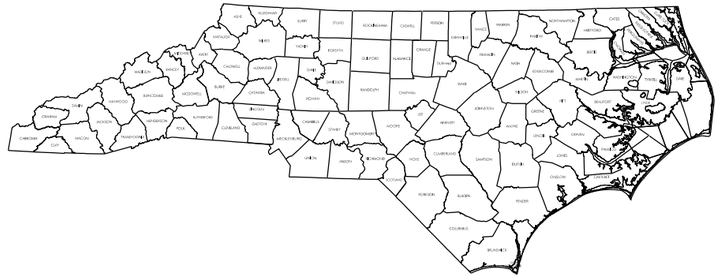
PROJECT: 15B.13.12

CONTRACT NO:



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

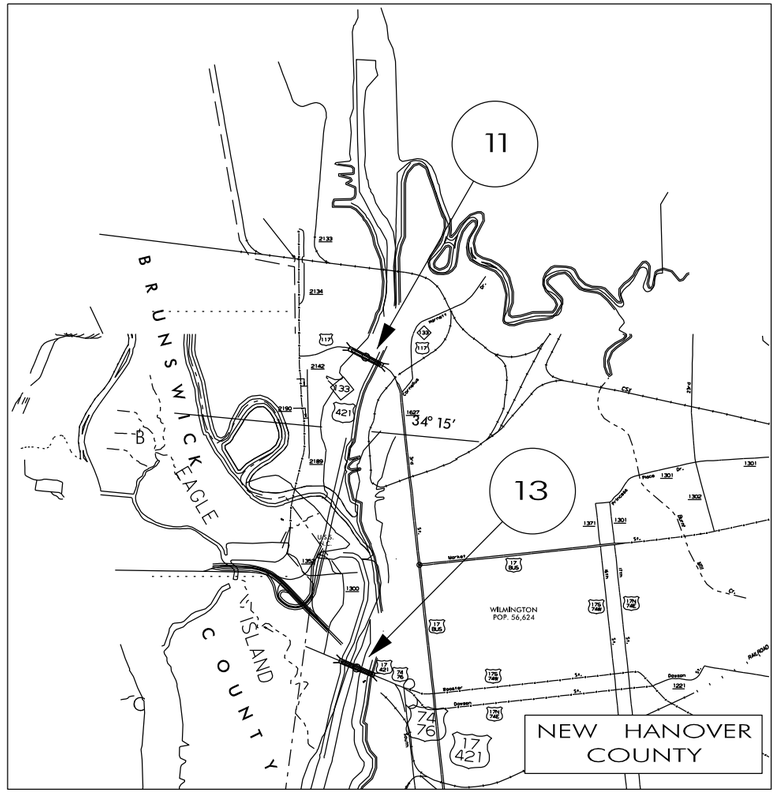
NEW HANOVER COUNTY

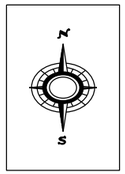
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	15B.13.12	1	

STATE PROJECT NO.	F. A. PROJ. NO.	DESCRIPTION
15B.13.10	N / A	PE
15B.13.12	N / A	CONSTR

LOCATION: BRIDGE #11 US 117 ACROSS NORTH EAST CAPE FEAR RIVER, BRIDGE #13 US 17, 74, 76, 421 ACROSS CAPE FEAR RIVER

TYPE OF WORK: MECHANICAL AND ELECTRICAL REPAIRS





STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT LENGTH

Prepared in the Office of:
BRIDGE MANAGEMENT UNIT
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

LETTING DATE:
JUNE 21, 2011

DAN HOLDERMAN, PE
STATE BRIDGE MANAGEMENT ENGINEER

MIKE SUMMERS
BRIDGE MANAGEMENT PROJECT MANAGER

NORTH CAROLINA PROFESSIONAL SEAL 20208 ENGINEER ERIC B. NELSON, JR. 3/24/11

RICK NELSON, PE
DESIGN ENGINEER

$DATE$
$FILE$
$TIME$

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

CAPE FEAR BASCULE BRIDGE AND MEMORIAL LIFT BRIDGE

WILMINGTON, NORTH CAROLINA

MECHANICAL AND ELECTRICAL REPAIRS
MARCH 2011

LIST OF DRAWINGS

3rd 18th 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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TS.DWG

PROJECT REFERENCE NO.	SHEET NO.
	2

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

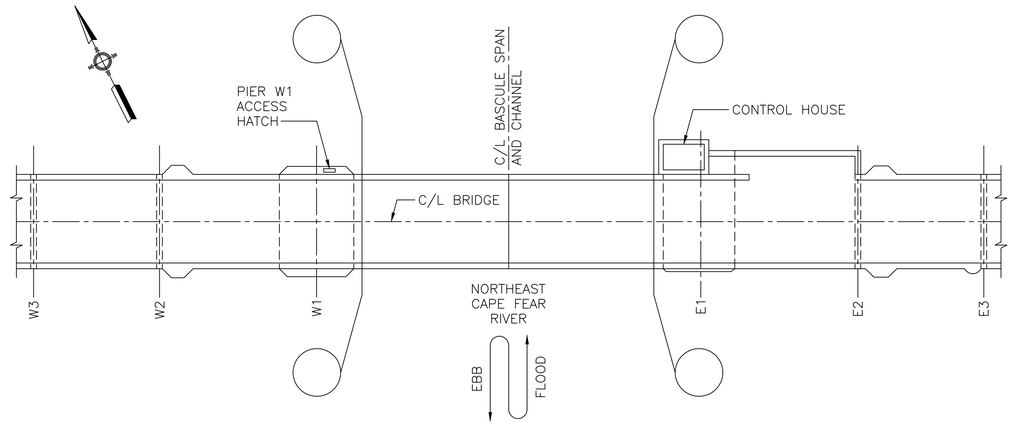
SUMMARY OF QUANTITIES

5/28/99

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$$

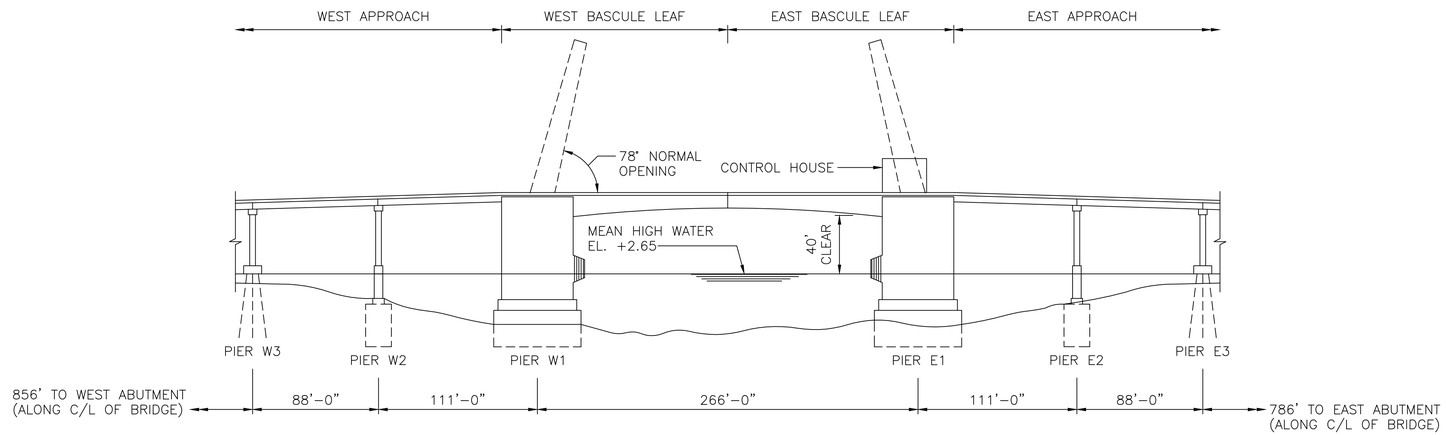
SCOPE OF MECHANICAL WORK

1. REPLACEMENT OF ALL EXISTING CENTER LOCK COMPONENTS WITH NEW AND INSTALLATION OF TEMPORARY LOCKS.
2. REPLACEMENT OF EXISTING LIVE LOAD SPAN LOCK COMPONENTS AS SHOWN ON PLANS WITH NEW.
3. REPLACEMENT OF EXISTING AUXILIARY DRIVE COMPONENTS WITH NEW.
4. REPLACEMENT OF EXISTING OPEN GEARING COVERS WITH NEW.
5. REPLACEMENT OF EXISTING AIR BUFFER BUSHINGS, FILTERS, GAGES, PIPING, AND FITTINGS.
6. REHABILITATION OF OPEN GEARING FRAME ANCHOR BOLTS.
7. MAINTAINING OF SPAN BALANCE WITHIN SPECIFIED BALANCE RANGE DURING CONSTRUCTION.
8. REPLACEMENT OF EXISTING SPAN DRIVE BRAKES AND WITH NEW.



PLAN

SCALE: 1" = 50'-0"



ELEVATION

SCALE: 1" = 50'-0"

WARNING

THE PAINT SYSTEM OF THE EXISTING BRIDGE STRUCTURE MAY CONTAIN LEAD AND/OR OTHER HEAVY METALS. ANY CONTAINMENT, ABATEMENT, AND/OR OTHER MEASURES NECESSITATED BY THE CONTRACTOR'S ACTIVITIES SHALL BE THE FULL RESPONSIBILTY OF THE CONTRACTOR.

3RD MAY 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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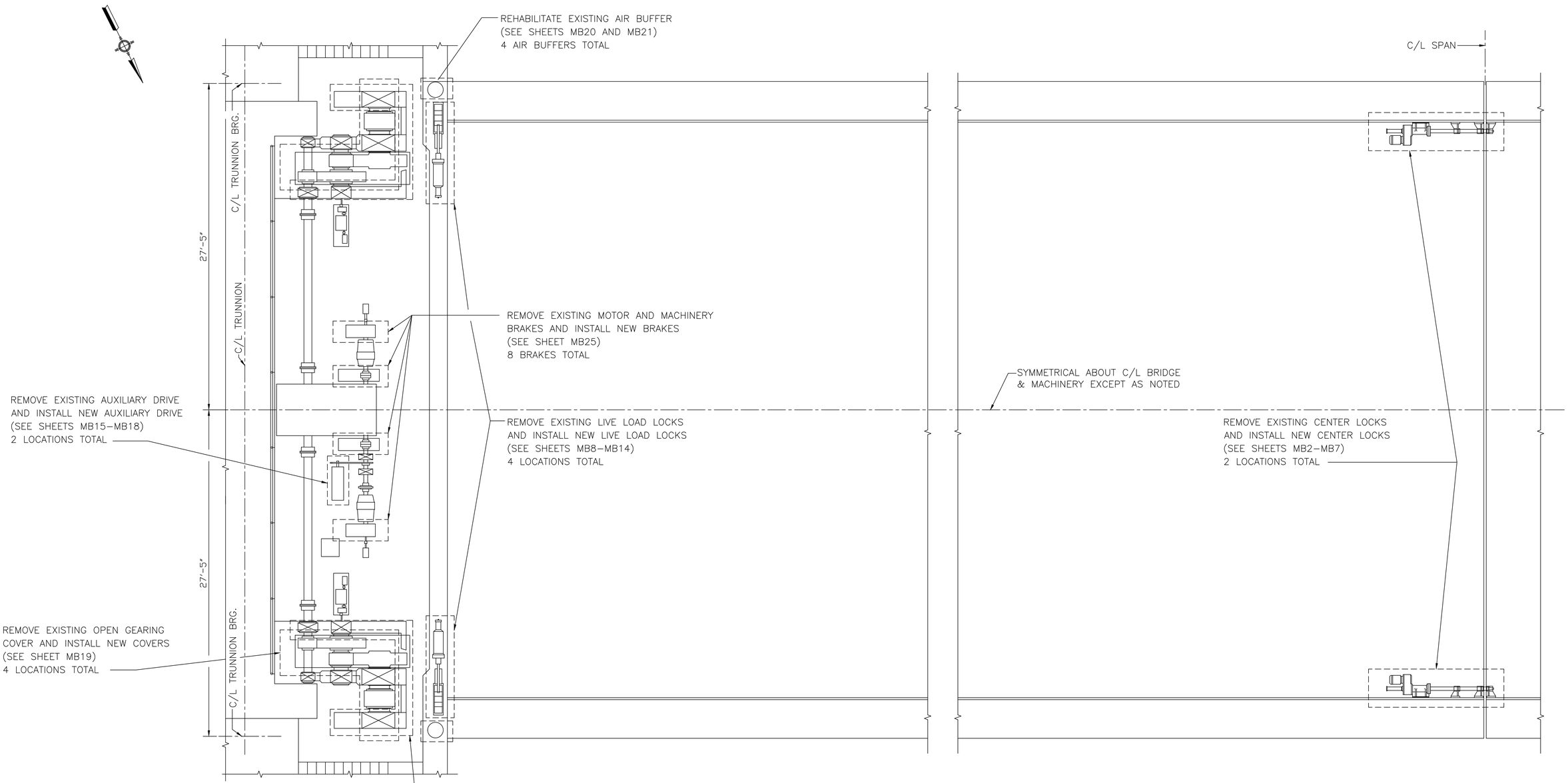
0 1 2 3
INCHES ON FULL SIZE SHEET

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
GENERAL PLAN AND ELEVATION
(BASCULE BRIDGE)

			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
GEPB	DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE MARCH 2011
	CHECKED D.M. BARRETT	CHECKED D.M. BARRETT	DRAWING NO. 1 OF 63

1--GPEB--GPEB.DWG,DWG



PLAN VIEW – MECHANICAL LAYOUT

EAST LEAF SHOWN
SCALE: 1/4" = 1'-0"

0 1 2 3
INCHES ON FULL SIZE SHEET

3RD MAY 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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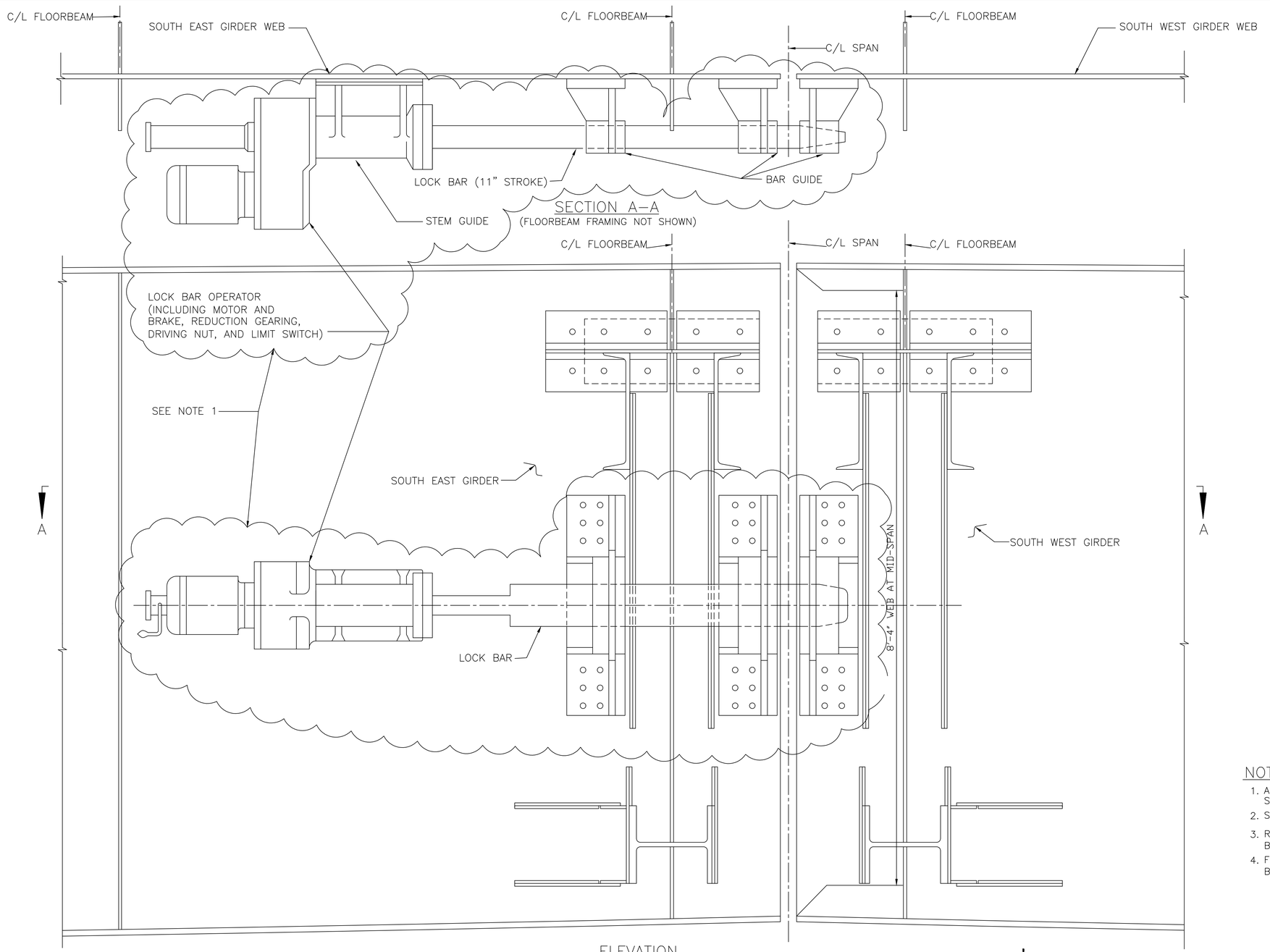
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

EXISTING MECHANICAL LAYOUT

		DRAWN BY	E. A. RICKENBACH
		SCALE	AS NOTED
MB1	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED J.W. NEWMAN	CHECKED J.W. NEWMAN	DRAWING NO. 2 OF 63

2-MB1-EML.DWG



ELEVATION

EXISTING CENTER LOCK ASSEMBLY

(FLOORBEAM FRAMING NOT SHOWN)

SCALE: 1 1/2" = 1'–0"

0 1 2 3

INCHES ON FULL SIZE SHEET

NOTES:

1. ALL EXISTING CENTER LOCK COMPONENTS TO BE REMOVED. SOUTH ASSEMBLY SHOWN, NORTH SIMILAR.
2. SEE SPECIFICATIONS FOR ADDITIONAL DETAILS.
3. REMOVAL MAY NOT PROCEED UNTIL A FULLY DETAILED PROCEDURE HAS BEEN SUBMITTED AND APPROVED.
4. FILL ALL EXISTING HOLES NOT REUSED WITH NEW PROPER SIZE ASTM A325 BOLTS WITH HS NUTS AND HARDENED WASHERS.

3rd MAY 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE

WILMINGTON, NORTH CAROLINA

EXISTING CENTER LOCK REMOVAL

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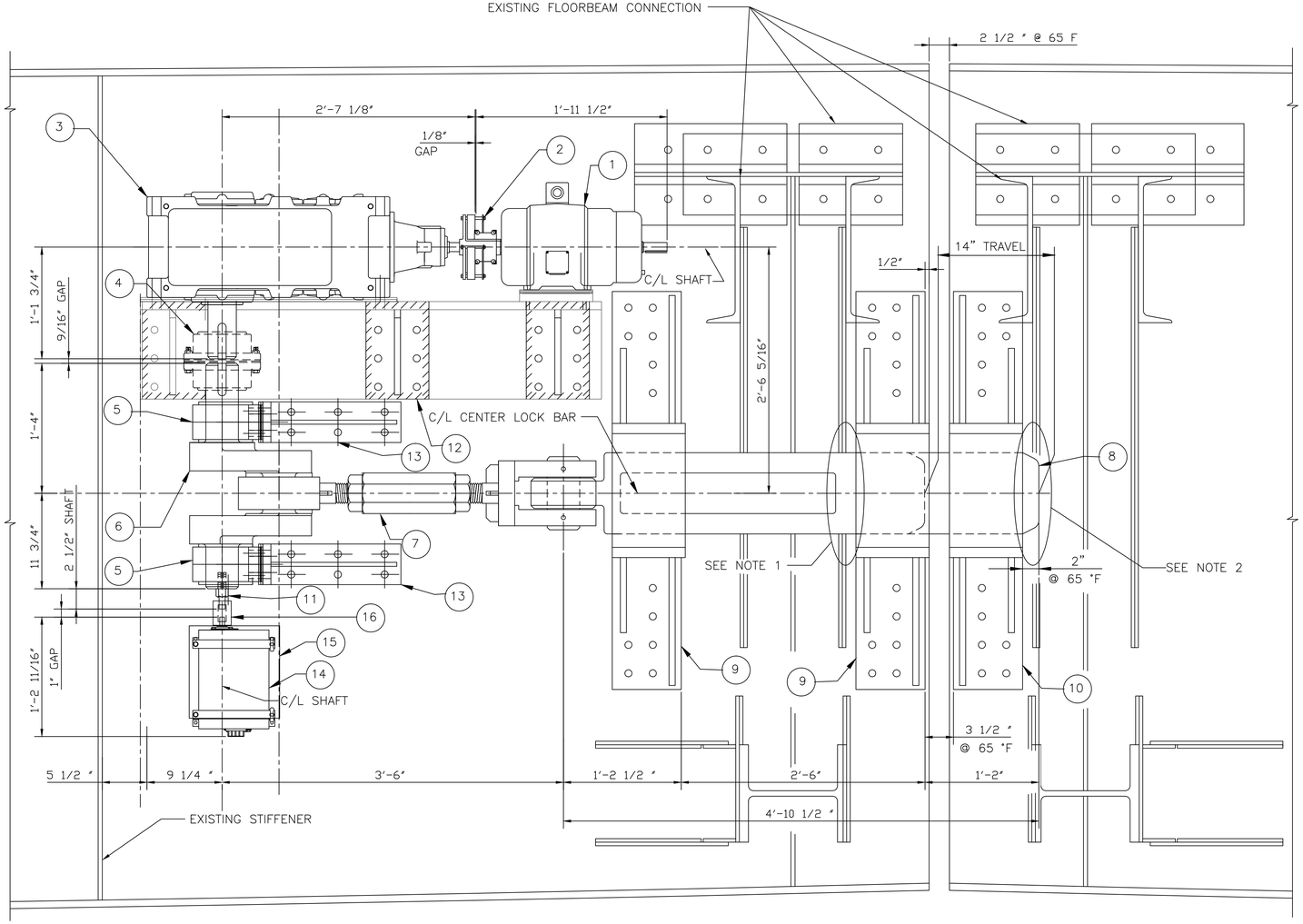
		DRAWN BY	E.A. RICKENBACH
		SCALE	AS NOTED
MB2	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED J.W. NEWMAN	CHECKED J.W. NEWMAN	DRAWING NO. 3 OF 63

3-MB2-ECLR.DWG



ELEVATION

NEW CENTER LOCK LAYOUT

SCALE: 1 1/2" = 1'-0"
ELEVATION VIEW – SOUTH SHOWN,
NORTH OPPOSITE HAND

MACHINERY SCHEDULE			
MACH'Y NO.	NO. REQ'D.	UNIT DESCRIPTION	SHEET NO.
1	3 (1 SPARE)	NEW CENTER LOCK BRAKE MOTOR, BY REULAND ELECTRIC, 3 HP, 900 RPM, TENV, NEMA DESIGN D, HOIST DUTY AC, WITH REULAND FLECTRIC 25 FT–LBS BRAKE, 215X FRAME, EXTENDED SHAFT FOR HAND CRANK, AND MICROSWITCH ASSEMBLY.	–
2	2	NEW TORQUE LIMITING COUPLING, BY THE FALK CORPORATION, TYPE T41, SIZE 1030T, SET FOR 315 IN–LBS TORQUE. WITH ASTM A668, CLASS G KEYS TO MATCH STANDARD KEYWAYS ON BRAKE MOTOR AND GEAR REDUCER.	–
3	2	NEW RIGHT ANGLE GEAR REDUCER, BY SUMITOMO MACHINERY CORPORATION OF AMERICA, MODEL 9040, QUADRUPLE REDUCTION, RATIO 140:1 WITH OUTDOOR BREATHER AND HIGH BUILD EPOXY PAINT. FOR LUBRICATION PIPING, WHEN VIEWED FROM HIGH SPEED SHAFT SIDE AND THE VERTICAL SHAFT DOWN, ONE UNIT TO HAVE PIPING ON THE LEFT AND ONE UNIT TO HAVE PIPING ON THE RIGHT. BREATHER POSITIONED TO ALLOW FOR 80 DEGREES OF ROTATION WHEN MOUNTED ON BRIDGE.	–
4	2	NEW DOUBLE ENGAGEMENT COUPLING, BY THE FALK CORPORATION, GEAR TYPE GV10, SIZE 1030GV, 107,100 IN–LB TORQUE RATING, WITH SHROUDED BOLTS AND WITH AISI 1045 HEAT TREATED TO 250–300 BHN KEYS TO MATCH KEYWAYS ON GEAR REDUCER AND CRANK SHAFT.	–
5	4	NEW CRANK SHAFT BEARINGS, MODEL NUMBER SMCB–16 BY STEWARD MACHINE CO., WITH CUSTOM RADIUS AND GREASE GROOVES ON ONE SIDE.	MB4
6	2	NEW CRANK SHAFT.	MB4
7	2	NEW TURNBUCKLE AND CRANK SHAFT ASSEMBLY.	MB4
8	2	NEW CENTER LOCK BAR.	MB4
9	4	NEW CENTER LOCK GUIDES.	MB5
10	2	NEW CENTER LOCK RECEIVER.	MB5
11	2	NEW STUB SHAFT FOR ROTARY CAM LIMIT SWITCH.	MB5
12	2	NEW GEAR REDUCER AND BRAKE MOTOR SUPPORT.	MB6
13	4	NEW CRANK SHAFT BEARING SUPPORT.	MB6
14	2	NEW ROTARY CAM LIMIT SWITCH WITH 8 CAMS, BY GEMCO, SPDT SWITCHES, CONTACTS RATED 10A AT 120 VAC., NEMA 4/4X TYPE 316 STAINLESS STEEL HOUSING, CAMS ADJUSTABLE WITHOUT TOOLS, SETABLE FROM 4 TO 356 DEGREES.	–
15	2	NEW ROTARY CAM LIMIT SWITCH SUPPORT.	MB6
16	2	NEW STAINLESS STEEL COUPLING BY HELICAL MODEL MC7C–225–24–20 TO MATCH SHAFTS.	–

NOTES:

1. EXISTING CUTOUTS IN GUSSET PLATES (AND GIRDER STIFFENER BETWEEN THE PLATES) MAY NEED TO BE ENLARGED TO PROVIDE MINIMUM 1/2" AND MAXIMUM 1" CLEARANCE WITH NEW LARGER LOCK BAR.
2. ONE NEW CUTOUT (FOR EACH LOCK BAR) IN WEST LEAF GUSSET PLATES REQUIRED WITH MINIMUM 1/2" AND MAXIMUM 1" CLEARANCE WITH NEW LOCK BAR.
3. CUTOUTS SHALL BE MADE BY MECHANICAL MEANS ONLY AFTER PROCEDURE IS SUBMITTED TO OWNER AND APPROVED.
4. PROVIDE NEW STAINLESS STEEL DEBRIS COVERS TO COMPLETELY COVER THE TOP OF THE CENTER LOCK BARS BETWEEN GUIDES. CONCEPT TO BE SUBMITTED TO OWNER FOR APPROVAL. SEE SPECIFICATIONS FOR ADDITIONAL DETAILS.
5. THE EXISTING LIVE LOAD SHOES SHALL BE ADJUSTED BY INSTALLING OR REMOVING SHIMS TO THE TOP SHOE TO ACHIEVE CONTACT ON BOTH SIDES OF EACH LIVE LOAD ASSEMBLY. THIS ADJUSTMENT SHALL BE COORDINATED WITH THE ROADWAY PROFILE AND AND ADJUSTMENT OF THE SHIMS FOR THE EXISTING CENTER LOCK RECEIVERS. EACH LIVE LOAD ADJUSTMENT SHALL BE SUBMITTED AND APPROVED BY THE NCDOT REPRESENTATIVE BEFORE THE ADJUSTMENT IS MADE.
6. A TEMPORARY SPAN LOCK ASSEMBLY IS DETAILED ON SHEET MB7. INSTALLATION IS REQUIRED BEFORE REMOVAL OF ANY EXISTING CENTER LOCK GUIDES, RECEIVERS, OR LOCK BARS.

0 1 2 3
INCHES ON FULL SIZE SHEET

3RD MAY 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

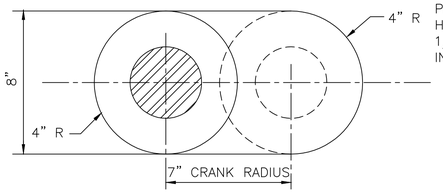
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

NEW CENTER LOCK – LAYOUT

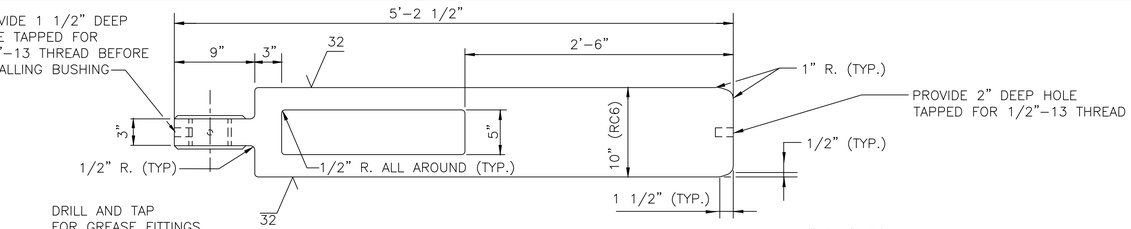
		DRAWN BY	E.A. RICKENBACH
		SCALE	AS NOTED
DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE	MARCH 2011
CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO.	4 OF 63

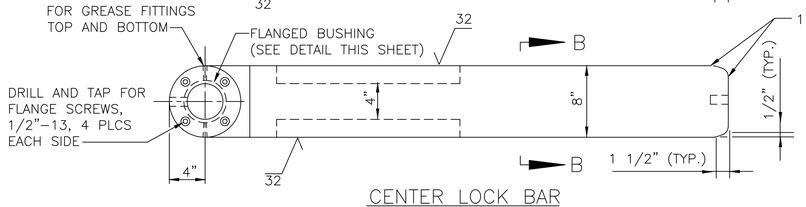
MB3

4-MB3-NCLL.DWG

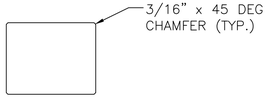


SECTION A–A
SCALE: 3" = 1'–0"

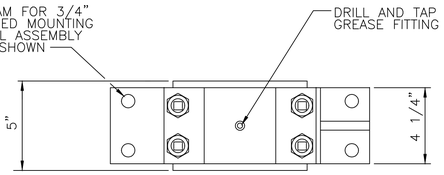


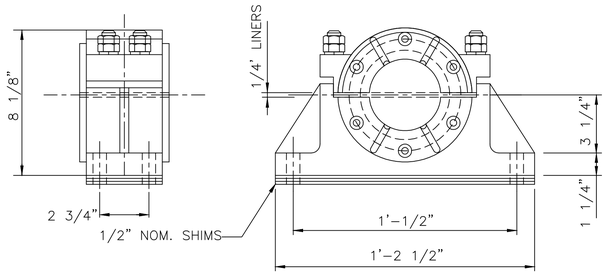


CENTER LOCK BAR
SCALE: 1 1/2" = 1'–0"
MATERIAL
LOCK BAR: ASTM A668 CLASS K

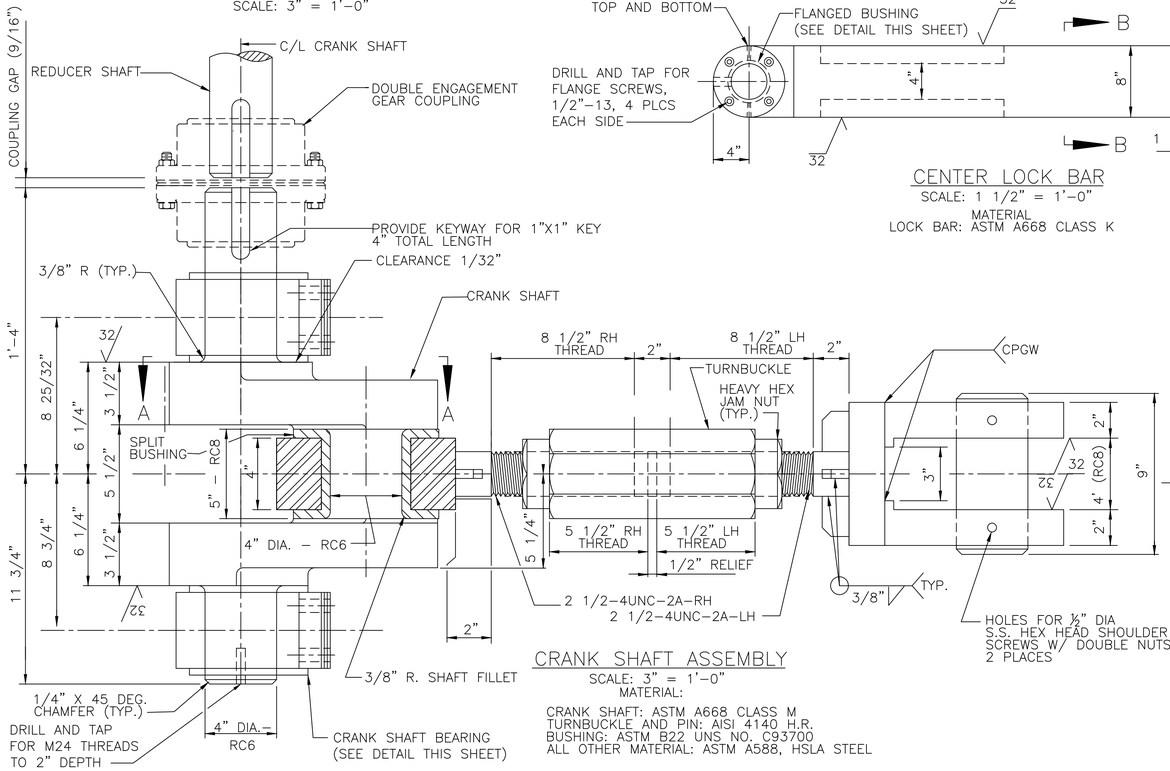


SECTION B–B
SCALE: 1 1/2" = 1'–0"

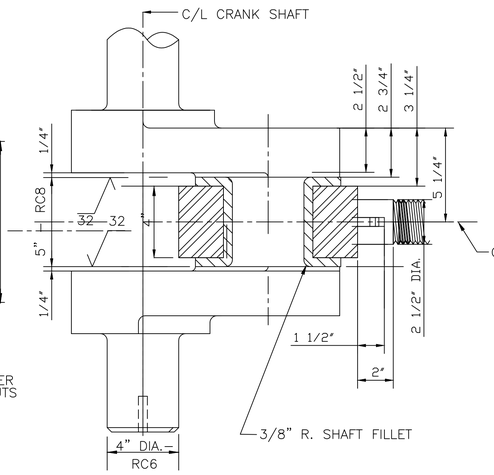




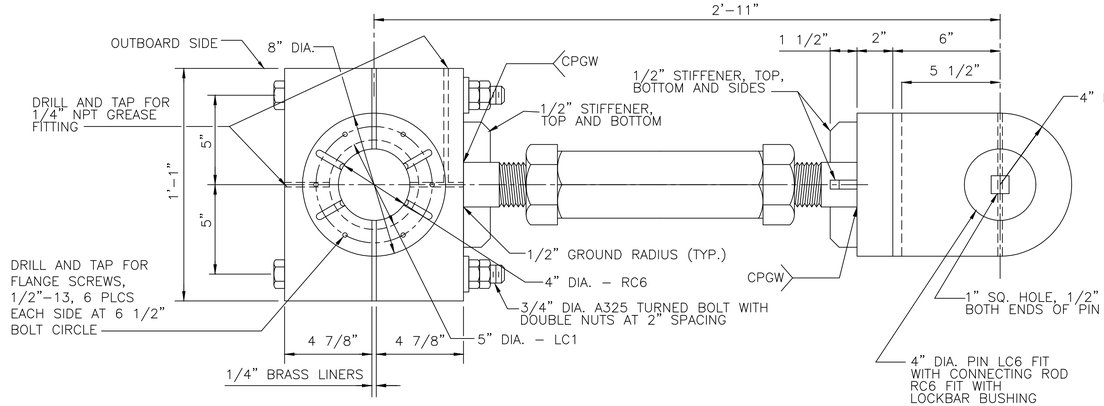
CRANK SHAFT BEARING DETAIL
SCALE: 3" = 1'–0"
MATERIAL
BASE AND CAP: ASTM A36 OR ASTM A27, GRADE 70–36
BUSHING: ASTM B22 UNS NO. C91100, 1/2" THICK
BOLTS: ASTM A490



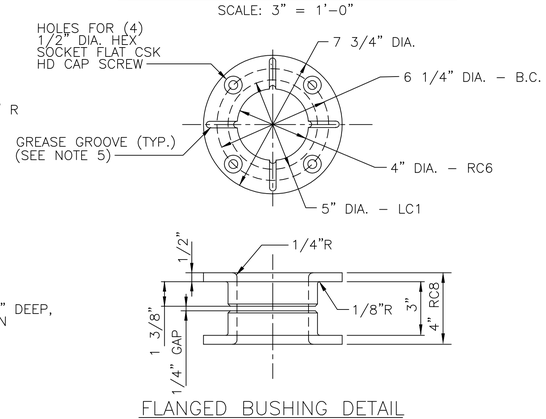
CRANK SHAFT ASSEMBLY
SCALE: 3" = 1'–0"
MATERIAL:
CRANK SHAFT: ASTM A668 CLASS M
TURNBUCKLE AND PIN: AISI 4140 H.R.
BUSHING: ASTM B22 UNS NO. C93700
ALL OTHER MATERIAL: ASTM A588, HSLA STEEL



ADDITIONAL CRANK SHAFT DETAIL
SCALE: 3" = 1'–0"



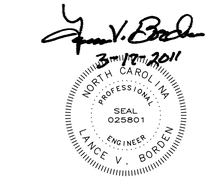
TURNBUCKLE (CONNECTING ROD)
SCALE: 3" = 1'–0"



FLANGED BUSHING DETAIL
SCALE: 3" = 1'–0"
MATERIAL
ASTM B22 UNS NO. C93700

NOTES:

1. ALL SPLIT BEARING GREASE GROOVES SHALL BE 1/8" WIDE AND 1/16" DEEP WITH ALL CORNERS AND EDGES ROUNDED TO 1/16" R. THE GREASE GROOVE SHALL BE CUT 1/2" FROM THE ENDS OF THE BEARING AND FORM A FIGURE EIGHT OVER THE ENTIRE JOURNAL SURFACE WITH ONE INTERSECTION AT THE GREASE PORT. THE CORNER OF THE BEARING AT A FILLET SHALL BE ROUNDED THE FILLET RADIUS PLUS 1/8" AT THE SPLIT. THE SHIM PACK SHALL BE CUT 1/4" BACK FROM THE JOURNAL SURFACE BETWEEN THE GREASE GROOVES. EACH BEARING SHALL BE DRILLED AND TAPPED FOR 1/4" STEEL PIPE, ADAPTER AND GREASE FITTING.
2. ALL WELDMENTS SHALL BE STRESS RELIEVED BY HEAT PRIOR TO FINAL MACHINING.
3. MAXIMUM WIDTH ACROSS CORNERS FOR TURNBUCKLE 4 1/2", 3 7/8" ACROSS FLATS.
4. HEX SOCKET FLAT CSK HEAD CAP SCREWS TO BE RECESSED 1/8".
5. FLANGED BUSHINGS TO HAVE 1/8" WIDE AND 1/16" DEEP GROOVES WITH CORNERS AND EDGES ROUNDED TO 1/16" R. I.D. GROOVES TO BE DOUBLE SPIRAL. THRUST FACE GROOVES TO TIE INTO I.D. GROOVES.
6. ALL BUSHINGS TO HAVE 32 MICROINCH FINISH AT JOURNAL AND THRUST AREAS AND 125 MICROINCH FINISH AT NON–SLIDING AREAS.



