

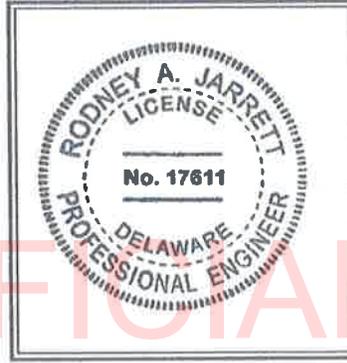
THE STATE OF DELAWARE  
DEPARTMENT OF TRANSPORTATION  
Signature Sheet

Contract No.: T201707005

F.A.P. No.: EBHOS-2018(36)  
P3E No.: 17-07005

Title: Statewide Movable Bridge Preventative Maintenance  
Location: Bridges 1-687, 1-688, 1-693, 2-021A, 3-151, 3-153, 3-154, 3-164  
County: Statewide

PREPARED BY



  
AECOM Project Manager  
Date: 08/31/2018

  
Hardesty & Hanover Project Manager  
Date: 08-28-2018

APPROVED for ADVERTISEMENT

  
Director, Maintenance & Operations  
Date: 9/4/2018

Bridge 1-688

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CLEAN AND FLUSH STEEL SURFACES IN PITS TO REMOVE PIGEON WASTE



REMOVE DEBRIS FROM MAIN SPAN SUPERSTRUCTURE



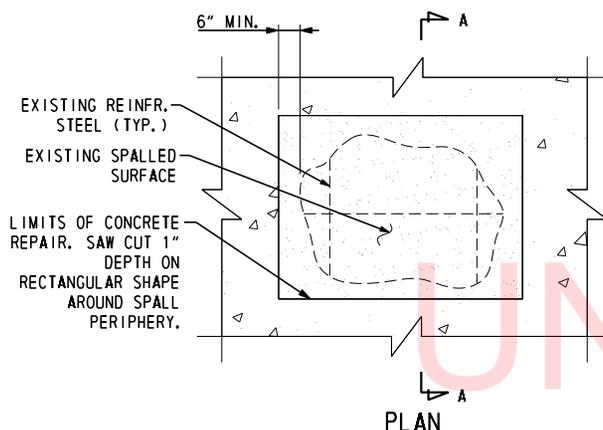
REPAINT THE CHIPPED HANDRAILS

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COPY

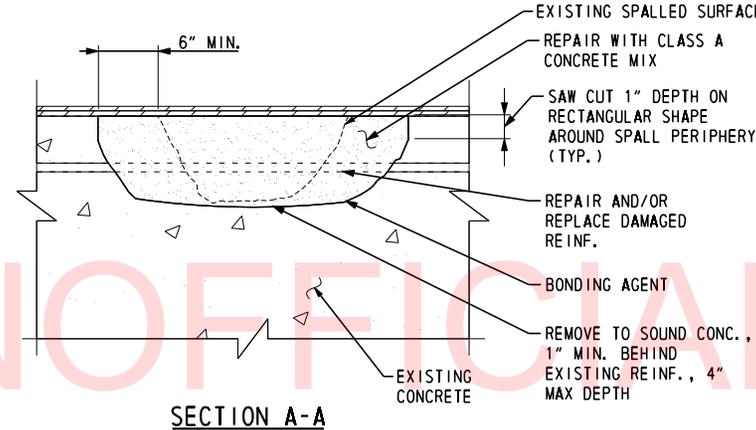
**NOTES:**

1. ALL WORK INVOLVING CLEANING AND PAINTING OF THE HANDRAILS SHALL BE PERFORMED IN ACCORDANCE WITH SPECIAL PROVISION "615606 - INITIAL REPAIRS AT BRIDGE 1-688", PAID UNDER "615606 - INITIAL REPAIRS AT BRIDGE 1-688."
2. QUANTITY OF BASCULE PIERS TO BE CLEANED = 2.
3. APPROXIMATE AREA OF STEEL TO BE CLEANED IN THE NORTH LEAF = 400 SF.
4. APPROXIMATE AREA OF STEEL TO BE CLEANED IN THE SOUTH LEAF = 400 SF.
5. APPROXIMATE AREA OF RAILING TO BE PAINTED = 170 SF.

