly those areas needing immediate corrective action, in order to keep the bridge safely in service. Any deficiencies related to the safety of the traffic system must be immediately reported to the Department and a priority repair letter must be generated to correct the deficiency. Information necessary to supplement the priority repair letter must be provided. Information may include providing electrical schematics, hand marked sketches, limit switch settings verification and adjustment procedures, field wiring changes and bridge operational program logic change.

(3.b.10) Prepare and submit a concise report of the inspection specified herein. The report shall include:

1. A description of the structure, its traffic safety system, and all major equipment
2. A description of the traffic safety system, and all related equipment
3. A copy of this scope of work
4. Completed inspection form EL45S
5. Electrical equipment layout
6. A typed copy of all field notes
7. A summary of conclusions and recommendations
8. Cost estimates for recommended repairs
9. Final report in electronic form

Note: Any condition requiring immediate corrective action or priority repair shall be promptly reported, in writing, to the Department.

DRAWBRIDGE TRAFFIC SAFETY INSPECTION REPORT

ROUTE: _____	BRIDGE: _____	STRUCTURE NO.: _____
DATE: ___/___/___	WEATHER: _____	TYPE _____ INSPECTION _____
INSPECTOR: _____		TEMPERATURE: _____ ° F

TRAFFIC SAFETY INSPECTION

The following were evaluated for smooth operation, uniform & regular movement, synchronization, interlock, mounting, overheating, vibration, wear, rust, noise, slippage, engagement, applied tension, lubrication, oil levels, oil contamination, dirt accumulation, fluid pressure, leakage, alignment, clearances, chordal thickness, backlash, air pressure, weather tightness, safety, and signs of distress:

S=Operational / Good Condition 2=Operational / Needs Repair 1=Non Operational N=Not Applicable

TRAFFIC SIGNAL MOUNTING		WARNING GONGS	
TRAFFIC SIGNAL POLE & ARM		BARRIER GATE MOUNTINGS	
TRAFFIC SIGNAL OPERATION		BARRIER GATE CABINETS	
WARNING GATE MOUNTINGS		BARRIER GATE MACHINERY	
WARNING GATE CABINETS		BARRIER GATE HAND CRANK OPERATION	
WARNING GATE MACHINERY		BARRIER GATE ARMS	
WARNING GATE HAND CRANK OPERATION		BARRIER GATE LIGHTS	
WARNING GATE ARMS		BARRIER GATE LOCKING MECHANISMS	
WARNING GATE LIGHTS		SAFETY INTERLOCKS	
MARINE NAVIGATION LIGHTING		AERIAL NAVIGATION LIGHTING	

SAFETY INTERLOCK VERIFICATION

(Check box if interlocks are operating correctly. The following operations should be prohibited)

WARNING GATE LOWER WITH GREEN SIGNAL	
BARRIER GATE LOWER/CLOSE WITH GREEN SIGNAL & WARNING GATES UP	
BARRIER GATE LOWER/CLOSE WITH RED SIGNAL & WARNING GATES UP	
SPAN LOCK PULL WITH GREEN SIGNAL, WARNING & BARRIER GATES UP/OPEN	
SPAN LOCK PULL WITH RED SIGNAL, WARNING & BARRIER GATES UP/OPEN	
SPAN LOCK PULL WITH RED SIGNAL, WARNING GATES DOWN, & BARRIER GATE(S) UP/OPEN	
SPAN LIFT WITH ANY GATE(S) UP OR TRAFFIC SIGNAL GREEN	
GATE(S) UP OR OPEN AND/OR TRAFFIC SIGNAL GREEN WITH SPAN RAISED	
SPAN LOCKS CANNOT BE DRIVEN WITH SPAN RAISED	
BARRIER GATE RAISE/OPEN WITH SPAN LOCKS PULLED	
WARNING GATE RAISE WITH ANY BARRIER GATES DOWN/CLOSED AND/OR SPAN LOCKS PULLED	
GREEN SIGNAL WITH ANY GATE(S) DOWN/CLOSED AND/OR SPAN LOCKS PULLED	

TIMING (In Seconds)

FROM GREEN TO YELLOW SIGNAL	
FROM YELLOW TO RED SIGNAL	
FROM RED SIGNAL TO WARNING GATE PERMISSIVE	

ATTACH EXPLANATION OF WORK NEEDED

CONSULTANT'S MAN-HOUR PROPOSAL PER-TASK WORKSHEET

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 Phone 609-530-2163 – Fax 609-530-4444

BRIDGE _____ GROUP _____ JOB # _____

TRAFFIC SAFETY INSPECTION

TASK ID	TASK DESCRIPTION	CONSUL ESTIMATE D HOURS
3.b.1	Mobilization - Review previous data, prepare forms	
3.b.2	Perform Visual Safety Inspection - Complete Form EL-45S.	
3.b.3	Marine Navigation Lighting – Inspect physical condition, mounting, and operation.	
3.b.4	Aerial Navigation Lighting – Inspect physical condition, mounting, and operation	
3.b.5	Warning Gongs – Inspect physical condition, mounting, and operation.	
3.b.6	Traffic Signals – Inspect physical condition, mounting, and operation. Provide measurements as described above.	
3.b.7	Traffic Warning Gates – Inspect physical condition, mounting, and operation. Provide measurements as described above.	
3.b.8	Barrier Gates - Inspect physical condition, mounting, and operation. Provide measurements as described above.	
3.b.9	Safety Interlock System – Inspect and document circuits and their operation.	
3.b.10	Prepare Report – Include all information as described above.	

TOTAL ELECTRICAL HOURS

Estimated by _____ Date _____