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

NEW CENTER LOCK – COMPONENTS

MODJESKI and MASTERS
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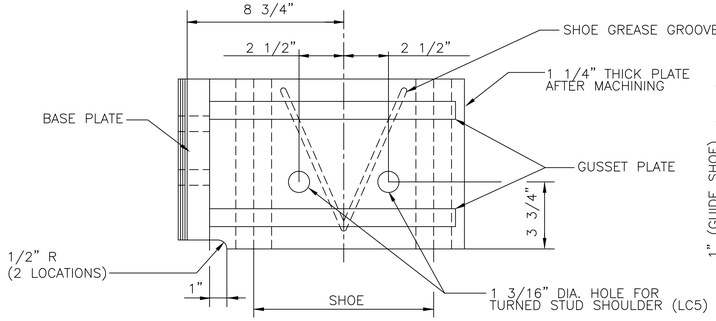
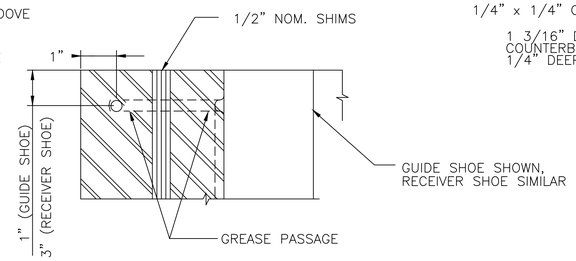
MB4			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO. 5 OF 63

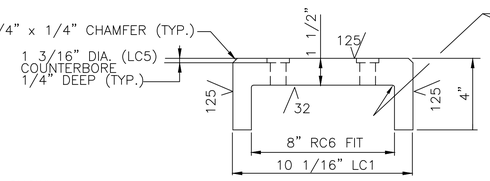
5–MB4–NCLC.DWG

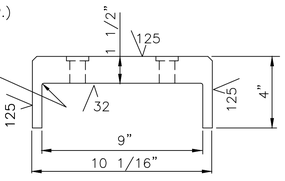


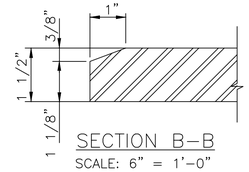


SECTION A–A

SCALE: 6" = 1'–0"

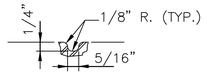






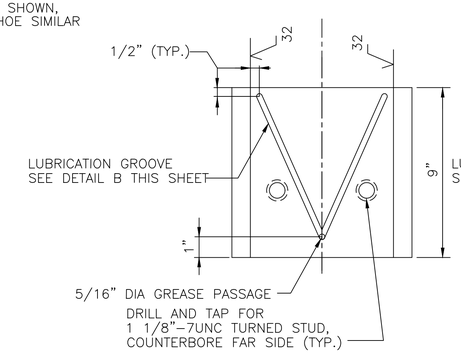
SECTION B–B

SCALE: 6" = 1'–0"



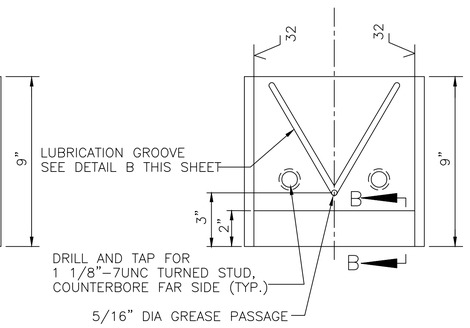
DETAIL B

SCALE: 6" = 1'–0"



GUIDE SHOE

8 REQUIRED



RECEIVER SHOE

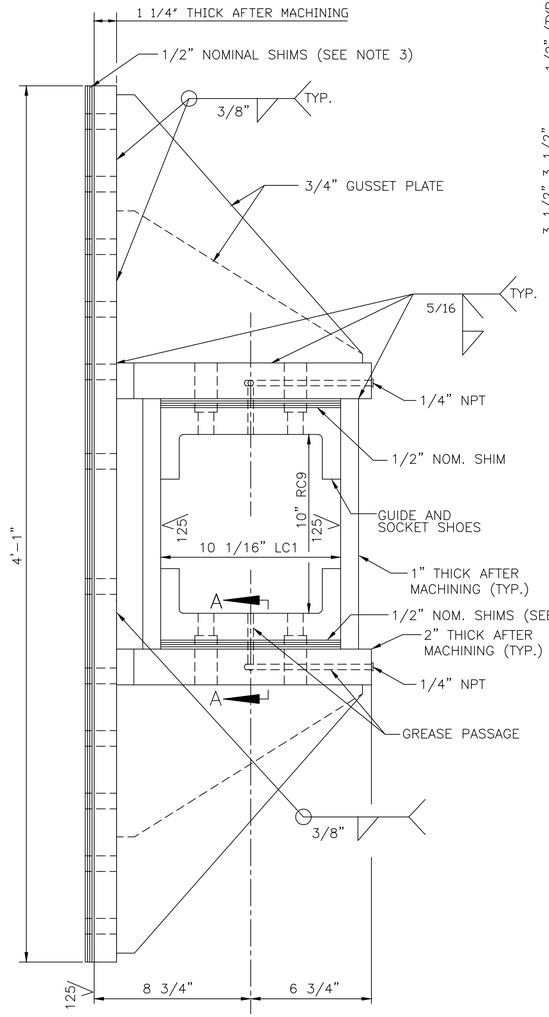
4 REQUIRED

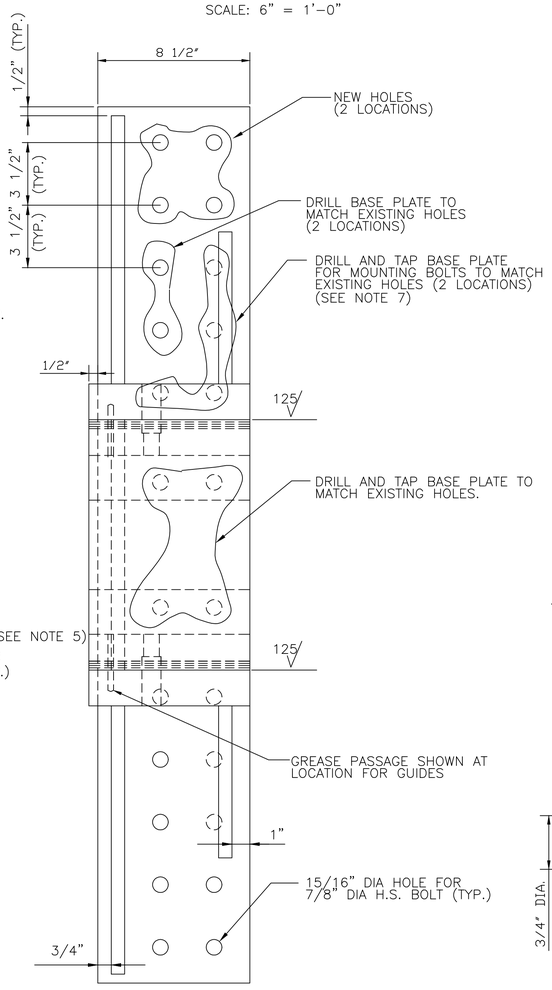
SHOE DETAIL

SCALE: 3" = 1'–0"

MATERIAL

SHOE: ASTM B22 UNS NO. C86300



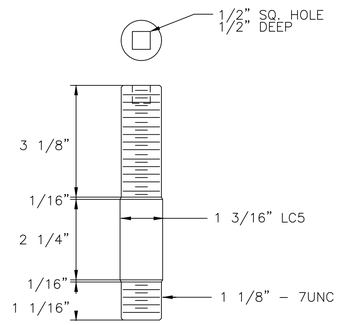


CENTER LOCK GUIDES AND RECEIVER

SCALE: 3" = 1'–0"

MATERIAL

ASTM A588, HSLA STEEL

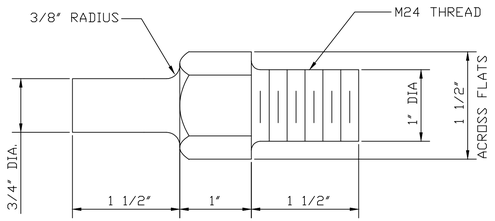


TURNED STUD DETAIL

SCALE: 6" = 1'–0"

24 REQUIRED

MATERIAL: ASTM A449



SHAFT FOR ROTARY CAM UNIT

SCALE: 1" =1"

MATERIAL: AISI 4140 H.R.

NOTES:

1. ALL WELDMENTS SHALL BE STRESS RELIEVED BY HEAT PRIOR TO MACHINING.
2. GREASE PASSAGES MUST BE CONNECTED WITH RIGIDLY MOUNTED STAINLESS STEEL TUBING TO GREASE FITTINGS ADJACENT TO MAINTENANCE WALKWAYS AND SECURED AGAINST VIBRATION.
3. ADDITIONAL 1/2" SHIM PLATES MAY BE REQUIRED AT SEVERAL LOCATIONS SUCH AS SOUTH RECEIVER MOUNTING. LONGER MOUNTING BOLTS MAY BE REQUIRED.
4. LOCATION OF MOUNTING HOLES FOR GUIDES AND RECEIVERS SHALL CENTER ON FINAL CENTER LOCK BAR LOCATIONS. NOTE: THERE IS SIGNIFICANT VARIATION IN VERTICAL POSITION FOR EXISTING GUIDES AND RECEIVERS.
5. EIGHT ADDITIONAL 1/8" SHIMS TO BE SUPPLIED FOR EACH GUIDE AND RECEIVER FOR ADJUSTMENT OF THE BASE PLATE AND FUTURE WEAR OF GUIDE AND RECEIVER SHOES.
6. GUIDES AND RECEIVERS SHALL BE ASSEMBLED IN THE SHOP WITH NOMINAL SHIMS TO VERIFY FIT WITH NEW CENTER LOCK BAR.
7. DRILLED AND TAPPED HOLES IN 1 1/4" PLATE NOT TO PENETRATE THE PLATE.
8. PROVIDE DOUBLE NUTS AND HARDENED WASHERS FOR TURNED STUDS.

0 1 2 3

INCHES ON FULL SIZE SHEET

6--MB5--NCLGRD.DWG

3-17-2011

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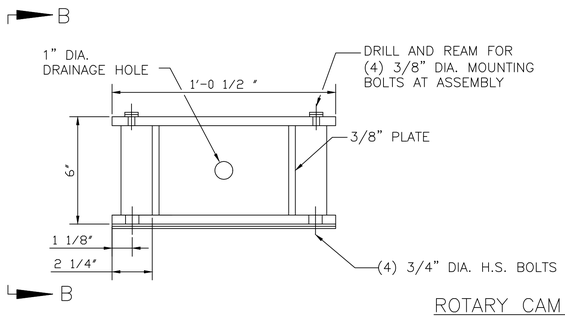
RALEIGH

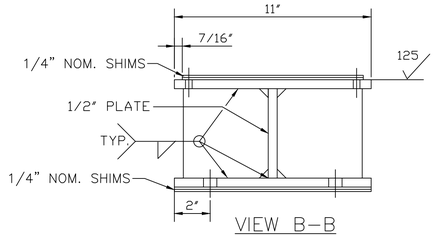
CAPE FEAR BASCULE BRIDGE AND MEMORIAL LIFT BRIDGE

WILMINGTON, NORTH CAROLINA

NEW CENTER LOCK – GUIDE AND RECEIVER DETAILS

		DRAWN BY	E.A. RICKENBACH
		SCALE	AS NOTED
MB5	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO. 6 OF 63

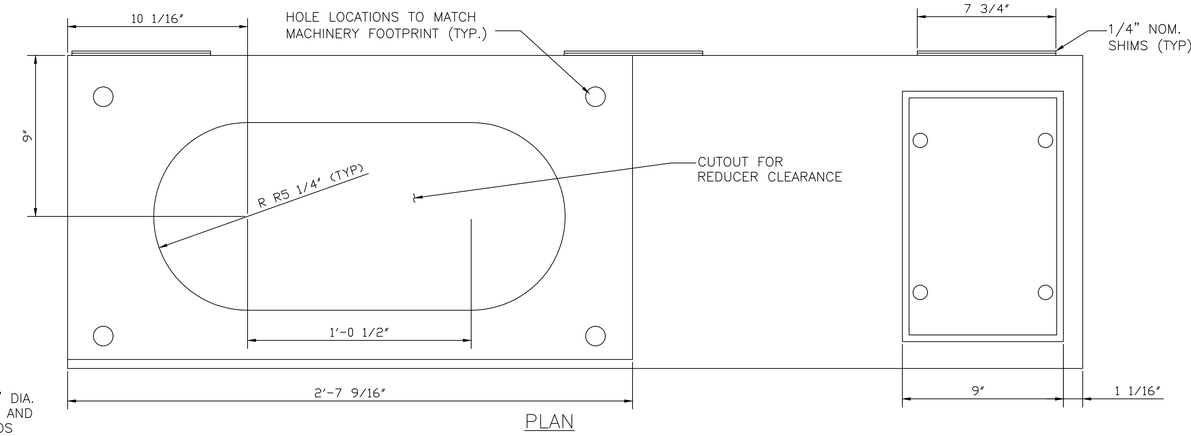




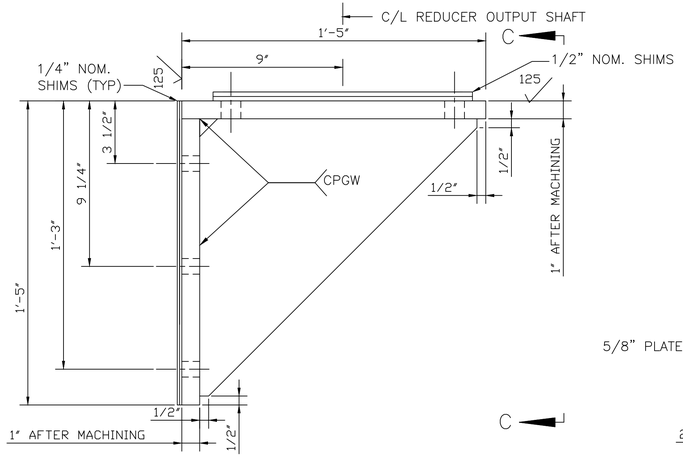
VIEW B–B

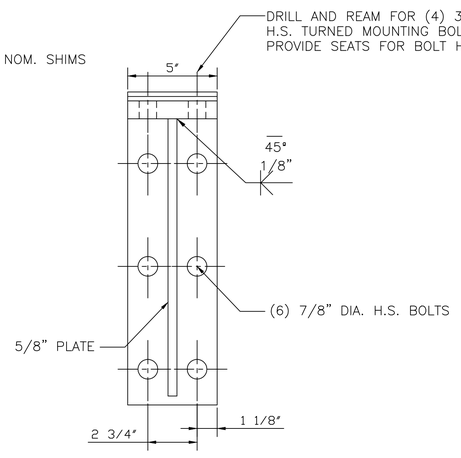
ROTARY CAM LIMIT SWITCH SUPPORT

SCALE: 3' = 1'–0"
MATERIAL: ASTM A36
QUANTITY: 2 TOTAL



PLAN

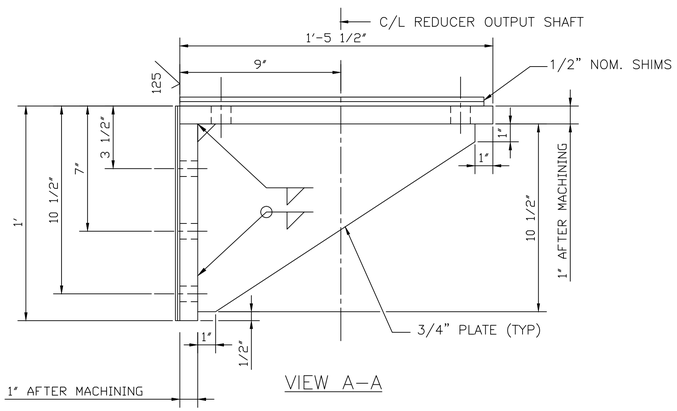




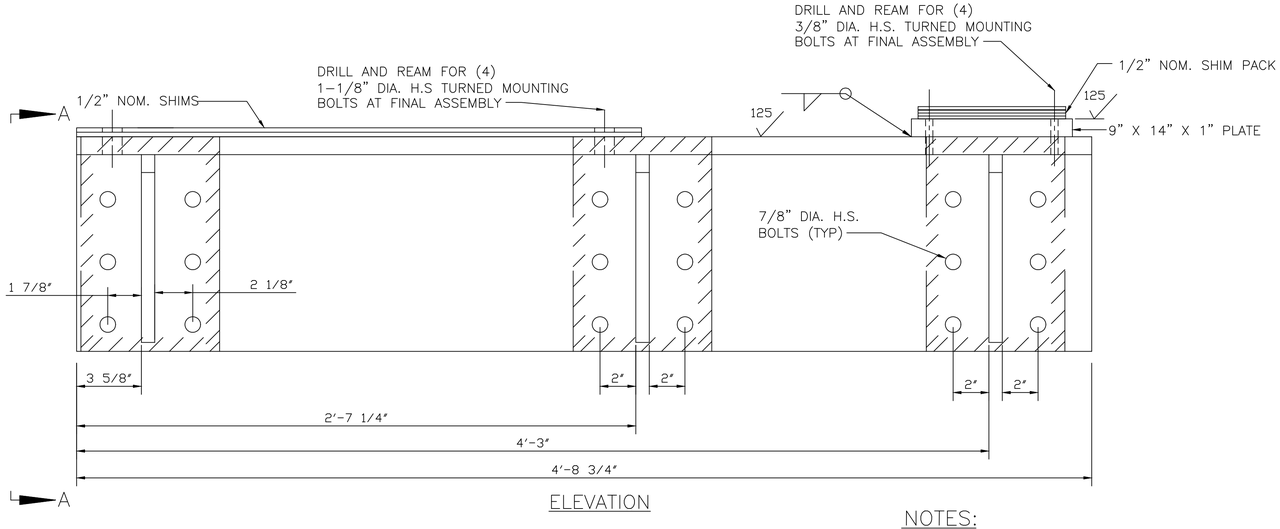
CRANK SHAFT BEARING SUPPORT

SCALE: 3' = 1'–0"
MATERIAL: ASTM A588, HSLA STEEL
QUANTITY: 4 TOTAL

VIEW C–C



VIEW A–A



ELEVATION

REDUCER AND BRAKE MOTOR SUPPORT

SCALE: 3' = 1'–0"
MATERIAL: ASTM A36
QUANTITY: 2 TOTAL

NOTES:

1. ALL WELDMENTS SHALL BE STRESSED RELIEVED BY HEAT PRIOR TO MACHINING.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd MARCH, 2011
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RALEIGH

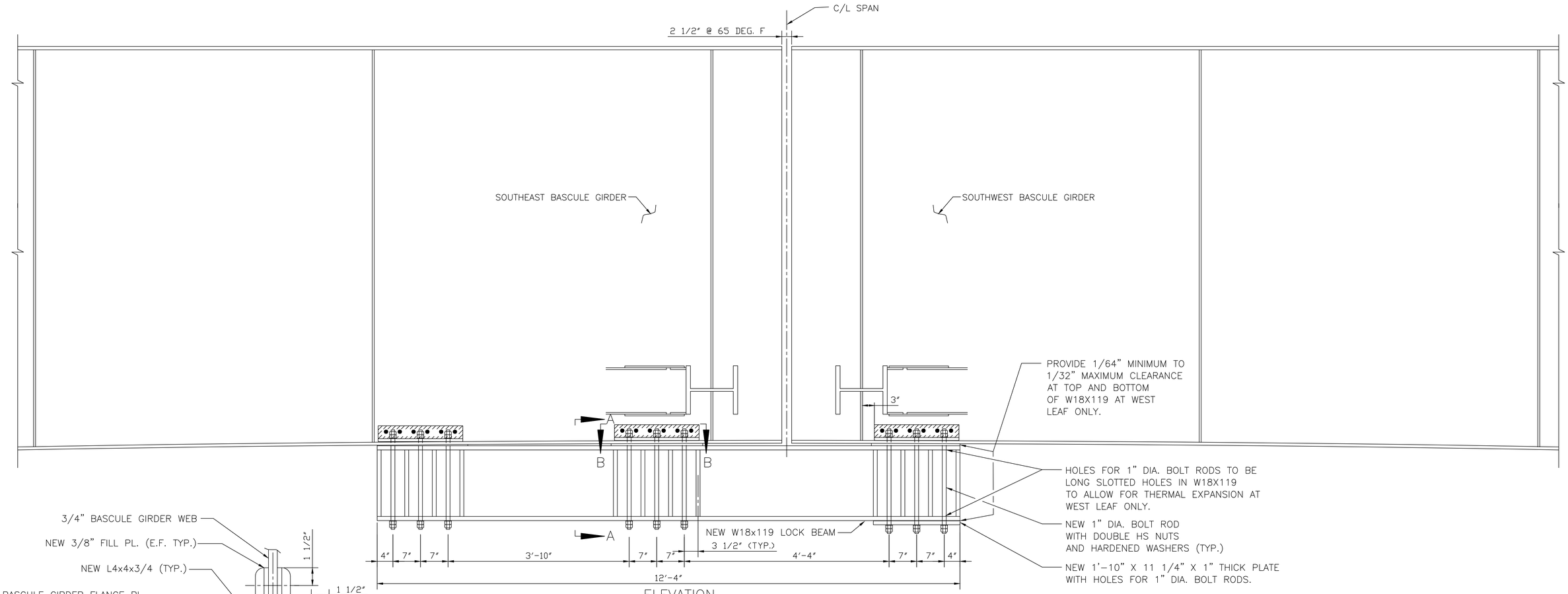
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

NEW CENTER LOCK – SUPPORT DETAILS

		DRAWN BY E.A. RICKENBACH
		SCALE AS NOTED
DESIGNED D.M. BARRETT	DETAILED A.M. BRODSKY	DATE MARCH 2011
CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO. 7 OF 63

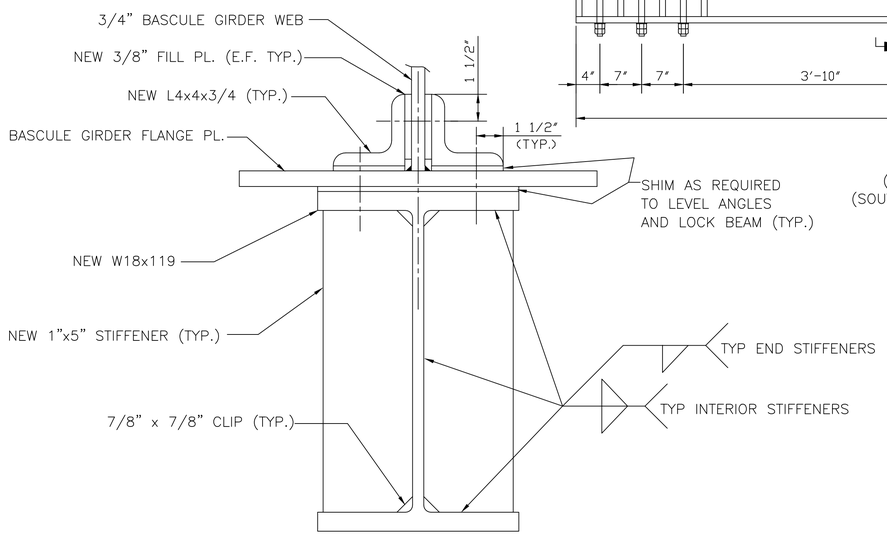
MB6

7-MB6-NCLSD.DWG



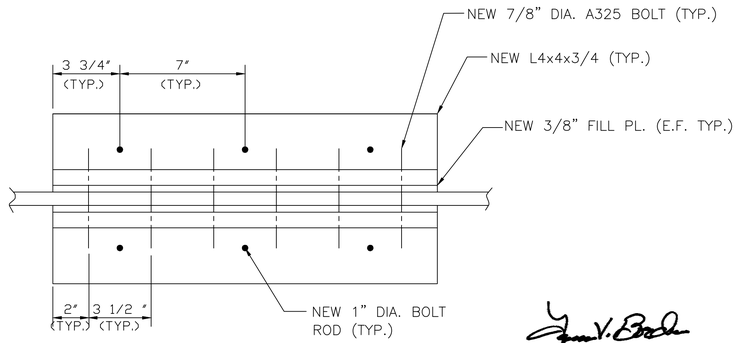
ELEVATION

SCALE 1" = 1'-0"
(FLOORBEAM AND FRAMING NOT SHOWN)
(SOUTH GIRDER SHOWN, NORTH GIRDER SIMILAR)



SECTION A–A

SCALE: 3" = 1'-0"



SECTION B–B

SCALE: 3" = 1'-0"

NOTES:

1. BOLT RODS SHALL BE ASTM F1554 GRADE 55 WITH HS NUTS AND HARDENED WASHERS.
2. ALL BOLTS SHALL BE ASTM A325 WITH HS NUTS AND HARDENED WASHERS.
3. ALL STEEL SHAPES AND PLATES SHALL BE ASTM A572 GRADE 50 OR ASTM A588.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING TRAFFIC CONTROL RESTRICTING VEHICULAR TRAFFIC SPEED TO 30 MPH ON THE BASCULE SPAN WHILE TEMPORARY CENTER LOCKS ARE IN PLACE.
5. UPON COMPLETION OF WORK, REMOVE ALL STEEL SHAPES AND PLATES AND FILL ALL OPEN HOLES WITH NEW PROPER SIZE ASTM A325 BOLTS WITH HS NUTS AND HARDENED WASHERS. REUSING FASTENERS FROM TEMPORARY CENTER LOCK MATERIAL IS NOT PERMITTED.
6. POSITION SLOTS IN W18X119 TO ALLOW FOR THERMAL EXPANSION AND CONTRACTION.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd MAY 2011
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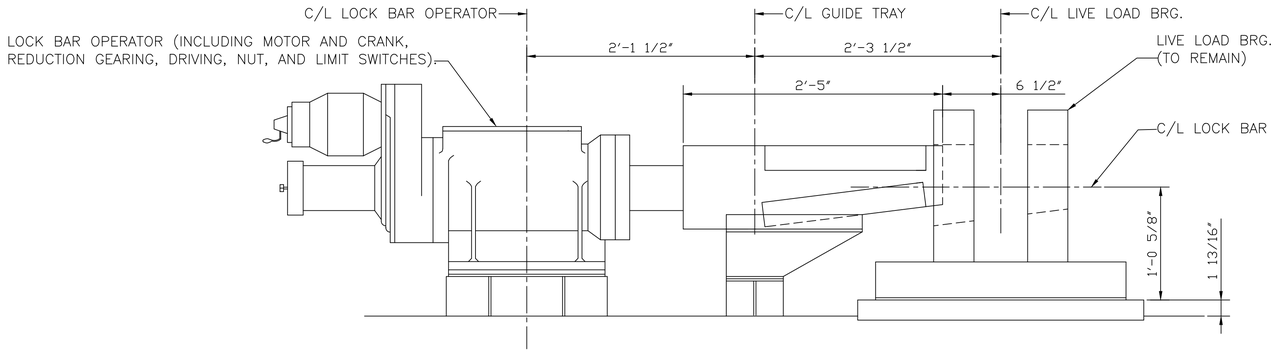
WILMINGTON, NORTH CAROLINA

TEMPORARY CENTER LOCK

			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB7	DESIGNED D.B. IRWIN	DETAILED D.B. IRWIN	DATE MARCH 2011
	CHECKED A.M. BRODSKY	CHECKED A.M. BRODSKY	DRAWING NO. 8 OF 63

8-MB7-TCL.DWG



ELEVATION

EXISTING LIVE LOAD SPAN LOCK ASSEMBLY

SCALE: 1 1/2" = 1'-0"

NOTES:

1. ALL EXISTING LIVE LOAD SPAN LOCK COMPONENTS TO BE REMOVED (EXCEPT FOR THE LIVE LOAD BEARINGS).

0 1 2 3

INCHES ON FULL SIZE SHEET

9--MB8--ELLSLR.DWG

3RD MAY 2011

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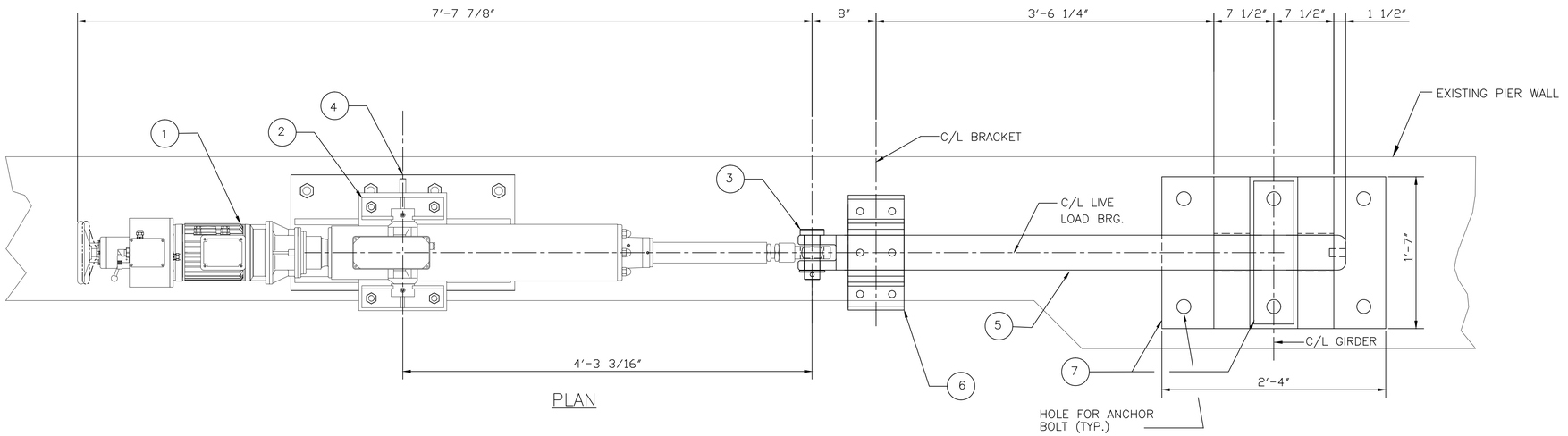
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
EXISTING LIVE LOAD SPAN LOCK REMOVAL

			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB8	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED G.L. FOREST	CHECKED G.L. FOREST	DRAWING NO. 9 OF 63

MACHINERY SCHEDULE			
MACH'Y NO.	NO. REQ'D.	UNIT DESCRIPTION	SHEET NO.
1	5 (1 SPARE)	NEW LIVE LOAD SPAN LOCK ACTUATOR, BY RACO INTERNATIONAL, SIZE 7, WITH 1800 RPM TENV GEARMOTOR, BRAKE, LATERAL ACCESSORY HOUSING D, STROKE OF 15.7 INCHES AT 1.9 IN/SEC. WITH 6750 LBS. NOMINAL THRUST, AND OVERSTROKE PROTECTION AND TWO PAIRS OF ADJUSTABLE STROKE LIMIT SWITCHES.	MB13
2	4	NEW TRUNNION BRACKETS BY RACO INTERNATIONAL	MB13
3	4	NEW PIN.	MB10
4	4	NEW TRUNNION BRACKET SUPPORT	MB14
5	8	NEW LIVE LOAD SPAN LOCK BAR.	MB10
6	4	NEW LIVE LOAD SPAN LOCK GUIDE AND SUPPORT.	MB12
7	4	REMACHINED LIVE LOAD BEARING.	MB11



PLAN

LIVE LOAD SPAN LOCK LAYOUT

SCALE: 1 1/2" = 1'-0"

PLAN VIEW – NE OR SW SHOWN, NW AND SE OPPOSITE HAND.