T201707005	SOUTH MARKET STREET
615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIRS S1 & S2	



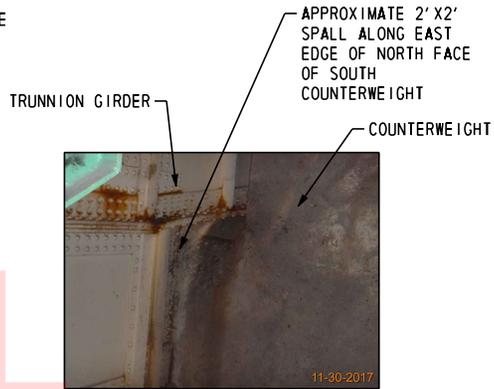
PLAN



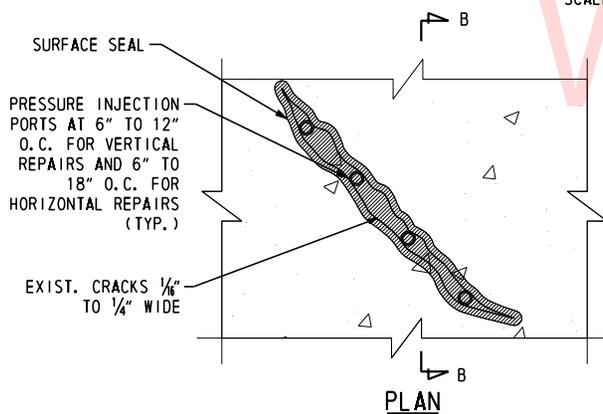
SECTION A-A

**DEEP SPALL REPAIR**

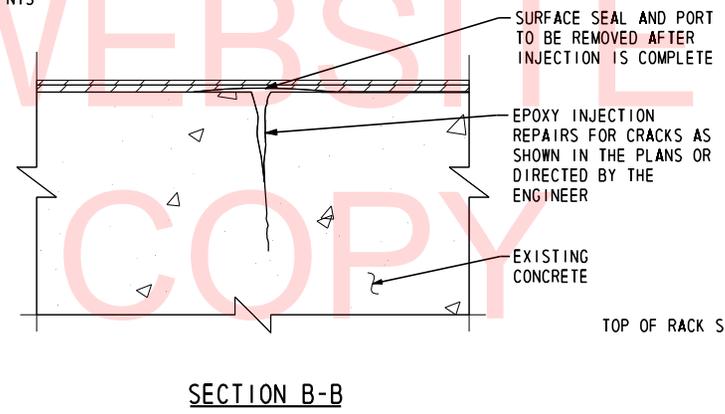
SCALE: NTS



**SPALL IN THE SOUTH COUNTERWEIGHT**



PLAN



SECTION B-B

**CRACK REPAIR**

SCALE: NTS



**TYPICAL CRACKS IN THE CONCRETE NEAR THE RACK SUPPORT**

**NOTES**

1. ALL WORK INVOLVING METHODS OF DEEP SPALL REPAIR SHALL BE PERFORMED IN ACCORDANCE WITH SPECIAL PROVISION "615606 - INITIAL REPAIRS AT BRIDGE 1-688". PAID UNDER "ITEM 615606 - INITIAL REPAIRS AT BRIDGE 1-688."
2. ALL WORK INVOLVING METHODS OF CRACK REPAIR SHALL BE PERFORMED IN ACCORDANCE WITH SPECIAL PROVISION "615606 - INITIAL REPAIRS AT BRIDGE 1-688". PAID UNDER "ITEM 615606 - INITIAL REPAIRS AT BRIDGE 1-688."
3. THE CRACKS THAT ARE TO BE SEALED ARE LOCATED IN THE RACK SUPPORT NEAR THE TOP OF THE RACK AT EACH LEAF.
4. MATERIAL USED FOR CONCRETE REPAIRS AND CRACK SEALING SHALL CONFORM TO DELDOT STANDARD SPECIFICATION SECTION 628.