NOTES:

1. PROVIDE STAINLESS STEEL DEBRIS COVERS TO COMPLETELY COVER TOP OF NEW LIVE LOAD SPAN LOCK BAR, SIMILAR TO EXISTING COVERS.
2. THE LOCATION OF THE TRUNNION BRACKET POSITIONS THE REQUIRED STROKE IN THE CENTER OF THE AVAILABLE STROKE.
3. THE CONTRACTOR SHALL PROVIDE AN ACCESS LADDER FOR EACH LIVE LOAD SPAN LOCK ACTUATOR. THE LADDER SHALL BE INSTALLED ONLY AFTER THE LOCATION AND LADDER STYLE HAVE BEEN APPROVED BY NCDOT.
4. THE ACTUATOR LOCATION IS WITH 2" OF RESERVE STROKE. THE LOCK BAR IS SHOWN IN THE DRIVEN POSITION.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd MARCH 2011
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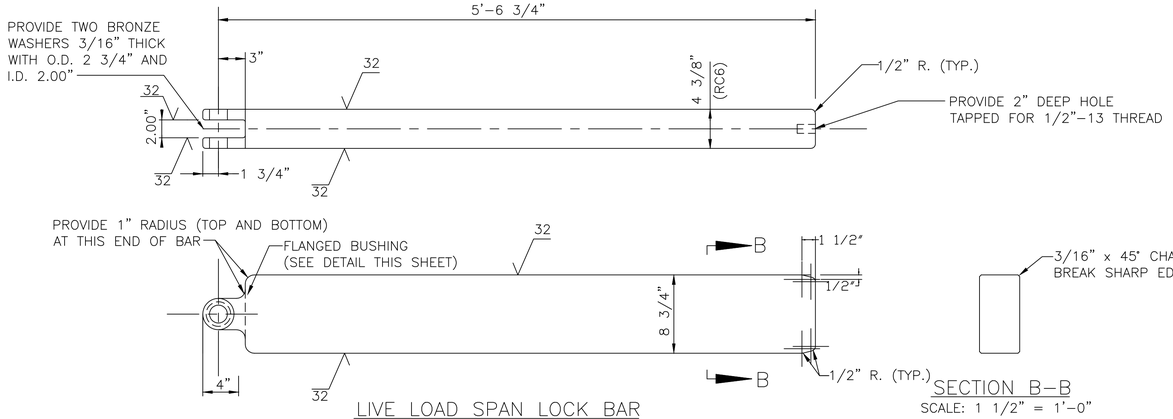
WILMINGTON, NORTH CAROLINA

NEW LIVE LOAD SPAN LOCK – LAYOUT

		DRAWN BY	E.A.RICKENBACH
		SCALE	AS NOTED
MB9	DESIGNED D.M BARRETT	DETAILED D.M BARRETT	DATE MARCH 2011
	CHECKED L.V. BORDEN	CHECKED L.V. BORDEN	DRAWING NO. 10 OF 63

10-MB9-NLSLLDWG



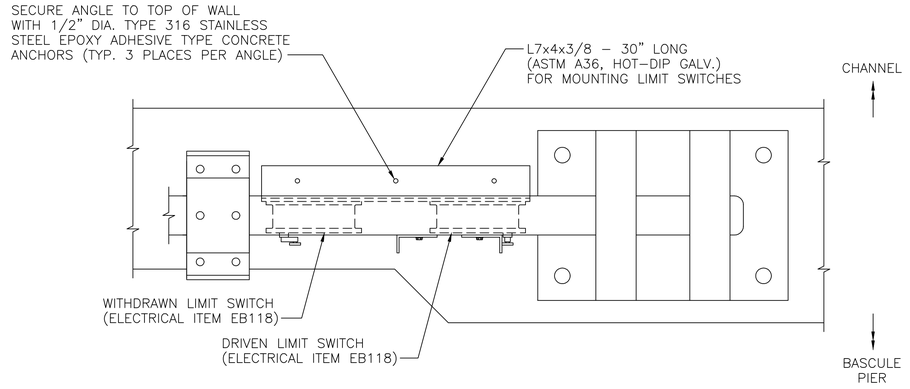
LIVE LOAD SPAN LOCK BAR

SCALE: 1 1/2" = 1'-0"

MATERIAL
LOCK BAR: ASTM A668 CLASS K

SECTION B-B

SCALE: 1 1/2" = 1'-0"

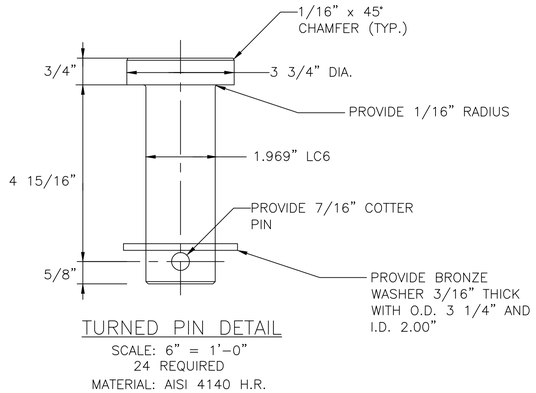


PLAN - LIVE LOAD SPAN LOCK LIMIT SWITCHES

SCALE: 1 1/2" = 1'-0"

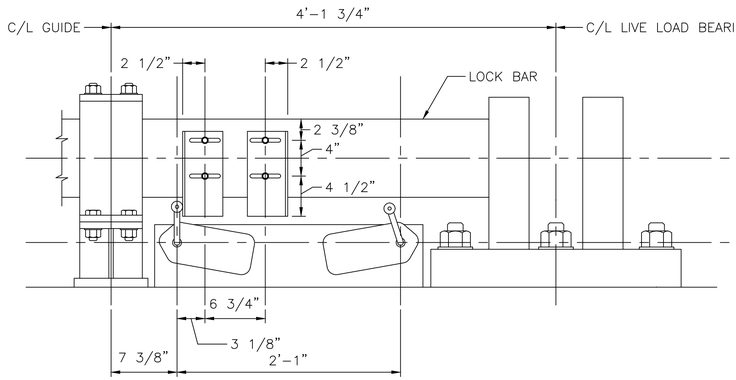
TYPICAL NORTHEAST AND SOUTHWEST LIVE LOAD SPAN LOCKS.
NORTHWEST AND SOUTHEAST LIVE LOAD SPAN LOCKS OPPOSITE HAND.

VIEW SHOWS LOCK BAR FULLY DRIVEN.

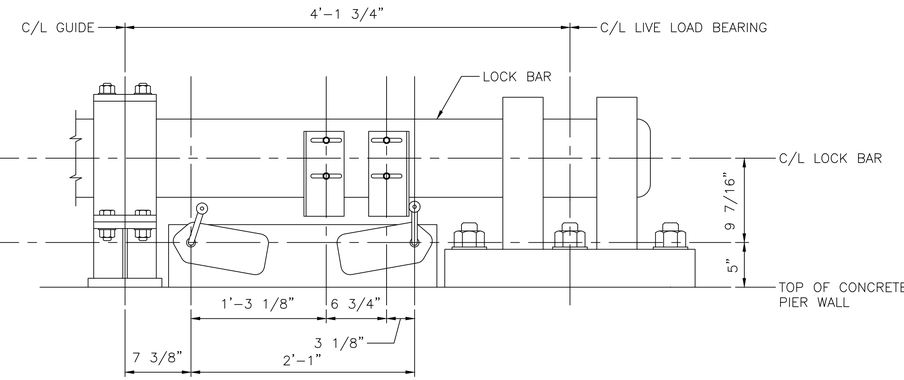


TURNED PIN DETAIL

SCALE: 6" = 1'-0"
24 REQUIRED
MATERIAL: AISI 4140 H.R.



(LOCK BAR FULLY WITHDRAWN)



(LOCK BAR FULLY DRIVEN)

ELEVATION - LIVE LOAD SPAN LOCK LIMIT SWITCHES

SCALE: 1 1/2" = 1'-0"

TYPICAL NORTHEAST AND SOUTHWEST LIVE LOAD SPAN LOCKS.
NORTHWEST AND SOUTHEAST LIVE LOAD SPAN LOCKS OPPOSITE HAND.

LIMIT SWITCH BODIES SHALL BE INSTALLED AT 10 DEGREES FROM HORIZONTAL AS SHOWN.

TRIP PLATES ARE 4 1/2" x 2" x 1/4" BENT PLATES (TYPE 316 STAINLESS STEEL), WITH TWO 7/16" x 3" SLOTTED HOLES EACH AS SHOWN. HOLES TAPPED FOR 3/8"-16 BOLTS SHALL BE PROVIDED IN THE LOCK BAR AS SHOWN FOR MOUNTING THE TRIP PLATES. TRIP PLATE MOUNTING BOLTS SHALL BE TYPE 316 STAINLESS STEEL AND PROVIDED WITH LOCKWASHERS. TRIP PLATES ARE SHOWN SET AT THEIR NOMINAL POSITIONS, BUT SHALL BE FIELD ADJUSTED AS REQUIRED.

SEE ELECTRICAL ITEM EB118 FOR LIMIT SWITCHES. LIMIT SWITCHES SHALL BE MOUNTED WITH TYPE 316 STAINLESS STEEL HARDWARE.

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CAPE FEAR BASCULE BRIDGE
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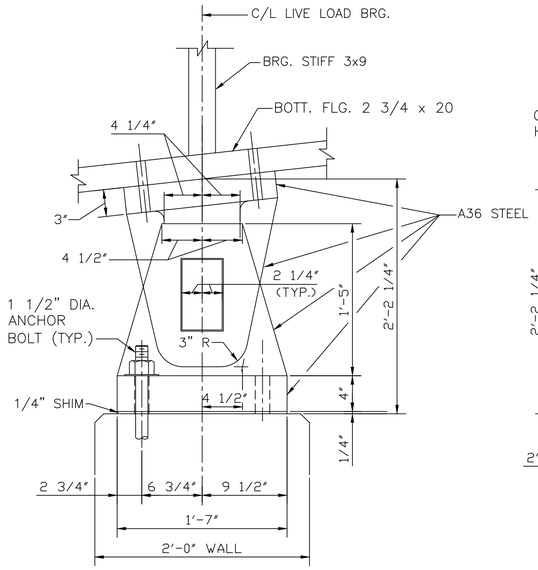
WILMINGTON, NORTH CAROLINA
NEW LIVE LOAD SPAN LOCK - DETAILS 1

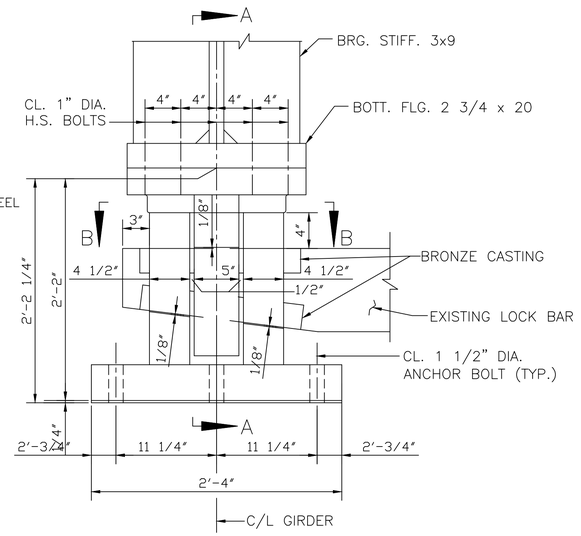
		DRAWN BY	E.A.RICKENBACH
		SCALE	AS NOTED
MB10	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED L.V. BORDEN	CHECKED L.V. BORDEN	DRAWING NO. 11 OF 63

11-MB10-NLLSLD1.DWG



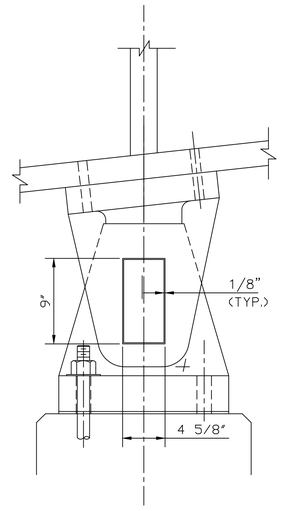
SECTION A–A

SCALE: 1 1/2" = 1'–0"



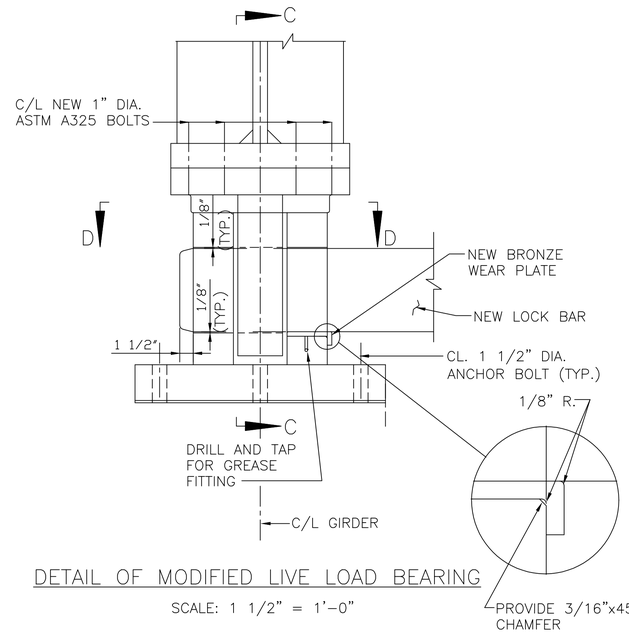
DETAIL OF EXISTING LIVE LOAD BEARING

SCALE: 1 1/2" = 1'–0"



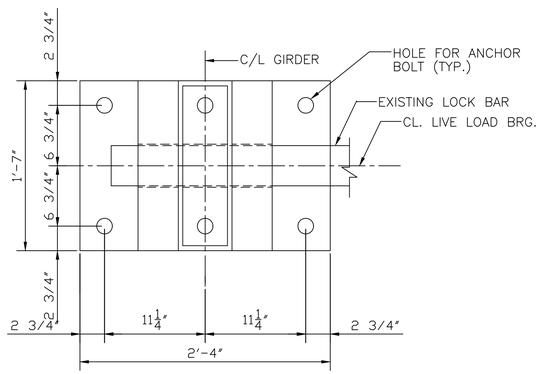
SECTION C–C

SCALE: 1 1/2" = 1'–0"



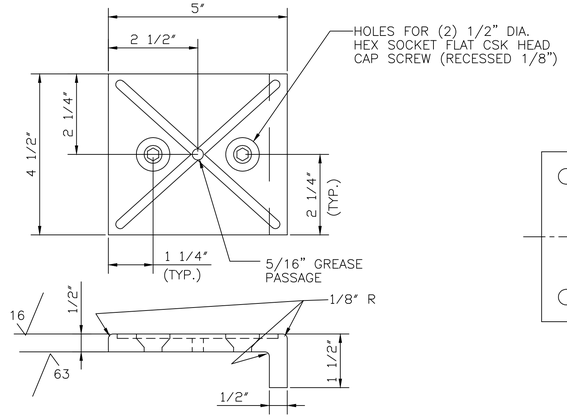
DETAIL OF MODIFIED LIVE LOAD BEARING

SCALE: 1 1/2" = 1'–0"



SECTION B–B

SCALE: 1 1/2" = 1'–0"

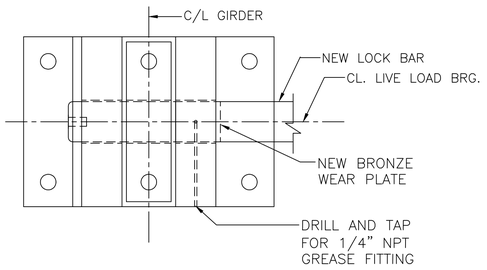


NEW BRONZE WEAR PLATE

SCALE: 6" = 1'–0"

MATERIAL: ASTM B22, UNS NO. C86300

FINISH ALL SURFACES TO 125 UNLESS NOTED OTHERWISE



SECTION D–D

SCALE: 1 1/2" = 1'–0"

NOTES:

1. THE MACHINING OF THE LIVE LOAD BEARINGS IS TO BE CONDUCTED IN PLACE. ALL MACHINED SURFACES TO BE 125 MICROINCH OR BETTER UNLESS OTHERWISE NOTED.
2. THE 4 1/2" WIDTH OF SLOT SHOWN IS TO BE WIDENED TO THE FIRST CLEAN VERTICAL SURFACE ON EACH SIDE (3 LOCATIONS PER LIVE LOAD BEARING.
3. NEW BRONZE WEAR PLATE GREASE GROOVES TO BE 1/4" WIDE AND 1/8" DEEP WITH CORNERS AND EDGES ROUNDED TO 1/16" RADIUS.
4. NEW 1" DIAMETER ASTM A325 BOLTS AND NUTS (8 PER LIVE LOAD BEARING) AT THE BOTTOM FLANGE WILL BE REQUIRED AFTER SHIMMING OF LIVE LOAD BEARINGS IS COMPLETED AND APPROVED.
5. BOTH LIVE LOAD BEARINGS SHALL REMAIN IN SERVICE AT ALL TIMES.

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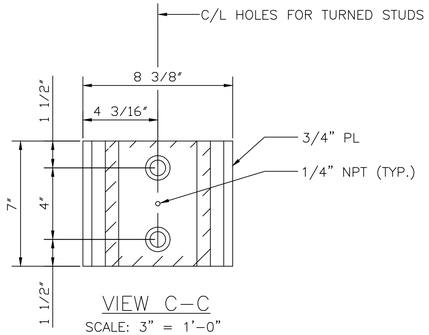
RALEIGH

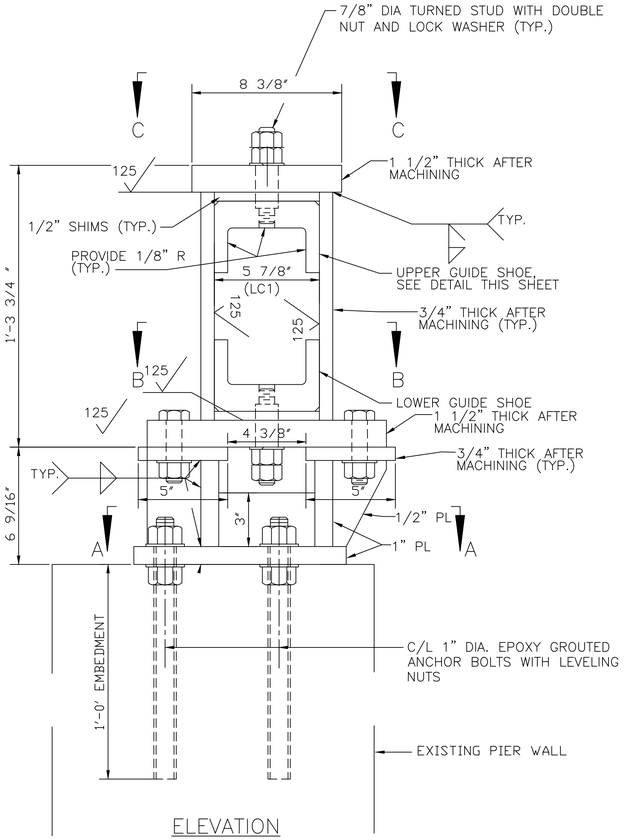
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
NEW LIVE LOAD SPAN LOCK – DETAILS 2

			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB11	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED G.L. FOREST	CHECKED G.L. FOREST	DRAWING NO. 12 OF 63

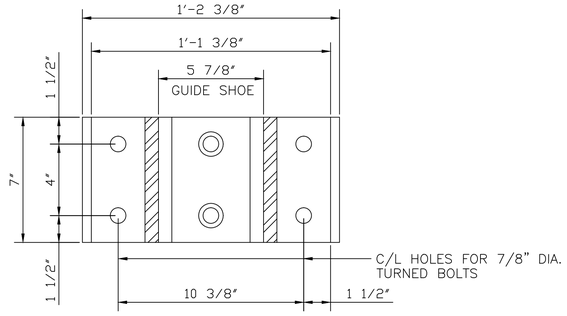
12-MB11-NSSSLD2.DWG



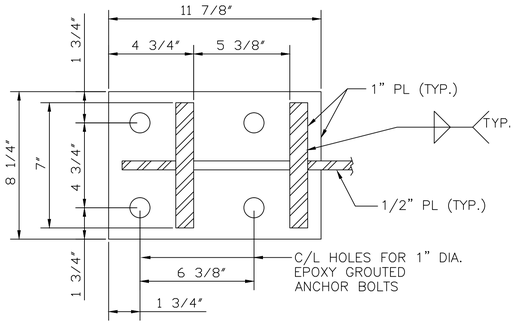
VIEW C–C
SCALE: 3" = 1'–0"



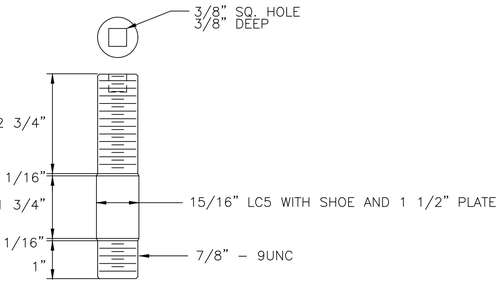
ELEVATION
LIVE LOAD SPAN LOCK GUIDE AND SUPPORT
SCALE: 3" = 1'–0"
MATERIAL: ASTM A588, HSLA STEEL



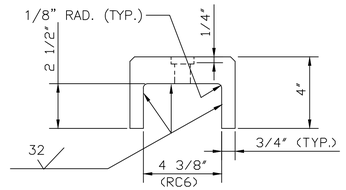
SECTION B–B
SCALE: 3" = 1'–0"



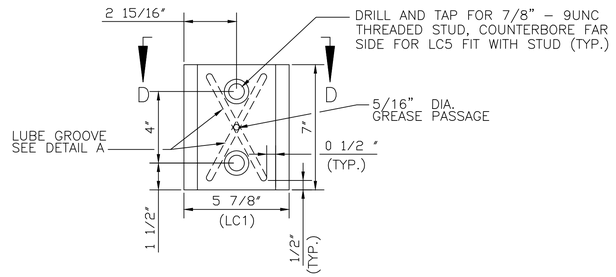
SECTION A–A
SCALE: 3" = 1'–0"



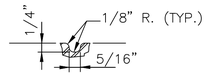
TURNED STUD DETAIL
NOT TO SCALE
16 REQUIRED
MATERIAL: ASTM A449



VIEW D–D
SCALE: 3" = 1'–0"



GUIDE SHOE DETAIL
SCALE: 3" = 1'–0"
MATERIAL: ASTM B22, UNS NO. C86300
FINISH ALL SURFACES TO 125/,UNLESS NOTED OTHERWISE



DETAIL A
NOT TO SCALE

NOTES:

1. ALL ITEMS NEW UNLESS NOTED OTHERWISE.
2. ALL WELDMENTS SHALL BE STRESS RELIEVED BY HEAT PRIOR TO MACHINING.
3. VERTICAL FIT WITH NEW LOCK BAR TO BE 1/8" ± 0.030.
4. GREASE PASSAGES FOR TOP AND BOTTOM GUIDE SHOES TO BE RUN TO CONVENIENT LOCATION FOR MAINTENANCE PERSONNEL.
5. TURNED STUD THREAD LENGTH MUST BE OPTIMIZED AFTER FINAL ALIGNMENT TO PROVIDE CLEARANCE AT BOTTOM GUIDE SHOE.

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0 1 2 3
INCHES ON FULL SIZE SHEET

13-MB12-NLLSLD3.DWG

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RALEIGH

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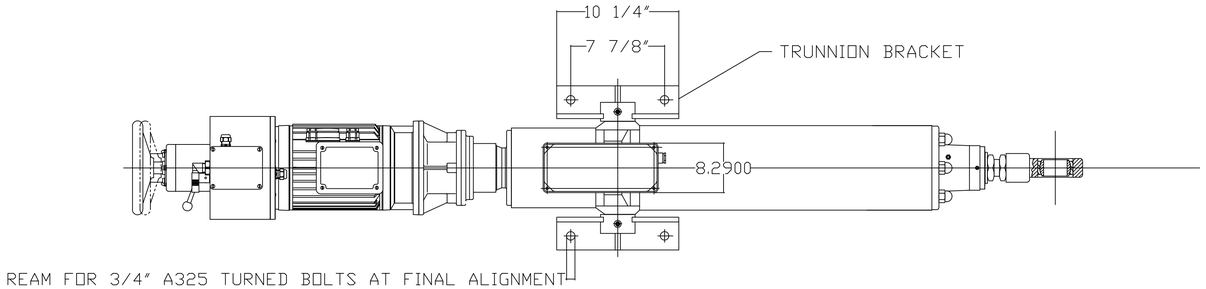
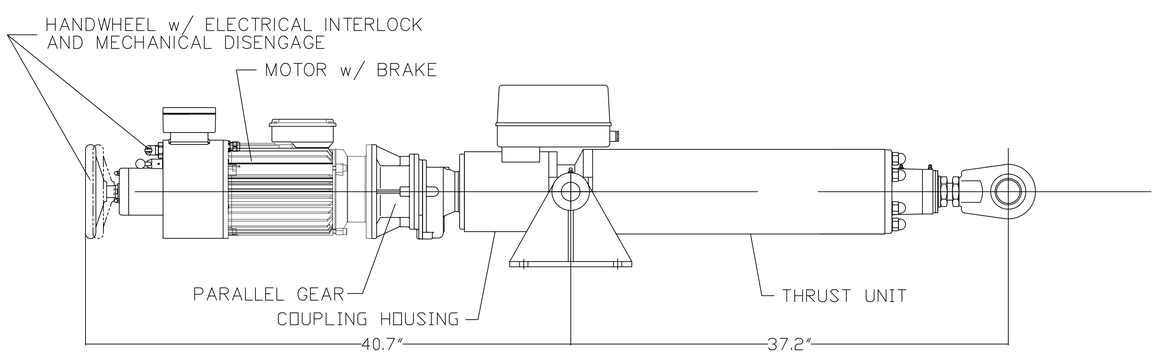
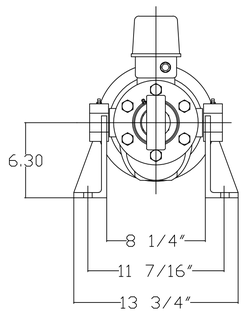
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
NEW LIVE LOAD SPAN LOCK – DETAILS 3

			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB12	DESIGNED G.L. FOREST	DETAILED G.L. FOREST	DATE MARCH 2011
	CHECKED D.M. BARRETT	CHECKED D.M. BARRETT	DRAWING NO. 13 OF 63







PLAN

LIVE LOAD SPAN LOCK ACTUATOR

SCALE: 1" = 1'-0"

NOTES:

1. THIS DRAWING IS PROVIDED FOR REFERENCE ONLY. ACTUATOR DIMENSIONS MUST BE VERIFIED BEFORE ORDERING. THE ACTUATOR IS SHOWN IN FULLY RETRACTED POSITION.
2. THE CONTRACTOR SHALL PROVIDE AN ACCESS LADDER FOR EACH LIVE LOAD SPAN LOCK SUPPORT. THE LADDER SHALL BE INSTALLED ONLY AFTER THE LOCATION AND LADDER STYLE HAVE BEEN APPROVED BY NCDOT.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd QTR 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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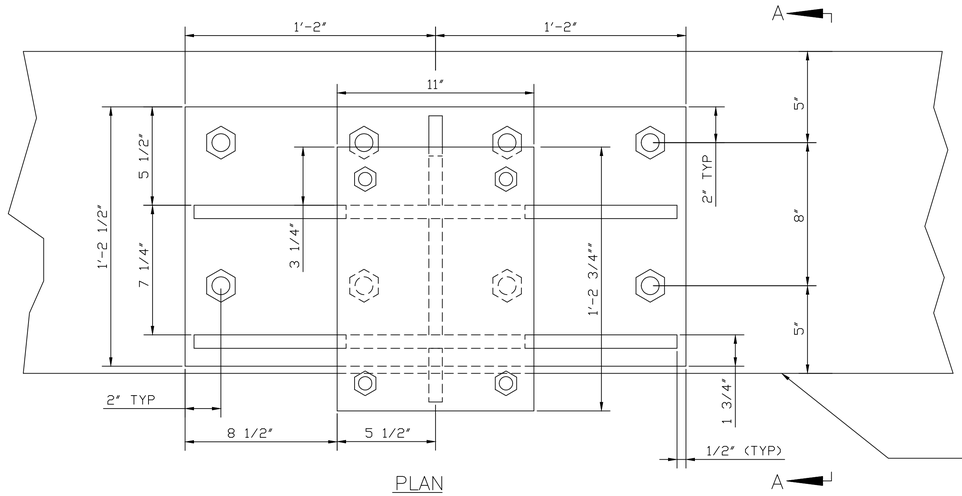
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
NEW LIVE LOAD SPAN LOCK – DETAILS 4

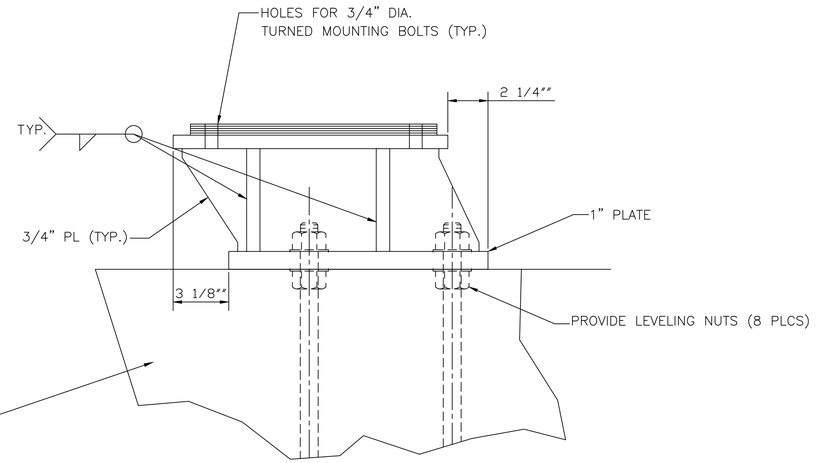
			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB13	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED L.V. BORDEN	CHECKED L.V. BORDEN	DRAWING NO. 14 OF 63

14-MB13-NLLSLD4.DWG



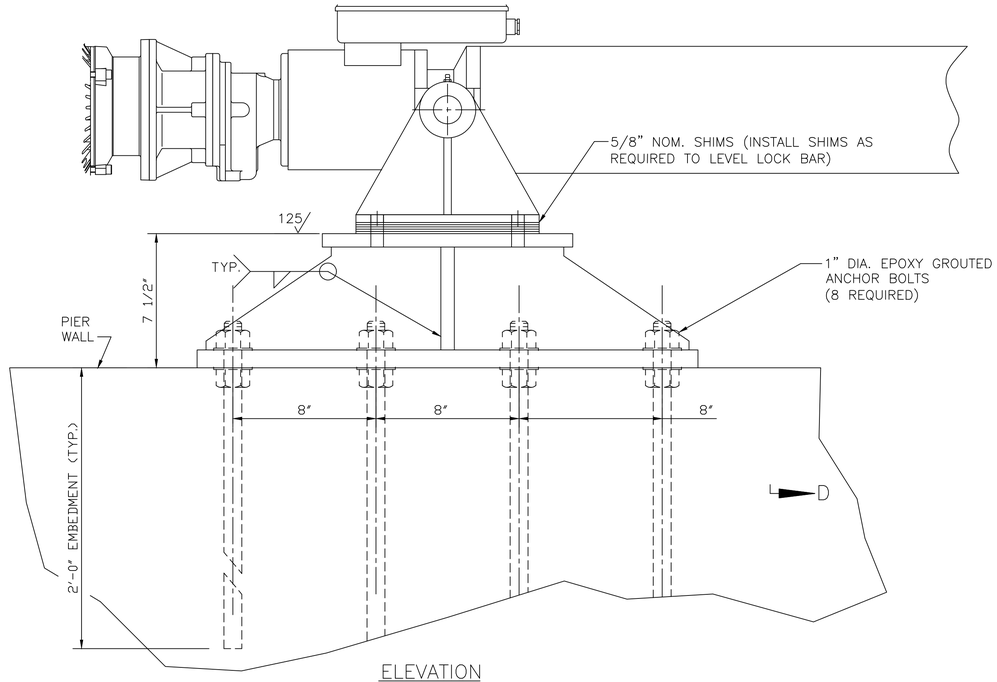
PLAN

NEW TRUNNION SUPPORT BRACKET
SCALE: 3" = 1'-0"



SECTION A-A

SCALE: 3" = 1'-0"



ELEVATION

NEW TRUNNION SUPPORT BRACKET
SCALE: 3" = 1'-0"

0 1 2 3
INCHES ON FULL SIZE SHEET

NOTES:

1. ALL STEEL PLATES AND SHAPES SHALL BE ASTM A36.
2. ALL GROUTED ANCHOR BOLTS AND ANCHOR RODS SHALL BE ASTM F1554 GRADE 55 WITH HS NUTS AND HARDENED WASHERS.
3. ALL OTHER FASTENERS SHALL BE ASTM A325 WITH HS NUTS AND HARDENED WASHERS.
4. ALL NEW STEEL SHALL BE PAINTED WITH A PAINT SYSTEM APPROVED BY NCDOT.
5. ALL WELDMENTS SHALL BE STRESS RELIEVED BY HEAT PRIOR TO MACHINING.
6. MOUNTING BOLTS FOR ACTUATOR TO BE DRILLED UNDERSIZED AND NOT REAMED UNTIL FINAL ALIGNMENT IS ACHIEVED.

3rd MARCH 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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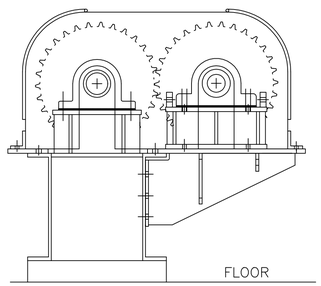
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

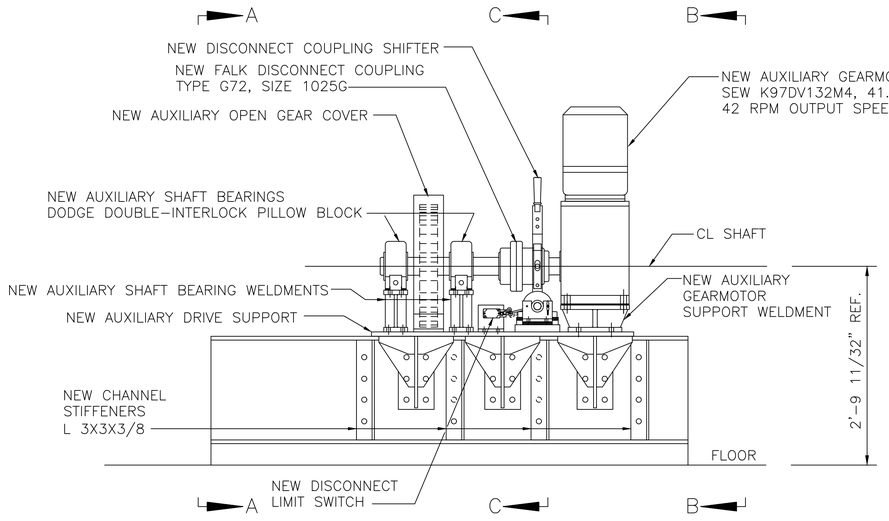
NEW LIVE LOAD SPAN LOCK – DETAILS 5

			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB14	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED L.V. BORDEN	CHECKED L.V. BORDEN	DRAWING NO. 15 OF 63

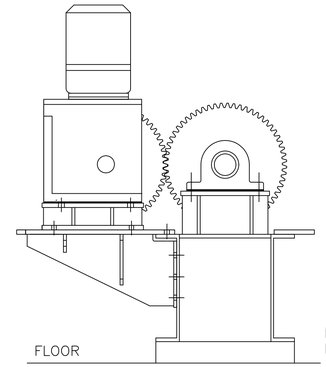
15-MB14-NLLSLD5.DWG



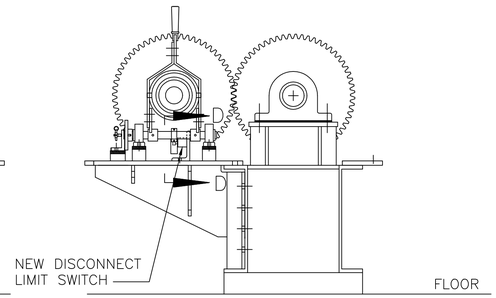
VIEW A–A
SCALE: 1" = 1'–0"



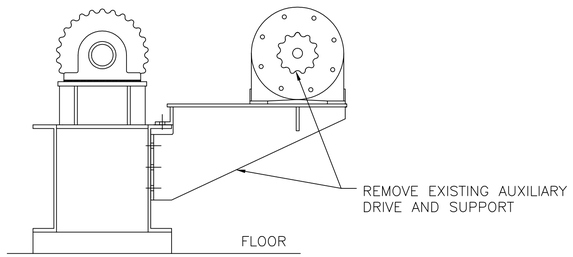
ELEVATION
SCALE: 1" = 1'–0"



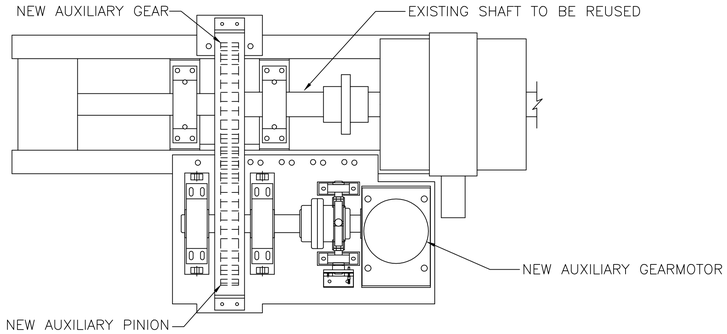
VIEW B–B
SCALE: 1" = 1'–0"
(GEAR COVER NOT SHOWN)



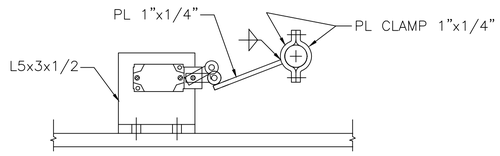
SECTION C–C
SCALE: 1" = 1'–0"
(GEAR COVER NOT SHOWN)



VIEW A–A
SCALE: 1" = 1'–0"
(EXISTING)



PLAN
AUXILIARY DRIVE SYSTEM
SCALE: 1" = 1'–0"



SECTION D–D
SCALE 3" 1'–0"

NOTES:

1. EXISTING AUXILIARY DRIVE COMPONENTS AND SUPPORT TO BE REMOVED, SEE VIEW A–A (EXISTING).

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd day of March, 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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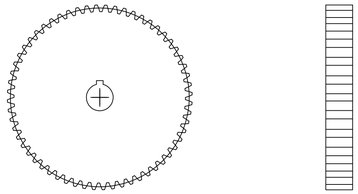
WILMINGTON, NORTH CAROLINA

NEW AUXILIARY DRIVE – LAYOUT

			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB15	DESIGNED A.M. BRODSKY	DETAILED A.M. BRODSKY	DATE MARCH 2011
	CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO. 16 OF 63

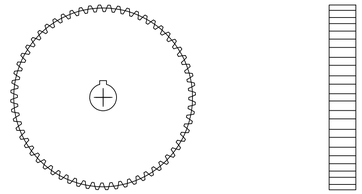
16-MB15-NADL.DWG



NEW AUXILIARY GEAR

SCALE: 1 1/2" = 1'-0"

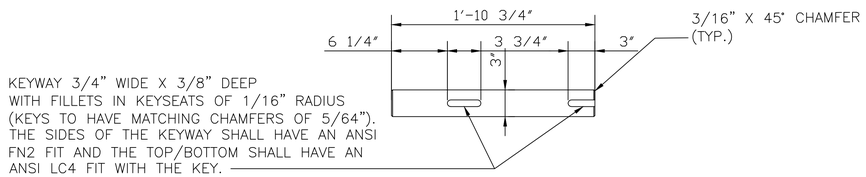
QUANITITY: 2
AGMA QUALITY # 8 OR HIGHER (PER AGMA 2000 – A88)
MATERIAL: A668–CLASS G OR EQUIVALENT WITH MINIMUM HARDNESS 200BHN
PITCH DIAMETER: 20"
DIAMETRAL PITCH: 3"
FACE WIDTH: 3"
TEETH: 60
PRESSURE ANGLE: 20°
TOOTH TYPE: FULL DEPTH
BORE: 3–5/8" (PROVIDE ANSI FN2 FIT WITH EXISTING SHAFT)
BREAK ALL SHARP EDGES



NEW AUXILIARY PINION

SCALE: 1 1/2" = 1'-0"

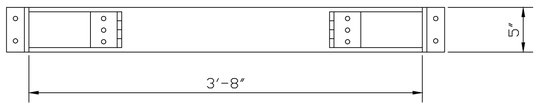
QUANITITY: 2
AGMA QUALITY # 8 OR HIGHER (PER AGMA 2000 – A88)
MATERIAL: A668–CLASS G OR EQUIVALENT WITH MINIMUM HARDNESS 200BHN
PITCH DIAMETER: 20"
DIAMETRAL PITCH: 3"
FACE WIDTH: 3"
TEETH: 60
PRESSURE ANGLE: 20°
TOOTH TYPE: FULL DEPTH
BORE: 3" (PROVIDE ANSI FN2 FIT WITH NEW SHAFT)
BREAK ALL SHARP EDGES

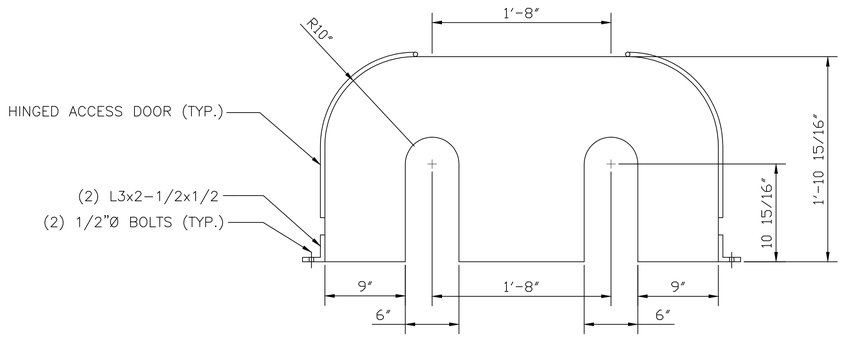


NEW AUXILIARY PINION SHAFT

SCALE: 1 1/2" = 1'-0"

MATERIAL: AISI 4140 OR EQUAL, WITH 75,000 PSI MINIMUM YIELD STRENGTH
QUANITITY: 2





OPEN GEARING COVER

SCALE: 1 1/2" = 1'-0"
MATERIAL: FABRICATED FROM 10GA STAINLESS STEEL UNLESS NOTED OTHERWISE
QUANTITY: 2 REQUIRED

NOTES:

1. BEFORE MOUNTING THE NEW AUXILIARY GEAR ON THE EXISTING SHAFT, A PROCEDURE MUST BE SUBMITTED BY THE CONTRACTOR AND APPROVED BY THE OWNER'S REPRESENTATIVE. THE PROCEDURE SHALL INCLUDE DETAILED STEPS FOR REMOVAL OF THE EXISTING SHAFT, REMOVAL OF THE EXISTING SPROCKET AND BEARINGS, AND INSTALLATION OF THE NEW AUXILARY GEAR AND KEY.

2. TWO THREADED STUDS TO BE WELDED TO THE OPEN GEAR COVER FOR SECURING OF EACH HINGED DOOR. WING NUTS FOR SECURING DOORS AND ALL MOUNTING HARDWARE TO BE STAINLESS STEEL.

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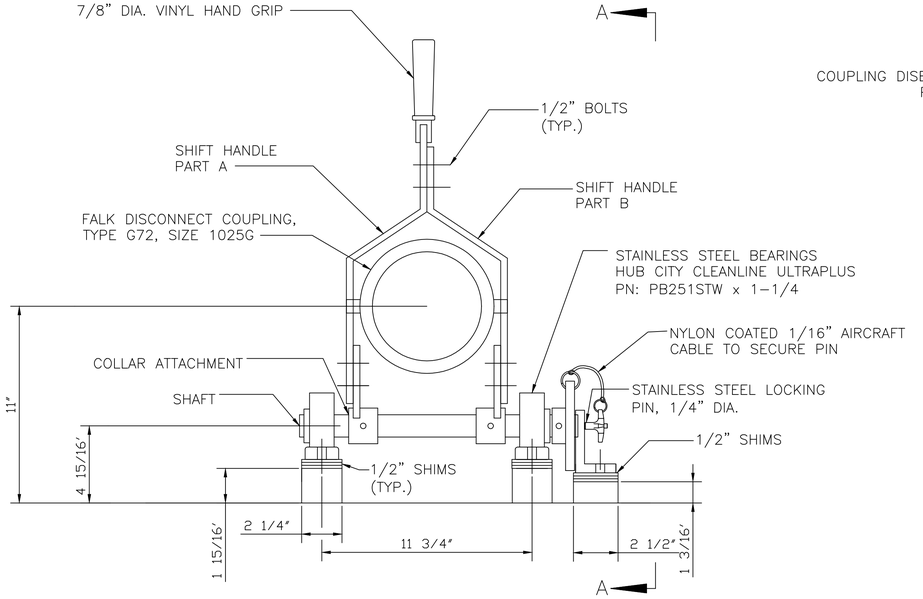
NEW AUXILIARY DRIVE – DETAILS

		DRAWN BY	E.A. RICKENBACH
		SCALE	AS NOTED
MB16	DESIGNED A.M. BRODSKY	DETAILED A.M. BRODSKY	DATE MARCH 2011
	CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO. 17 OF 63

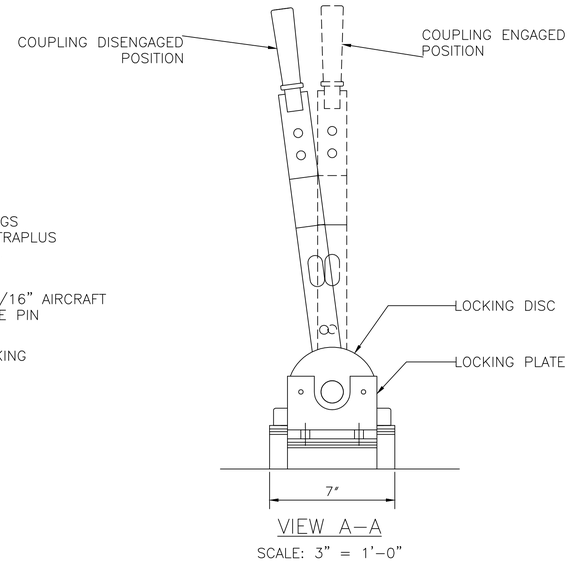
0 1 2 3
INCHES ON FULL SIZE SHEET

17-MB16-NADD.DWG



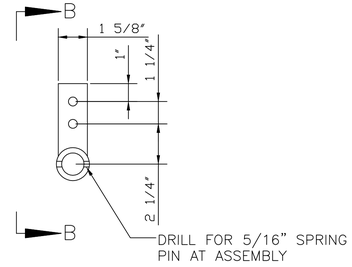
SHIFTER COUPLING HANDLE

SCALE: 3" = 1'-0"



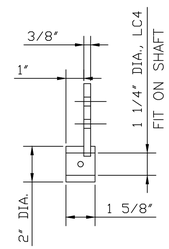
VIEW A-A

SCALE: 3" = 1'-0"



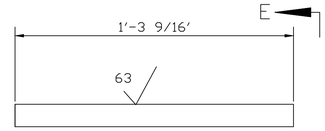
COLLAR ATTACHMENT

SCALE: 3" = 1'-0"



VIEW B-B

SCALE: 3" = 1'-0"

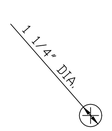


SHAFT

SCALE: 3" = 1'-0"

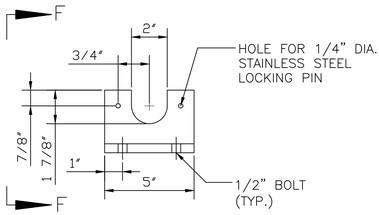
MATERIAL: AISI 4140 OR EQUAL, WITH 75,000 PSI MINIMUM YIELD STRENGTH

QUANITITY: 2



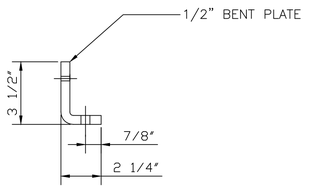
VIEW E-E

SCALE: 3" = 1'-0"



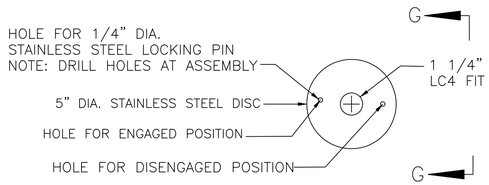
LOCKING PLATE

SCALE: 3" = 1'-0"



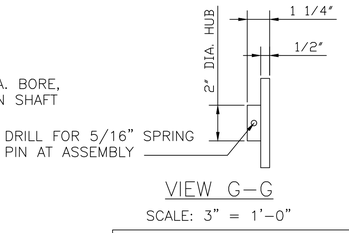
VIEW F-F

SCALE: 3" = 1'-0"



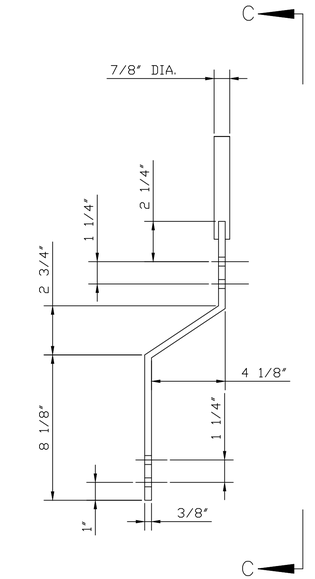
LOCKING DISC

SCALE: 3" = 1'-0"



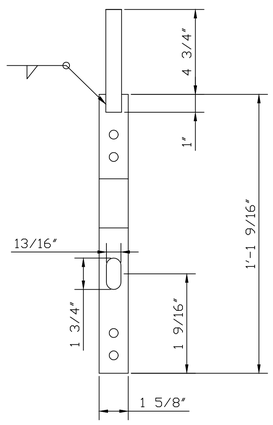
VIEW G-G

SCALE: 3" = 1'-0"



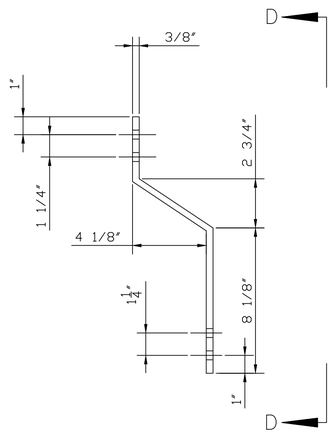
SHIFT HANDLE PART A

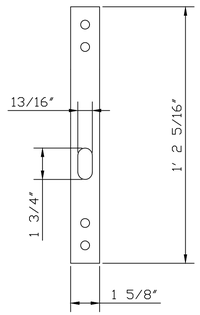
SCALE: 3" = 1'-0"



VIEW C-C

SCALE: 3" = 1'-0"





VIEW D-D

SCALE: 3" = 1'-0"

SHIFTER COUPLING HANDLE DETAILS

SCALE: 3" = 1'-0"

0 1 2 3

INCHES ON FULL SIZE SHEET

18-MB17-NADSC.DWG

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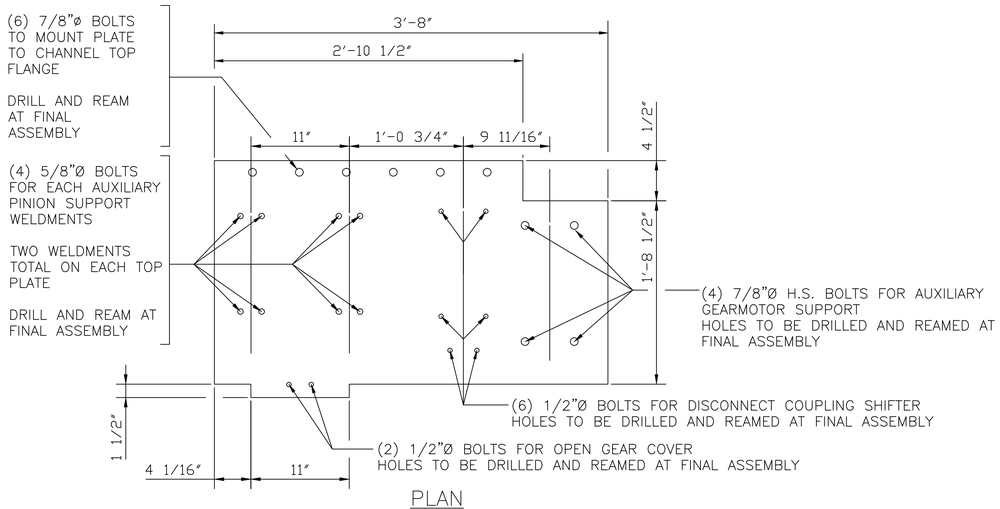
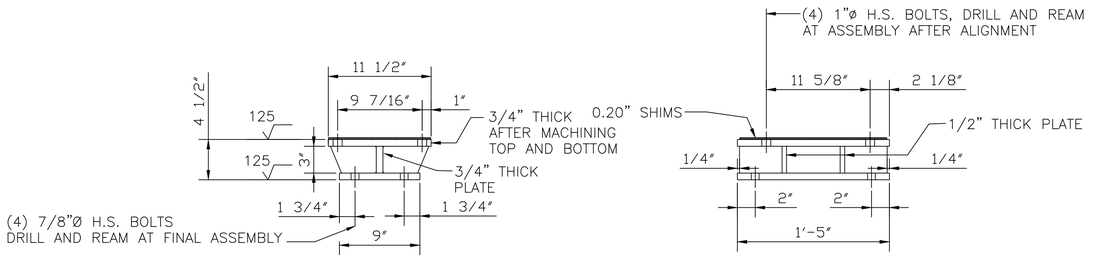
WILMINGTON, NORTH CAROLINA

NEW AUXILIARY DRIVE-SHIFTER COUPLING

		DRAWN BY	E.A. RICKENBACH
		SCALE	AS NOTED
MB17	DESIGNED A.M. BRODSKY	DETAILED A.M. BRODSKY	DATE MARCH 2011
	CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO. 18 OF 63

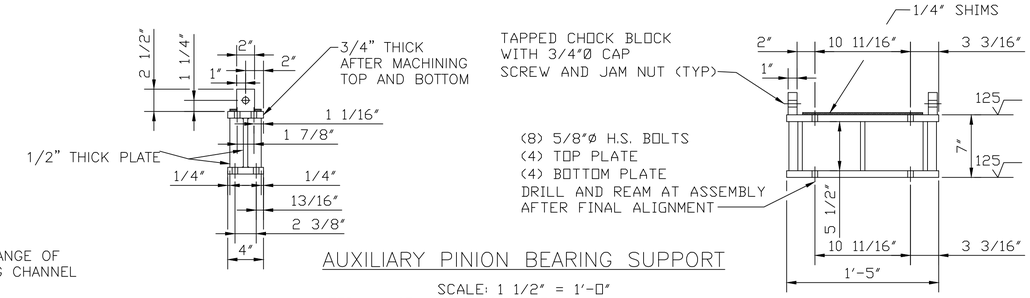


PLAN



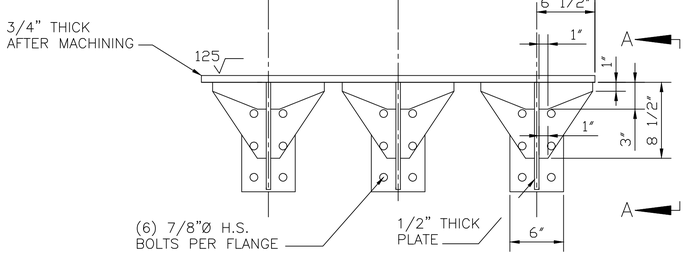
AUXILIARY GEARMOTOR SUPPORT

SCALE: 1 1/2" = 1'-0"
MATERIAL: ASTM A588 HSLA STEEL
QUANTITY: 2 REQUIRED

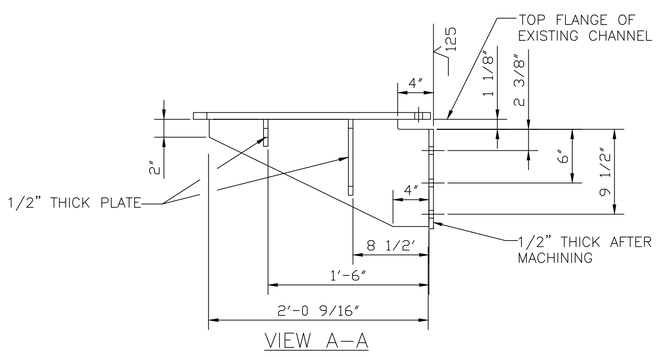


AUXILIARY PINION BEARING SUPPORT

SCALE: 1 1/2" = 1'-0"
MATERIAL: ASTM A588 HSLA STEEL
QUANTITY; 4 REQUIRED, 2 PER AUXILIARY DRIVE SUPPORT



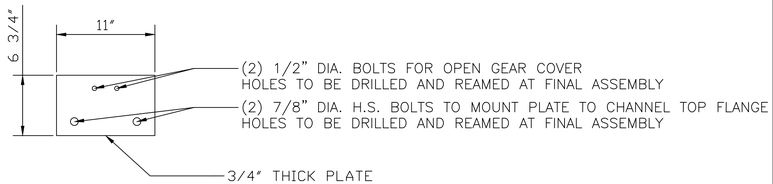
ELEVATION



VIEW A–A

AUXILIARY DRIVE SUPPORT

SCALE: 1 1/2" = 1'-0"
MATERIAL: ASTM A588 HSLA STEEL
QUANTITY: 2 REQUIRED



OPEN GEAR COVER SUPPORT PLATE

SCALE: 1 1/2" = 1'-0"
MATERIAL: ASTM A588 HSLA STEEL
QUANTITY: 2 REQUIRED

0 1 2 3
INCHES ON FULL SIZE SHEET

19--MB18-NADS.DWG

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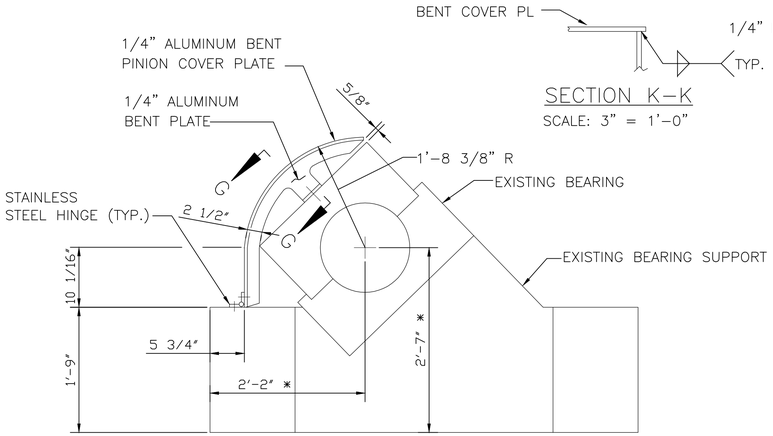
NEW AUXILIARY DRIVE – SUPPORTS

		DRAWN BY	E.A. RICKENBACH
		SCALE	AS NOTED
MB18	DESIGNED A.M. BRODSKY	DETAILED A.M. BRODSKY	DATE MARCH 2011
	CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO. 19 OF 63

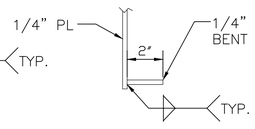


VIEW C–C

SCALE: 1" = 1'–0"

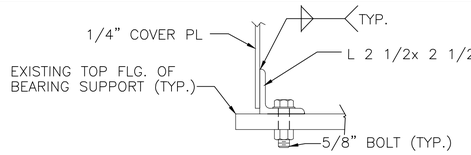
SECTION K–K

SCALE: 3" = 1'–0"



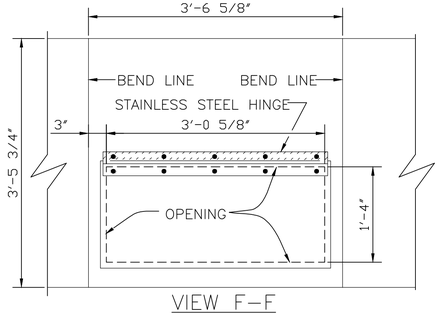
SECTION D–D

SCALE: 3" = 1'–0"



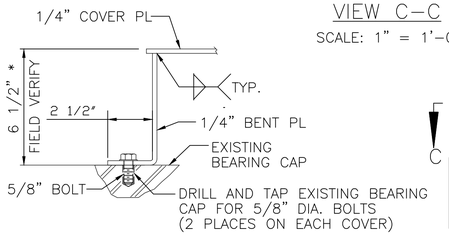
SECTION E–E

SCALE: 3" = 1'–0"



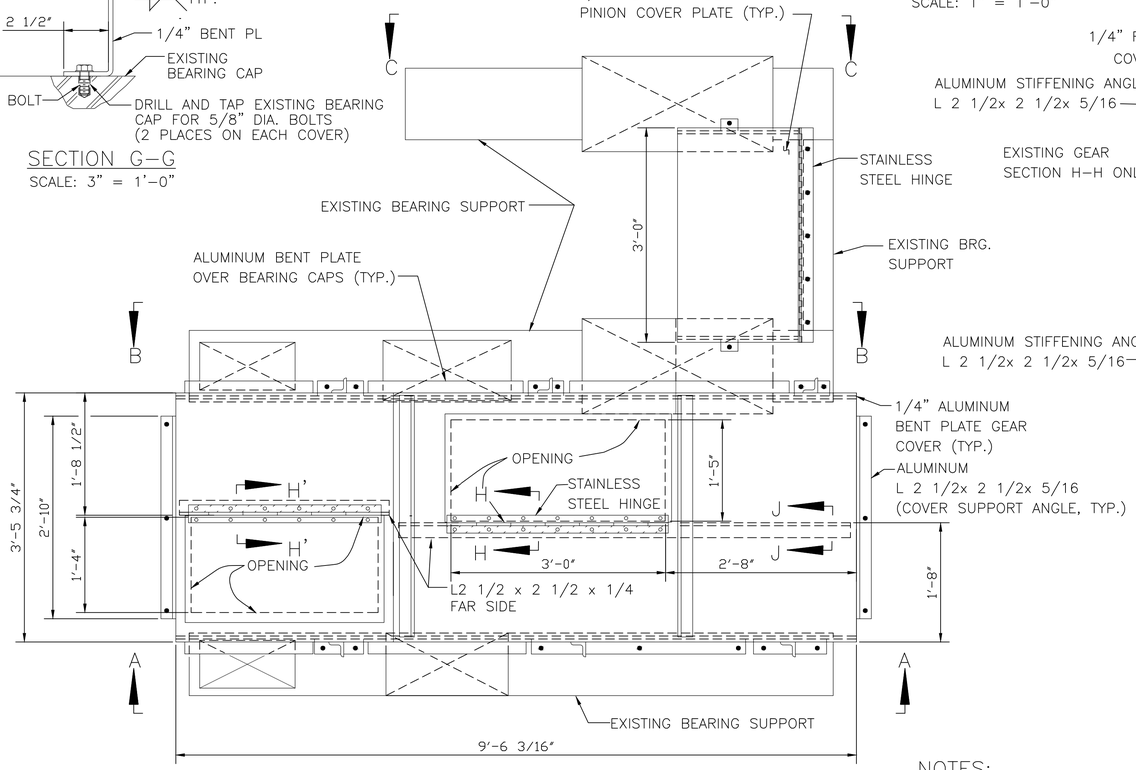
VIEW F–F

SCALE: 1" = 1'–0"



SECTION G–G

SCALE: 3" = 1'–0"



PLAN

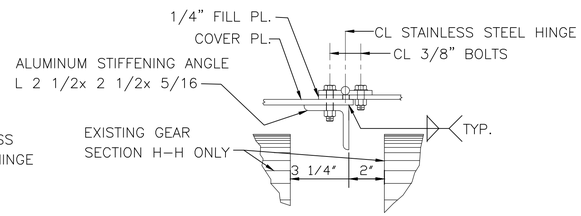
NORTHWEST AND SOUTHEAST GEAR COVER

SCALE: 1" = 1'–0"

(NORTHEAST AND SOUTHWEST OPPOSITE HAND,
GEARS AND SHAFTS NOT SHOWN FOR CLARITY)

0 1 2 3

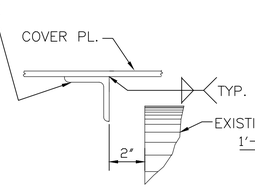
INCHES ON FULL SIZE SHEET



SECTION H–H

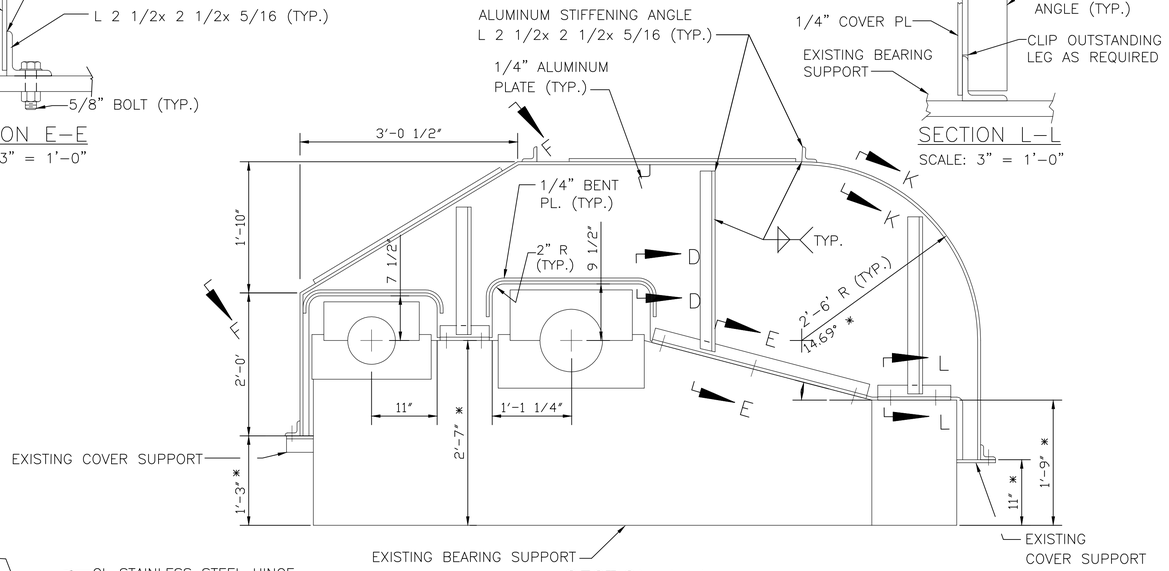
SECTION H'–H'

SCALE: 3" = 1'–0"



SECTION J–J

SCALE: 3" = 1'–0"

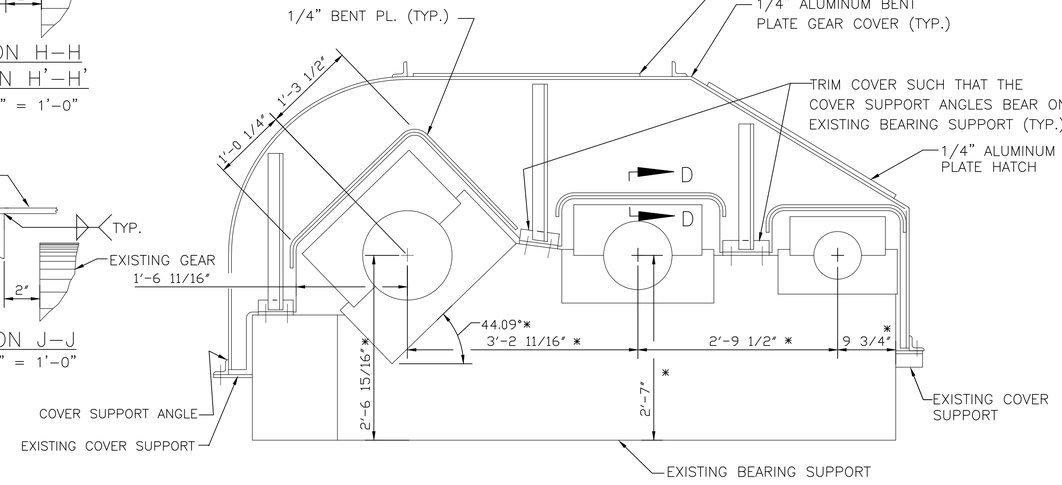


SECTION L–L

SCALE: 3" = 1'–0"

SECTION A–A

SCALE: 1" = 1'–0"



SECTION B–B

SCALE: 1" = 1'–0"

NOTES:

1. * DIMENSIONS PROVIDED AS REFERENCE ONLY, FIELD VERIFY.
2. ALL ITEMS NEW, UNLESS NOTED OTHERWISE.
3. EXISTING GEARING COVERS TO BE REMOVED.
4. COVER MATERIAL TO BE ALUMINUM, ASTM B308.
5. FASTENERS TO BE STAINLESS STEEL, ASTM F593, GROUP 2 – ALLOY 316.
6. HINGES TO BE TYPE 304 STAINLESS STEEL PIANO HINGES, McMASTERS–CARR PART NO. 1582A434, OR APPROVED EQUAL.