T201707005	SOUTH MARKET STREET
615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIRS S3 & S4	

## REPAIRS

- M1 REPLACE SEALS AND GASKETS AT THE SOUTH MOTOR COUPLING, SOUTH AUXILIARY MOTOR COUPLING, AND THE SOUTH ENCLOSED BEVEL SPEED REDUCER INPUT SHAFT COUPLING.
- M2 CLEAN DEBRIS, GREASE, AND BIRD WASTE FROM ALL TRUNNION BEARING ASSEMBLIES, SHAFTS, BEARINGS, COUPLINGS, REDUCERS, AND GEARS. CLEAN AND PAINT GEAR FRAME COMPONENTS ON THE COUNTERWEIGHTS. (BOTH LEAFS)

### EXISTING COUPLING INFORMATION

COUPLING I. D.	MANUFACTURER	MODEL (SEE NOTE 4)	LOCATIONS TO REPLACE SEALS	QTY. (BRIDGE TOTAL)
AUXILIARY MOTOR COUPLING	FALK	GEAR DISCONNECT COUPLING 1020G72	SOUTH LEAF	1
MOTOR COUPLING	FALK	GEAR COUPLING DOUBLE ENGAGEMENT 1025G20	SOUTH LEAF	1
ENCLOSED BEVEL SPEED REDUCER INPUT SHAFT COUPLING	FALK	GEAR TYPE SPACER COUPLING SINGLE ENGAGEMENT FALK 1035G32	SOUTH LEAF	1

### NOTES:

- ALL ITEMS ON THIS DRAWING SHALL BE PAID UNDER SECTION 615606 "INITIAL REPAIRS FOR BRIDGE 1-688."
- REFER TO THE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.
- THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL BIRD WASTE AND DEBRIS AT THE SPAN DRIVE MACHINERY. THE CONTRACTOR SHALL UTILIZE PROPER PPE AND REMOVAL METHODS WHEN CLEANING THE WASTE. BIRD WASTE SHALL BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
- THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING COUPLING MANUFACTURER AND MODELS PRIOR TO PURCHASING NEW SEAL, GASKET, AND BOLT KITS.
- PRIOR TO DISASSEMBLING ANY COUPLING, THE CONTRACTOR SHALL LOCK OUT THE SPAN DRIVE MOTORS AND TEMPORARILY HAND RELEASE THE BRAKES TO REMOVE ANY RESIDUAL TORQUE WITHIN THE SPAN DRIVE MACHINERY. SET THE BRAKES AFTER THE RESIDUAL TORQUE HAS BEEN REMOVED.
- TEMPORARILY SUPPORT SHAFTS WHENEVER ANY COUPLING IS DISASSEMBLED.
- WHILE COUPLINGS ARE DISASSEMBLED, CLEAN OLD GREASE FROM THE COMPONENTS AND MANUALLY APPLY FRESH GREASE TO THE COUPLING TEETH. FINISH FILLING COUPLINGS WITH GREASE USING A GREASE GUN AFTER THE COUPLINGS HAVE BEEN REASSEMBLED. REFER TO O&M MANUALS FOR LUBRICATION PROCEDURES AND WARNINGS.

T201707005

SOUTH MARKET STREET

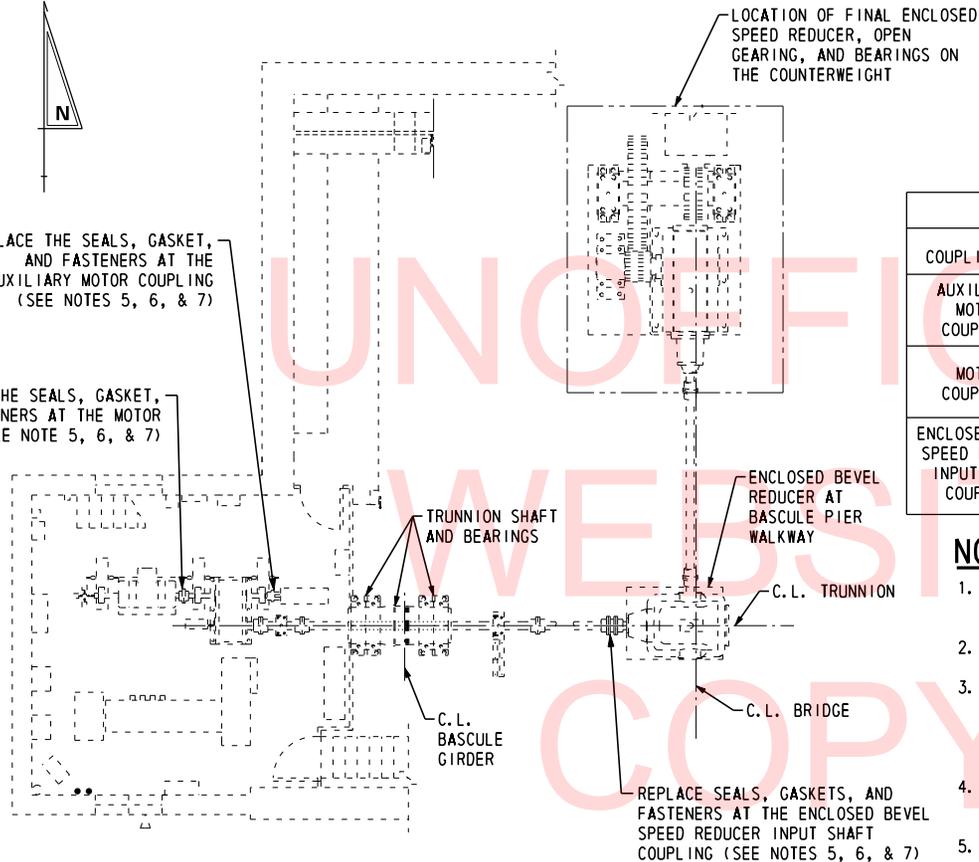
615606 - INITIAL REPAIRS AT BRIDGE 1-688