3rd 17th 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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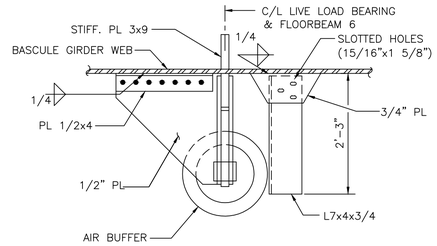
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

NEW OPEN GEARING COVER – DETAILS

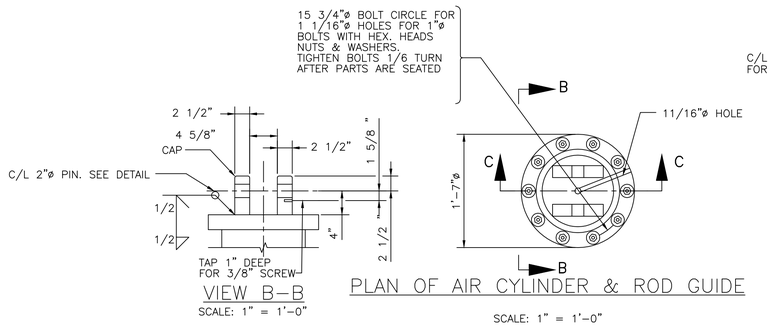
		DRAWN BY	E.A. RICKENBACH
		SCALE	AS NOTED
MB19	DESIGNED G.L. FOREST	DETAILED G.L. FOREST	DATE MARCH 2011
	CHECKED E.A. SAMPLE	CHECKED E.A. SAMPLE	DRAWING NO. 20 OF 63

20–MB19–NOGCD.DWG



PLAN OF AIR BUFFER

SCALE: 3/4" = 1'-0"

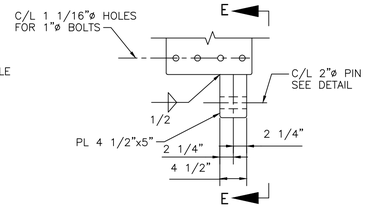


VIEW B-B

SCALE: 1" = 1'-0"

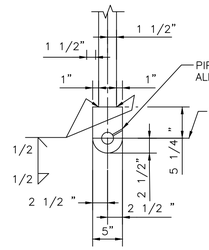
PLAN OF AIR CYLINDER & ROD GUIDE

SCALE: 1" = 1'-0"



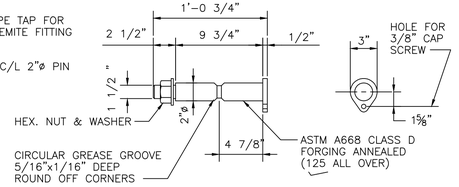
PIN SUPPORT DETAIL

SCALE: 1" = 1'-0"



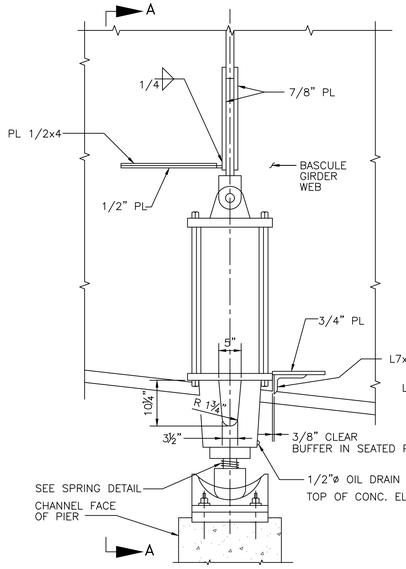
VIEW E-E

SCALE: 1" = 1'-0"



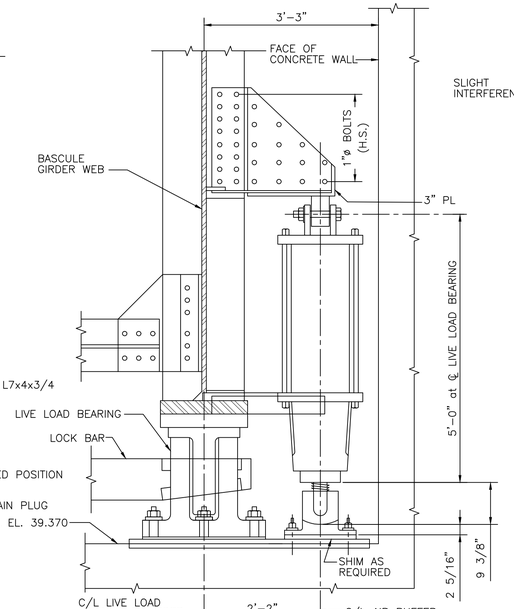
PIN DETAIL

SCALE: 1 1/2" = 1'-0"



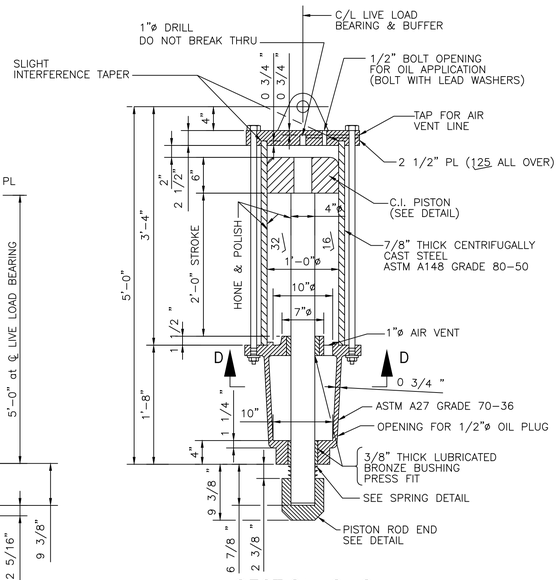
ELEVATION

SCALE: 3/4" = 1'-0"



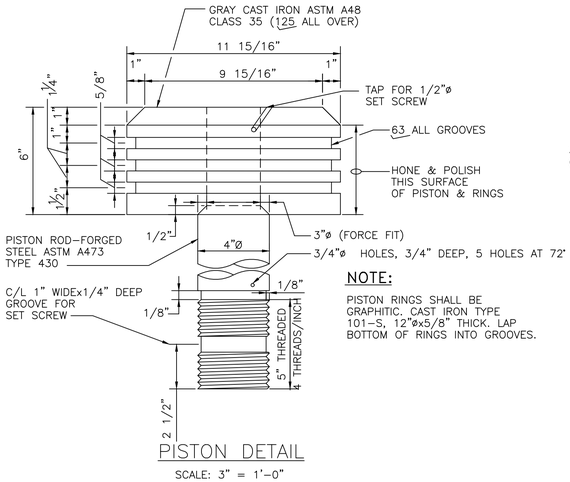
SECTION A-A

SCALE: 3/4" = 1'-0"



SECTION C-C

SCALE: 1" = 1'-0"

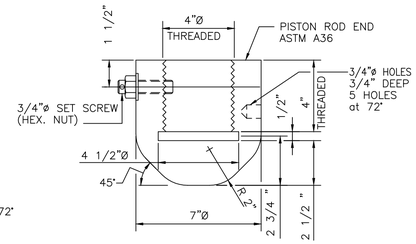


PISTON DETAIL

SCALE: 3" = 1'-0"

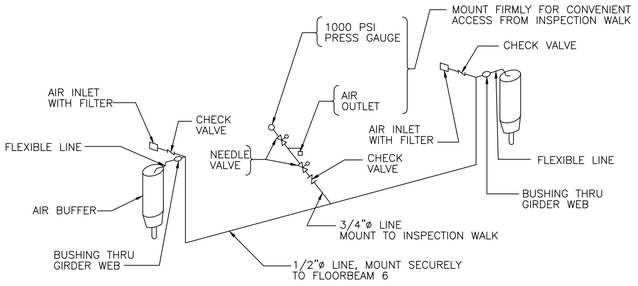
NOTE:

PISTON RINGS SHALL BE GRAPHITIC. CAST IRON TYPE 101-S, 12"øx5/8" THICK. LAP BOTTOM OF RINGS INTO GROOVES.



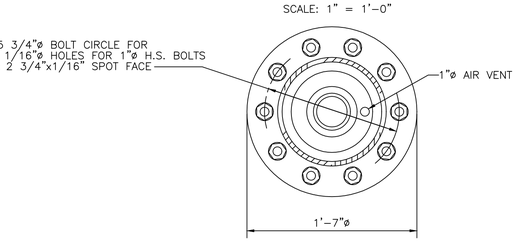
PISTON ROD END DETAIL

SCALE: 3" = 1'-0"



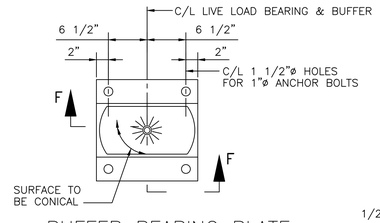
SCHEMATIC
EXISTING TYPICAL LEAF BUFFER SYSTEM

SCALE: NONE



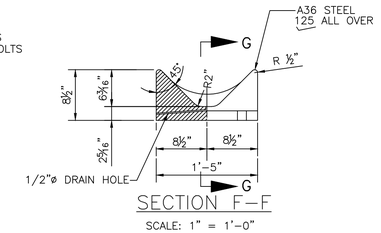
SECTION D-D

SCALE: 1 1/2" = 1'-0"



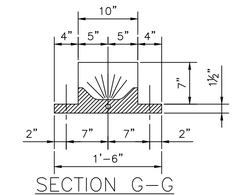
BUFFER BEARING PLATE

SCALE: 1" = 1'-0"



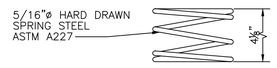
SECTION F-F

SCALE: 1" = 1'-0"



SECTION G-G

SCALE: 1" = 1'-0"



SPRING DETAIL

SCALE: 3" = 1'-0"

NOTES:

THIS DRAWING IS INCLUDED FOR REFERENCE ONLY. ALL DIMENSIONS MUST BE FIELD VERIFIED.

0 1 2 3

INCHES ON FULL SIZE SHEET

STATE OF NORTH CAROLINA
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CAPE FEAR BASCULE BRIDGE
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WILMINGTON, NORTH CAROLINA

EXISTING AIR BUFFER

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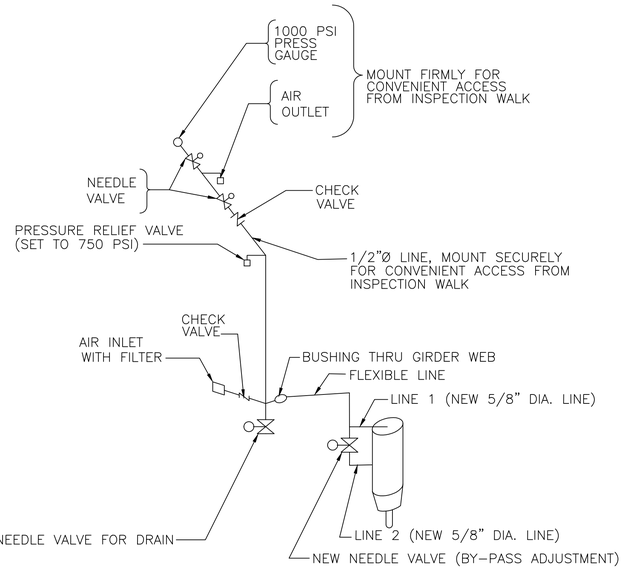
		DRAWN BY	E.A. RICKENBACH
		SCALE	AS NOTED
MB20	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED G.L. FOREST	CHECKED G.L. FOREST	DRAWING NO. 21 OF 63

21-MB20-FAB.DWG



SCHEMATIC

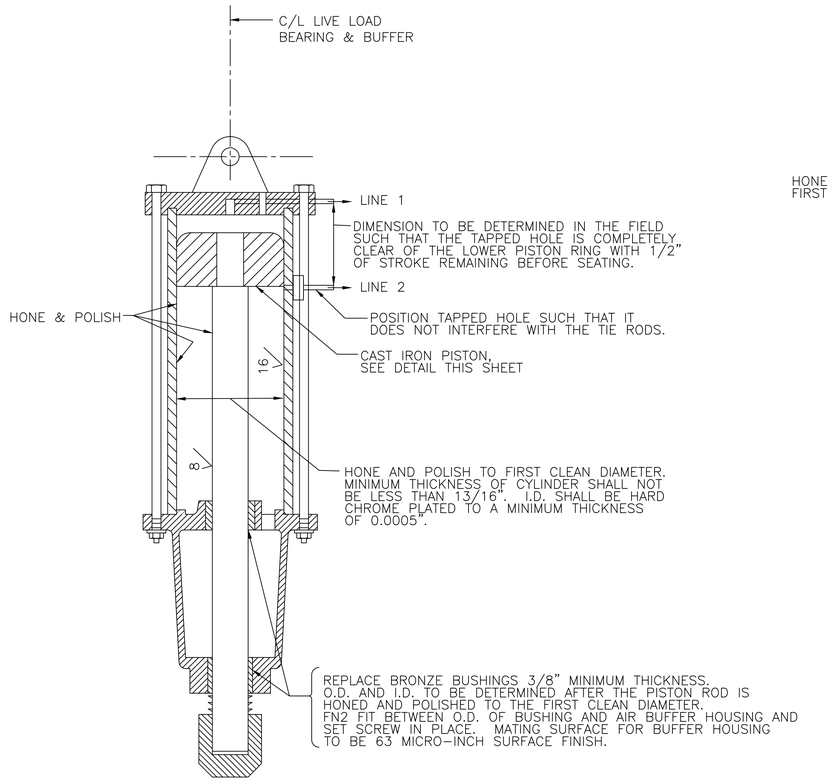
TYPICAL LEAF BUFFER SYSTEM

SCALE: NONE

QUANTITY: FOUR

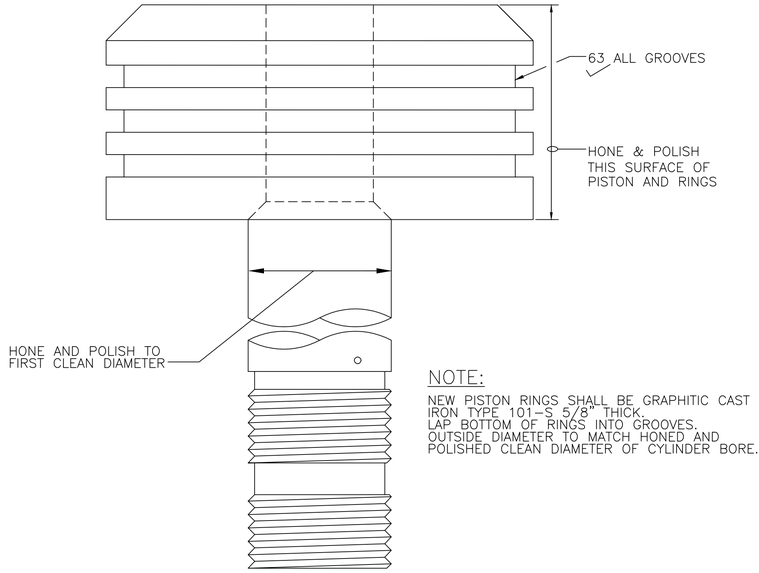
NOTE:

REPLACE ALL EXISTING FITTINGS, LINES AND VALVES WITH NEW STAINLESS STEEL COMPONENTS RATED AT 1500 PSI MINIMUM.



AIR BUFFER DETAIL

SCALE: 1 1/2" = 1'-0"



NOTE:

NEW PISTON RINGS SHALL BE GRAPHITIC CAST IRON TYPE 101-S 5/8" THICK.
LAP BOTTOM OF RINGS INTO GROOVES.
OUTSIDE DIAMETER TO MATCH HONED AND POLISHED CLEAN DIAMETER OF CYLINDER BORE.

PISTON DETAIL

SCALE: 6" = 1'-0"

NOTES:

1. FOR SCOPE OF WORK, SEE DWG. NO. M1.
2. ALL BUFFER FITTINGS AND LINES SHALL HAVE MINIMUM CAPACITY OF 1500 PSI.
3. SELF LUBRICATING BRONZE BUSHINGS SHALL BE OILITE BRONZE, ASTM B438, GRADE 1, TYPE II OR APPROVED EQUAL.
4. ALL BUSHINGS SHALL BE SECURED IN POSITION ADEQUATE TO INSURE AGAINST DISLODGEMENT DURING OPERATION.
5. ALL EXISTING COMPONENTS TO BE REUSED SHALL BE SAND BLASTED WITH SSPC SURFACE PREP SP6 COMMERCIAL BLAST CLEANING.
6. SEE SPECIFICATIONS FOR PRIMING AND PAINTING DETAILS. ALL COMPONENTS TO BE THOROUGHLY CLEANED, PRIMED AND PAINTED EXCEPT SLIDING SURFACES.
7. PROVIDE LADDER BOLTED TO PIER WALL ADJACENT TO AIR BUFFER LOCATION FOR ACCESS DURING ADJUSTMENTS AND MAINTENANCE. LADDER LOCATION, TYPE, AND MOUNTING DETAILS TO BE SUBMITTED AND APPROVED BY NCDOT BEFORE INSTALLATION.

0 1 2 3

INCHES ON FULL SIZE SHEET

3rd MARCH 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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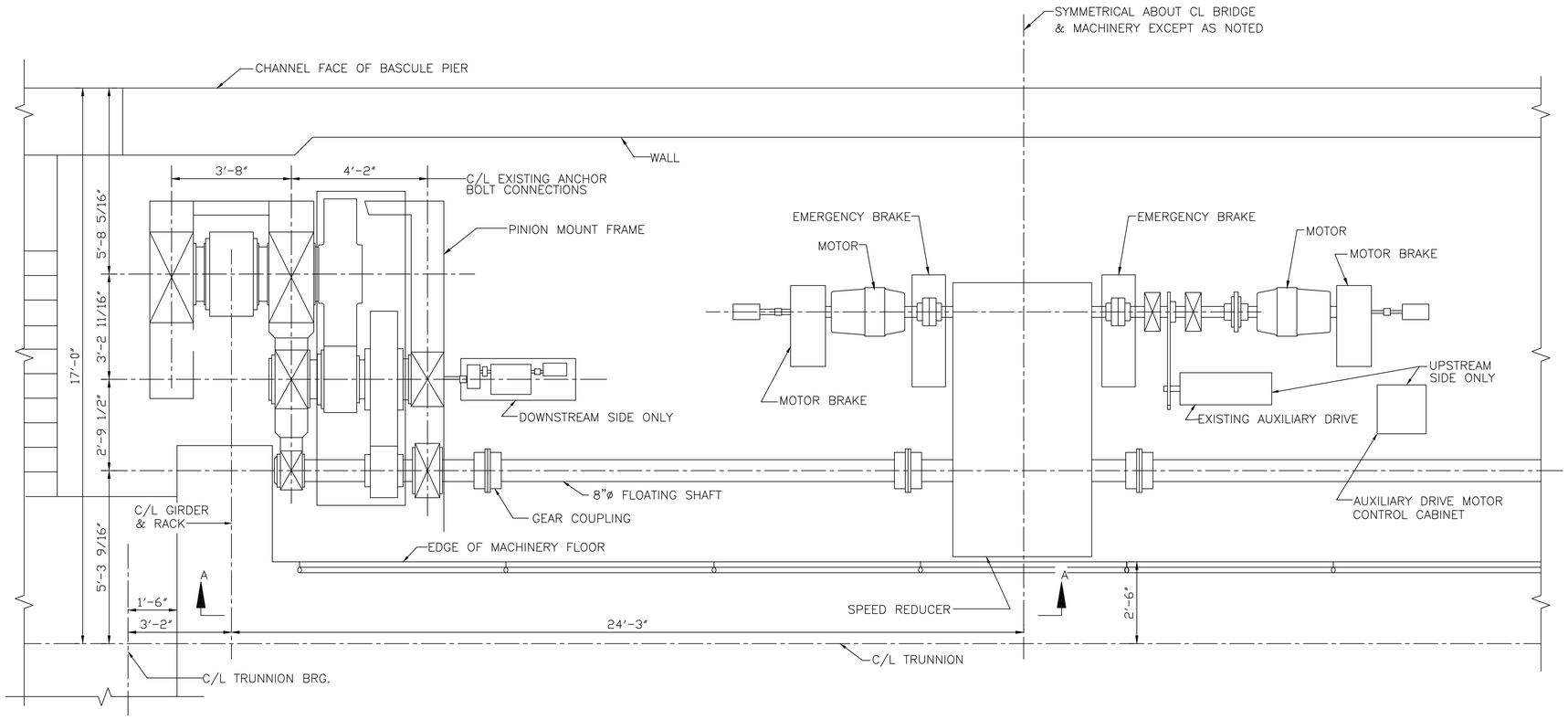
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

AIR BUFFER REHABILITATION

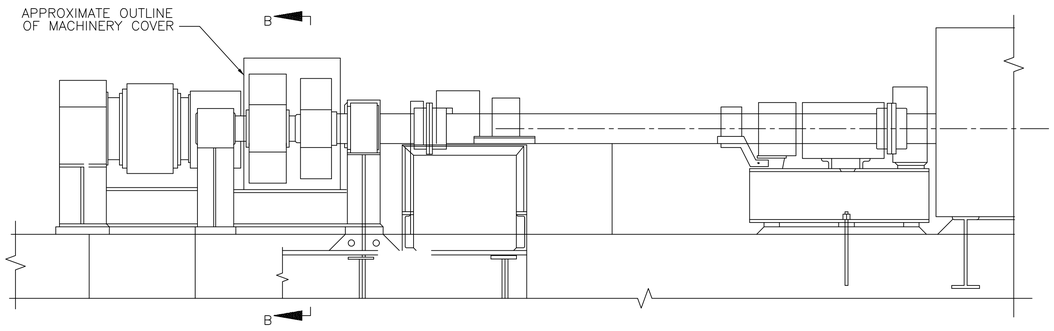
			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB21	DESIGNED D.M. BARRETT	DETAILED A.M. BRODSKY	DATE MARCH 2011
	CHECKED G.L. FOREST	CHECKED G.L. FOREST	DRAWING NO. 22 OF 63

22-MB21-ABR.DWG



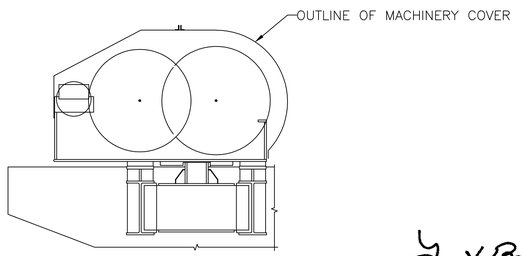
PLAN OF EXISTING OPERATING MACHINERY

SCALE: 1/2" = 1'-0"



SECTION A–A

SCALE: 1/2" = 1'-0"



SECTION B–B

SCALE: 1/2" = 1'-0"

0 1 2 3

INCHES ON FULL SIZE SHEET

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RALEIGH

CAPE FEAR BASCULE BRIDGE
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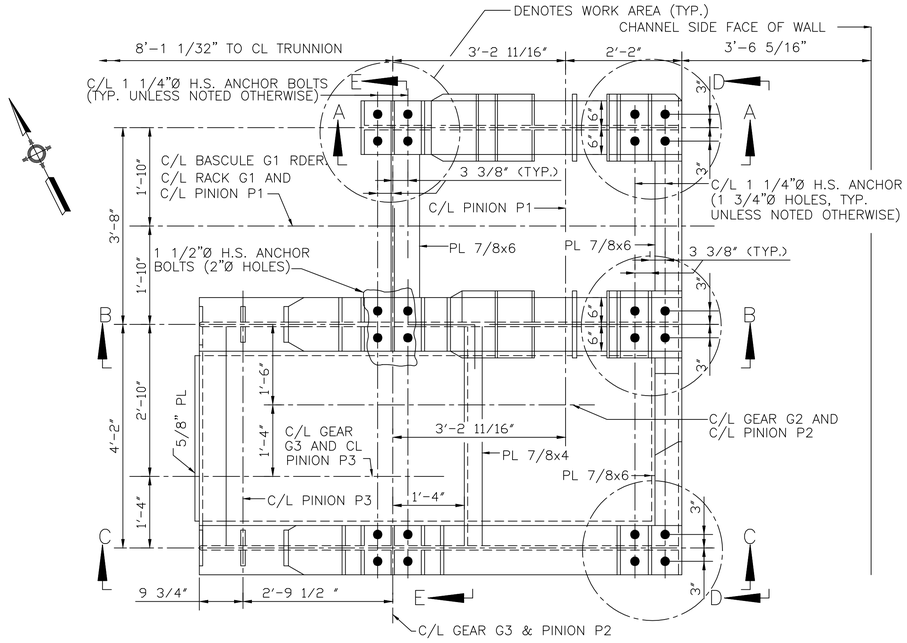
WILMINGTON, NORTH CAROLINA

OPEN GEARING FRAME ANCHOR BOLT REPLACEMENT – 1

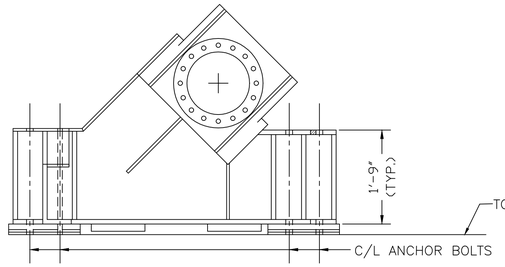
				DRAWN BY	E. A. RICKENBACH
				SCALE	AS NOTED
MB22	DESIGNED D.B. IRWIN	DETAILED D.B. IRWIN		DATE	MARCH 2011
	CHECKED H. BUI	CHECKED H.BUI		DRAWING NO.	23 OF 63

23-MB22-OSFABR1.DWG

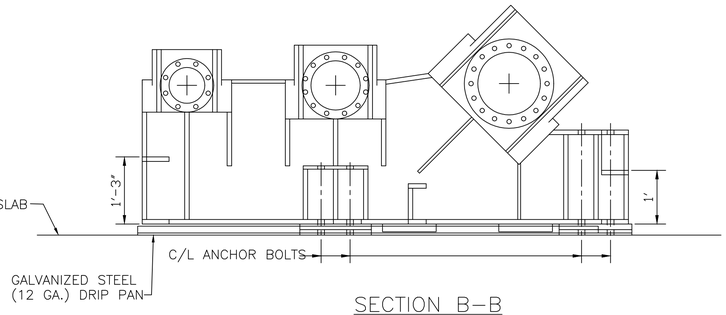


PLAN – EXISTING PINION MOUNTS

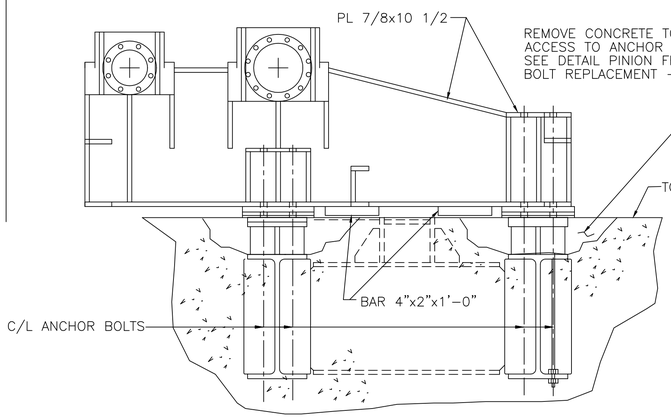
(NORTHWEST LAYOUT SHOWN,
OTHERS SIMILAR)
(GRILLAGE NOT SHOWN,
SEE SECTIONS C–C AND D–D FOR DETAILS)



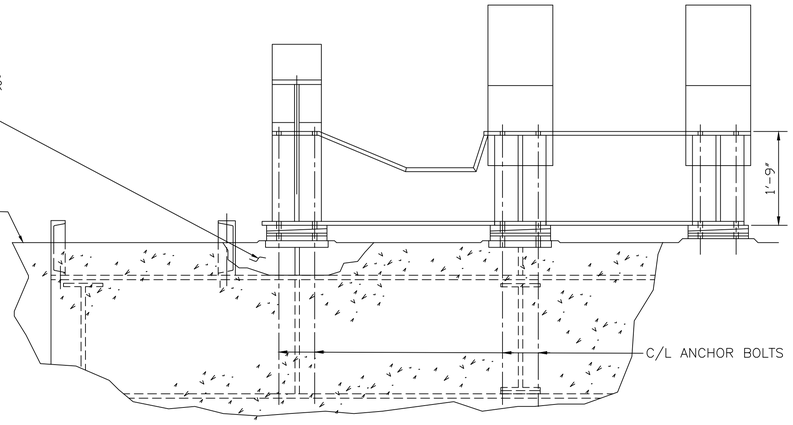
SECTION A–A



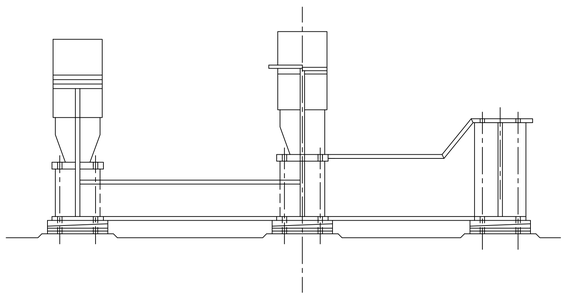
SECTION B–B



SECTION C–C



VIEW D–D



SECTION E–E

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd MARCH 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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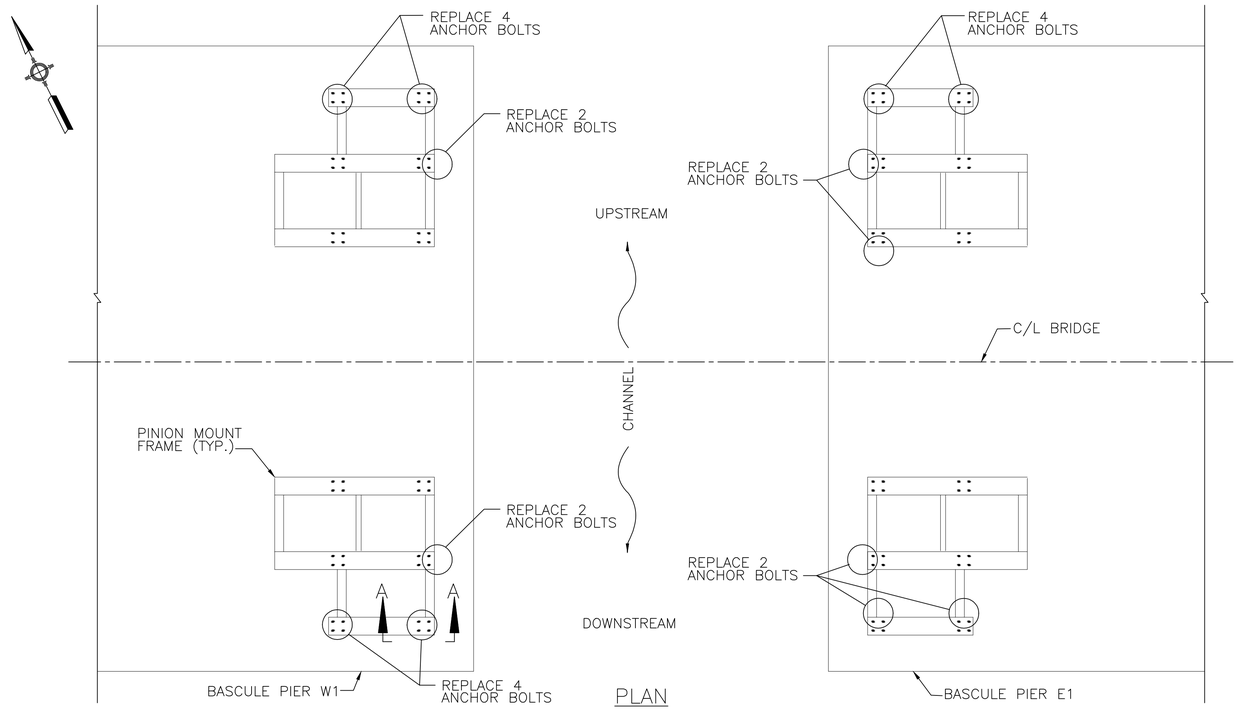
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

OPEN GEARING FRAME ANCHOR BOLT REPLACEMENT – 2

				DRAWN BY	E.A. RICKENBACH
				SCALE	AS NOTED
MB23	DESIGNED	D.B. IRWIN	DETAILED	D.B. IRWIN	DATE MARCH 2011
	CHECKED	H. BUI	CHECKED	H. BUI	DRAWING NO. 24 OF 63