REPAIRS M1 & M2



REPLACE THE SEALS, GASKET, AND FASTENERS AT THE AUXILIARY MOTOR COUPLING (SEE NOTES 5, 6, & 7)

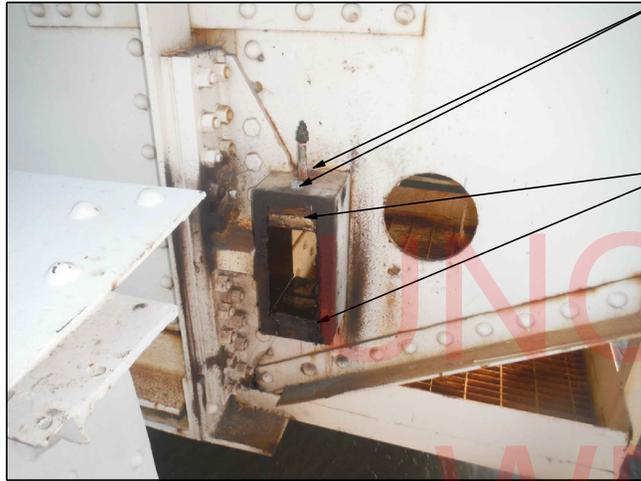
REPLACE THE SEALS, GASKET, AND FASTENERS AT THE MOTOR COUPLING (SEE NOTE 5, 6, & 7)



## SPAN DRIVE MACHINERY - PLAN

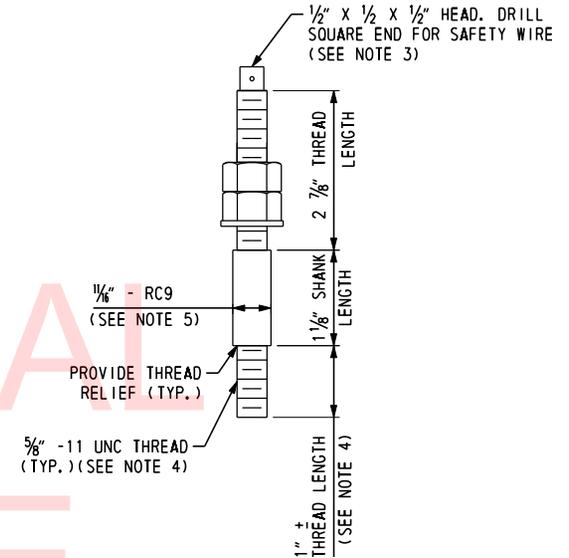
SCALE: NTS

NOTES: NORTH LEAF SHOWN, SOUTH LEAF OPPOSITE HAND  
TRUNNION BEARINGS SYMMETRICAL ABOUT CENTERLINE OF BRIDGE (ONLY 1 TRUNNION ASSEMBLY SHOWN)  
WALKWAYS INSIDE THE BASCULE PIER NOT SHOWN FOR CLARITY



PROVIDE AND INSTALL NEW 5/8" DIA. H.S. TURNED STUDS. INSTALL SAFETY WIRE IN STUDS AFTER SHIM ADJUSTMENTS (4 STUDS PER RECEIVING SOCKET). CLEAN AND SPOT PAINT NEW STUDS AFTER SHIM ADJUSTMENTS ARE MADE.

REPLACE RECEIVING SOCKET SHOE SHIMS. ADJUST SHIMS TO PROVIDE 0.010" TO 0.020" TOTAL CLEARANCE WITH THE LOCK BAR. VERIFY THERE IS CLEARANCE BETWEEN THE RECEIVING SOCKET SHOES AND THE TOP AND BOTTOM SIDES OF THE LOCK BARS. (2 LOCATIONS) (SEE NOTES 6 & 7)

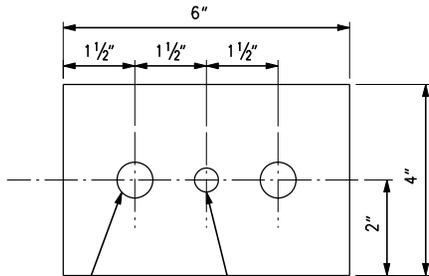


### RECEIVING SOCKET STUD

SCALE: NTS  
 QTY: 8  
 MATERIAL: ASTM A354 GRADE BD

### RECEIVING SOCKET - FACING SOUTH

NOTES: WEST RECEIVING SOCKET SHOWN WITH SOUTH LEAF PARTIALLY RAISED.  
 EAST RECEIVING SOCKET SYMMETRICAL ABOUT CENTERLINE OF BRIDGE.



2 x 3/4" DIA. HOLE 1/2" DIA. HOLE FOR GREASE PORT

### RECEIVING SOCKET SHIM PACK

SCALE: NTS  
 QTY: 4

MATERIAL: ASTM A240 TYPE 316 STAINLESS STEEL  
 NOTES: CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS.  
 EACH RECEIVING SOCKET SHIM PACK SHALL BE COMPRISED OF SHIMS OF THE FOLLOWING THICKNESSES: 1 X 1/2", 1 X 1/4", 1 X 1/8", 1 X 1/16", 1 X 1/32", AND 2 X 1/64"

### NOTES:

- ALL ITEMS ON THIS DRAWING SHALL BE PAID UNDER SECTION 615606 "INITIAL REPAIRS AT BRIDGE 1-688."
- REFER TO THE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.
- ALL RECEIVING SOCKET SAFETY WIRE SHALL BE STAINLESS STEEL WITH A MINIMUM DIAMETER OF 0.042" AND FILL A MINIMUM OF 75% OF THE HOLE DRILLED INTO THE SQUARE END OF THE STUDS. SAFETY WIRE SHALL BE INSTALLED AFTER FINAL SHIMMING OF THE RECEIVING SOCKETS AND IN A MANNER THAT WILL PREVENT THE TENDENCY OF THE STUDS TO LOOSEN.
- CONTRACTOR SHALL FIELD VERIFY THREAD SIZE, PITCH, AND LENGTH IN EXISTING RECEIVING SOCKET SHOES PRIOR TO FABRICATING NEW STUDS. STUD THREAD LENGTH SHALL MATCH THE TAPPED DEPTH IN THE RECEIVING SOCKET SHOES.
- CONTRACTOR SHALL FIELD VERIFY HOLE DIAMETER IN RECEIVING SOCKET HOUSING PRIOR TO FABRICATING NEW STUDS.
- PRIOR TO MEASURING CLEARANCES AT THE RECEIVING SOCKETS AND ADJUSTING SHIMS, VERIFY THAT ALL LIVE LOAD BEARINGS ARE IN HARD CONTACT. NO VEHICLES OR EQUIPMENT SHALL BE ON THE SPAN WHEN THE RECEIVING SOCKET CLEARANCES ARE BEING MEASURED OR WHEN SHIMS ARE ADJUSTED.
- MANUALLY OPERATE THE SPAN LOCKS AFTER THE SHIMMING IS COMPLETE TO VERIFY THAT THERE IS NO BINDING IN THE SPAN LOCK MACHINERY WHEN THE LOCK BARS ARE DRIVEN AND PULLED.