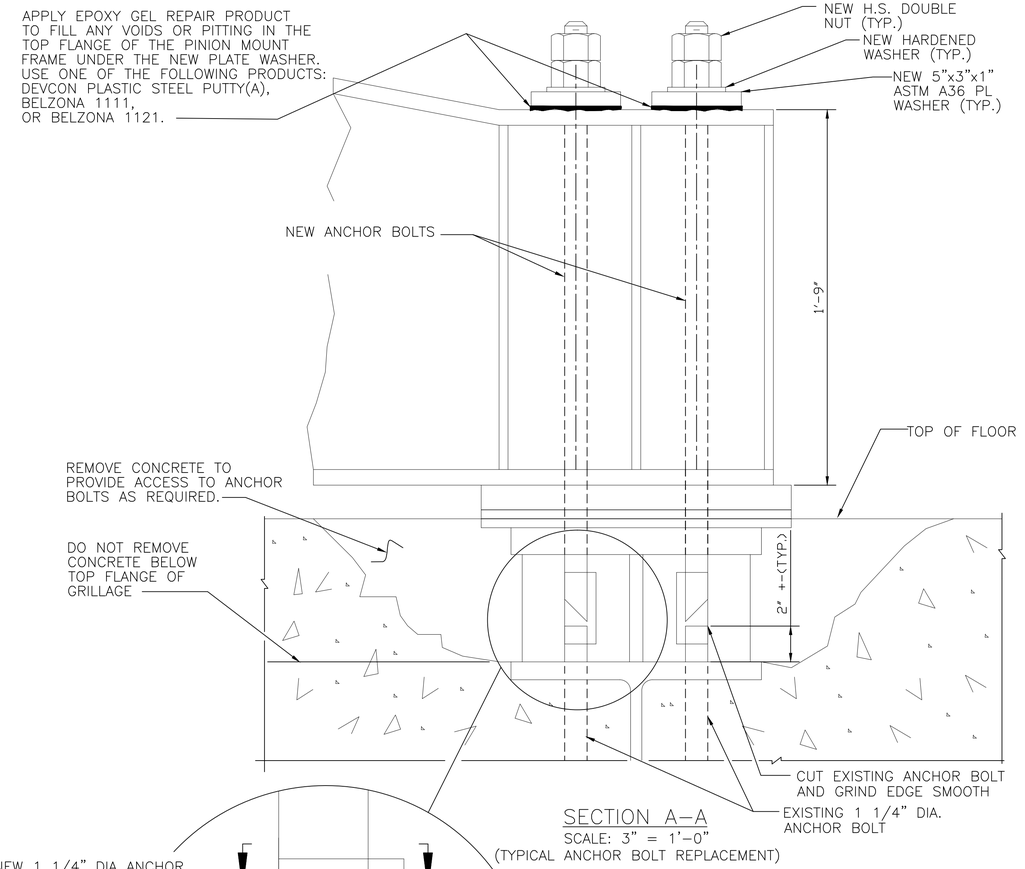
24-MB23-OGFABR2.DWG



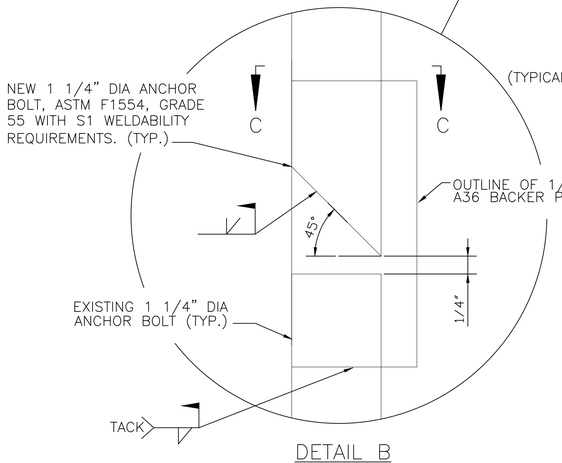
PLAN

PINION FRAME ANCHOR BOLT LAYOUT

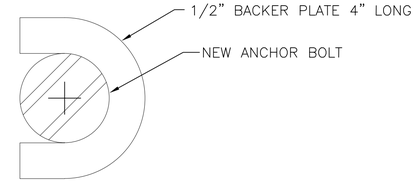
NOT TO SCALE
(38 TOTAL TO BE REPLACED)



SECTION A–A
SCALE: 3" = 1'–0"
(TYPICAL ANCHOR BOLT REPLACEMENT)



DETAIL B
SCALE: 1" = 1"



SECTION C–C
SCALE: 1" = 1"

WELDING NOTES

1. ALL WORK IS TO BE DONE IN ACCORDANCE WITH THE AASHTO/AWS BRIDGE WELDING CODE D1.5–2008 (BWC).
2. THE EXISTING ANCHOR BOLT MATERIAL, THE SPECIFIED NEW ANCHOR BOLT EXTENSIONS, AND THE 1/2" BACKER PLATE ARE CONSIDERED APPROVED BASE METALS. THEREFORE, THE VARIOUS PROCEDURE QUALIFICATION TESTS AND WELDABILITY INVESTIGATION TESTING REQUIRED BY CLAUSE 5 OF THE BWC ARE NOT NECESSARY FOR THIS WORK. HOWEVER, THE CONTRACTOR IS REQUIRED TO PREPARE AND SUBMIT FOR APPROVAL BY THE ENGINEER, A COMPLETE WELDING PROCEDURE SPECIFICATION (WPS) FORM DOCUMENTING ALL WELDING VARIABLES PROPOSED FOR THE WORK. SUITABLE FORMS ARE INCLUDED IN ANNEX L OF THE BWC.
3. ALL WELDING SHALL BE PERFORMED USING THE SHIELDED METAL–ARC WELDING (SMAW) PROCESS UTILIZING ELECTRODES CLASSIFIED AS E7018H4.
4. ALL SURFACES TO BE WELDED, INCLUDING THE BACKER PLATE, SHALL BE PREHEATED TO 250 DEGREES F PRIOR TO WELDING, INCLUDING TACK WELDING.
5. ALL COMPLETED WELDS SHALL BE RADIOGRAPHIC TESTED (RT) IN ACCORDANCE WITH CLAUSE 6 OF THE BWC. WELD QUALITY SHALL MEET THE REQUIREMENTS OF CLAUSE 6.26 OF THE BWC USING TENSILE STRESS CRITERIA.
6. PRIOR TO UNDERTAKING ANY WORK ON THE STRUCTURE, THE CONTRACTOR SHALL PERFORM THREE (3) TEST WELDS UNDER CONTROLLED CONDITIONS SIMILAR TO THE CONDITIONS TO BE ENCOUNTERED IN THE FIELD. RESTRAINTS ON ACCESS FOR THE WELDERS MUST BE DUPLICATED BASED UPON ANTICIPATED TECHNIQUES TO BE EMPLOYED TO PERFORM THE WORK ON THE JOBSITE. ANCHOR BOLT AND BACKER PLATE MATERIAL USED TO PREPARE THE TEST WELDS MUST BE THE SAME AS THE NEW MATERIALS TO BE USED ON THE WORK. TEST WELDS SHALL BE MADE USING THE WPS AND ELECTRODES PROPOSED FOR THE WORK. ALL THREE (3) TEST WELDS SHALL BE RT INSPECTED AS SPECIFIED ABOVE AND SHALL MEET THE WELD QUALITY AS SPECIFIED. IN ADDITION, ONE (1) TEST WELD SHALL BE TENSION TESTED TO FAILURE BY A SUITABLE INDEPENDENT TESTING LABORATORY. MINIMUM TENSILE STRENGTH SHALL BE AT LEAST EQUAL TO THE TENSILE STRENGTH OF AN UN–WELDED SECTION OF THE SAME BAR USED TO MANUFACTURE THE NEW ANCHOR BOLT EXTENSIONS.

GENERAL PROCEDURE

1. BEFORE STARTING WORK, CLEAN THE AREA AROUND THE PINION MOUNT FRAMES TO REMOVE ALL GREASE AND DEBRIS FROM THE FRAMES AND THE CONCRETE FLOOR.
2. REMOVE CONCRETE TO THE LIMITS SHOWN TO PROVIDE ACCESS TO THE ANCHOR BOLTS SPECIFIED FOR REPLACEMENT.
3. REPLACE THE ANCHOR BOLTS FOLLOWING THE WELDING PROCEDURE AND DETAILS SHOWN ON THIS SHEET. WORK IS PERMITTED ON ONLY ONE ANCHOR BOLT AT ANY TIME. WORK MAY PROGRESS TO ANOTHER BOLT ONLY AFTER THE WELD HAS PASSED RADIOGRAPHIC TESTING AND THE BOLT IS TIGHTENED. THE BRIDGE SHALL NOT BE OPERATED IF A BOLT IS CUT AND NOT YET WELDED, RADIOGRAPHIC TESTED, AND TIGHTENED.
4. AFTER COMPLETION OF ALL WELDING, CLEAN AND PAINT THE PINION MOUNT FRAMES AND ALL NEW STEEL WITH A PAINT SYSTEM APPROVED BY NCDOT.
5. APPLY AN EPOXY BONDING ADHESIVE CONFORMING TO ASTM C881, TYPE II, GRADE 2 TO THE SURFACES OF THE EXCAVATED CONCRETE AND FILL THE EXCAVATIONS WITH A NON–SHRINK CEMENTITIOUS GROUT EXTENDED WITH AN EQUAL VOLUME OF CLEAN AGGREGATE OF 1/2" MAXIMUM SIZE.

0 1 2 3
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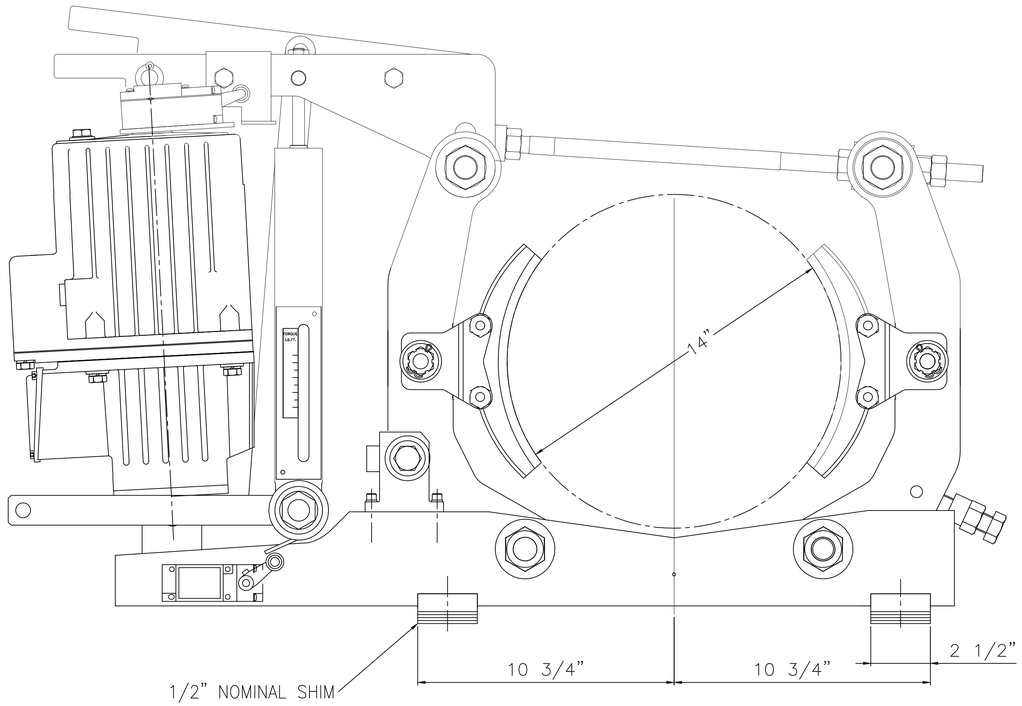
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
OPEN GEARING FRAME ANCHOR BOLT REPLACEMENT – 3

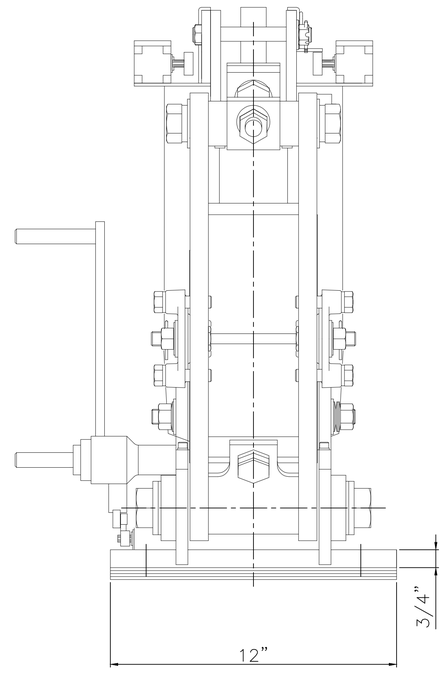
			DRAWN BY E.A. RICKENBACH
			SCALE AS NOTED
MB24	DESIGNED D.B. IRWIN	DETAILED D.B. IRWIN	DATE MARCH 2011
	CHECKED H. BUI	CHECKED H. BUI	DRAWING NO. 25 OF 63

25–MB24–OSFABR3.DWG

MAX.TORQUE: 800 lb.ft.



14" MBTE ED80/6 (LHR)(3LS)SHOE BRAKE
DROP-IN (GE IC9516)



NOTES:

1. MOUNTING BOLT HOLES TO BE DRILLED BASED ON FIELD MEASUREMENTS.
2. ALL DIMENSIONS ON EXISTING BRAKES TO BE FIELD VERIFIED FOR PROPER FIT WITH NEW BRAKES BEFORE NEW BRAKES ARE ORDERED. ALL EXISTING BRAKES AND BRAKE LOCATIONS MAY NOT BE IDENTICAL.
3. NEW BRAKES TO BE SUPPLIED WITH STAINLESS STEEL COVERS MODIFIED FOR MANUAL HAND RELEASE.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd MARCH 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

SPAN DRIVE BRAKE REPLACEMENT

		DRAWN BY	D.M. BARRETT
		SCALE	AS NOTED
MB25	DESIGNED D.M. BARRETT	DETAILED D.M. BARRETT	DATE MARCH 2011
	CHECKED A.M. BRODSKY	CHECKED A.M. BRODSKY	DRAWING NO. 26 OF 63

26-MB25-SDBR.DWG

ELECTRICAL GENERAL NOTES (BASCULE BRIDGE)

1. GENERAL

1.01 ALL WORK SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE (2008 EDITION), THE NORTH CAROLINA ELECTRICAL CODE (2008 EDITION), THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES (LATEST EDITION), THE AASHTO LRFD MOVABLE HIGHWAY BRIDGE DESIGN SPECIFICATIONS (LATEST EDITION), AND ALL APPLIC-ABLE STATE AND/OR LOCAL CODES.

1.02 FOR THE PURPOSES OF APPLYING THE NATIONAL ELECTRICAL CODE, THE FOLLOWING LOCATION DEFINITIONS SHALL APPLY.

(1) DRY LOCATIONS: INSIDE THE CONTROL HOUSE CONTROL ROOM, RESTROOM, ELECTRICAL ROOM, AND GENERATOR ROOM.

(2) DAMP LOCATIONS: INSIDE THE CONTROL HOUSE WORK ROOM, AND FUEL TANK ROOM.

(3) WET LOCATIONS: ANY LOCATION NOT DEFINED AS DRY OR DAMP, INCLUDING WITHIN THE BASCULE PIERS.

1.03 ALL EQUIPMENT, RACEWAYS, WIRING, ETC. SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER IN ACCORDANCE WITH NECA 1 (STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONTRACTING), AND WITHOUT VIOLATING ANY REQUIRED CLEAR WORKING SPACE (NEC 110.26).

1.04 IN NO WAY SHALL THESE PLANS BE INTERPRETED AS REQUIRING A VIOLATION OF THE NATIONAL ELECTRICAL CODE, OR ANY OTHER APPLICABLE FEDERAL, STATE, OR LOCAL CODE OR REGULATION. IN ANY CASE OF DISPUTE BETWEEN THESE PLANS AND THE NATIONAL ELECTRICAL CODE, THE MORE STRINGENT REQUIREMENT SHALL GOVERN.

1.05 THE INSTALLATION OF ALL EQUIPMENT AND MATERIALS SHALL COMPLY WITH THEIR RESPECTIVE MANUFACTURERS' RECOMMENDATIONS AND INSTALLATION PROCEDURES.

1.06 THE CONTRACTOR IS EXPECTED TO DELIVER A COMPLETE, WORKING, AND SAFE ELECTRICAL SYSTEM.

1.07 VARIATIONS FROM THESE PLANS MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL. ALL CHANGES SHALL BE REFLECTED IN THE AS-BUILT DRAWINGS.

1.08 IN ADDITION TO THE MATERIALS, COMPONENTS, AND EQUIPMENT SHOWN ON THE PLANS, PROVIDE ALL RACEWAYS, JUNCTION AND PULL BOXES, FITTINGS, CONDUCTORS, CONNECTORS, AND OTHER ITEMS REQUIRED TO PROVIDE A COMPLETE, FUNCTIONAL, AND SAFE INSTALLATION.

1.09 THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR VERIFICATION OF ALL RELEVANT DIMENSIONS, EQUIPMENT SPECIFICATIONS, ELECTRICAL LOADS, CIRCUIT LOADS, AND SIMILAR INFORMATION PRIOR TO PURCHASE AND/OR FABRICATION OF EQUIPMENT OR MATERIALS. EQUIPMENT RATINGS AND/OR WIRE SIZES SHOWN ON THE PLANS SHALL BE INCREASED WHERE REQUIRED BY THE LOADS SERVED.

1.10 THE CONTRACTOR SHALL INVESTIGATE AND/OR VERIFY THE LOCATIONS OF ALL EXISTING FACILITIES, ABOVE GROUND AND UNDERGROUND, PRIOR TO CONSTRUCTION. ANY DAMAGE TO EXISTING FACILITIES SHALL BE REPAIRED BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST.

1.11 THE CONTRACTOR SHALL CAREFULLY TRACE, LOCATE, IDENTIFY, AND DOCUMENT ALL EXISTING EQUIPMENT, CONDUCTORS, RACEWAYS, AND OTHER ITEMS WHICH ARE EXISTING AND TO REMAIN IN PLACE, BE RE-ROUTED, OR BE RELOCATED. THE CONTRACTOR SHALL EXERCISE CARE NOT TO DAMAGE OR OTHERWISE DISTURB ANY ITEMS WHICH ARE EXISTING AND TO REMAIN IN PLACE.

1.12 NUMBERS IN PARENTHESES ASSOCIATED WITH EQUIPMENT REFER TO ITEM NUMBERS IN THE EQUIPMENT SCHEDULES.

1.13 ALL EQUIPMENT, RACEWAYS, WIRING, ETC. SHOWN ON THESE PLANS, OR OTHERWISE REQUIRED, SHALL BE NEW UNLESS SPECIFICALLY NOTED OTHERWISE.

1.14 LOCATIONS OF RACEWAYS, CABLES, AND EQUIPMENT SHOWN ARE DIAGRAMMATIC ONLY. EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND SUBJECT TO THE APPROVAL OF THE ENGINEER.

1.15 DO NOT CUT, DRILL, OR WELD ANY STRUCTURAL MEMBER WITHOUT THE EXPLICIT PERMISSION OF THE ENGINEER ON A CASE-BY-CASE BASIS.

1.15 THE EXISTING BRIDGE NAVIGATION LIGHTING SYSTEM SHALL REMAIN OPERATIONAL AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE TEMP-ORARY NAVIGATION LIGHTS AND WIRING AS NECESSARY TO MEET THIS REQUIREMENT.

2. WIRING MATERIALS & METHODS

2.01 UNLESS EXPLICITLY INDICATED OTHERWISE, ONLY THE FOLLOWING WIRING METHODS ARE PERMITTED.

GENERAL
1. PLASTIC COATED STEEL RIGID METAL CONDUIT (RMC)
2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

FOR NEW LIGHTING AND RECEPTACLE CIRCUITS IN THE BASCULE PIERS
1. RIGID NONMETALLIC CONDUIT (RNC) – SCH 40 PVC
2. LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

2.02 THE USE OF FLEXIBLE CONDUIT SHALL BE LIMITED TO THE FOLLOWING.
1. FOR FINAL CONNECTIONS TO MOTORS AND SIMILAR EQUIPMENT SUBJECT TO VIBRATION. LENGTHS SHALL NOT BE LESS THAN 18 INCHES, BUT SHALL NOT EXCEED 36 INCHES.
2. WHERE FLEXIBILITY IS REQUIRED. LENGTHS SHALL NOT EXCEED 18 INCHES, UNLESS EXPLICITLY INDICATED OTHERWISE OR WITH THE SPECIAL PERMISSION OF THE ENGINEER.
3. AS MAY BE OTHERWISE SPECIFICALLY SHOWN IN THESE PLANS.
4. FLEXIBLE CONDUIT SHALL NOT BE USED IN LIEU OF BENDS IN RIGID CONDUIT, EXCEPT WITH THE SPECIAL PERMISSION OF THE ENGINEER.
5. FOR FLEXIBLE CONDUIT CONNECTIONS BETWEEN TWO SECTIONS OF RIGID CONDUIT, PROVIDE A CONDUIT BODY ON AT LEAST ONE SIDE OF THE FLEXIBLE CONDUIT.

2.03 ALUMINUM CONDUITS, BOXES, ENCLOSURES, ETC. SHALL BE ISOLATED FROM CONCRETE AND/OR STRUCTURAL STEEL WITH NEOPRENE SHIMS. GALVANIZED CONDUITS, BOXES, ENCLOSURES, ETC. SHALL BE ISOLATED FROM UNPAINTED STEEL WITH NEOPRENE SHIMS.

2.04 RIGID CONDUITS SHALL BE SUPPORTED WITHIN 18 INCHES OF ALL TERMINATIONS AND AT REGULAR INTERVALS NOT TO EXCEED 6 FEET. FLEXIBLE CONDUITS SHALL BE SUPPORTED WITHIN 12 INCHES OF ALL TERMINATIONS AND AT REGULAR INTERVALS NOT TO EXCEED 3 FEET.

2.05 ALL CONDUIT CONNECTIONS TO BOXES AND ENCLOSURES WHICH DO NOT HAVE INTEGRAL THREADED HUBS SHALL UTILIZE WEATHERPROOF GROUNDING TYPE HUBS OR CONNECTORS. ALL HUBS AND CONNECTORS SHALL HAVE INSULATED THROATS OR BE PROVIDED WITH INSULATED BUSHINGS.

2.06 ANY CONDUIT ROUTINGS SHOWN ON THESE PLANS ARE CONCEPTUAL ONLY. ACTUAL ROUTINGS SHALL BE DETERMINED BY THE CONTRACTOR BASED ON ACTUAL CONDITIONS AND SUBMITTED TO THE ENGINEER FOR APPROVAL.

2.07 ALL CONDUCTORS SHALL BE STRANDED COPPER TYPE XHHW-2, EXCEPT WHERE SHOWN OTHERWISE ON THE PLANS. THE MINIMUM SIZE FOR FIELD POWER AND CONTROL WIRING SHALL BE 12 AWG.

2.08 SUPPORT CABLES IN VERTICAL RACEWAYS IN ACCORDANCE WITH NEC 300.19 WITH CABLE SUPPORTS INSTALLED AT TERMINAL CABINETS AND/OR PULL BOXES.

2.09 NEUTRAL CONDUCTORS SHALL NOT BE SHARED BETWEEN MULTIPLE BRANCH CIRCUITS, EXCEPT FOR DESIGNATED MULTIWIRE LIGHTING AND RECEPTACLE CIRCUITS WHERE CLEARLY SHOWN ON THE PLANS.

2.10 MINIMUM CONDUIT SIZE SHALL BE 3/4 INCH, EXCEPT THAT 1/2 INCH SHALL BE PERMITTED FOR FLEXIBLE CONDUIT CONNECTIONS TO LUMINAIRES.

2.11 WIRING IN ENCLOSURES, CABINETS, BOXES, ETC. SHALL BE NEATLY ROUTED, AND BUNDLED WITH PVC CABLE TIES OR PLACED IN NON-METALLIC WIRING TROUGHS.

2.12 SPARE AND UN-TERMINATED CONDUCTORS SHALL BE CAPPED, OR CONNECTED TO SPARE TERMINAL BLOCKS WHERE AVAILABLE, AND CLEARLY IDENTIFIED. ONE FULL TURN OF SLACK FOR ALL SPARE CONDUCTORS SHALL BE PROVIDED IN ALL ENCLOSURES, CABINETS, BOXES. ETC.

2.13 ONE FULL TURN OF SLACK SHALL BE PROVIDED FOR ALL CONDUCTORS IN ALL PULL BOXES, JUNCTION BOXES, AND TERMINAL CABINETS.

2.14 RACEWAYS CROSSING EXPANSION JOINTS, OR OTHERWISE SUBJECT TO MOVEMENT, SHALL BE PROVIDED WITH EXPANSION AND/OR DEFLECTION FITTINGS, OR OTHER APPROVED MEANS, TO COMPENSATE FOR SUCH MOVEMENT. EACH SUCH EXPANSION AND/OR DEFLECTION MEANS SHALL BE PROVIDED WITH AN EXTERNAL COPPER BONDING JUMPER, SIZED 6 AWG MINIMUM.

2.15 CONDUCTORS SPLICES SHALL BE MADE ONLY IN JUNCTION BOXES, OUTLET OR DEVICE BOXES, AND EQUIPMENT ENCLOSURES. SPLICES SHALL BE MADE ONLY ON TERMINAL BLOCKS, EXCEPT FOR SPLICES AT LUMINAIRES AND WIRING DEVICES WHICH SHALL UTILIZE INSULATED SET-SCREW TYPE, OR SIMILAR APPROVED, CONNECTORS. TWIST-ON (WIRENUT) TYPE CONNECTORS SHALL NOT BE USED. TERMINAL BLOCKS SHALL NOT HAVE MORE THAN TWO CONDUCTORS PER TERMINAL.

2.16 LAYOUT OF TERMINAL BLOCKS IN JUNCTION BOXES AND TERMINAL CABINETS SHALL COMPLY WITH THE REQUIREMENTS FOR WIRE BENDING SPACE GIVEN IN NEC 312.6, EXCEPT THAT THE MINIMUM SPACE PERMITTED SHALL BE 2 INCHES. PROPOSED LAYOUTS, INCLUDING ANTICIPATED LOCATONS AND SIZES OF KNOCKOUTS, SHALL BE SUBMITTED FOR APPROVAL PRIOR TO FABRICATION.

2.17 A CONDUIT BODY OR BOX SHALL BE PROVIDED ON AT LEAST ONE SIDE OF ALL FLEXIBLE CONDUITS.

2.18 ALL RACEWAYS SHALL BE ARRANGED TO DRAIN. CONDUIT DRAINS SHALL BE INSTALLED IN A CONDUIT BODY AT THE LOW POINT OF ALL RUNS.

2.19 UNLESS SPECIFICALLY INDICATED OTHERWISE, CONDUIT AND CABLE ENTRANCES IN DAMP AND WET LOCATIONS SHALL BE MADE ONLY IN THE BOTTOM OF CABINETS AND/OR ENCLOSURES.

2.20 CONDUCTORS WITH GREEN COLORED INSULATION MAY BE USED ONLY FOR GROUNDING CONDUCTORS. RE-IDENTIFICATION OF CONDUCTORS WITH GREEN COLORED INSULATION, SUCH AS WITH COLORED TAPE, IS NOT PERMITTED.

3. GROUNDING & BONDING

3.01 ALL CIRCUITS SHALL INCLUDE AN EQUIPMENT GROUNDING CONDUCTOR. EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED EQUAL TO THE CIRCUIT CONDUCTORS, EXCEPT WHERE SHOWN OTHERWISE ON THE PLANS.

3.02 GROUNDING TYPE HUBS AND CONNECTORS SHALL BE CONNECTED TO THE EQUIPMENT GROUNDING CONDUCTOR(S) CONTAINED WITHIN THEIR ASSOCIATED CONDUIT OR CABLE.

3.03 ALL GROUNDING CONDUCTORS WITHIN AN EQUIPMENT ENCLOSURE OR TERMINAL CABINET SHALL BE TERMINATED ON A COMMON UNINSULATED GROUNDING BAR.

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CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
ELECTRICAL GENERAL NOTES
BASCULE BRIDGE – 1

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE	MARCH 2011
CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO.	27 OF 63

EB1

27-EB1-EGNBB1.DWG

ELECTRICAL GENERAL NOTES (BASCULE BRIDGE) (CONTINUED)

4. IDENTIFICATION

4.01 ALL CONDUCTORS SHALL BE UNIQUELY IDENTIFIED AND CLEARLY LABELED WITH MACHINE PRINTED, WEATHERPROOF, NON–SHRINK SLEEVE TYPE LABELS.

4.02 ALL TERMINAL BLOCKS SHALL BE CLEARLY LABELED, AT EACH TERMINAL POSITION, WITH ENGRAVED PLASTIC WEATHERPROOF LABELS (WHITE TEXT ON BLACK BACKGROUND) ATTACHED WITH STAINLESS STEEL HARDWARE.

4.03 ALL ELECTRICAL EQUIPMENT ENCLOSURES, PULL AND JUNCTION BOXES, AND SIMILAR ITEMS SHALL BE CLEARLY LABELED WITH ENGRAVED PLASTIC WEATHERPROOF LABELS (WHITE TEXT ON BLACK BACKGROUND) ATTACHED WITH STAINLESS STEEL HARDWARE.

3. MISCELLANEOUS MATERIALS & METHODS

3.01 UNLESS NOTED OTHERWISE FOR A SPECIFIC APPLICATION, ALL BOLTS, NUTS, WASHERS, AND SIMILAR HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.

3.02 UNLESS NOTED OTHERWISE FOR A SPECIFIC APPLICATION, ALL CONCRETE ANCHORS SHALL BE EITHER EPOXY ADHESIVE TYPE OR WEDGE STUD TYPE. ALL CONCRETE ANCHORS SHALL BE TYPE 316 STAINLESS STEEL.

3.03 ALL BOLTED, AND SIMILAR, CONNECTIONS SHALL UTILIZE LOCK WASHERS. CONNECTIONS WHICH DO NOT PERMIT THE USE OF LOCK WASHERS SHALL UTILIZE AN APPROVED MEDIUM STRENGTH THREADLOCKINIG ADHESIVE.

3.04 SUPPORTS FOR ELECTRICAL EQUIPMENT SHALL BE FABRICATED FROM TYPE 316 STAINLESS STEEL OR TYPE A36 STEEL (HOT–DIP GALVANIZED AFTER FABRICATION).

3.05 THE OPERATING HANDLE(S) OF ALL MANUALLY OPERABLE DEVICES SHALL NOT BE LESS THAN 2 FEET, NOR MORE THAN 6'–7", ABOVE THE FLOOR.

3.06 EQUIPMENT ENCLOSURES, CABINETS, BOXES, AND SIMILAR ITEMS SHALL BE INSTALLED PLUMB AND SECURELY FASTENED IN PLACE.

6. REMOVALS, SALVAGE, & DISPOSAL

6.01 EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE, ONLY EXISTING CONCRETE EMBEDDED RACEWAYS AND BOXES MAY BE ABANDONED IN PLACE. EXISTING UNDERGROUND RACEWAYS, UNDERGROUND BOXES, AND OTHER EQUIPMENT SHALL NOT BE ABANONED IN PLACE, EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE.

EXISTING CONCRETE EMBEDDED RACEWAYS WHICH ARE TO BE ABANDONED IN PLACE SHALL HAVE ALL CONDUCTORS REMOVED, BE GROUND FLUSH WITH THE CONCRETE, AND FILLED WITH NON–SHRINK GROUT FLUSH WITH THE CONCRETE.

EXISTING CONCRETE EMBEDDED BOXES WHICH ARE TO BE ABANDONED IN PLACE SHALL HAVE ALL CONDUCTORS REMOVED AND BE COVERED WITH A NEW BLANK GALVANIZED STEEL COVER.

6.02 THE CONTRACTOR SHALL GIVE THE DEPARTMENT THE OPTION OF SALVAGING ALL ELECTRICAL EQUIPMENT WHICH IS TO BE REMOVED. THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT WHICH THE DEPARTMENT WISHES TO SALVAGE FROM THE PROJECT SITE AND DELIVER IT TO THE LOCATION DESIGNATED BY THE DEPARTMENT. ALL EQUIPMENT WHICH IS TO BE SALVAGED SHALL BE HANDLED WITH CARE AT ALL TIMES TO AVOID DAMAGE.

ALL ELECTRICAL EQUIPMENT WHICH IS TO BE REMOVED AND THE DEPARTMENT DOES NOT WISH TO SALVAGE SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM THE PROJET SITE BY HIM.

6.03 THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR PROPER DISPOSAL OF REMOVED EQUIPMENT AND MATERIALS IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.

7. WORKING DRAWINGS & SUBMITTALS

7.01 THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL REQUIRED WORKING DRAWINGS AND PRODUCT SUBMITTALS, WORKING IN COOPERATION AND COMMUNICATION WITH THE ENGINEER IN ORDER TO PROVIDE A COMPLETE, FUNCTIONAL, AND SAFE INSTALLATION IN ACCORDANCE WITH THE REQUIREMENTS AND INTENTS OF THESE PLANS, THE SPECIFICATIONS, THE CONTRACT DOCUMENTS, AND ALL APPLICABLE CODES.

7.02 ALL REQUIERD WORKING DRAWINGS AND PRODUCT DESCRIPTIVE DATA SHALL BE SUBMITTED TO THE PROJECT ENGINEER FOR REVIEW AND APPROVAL. SUCH ITEMS MUST BE APPROVED BY THE PROJECT ENGINEER PRIOR TO PURCHASE OF THE RELATED MATERIALS AND/OR UNDERTAKING OF THE RELATED WORK.

7.03 SUBMIT COMPLETE DESCRIPTIVE DATA FOR EACH ITEM OF EQUIPMENT AND MATERIAL.

7.04 WIRING DIAGRAMS AND SCHEMATICS PROVIDED IN THESE PLANS ARE FOR ILLUSTRATIVE PURPOSES ONLY. THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR DEVELOPING ALL REQUIRED DIAGRAMS, INCLUDING FIELD INTERCONNECTION DIAGRAMS.

7.05 WIRING LAYOUTS AND TABULATIONS PROVIDED IN THESE PLANS ARE FOR ILLUSTRATIVE PURPOSES ONLY. THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR DEVELOPING THE ACTUAL LAYOUTS AND TABULATIONS.

7.06 THE CONTRACTOR SHALL DEVELOP ALL FINAL MOUNTING DETAILS FOR ALL EQUIPMENT. SUCH DETAILS SHALL COMPLY WITH ANY TYPICAL DETAILS SHOWN ON THESE PLANS.

8. DOCUMENTATION OF EXISITNG WIRING

8.01 THE CONTRACTOR SHALL TRACE, MARK, AND DOCUMENT EXISTING WIRING AT THE MACHINERY DECKS AND ON THE BASCULE SPANS PRIOR TO BEGINNING REPLACEMENT OF ANY WIRING, CONDUITS, OR BOXES IN THESE AREAS. THIS PREPARATION IS NECESSARY IN ORDER TO ENSURE THAT THE NEW WIRING WILL CORRECTLY REPLICATE THE EXISTING WIRING WHICH IS TO BE REPLACED.

ALL EXISTING WIRING TO BE REPLACED SHALL BE POSITIVELY TRACED FROM END TO END TO DETERMINE EXISTING CONNECTIONS AT BOTH ENDS.