### REPAIR

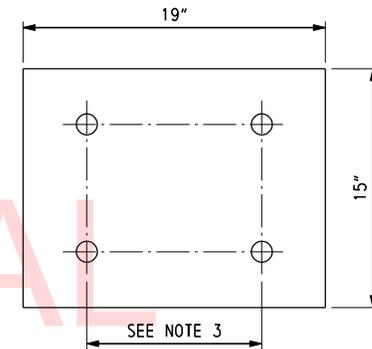
M3 SHIM THE SPAN LOCK RECEIVING SOCKETS AND LIVE LOAD BEARINGS.

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615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIR M3 (1 OF 2)	



**TYPICAL LIVE LOAD BEARING ASSEMBLY**

QTY: 4 LIVE LOAD BEARING LOCATIONS



**LIVE LOAD BEARING SHIM PACK**

SCALE: NTS

QTY: 4

MATERIAL: ASTM A240 TYPE 316 STAINLESS STEEL

NOTE: EACH SHIM PACK SHALL BE COMPRISED OF SHIMS OF THE FOLLOWING THICKNESSES: 1 X 1/2", 1 X 1/4", 1 X 1/8", 1 X 1/16", 1 X 1/32", AND 2 X 1/64".

**NOTES:**

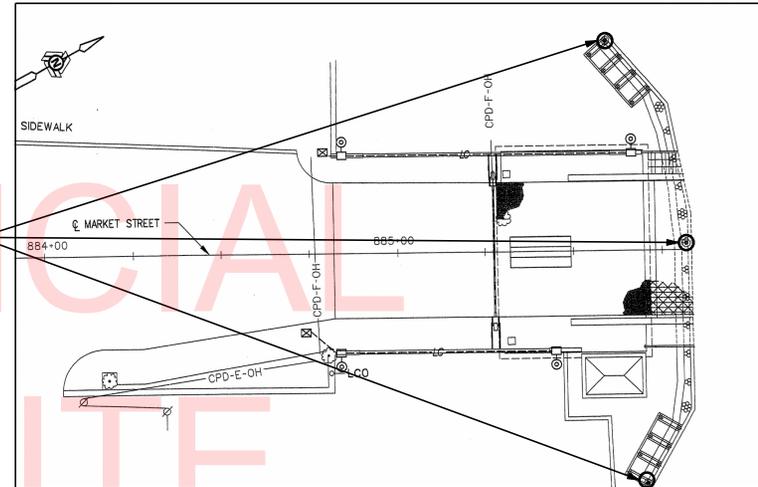
1. ALL ITEMS ON THIS DRAWING SHALL BE PAID UNDER SECTION 615606 "INITIAL REPAIRS AT BRIDGE 1-688."
2. REFER TO THE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS AND SUGGESTED SHIMMING PROCEDURE.
3. THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING SHIM DIMENSIONS (INCLUDING BOLT SPACING) AND BOLT HOLE DIMENSIONS PRIOR TO FABRICATING NEW SHIMS.
4. THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING FIT BETWEEN THE SOLE PLATE FASTENERS AND THE BOLT HOLES IN THE SOLE PLATE AND BASCULE GIRDER. THE CLEARANCE BETWEEN THE EXISTING LIVE LOAD BEARING COMPONENT BOLT HOLES AND THE NEW BOLTS SHALL BE NO GREATER THAN THE EXISTING CLEARANCES. SUBMIT MEASUREMENTS TO THE ENGINEER FOR REVIEW PRIOR TO ORDERING NEW MATERIAL.

T201707005	SOUTH MARKET STREET
615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIR M3 (2 OF 2)	