AS EACH WIRE IS TRACED, IT SHALL BE MARKED AT BOTH ENDS WITH NEW ADHESIVE MARKERS. IF THE WIRE IN QUESTION IS ALREADY MARKED, THE EXISTING MARKERS SHALL BE RETAINED AND THE NEW MARKERS ADDED IN SUCH A MANNER THAT THE TWO ARE DISTINGUISHABLE. THE NUMBERS ON THE NEW MARKERS SHALL BE PRECEDED WITH A DISTINGUISHING CHARACTER (SUCH AS +) TO CLEARLY DIFFERENTIATE THE NEW MARKERS FROM ANY EXISTING MARKERS.

THE WIRE NUMBERS (BOTH EXISTING AND NEW) AND CONNECTIONS AT EACH END SHALL BE CAREFULLY AND NEATLY DOCUMENTED.

FOR ALL TERMINAL CABINETS AND JUNCTION BOXES, A SKETCH SHOWING THE RELATIVE LAYOUTS OF THE EXISTING TERMINALS SHALL BE PRODUCED. EACH TERMINAL SHALL CLEARLY IDENTIFY THE NUMBERS (BOTH EXISTING AND NEW) OF ANY WIRES CONNECTED TO IT.

8.02 AFTER THE TRACING, MARKING, AND DOCUMENTATION ARE COMPLETE, THE CONTRACTOR SHALL SUBMIT THE RESULTING DOCUMENTATION TO THE ENGINEER, WHO WILL REVIEW IT FOR COMPLETENESS AND GENERAL ACCEPTABILITY. THE CONTRACTOR MAY NOT PROCEED WITH REPLACEMENT OF ANY WIRING, CONDUITS, OR BOXES IN THESE AREAS UNTIL THE ENGINEER HAS REVIEWED AND APPROVED THIS DOCUMENTATION.

8.03 THE CONTRACTOR SHALL USE THE RESULTING DOCUMENTATION AS A GUIDE IN MAKING CONNECTIONS BETWEEN NEW WIRING AND EXISTING WIRING AND EQUIPMENT.

8.04 THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR ENSURING THE CORRECT CONNECTION OF ALL NEW WIRING, AND THAT BRIDGE OPERATION AFTER REPLACEMENT OF ANY WIRING IS THE SAME AS IT WAS BEFORE REPLACEMENT. IN ADDITION TO THE WIRING SHOWN ON THESE SHEETS, THE CONTRACTOR SHALL PROVIDE AND INSTALL ANY ADDITIONAL WIRING (AND ALSO INCLUDING CONDUITS, BOXES, AND RELATED ITEMS) AS MAY BE NECESSARY TO REPLICATE THE EXISTING WIRING WHICH IS TO BE REPLACED.

0 1 2 3
INCHES ON FULL SIZE SHEET

28–EB2–EGNBB2.DWG

3RD MARCH 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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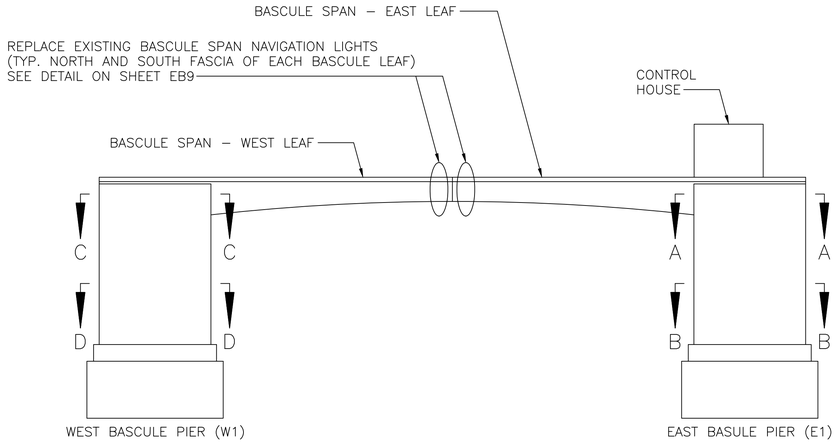
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

ELECTRICAL GENERAL NOTES
BASCULE BRIDGE – 2

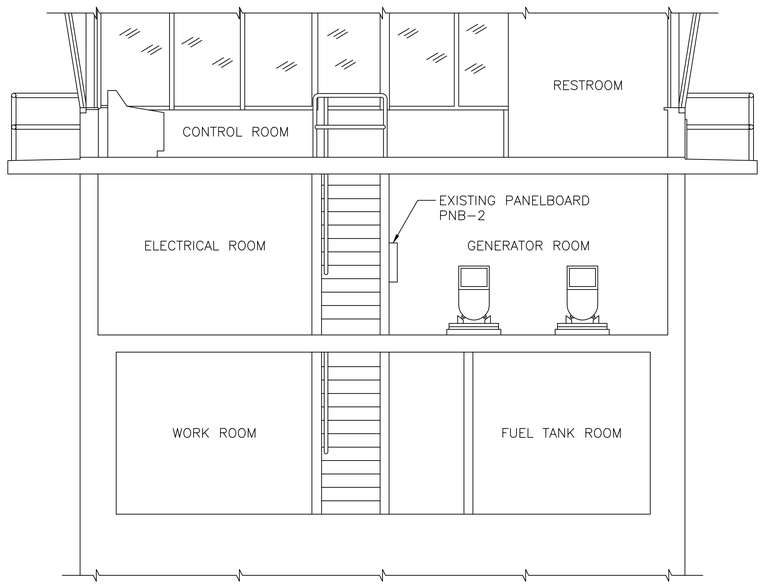
EB2

		DRAWN BY	N.E. ALGER
		SCALE	AS NOTED
DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE	MARCH 2011
CHECKED Q.C. TON	CHECKED Q.C. TON	DRAWING NO.	28 OF 63



SIMPLIFIED ELEVATION – BASCULE PIERS AND SPANS

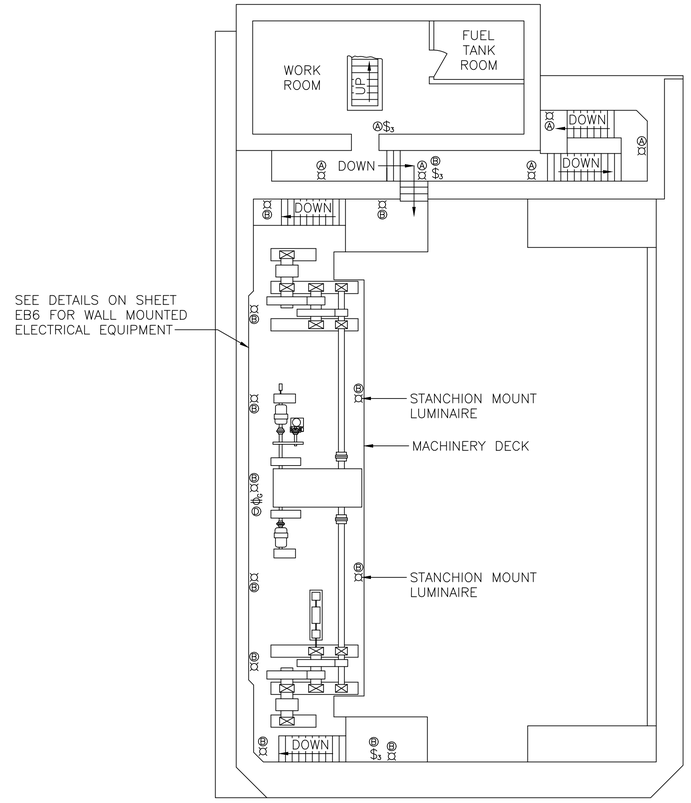
SCALE: NONE



PARTIAL SECTION THROUGH CONTROL HOUSE

SCALE: 1/4" = 1'–0"

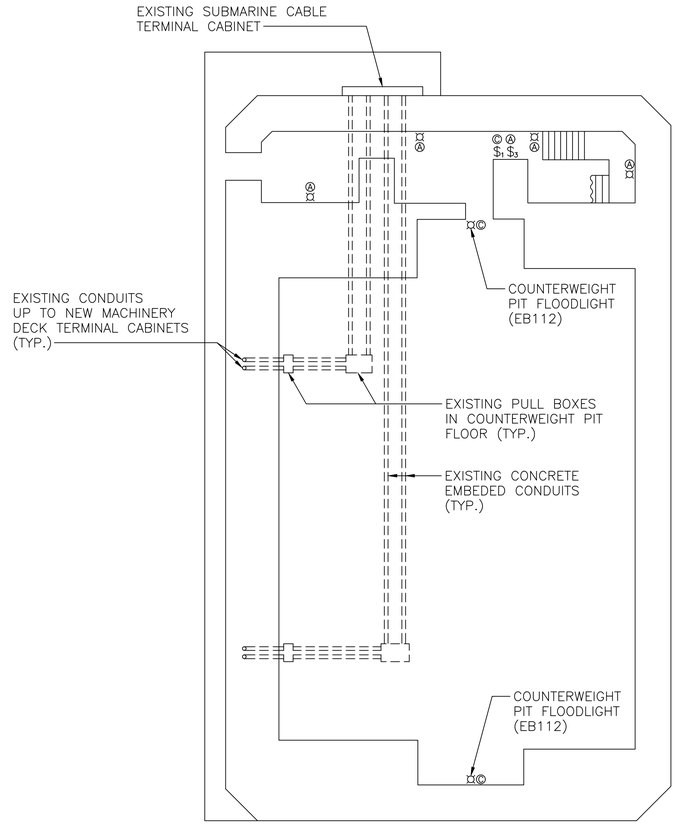
NOTE: NOT ALL FEATURES AND EQUPMENT SHOWN.



SECTION A–A

SCALE: 1/8" = 1'–0"

NOTE: NOT ALL FEATURES AND EQUPMENT SHOWN.



SECTION B–B

SCALE: 1/8" = 1'–0"

NOTE: NOT ALL FEATURES AND EQUPMENT SHOWN.

DEVICE LEGEND

- $\$_1$ SINGLE POLE SWITCH (EB113)
- $\$_3$ THREE WAY SWITCH (EB113)
- ⌑ LUMINAIRE (TYPE AS INDICATED)
- $\$_{GFCI}$ GFCI RECEPTACLE (EB114)
- ⊗ LETTER INDICATES DEVICES ON A COMMON CIRCUIT

NOTES:

1. ALL ELECTRICAL ITEMS ARE NEW EXCEPT AS NOTED.
2. ALL LUMINAIRES ARE VAPORTIGHT INCANDESCENT TYPE EB111 EXCEPT AS NOTED.
3. SEE SHEET EB4 FOR SECTIONS C–C AND D–D.
4. SEE SHEET EB5 FOR DETAILS OF MACHINERY DECK.

3rd FEBRUARY 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

0 1 2 3
INCHES ON FULL SIZE SHEET

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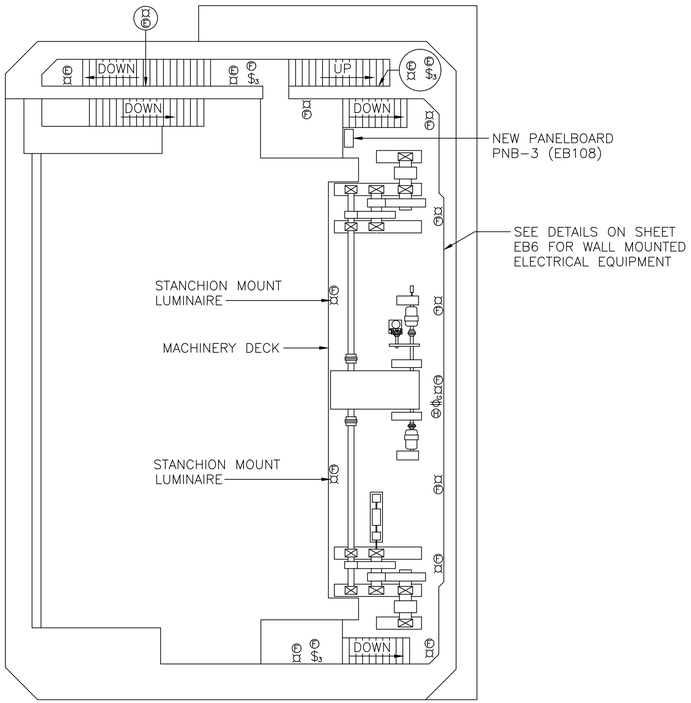
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

ELECTRICAL PLANS AND DETAILS – 1

		DRAWN BY	N.E. ALGER
		SCALE	AS NOTED
DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE	MARCH 2011
CHECKED Q.C. TON	CHECKED Q.C. TON	DRAWING NO.	29 OF 63

EB3

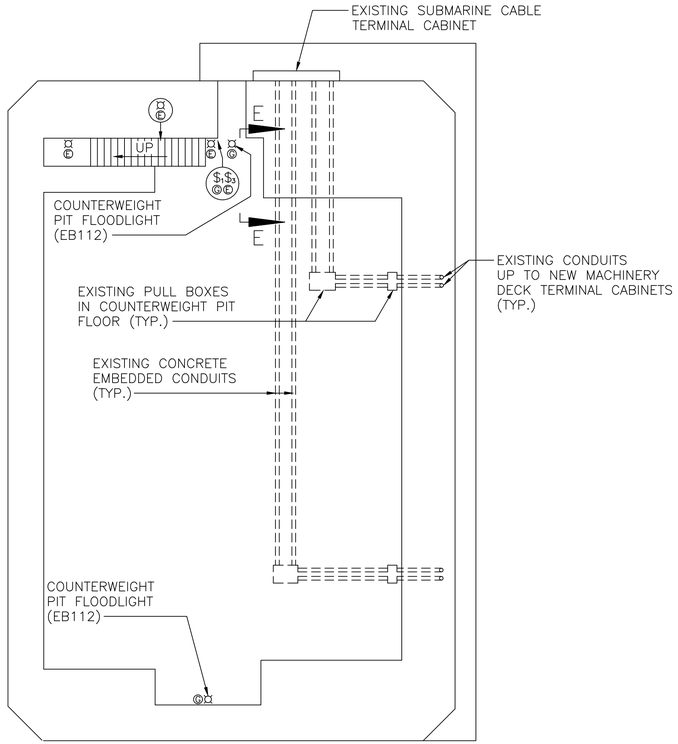
29-EB3-EP01.DWG



SECTION C–C

SCALE: 1/8" = 1'–0"

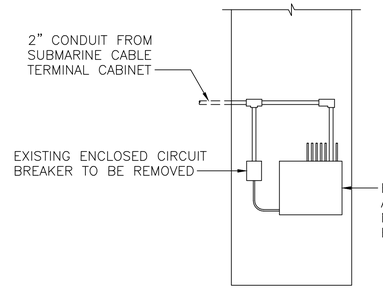
NOTE: NOT ALL FEATURES AND EQUPMENT SHOWN.



SECTION D–D

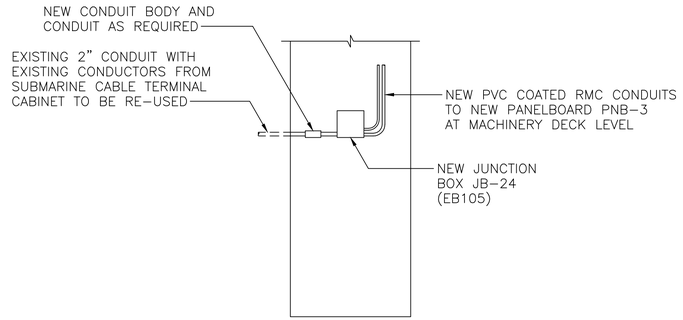
SCALE: 1/8" = 1'–0"

NOTE: NOT ALL FEATURES AND EQUPMENT SHOWN.



SECTION E–E – EXISTING

SCALE: 1/4" = 1'–0"



SECTION E–E – NEW

SCALE: 1/4" = 1'–0"

DEVICE LEGEND

- $\$_1$ SINGLE POLE SWITCH (EB113)
- $\$_3$ THREE WAY SWITCH (EB113)
- ¤ LUMINAIRE (TYPE AS INDICATED)
- ϕ_G GFCI RECEPTACLE (EB114)
- ⊗ LETTER INDICATES DEVICES ON A COMMON CIRCUIT

NOTES:

1. ALL ELECTRICAL ITEMS ARE NEW EXCEPT AS NOTED.
2. ALL LUMINAIRES ARE VAPORTIGHT INCANDESCENT TYPE (EB111) EXCEPT AS NOTED.
3. SEE SHEET EB3 FOR LOCATIONS OF SECTIONS C–C AND D–D.
3. SEE SHEET EB4 FOR DETAILS OF MACHINERY DECK.

0 1 2 3
INCHES ON FULL SIZE SHEET

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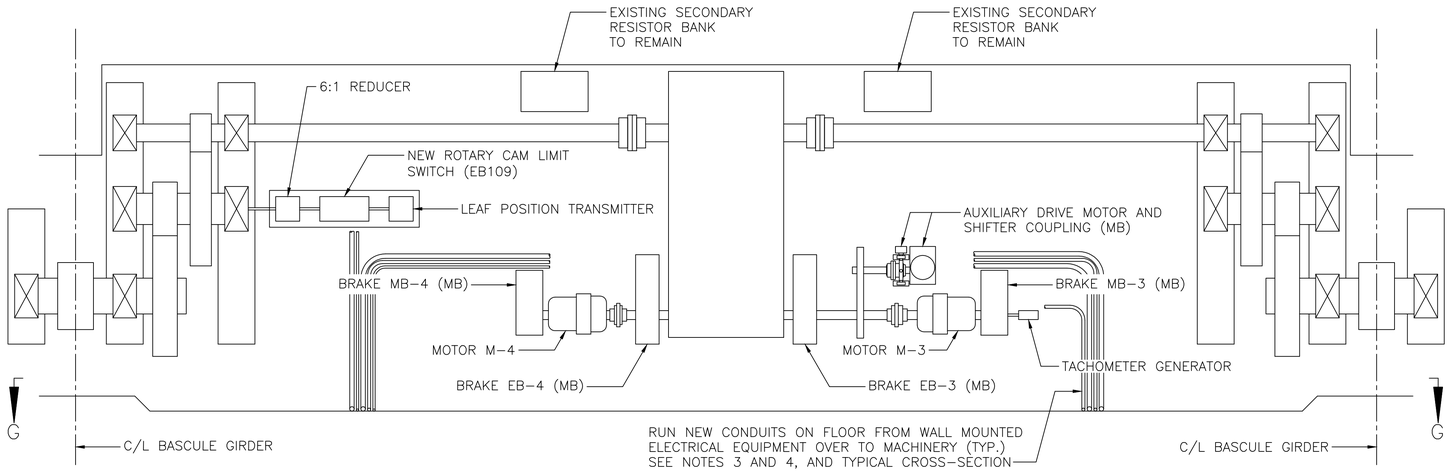
ELECTRICAL PLANS AND DETAILS – 2

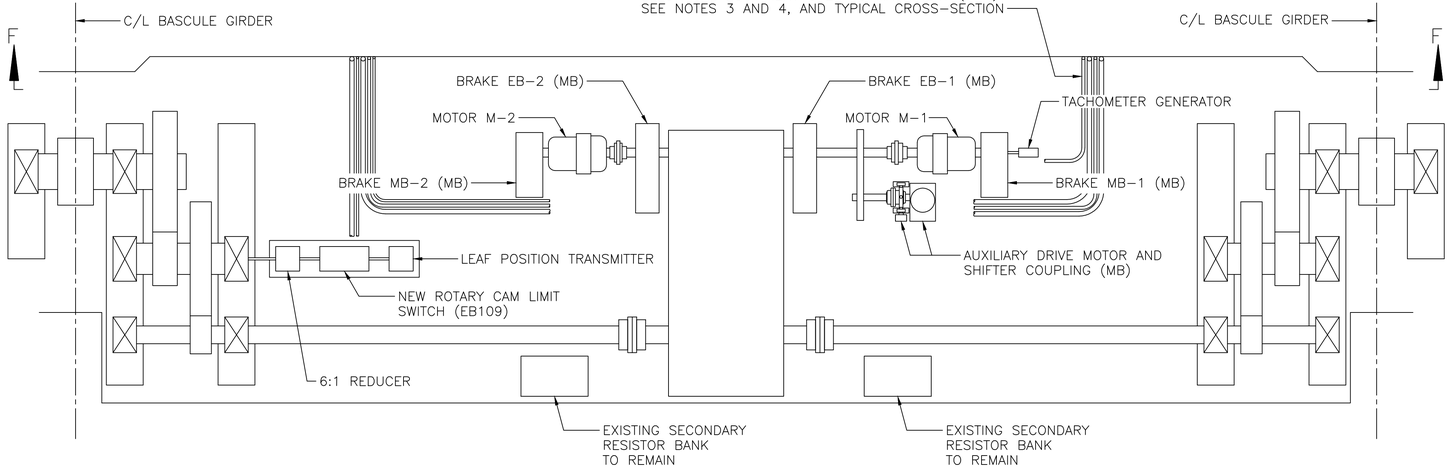
		DRAWN BY	N.E. ALGER
		SCALE	AS NOTED
EB4	DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE MARCH 2011
	CHECKED Q.C. TON	CHECKED Q.C. TON	DRAWING NO. 30 OF 63

30-EB4-EP02.DWG



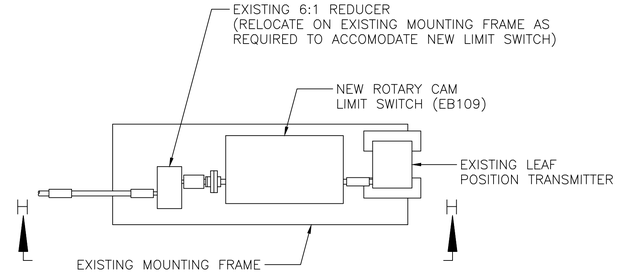
MACHINERY DECK ELECTRICAL LAYOUT – WEST BASCULE PIER (W1)

SCALE: 3/8" = 1'-0"



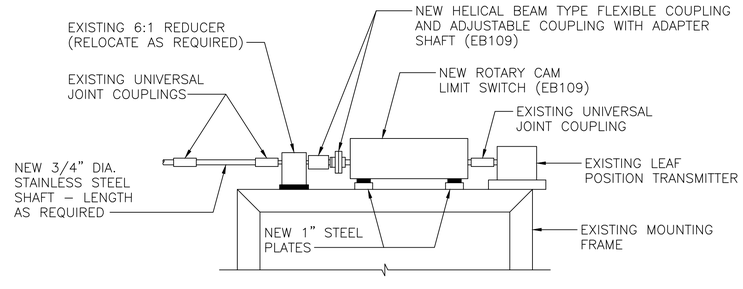
MACHINERY DECK ELECTRICAL LAYOUT – EAST BASCULE PIER (E1)

SCALE: 3/8" = 1'-0"



TYPICAL DETAIL – NEW ROTARY CAM LIMIT SWITCH

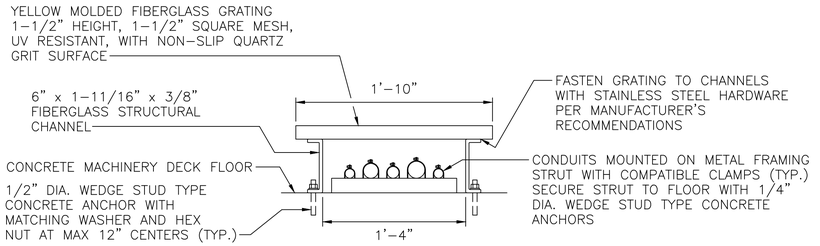
SCALE: NONE



SECTION H–H

SCALE: NONE

SHIM REDUCER AND NEW LIMIT SWITCH WITH STAINLESS STEEL SHIMS AS REQUIRED FOR PROPER ALIGNMENT OF ALL COMPONENTS. MECHANICAL INSTALLATION AND ALIGNMENT OF ALL COMPONENTS SHALL BE BY PROPERLY QUALIFIED MACHINISTS.



TYPICAL CROSS–SECTION – CONDUITS ON FLOOR

SCALE: 1-1/2" = 1'-0"

FIBERGLASS GRATING AND CHANNEL SHALL BE AS MANUFACTURED BY MCNICHOLS COMPANY (TAMPA, FL), OR APPROVED EQUAL. METAL FRAMING STRUT AND CONDUIT CLAMPS SHALL BE TYPE 316 STAINLESS STEEL, SIMILAR TO COOPER B-LINE B22.

NOTES:

1. ITEMS MARKED WITH "EB" NUMBERS ARE NEW ELECTRICAL EQUIPMENT. ITEMS MARKED WITH (MB) ARE NEW MECHANICAL ITEMS; REFER TO THE MECHANICAL PLANS. ALL OTHER ITEMS ARE EXISITNG TO REMAIN.
2. SEE SHEET E6 FOR SECTIONS F–F AND G–G.
3. CONDUIT ARRANGEMENT SHOWN IS CONCEPTUAL; ACTUAL ARRANGEMENT SHALL BE DETERMINED BY THE CONTRACTOR. CONDUIT ROUTING SHALL GENERALLY BE AS SHOWN.
4. CONDUITS ON MACHINERY DECK FLOOR SHALL BE COVERED BY A NEW WALKWAY. SEE TYPICAL CROSS SECTION ON THIS SHEET.
5. CONCRETE ENCASED CONDUITS AT VARIOUS LOCATIONS ON THE MACHINERY DECK WHICH ARE TO BE ABANDONED DUE TO INSTALLATION OF NEW CONDUITS SHALL BE CUT–OFF FLUSH WITH THE CONCRETE AND CAPPED WITH NON–SHRINK GROUT.
6. ALL NEW RIGID CONDUITS AT MACHINERY DECK SHALL BE PVC COATED RMC; ALL NEW FLEXIBLE CONDUITS SHALL BE LFMC.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd MARCH 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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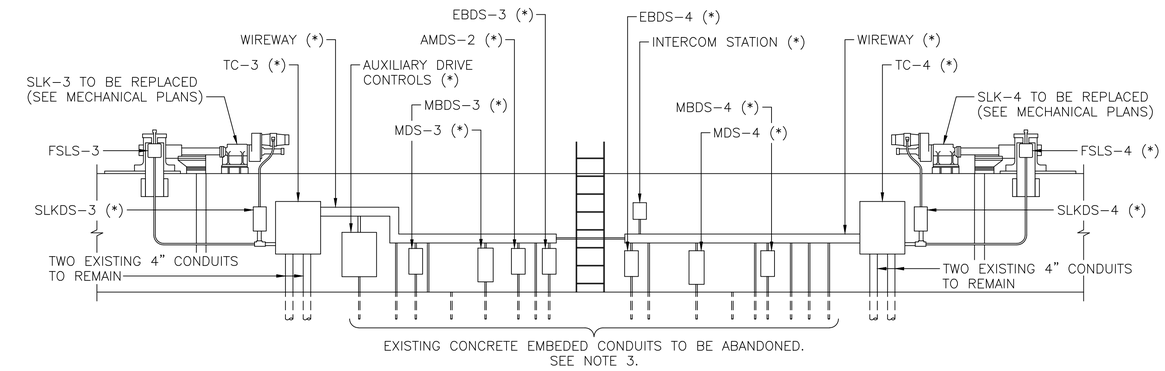
WILMINGTON, NORTH CAROLINA

ELECTRICAL PLANS AND DETAILS – 3

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE	MARCH 2011
CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO.	31 OF 63

EB5

31-EB5-EP03.DWG

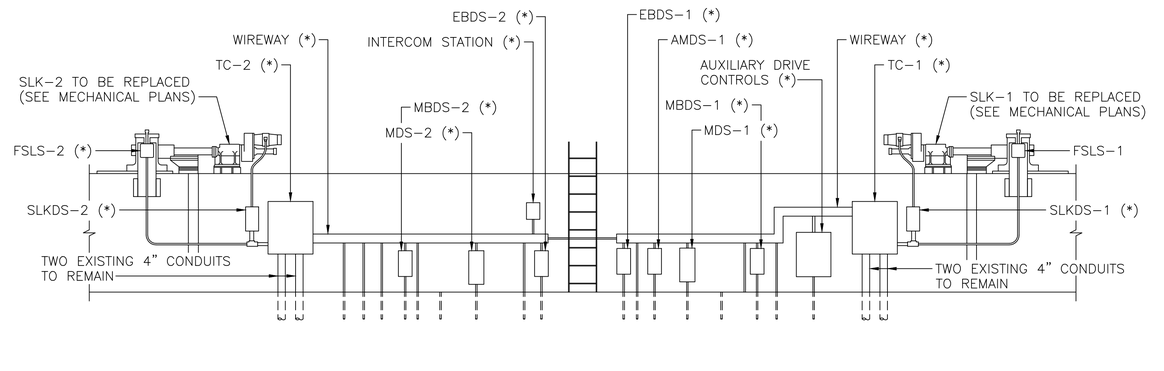


SECTION G–G – EXISTING

SCALE: 1/4" = 1'–0"

ITEMS MARKED WITH (*) ARE TO BE REMOVED. ALL CONDUITS SHOWN SHALL BE REMOVED, EXCEPT FOR THE EXISTING 4" CONDUITS ENTERING THE BOTTOM OF TERMINAL CABINETS TC–3 AND –4.

EXISTING LIGHTS AND RECEPTACLES TO BE REMOVED ARE NOT SHOWN.

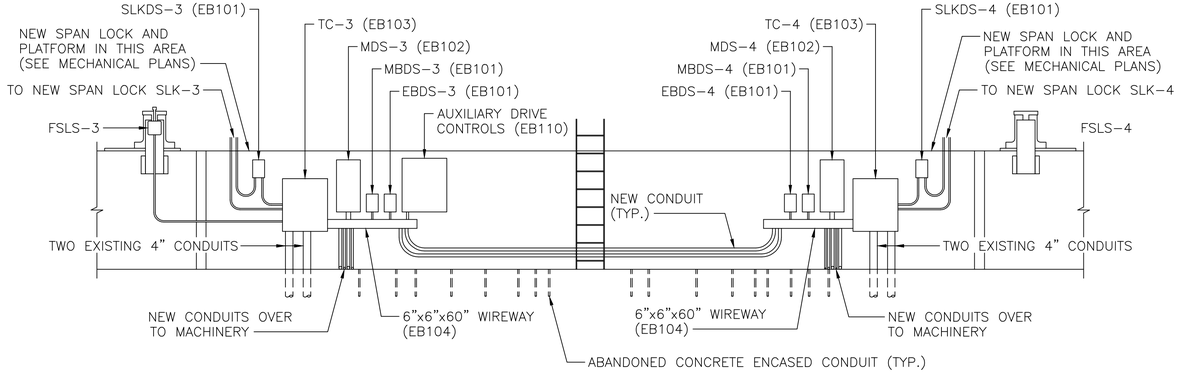


SECTION F–F – EXISTING

SCALE: 1/4" = 1'–0"

ITEMS MARKED WITH (*) ARE TO BE REMOVED. ALL CONDUITS SHOWN SHALL BE REMOVED, EXCEPT FOR THE EXISTING 4" CONDUITS ENTERING THE BOTTOM OF TERMINAL CABINETS TC–1 AND –2.

EXISTING LIGHTS AND RECEPTACLES TO BE REMOVED ARE NOT SHOWN.

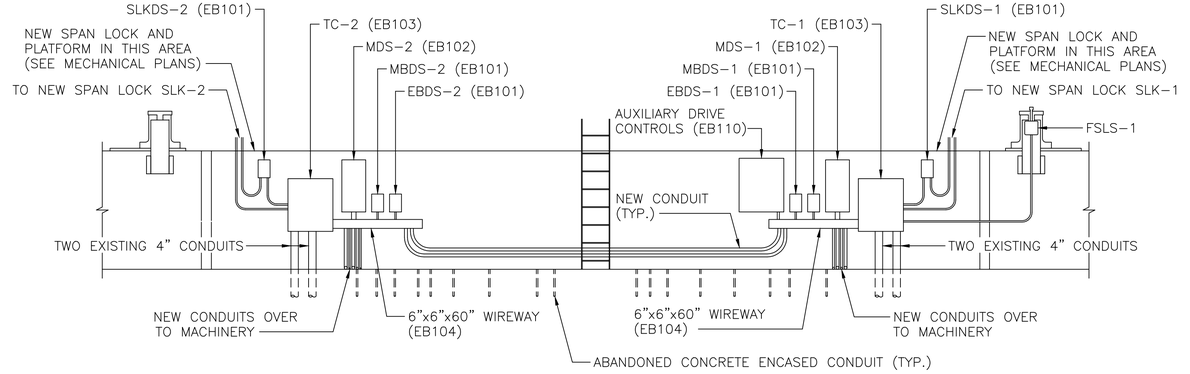


SECTION G–G – NEW

SCALE: 1/4" = 1'–0"

ITEMS MARKED WITH "EB" NUMBERS ARE NEW ELECTRICAL EQUIPMENT. ITEMS MARKED WITH (MB) ARE MECHANICAL ITEMS; REFER TO THE MECHANICAL PLANS. ALL OTHER ITEMS ARE EXISTING TO REMAIN. ALL CONDUITS ARE NEW, EXCEPT AS NOTED.

NEW LIGHTS AND RECEPTACLES ARE NOT SHOWN.



SECTION F–F – NEW

SCALE: 1/4" = 1'–0"

ITEMS MARKED WITH "EB" NUMBERS ARE NEW ELECTRICAL EQUIPMENT. ITEMS MARKED WITH (MB) ARE MECHANICAL ITEMS; REFER TO THE MECHANICAL PLANS. ALL OTHER ITEMS ARE EXISTING TO REMAIN. ALL CONDUITS ARE NEW, EXCEPT AS NOTED.

NEW LIGHTS AND RECEPTACLES ARE NOT SHOWN.

NOTES:

1. SEE SHEET EB5 FOR LOCATIONS OF SECTIONS F–F AND G–G.
2. ARRANGEMENTS OF NEW ELECTRICAL EQUIPMENT AND CONDUITS SHOWN ARE CONCEPTUAL; ACTUAL ARRANGEMENTS SHALL BE DETERMINED BY THE CONTRACTOR.
3. CONCRETE ENCASED CONDUITS WHICH ARE TO BE ABANDONED SHALL BE CUT–OFF FLUSH WITH THE CONCRETE AND CAPPED WITH NON–SHRINK GROUT.
4. ALL NEW RIGID CONDUITS AT MACHINERY DECK SHALL BE PVC COATED RMC; ALL NEW FLEXIBLE CONDUITS SHALL BE LFMC.
5. SEE SHEET EB19 FOR DEVICE DESIGNATIONS.