ADJUST AND ROTATE  
EXISTING  
FENDER NAVIGATION  
LIGHTS TO  
MEET USCG  
REQUIREMENTS  
33 CFR 118.65

APPROXIMATE LOCATION  
OF FENDER NAVIGATION  
LIGHTS



**TYPICAL FENDER NAVIGATION LIGHT**

QTY: TYPICAL FOR 6 NAVIGATION LIGHTS

**SOUTH FENDER - PLAN VIEW**

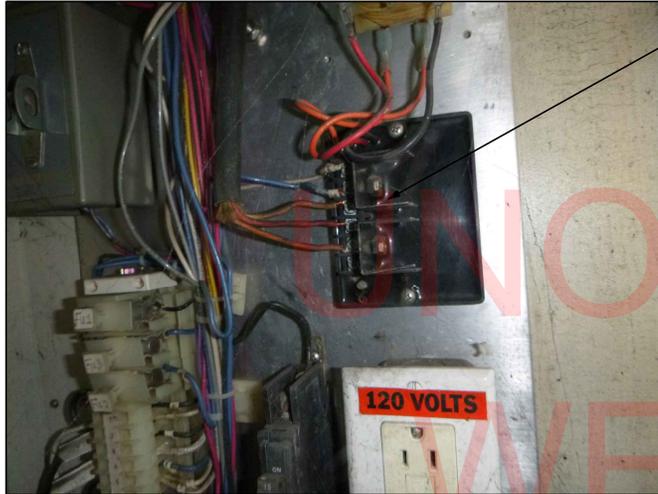
NORTH FENDER SIMILAR  
QTY: 2 FENDERS

NO OFFICIAL  
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COPY

**NOTE:**

1. REFER TO THE SPECIAL PROVISIONS FOR REQUIREMENTS.

T201707005	SOUTH MARKET STREET
615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIR E1	



CONNECT NEW 5C#14 FLEXIBLE CABLE TO EXISTING FLASHER AND TERMINATE WIRING FOR TWO ALTERNATING CIRCUITS, ONE COMMON, AND ONE STEADY (TIP LIGHT)

REPLACE FLEXIBLE CABLE

APPROXIMATE LOCATION OF FLASHER



**TYPICAL WARNING GATE HOUSING AND FLEXIBLE CABLE**

QTY: TYPICAL FOR 4 WARNING GATES

**TYPICAL WARNING GATE FLASHER**

QTY: TYPICAL FOR 4 WARNING GATES

**NOTES:**

1. RECONNECT EXISTING ARM LIGHTS TO NEW CABLE AND CONNECT TIP LIGHT TO STEADY CIRCUIT.
2. REFER TO THE SPECIAL PROVISIONS FOR REQUIREMENTS.

T201707005	SOUTH MARKET STREET
615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIR E2	



**DAMAGED CONDUIT ON WEST  
SPAN LOCK PLATFORM - FRONT VIEW**

QTY: 1 LOCATION

FURNISH AND INSTALL NEW  
LIQUID TIGHT FLEXIBLE  
CONDUIT FROM JUNCTION BOX  
TO DISCONNECT SWITCH

REMOVE EXISTING WIRING FROM  
CONDUIT AND RE-INSTALL IN  
NEW CONDUIT SECTION



**DAMAGED CONDUIT ON WEST  
SPAN LOCK PLATFORM - PLAN VIEW**

QTY: 1 LOCATION

**NOTES:**

1. REPLACE BOXES ON DAMAGED CONDUIT AND ASSOCIATED CONDUIT HUBS CONNECTING FLEXIBLE CONDUIT TO RIGID CONDUIT.
2. REFER TO THE SPECIAL PROVISIONS FOR REQUIREMENTS.

T201707005	SOUTH MARKET STREET
615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIR E3	



FURNISH AND INSTALL NEW  
CONDUIT HUB, BUSHING AND  
LOCK WASHERS FOR THE  
SOUTH BRAKE NO. 1 MOTOR  
CONDUIT CONNECTION

DISCONNECTED CONDUIT TO  
SOUTH BRAKE NO. 1

QTY: 1 LOCATION

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COPY

**NOTE:**

1. REFER TO THE SPECIAL PROVISIONS FOR REQUIREMENTS.

T201707005	SOUTH MARKET STREET
615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIR E4	



REPLACE/REPAIR EXISTING  
FRAYING GROUND BOND  
CONNECTION TO MOVABLE  
SPAN

**NORTHEAST DAMAGED FLEXIBLE GROUND BOND  
CONNECTION**

QTY: 1 LOCATION

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WEBSITE  
COPY

**NOTE:**

1. REFER TO THE SPECIAL PROVISIONS FOR REQUIREMENTS.

T201707005	SOUTH MARKET STREET
615606 - INITIAL REPAIRS AT BRIDGE 1-688	
REPAIR E5	