0 1 2 3
INCHES ON FULL SIZE SHEET

3RD NOV 2011
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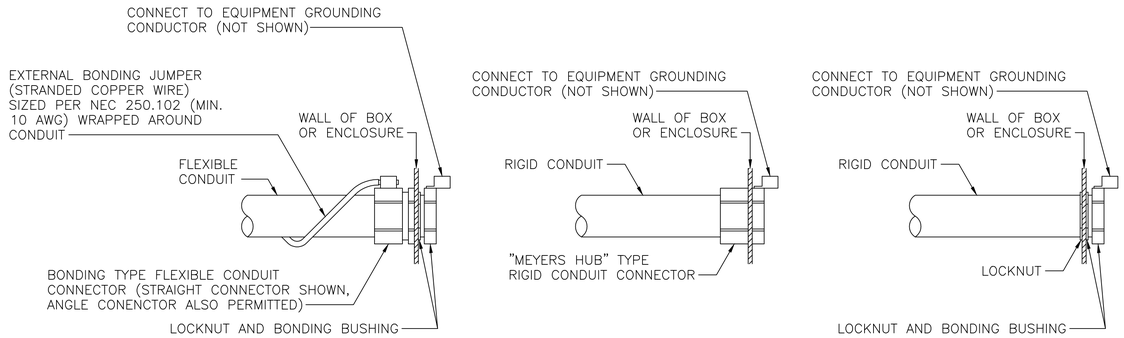
WILMINGTON, NORTH CAROLINA

ELECTRICAL PLANS AND DETAILS – 4

EB6

		DRAWN BY	N.E. ALGER
		SCALE	AS NOTED
DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE	MARCH 2011
CHECKED Q.C. TON	CHECKED Q.C. TON	DRAWING NO.	32 OF 63

32-EB6-EPD4.DWG



FLEXIBLE CONDUIT (ALL LOCATIONS)

RIGID CONDUIT (DAMP OF WET LOCATIONS)

RIGID CONDUIT (DRY LOCATIONS)

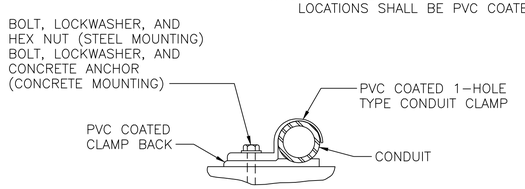
TYPICAL DETAILS – CONDUIT TERMINATIONS

SCALE: NONE

TERMINATIONS SHOWN ARE FOR BOXES OR ENCLOSURES WITHOUT INTEGRAL THREADED HUBS. TERMINATIONS FOR BOXES OR ENCLOSURES WITH INTEGRAL THREADED HUBS ARE SIMILAR, BUT WITHOUT LOCKNUTS, BONDING BUSHINGS, OR "MEYERS HUBS".

TERMINATIONS SHOWN ARE FOR TYPE RMC OR LFMC CONDUIT. TERMINATIONS FOR TYPE RNC OR LFNC ARE SIMLAR, BUT WITHOUT BONDING FITTINGS OR BUSHINGS.

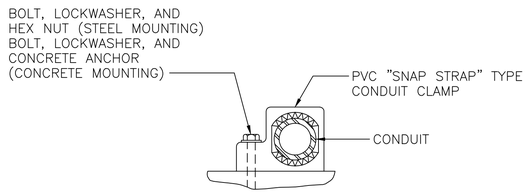
FITTINGS FOR USE WITH PVC COATED RMC CONDUIT SHALL BE PVC COATED. FITTINGS FOR USE WITH LFMC CONDUIT IN WET LOCATIONS SHALL BE PVC COATED. FITTINGS FOR USE WITH RNC OR LFNC CONDUIT SHALL BE NON–METALLIC.



TYPICAL DETAL – CONDUIT CLAMP FOR TYPE RMC & LFMC CONDUIT

SCALE: NONE

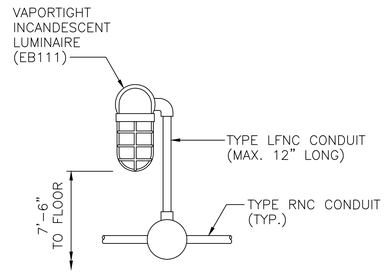
ALL MOUNTING HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.



TYPICAL DETAIL – CONDUIT CLAMP FOR TYPE RNC & LFNC CONDUIT

SCALE: NONE

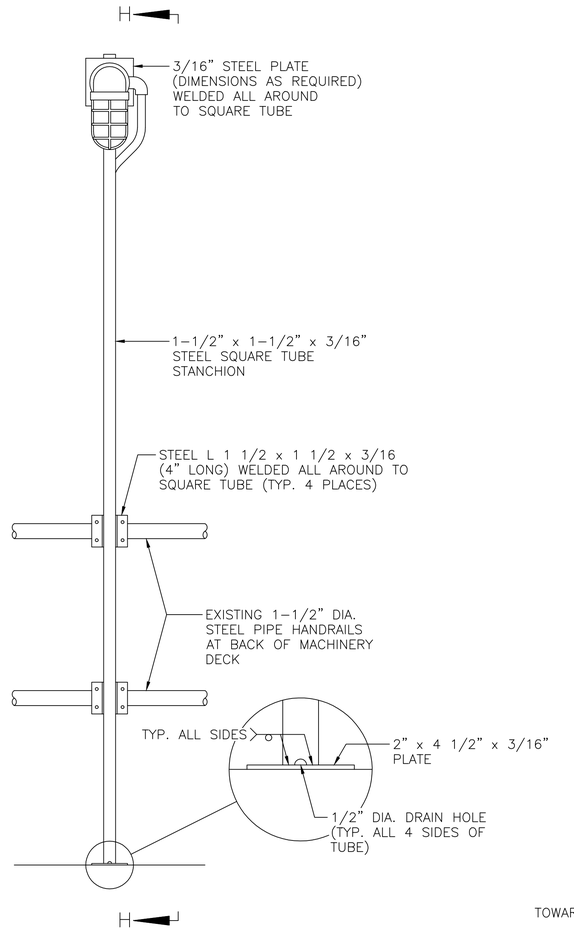
ALL MOUNTING HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.



TYPICAL DETAIL – WALL MOUNTED LUMINAIRE

SCALE: NONE

ALL MOUNTING HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.

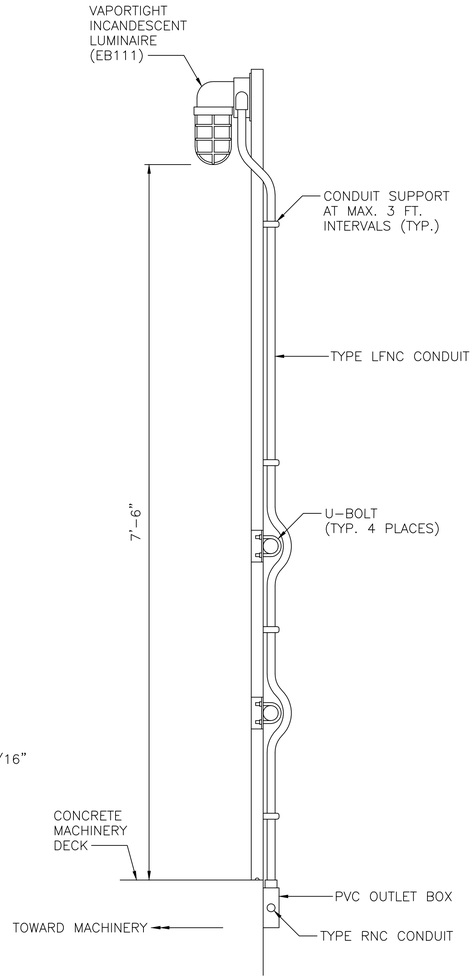


TYPICAL DETAIL – MACHINERY PLATFORM STANCHION MOUNTED LUMINAIRE

SCALE: NONE

COMPLETE STANCHION ASSEMBLY, INCLUDING PLATES AND ANGLES, SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION.

SQUARE TUBE, PLATE, AND ANGLES SHALL BE TYPE A36, OR EQUIVALENT, STEEL.



SECTION H–H

SCALE: NONE

U–BOLTS AND LUMINAIRE MOUNTING HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.

NOTES:

1. OBTAIN PERMISSION FROM THE ENGINEER PRIOR TO DRILLING OR CUTTING ANY STRUCTURAL ELEMENT.

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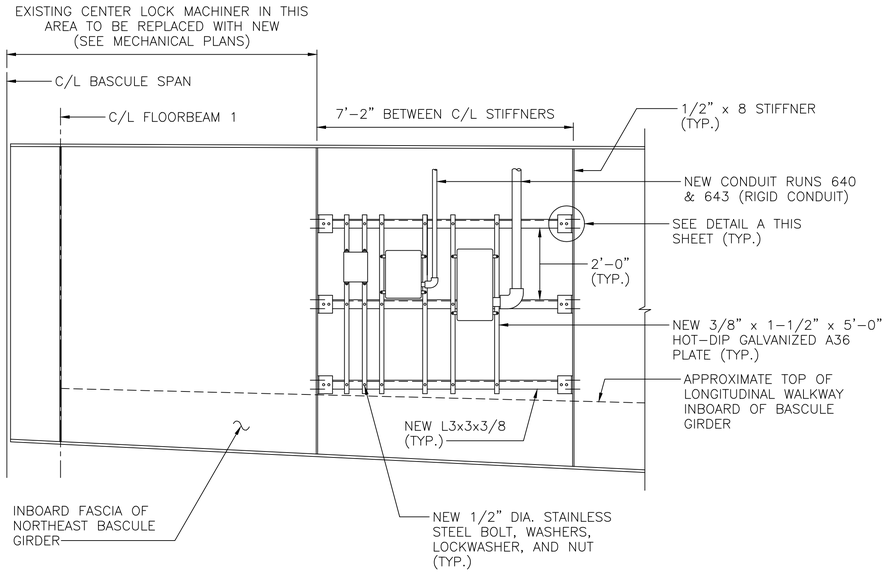
WILMINGTON, NORTH CAROLINA

ELECTRICAL PLANS AND DETAILS – 5

EB7

		DRAWN BY	N.E. ALGER
		SCALE	AS NOTED
DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE	MARCH 2011
CHECKED Q.C. TON	CHECKED Q.C. TON	DRAWING NO.	33 OF 63

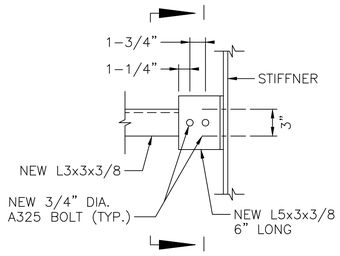
33–EB7–EP05.DWG



ELEVATION – CENTER LOCK ELECTRICAL EQUIPMENT

SCALE: 1/2" = 1'-0"

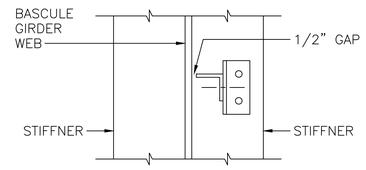
EQUIPMENT AT NORTHEAST BASCULE GIRDER SHOWN. EQUIPMENT AT SOUTHEAST BASCULE GIRDER SIMILAR, BUT OPPOSITE HAND.
NOT ALL CONDUITS SHOWN. EXCEPT AS NOTED, ALL CONDUIT CONNECTIONS BETWEEN BOXES, ENCLOSURES, AND EQUIPMENT SHOWN IN THIS VIEW SHALL UTILIZE TYPE LFMC CONDUIT.
ACTUAL ARRANGEMENT OF EQUIPMENT AND CONDUITS TO BE DETERMINED BY THE CONTRACTOR.



DETAIL A

SCALE: 1-1/2" = 1'-0"

ALL HOLES IN ANGLES FOR A325 BOLTS SHALL BE SHOP DRILLED.

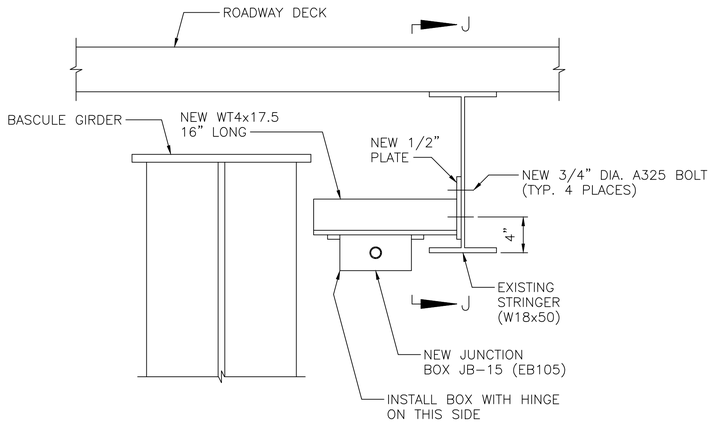


SECTION I-I

SCALE: 1-1/2" = 1'-0"

NOTES:

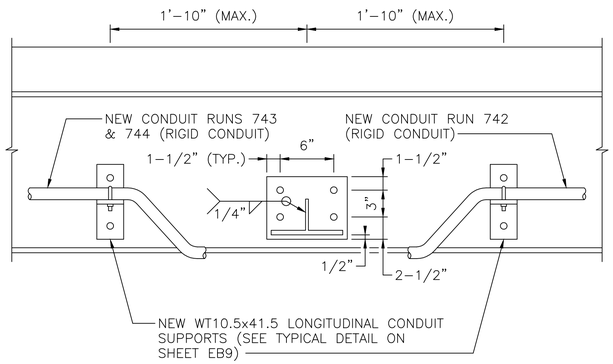
1. PRIOR TO STARTING WORK, THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS OF THE EXISTING STRUCTURE.
2. ALL WORK RELATED TO THE INSTALLATION OF NEW STRUCTURAL STEEL ELEMENTS (ANGLES, TEES, PLATES, ETC.) SHOWN ON THIS SHEET SHALL CONFORM TO THE REQUIREMENTS OF SECTION 440 (STEEL STRUCTURES) OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, AND BE PERFORMED BY QUALIFIED IRONWORKERS. ALL STRUCTURAL ELEMENTS SHALL BE SHOP AND FIELD PAINTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 442 (PAINTING STEEL STRUCTURES), EXCEPT WHERE HOT-DIP GALVANIZED.
3. UNLESS OTHERWISE NOTED, ALL STEEL PLATES AND SHAPES SHOWN ON THIS SHEET SHALL CONFORM TO ASTM A709, GRADE 50W. ASTM A588 MAY BE SUBSTITUTED FOR A709, GRADE 50W WITH THE APPROVAL OF THE ENGINEER AND AT NO ADDITIONAL COST TO THE DEPARTMENT. CVN TESTING IS NOT REQUIRED.
4. WHERE A325 BOLTS ARE INDICATED, THEY SHALL BE TYPE 3, WITH A563 GRADE C3 HEAVY HEX NUTS AND F436, TYPE 3 HARDENED WASHERS. A325 BOLTS, NUTS, AND WASHERS SHALL BE HOT-DIP GALVANIZED.
5. WHERE STAINLESS STEEL BOLTS AND/OR OTHER HARDWARE IS INDICATED, THEY SHALL BE TYPE 316. ALL ELECTRICAL BOXES AND OTHER EQUIPMENT SHALL BE MOUNTED USING STAINLESS STEEL BOLTS, NUTS, WASHERS, AND LOCKWASHERS.
6. PRIOR TO FASTENING NEW STRUCTURAL ELEMENTS TO EXISTING BRIDGE STRUCTURAL ELEMENTS, CLEAN AND RE-PAINT THE AREA ON THE EXISTING STRUCTURE WHICH WILL BE IN CONTACT WITH THE NEW ELEMENT. CLEANING SHALL BE WITH POWER TOOLS TO SSPC SP11 TO REMOVE RUST AND POOR COATING. NEW PAINT SHALL BE A THICK EPOXY MASTIC TOPCOAT (CARBOMASTIC 15 AS MANUFACTURED BY CARBOLINE, OR APPROVED EQUAL). NOTE THAT THE EXISTING STRUCTURE PAINT SYSTEM MAY BE LEAD BASED.
7. ALL RIGID CONDUIT ON BASCULE SPAN SHALL BE PVC COATED TYPE RMC; ALL FLEXIBLE CONDUIT SHALL BE TYPE LFMC.



DETAIL – JB-15 MOUNTING

SCALE: 1-1/2" = 1'-0"

PLATE AND WT SHALL BE SHOP DRILLED FOR ALL REQUIRED HOLES (A325 BOLTS AND BOX MOUNTING BOLTS)



SECTION J-J

SCALE: 1-1/2" = 1'-0"

JUNCTION BOX NOT SHOWN FOR CLARITY.

0 1 2 3
INCHES ON FULL SIZE SHEET

34-EB8-EP06.DWG

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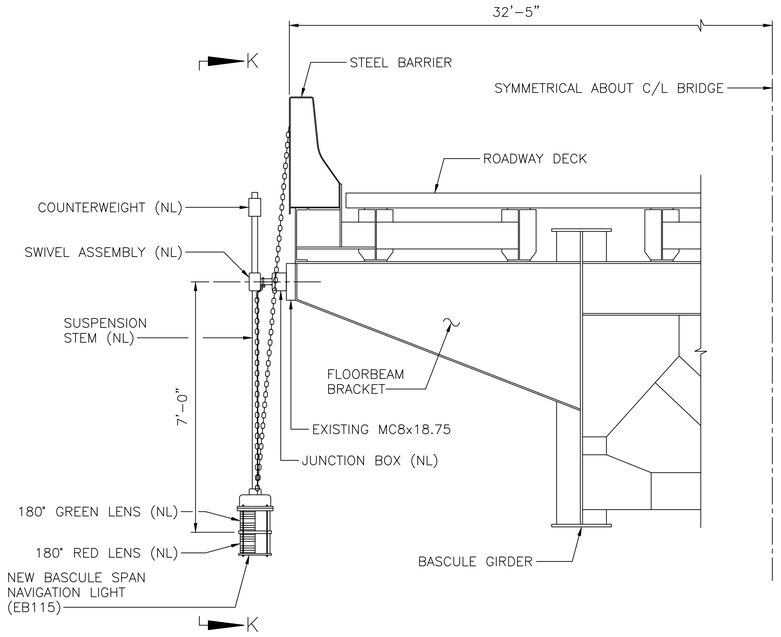
ELECTRICAL PLANS AND DETAILS – 6

EB8

		DRAWN BY	N.E. ALGER
		SCALE	AS NOTED
DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE	MARCH 2011
CHECKED Q.C. TON	CHECKED Q.C. TON	DRAWING NO.	34 OF 63

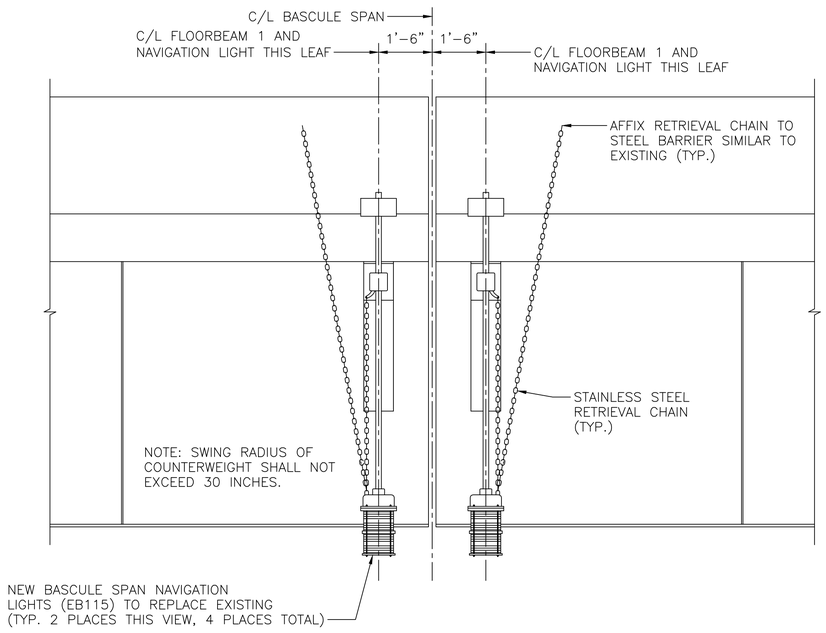


PARTIAL CROSS SECTION – BASCULE LEAF AT FLOORBEAM 1

SCALE: 1/2" = 1'-0"

VIEW IS LOOKING TOWARD CENTERLINE OF BASCULE SPAN. TYPICAL BOTH BASCULE LEAVES. CENTER LOCKS, CONDUITS, JUNCTION BOXES, WALKWAYS, AND SIMILAR ITEMS NOT SHOWN.

ITEMS MARKED (NL) SHALL BE SUPPLIED AS PART OF THE NEW NAVIGATION LIGHT.



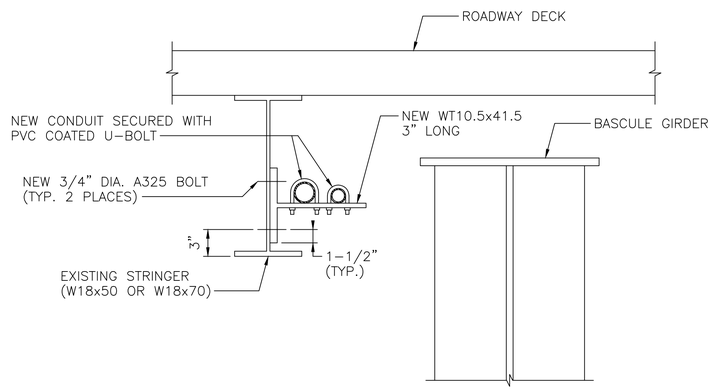
VIEW K–K

SCALE: 1/2" = 1'-0"

CONDUITS TO NAVIGATION LIGHTS NOT SHOWN.

NOTES:

1. NOTES 1 THRU 7 (INCLUSIVE) ON SHEET EB8 SHALL APPLY TO THIS SHEET ALSO.
2. CONTRACTOR SHALL PROVIDE TEMPORARY NAVIGATION LIGHTS AND ASSOCIATED WIRING AS REQUIRED TO MAINTAIN NAVIGATION LIGHTING OF THE BASCULE SPAN LEAVES DURING REPLACEMENT OF THE EXISTING NAVIGATION LIGHTS AND WIRING. SEE GENERAL NOTE 1.16 ON SHEET EB1.

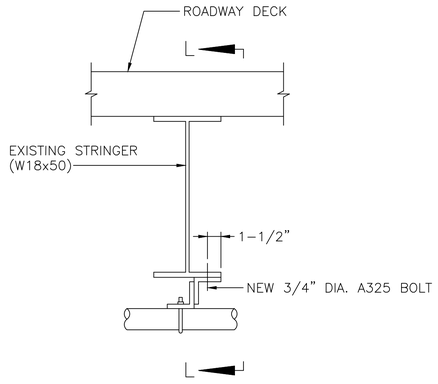


TYPICAL DETAIL – LONGITUDINAL BASCULE SPAN CONDUITS SUPPORT

SCALE: 1-1/2" = 1'-0"

ANGLES SHALL BE SHOP DRILLED FOR ALL REQUIRED HOLES (A325 BOLTS AND U-BOLTS).

INSTALL AT MAXIMUM 5 FOOT INVERVALS; APPROXIMATELY 50 LOCATIONS (CONTRACTOR TO FIELD DETERMINE EXACT REQUIRED QUANTITY).

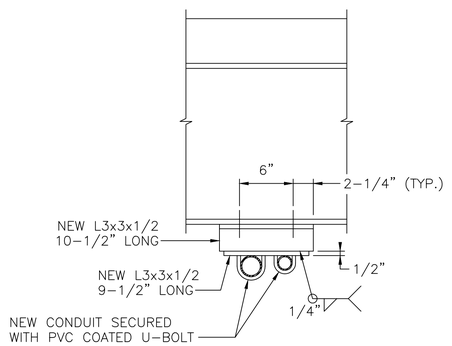


TYPICAL DETAIL – TRANSVERSE BASCULE SPAN CONDUITS SUPPORT

SCALE: 1-1/2" = 1'-0"

ANGLES SHALL BE SHOP DRILLED FOR ALL REQUIRED HOLES (A325 BOLTS AND U-BOLTS).

INSTALL AT EACH STRINGER; APPROXIMATELY 32 LOCATIONS (CONTRACTOR TO FIELD DETERMINE EXACT REQUIRED QUANTITY).



SECTION L–L

SCALE: 1-1/2" = 1'-0"

0 1 2 3
INCHES ON FULL SIZE SHEET

35-ENG-EP07.DWG

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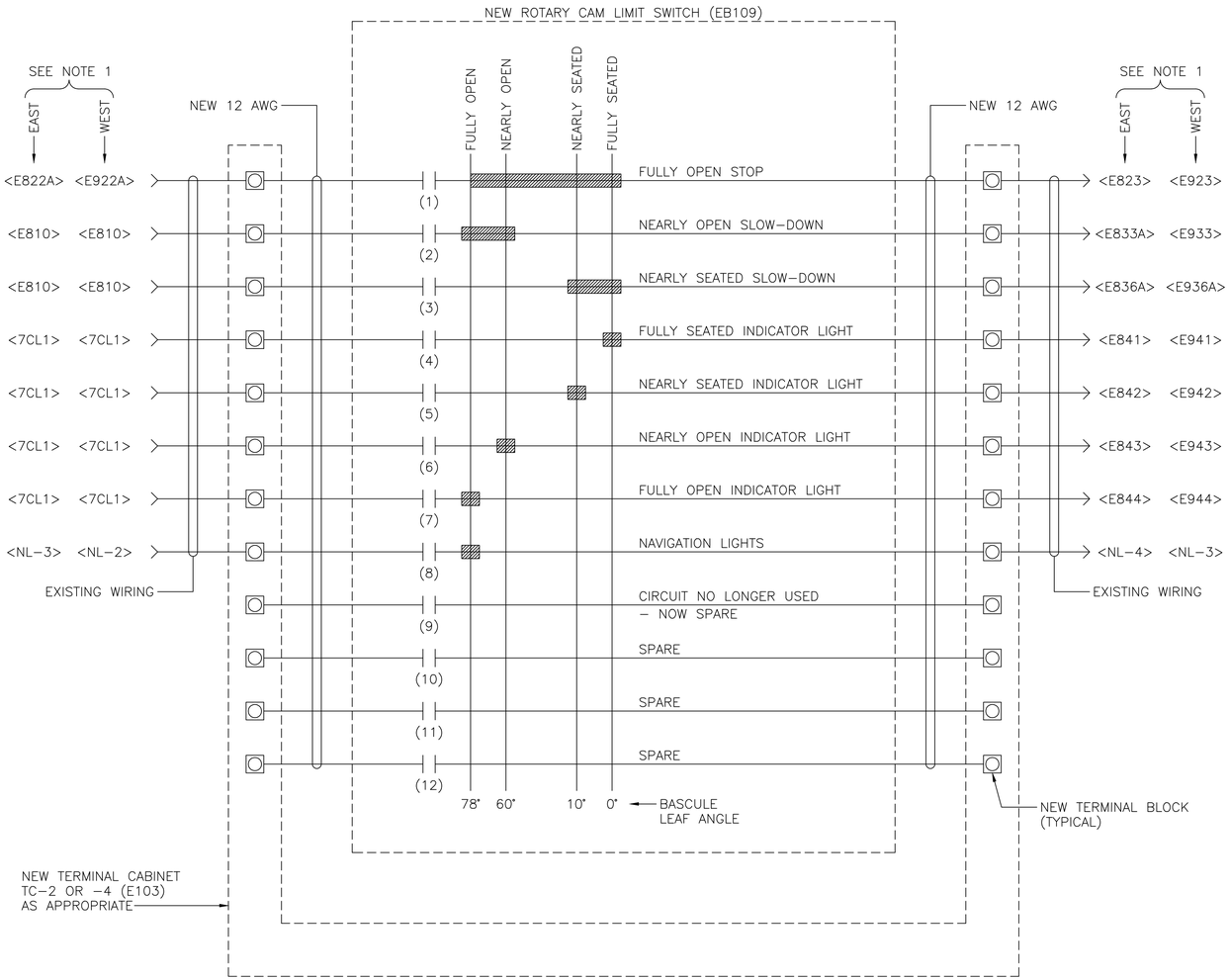
ELECTRICAL PLANS AND DETAILS – 7

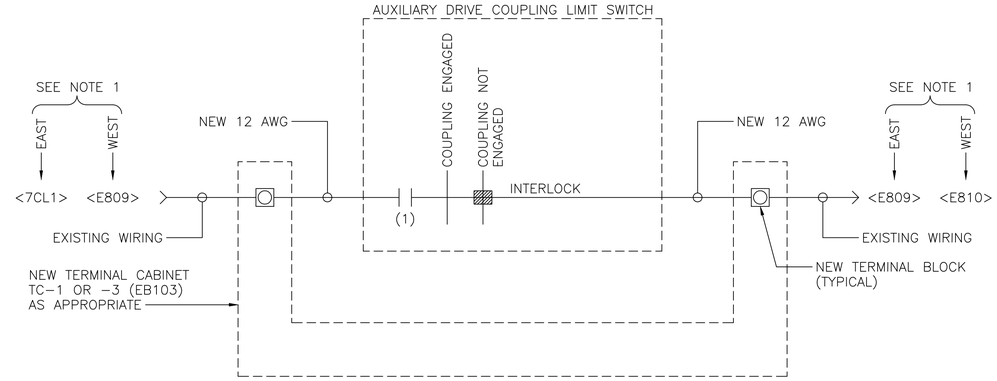
EB9

		DRAWN BY	N.E. ALGER
		SCALE	AS NOTED
DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE	MARCH 2011
CHECKED Q.C. TON	CHECKED Q.C. TON	DRAWING NO.	35 OF 63



TYPICAL WIRING – NEW ROTARY CAM LIMIT SWITCHES

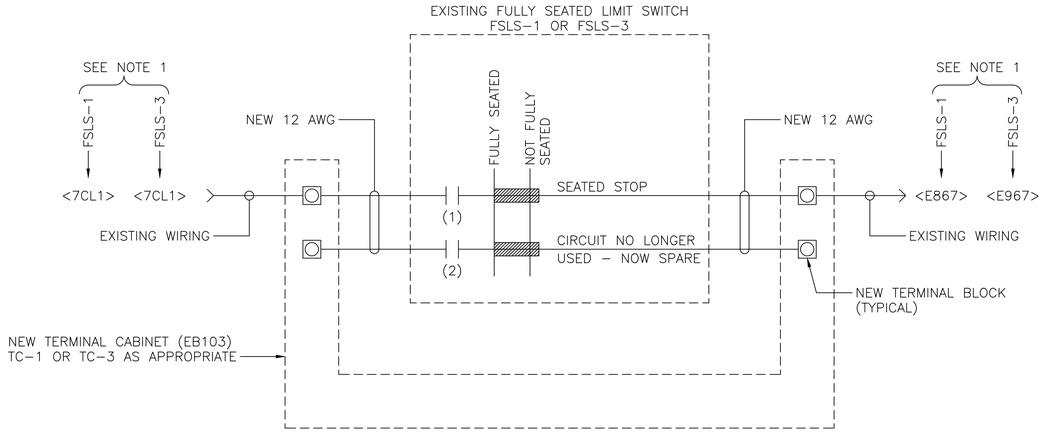
SCALE: NONE



TYPICAL WIRING – AUXILIARY DRIVE COUPLING LIMIT SWITCH

SCALE: NONE

LIMIT SWITCHES ARE PROVIDED WITH AUXILIARY DRIVE COUPLING ASSEMBLIES; SEE MECHANICAL PLANS.



TYPICAL WIRING – FULLY SEATED LIMIT SWITCHES

SCALE: NONE

ONLY LIMIT SWITCHES FSLS-1 AND FSLS-3 ARE TO REMAIN AND BE RE-WIRED; LIMIT SWITCHES FSLS-2 AND FSLS-4 ARE TO BE REMOVED.

NOTES:

1. NUMBERS IN ANGLE BRACKETS ARE EXISTING WIRE NUMBERS BASED ON WESTINGHOUSE ELECTRICAL SYSTEM SHOP DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY NUMBERING BEFORE PROCEEDING WITH ANY RELATED WORK.
2. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.

0 1 2 3
INCHES ON FULL SIZE SHEET

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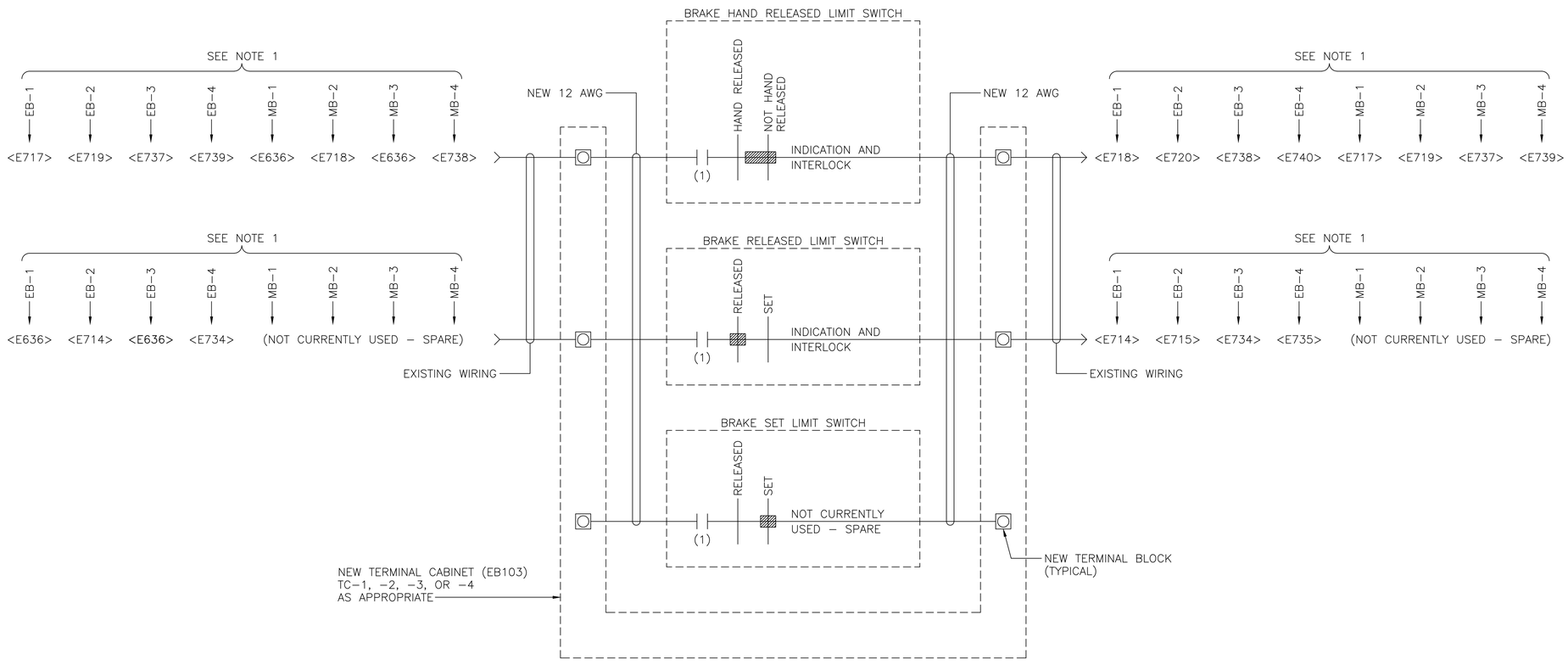
ELECTRICAL SCHEMATICS – 1

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
EB10	DESIGNED N.E. ALGER	DETAILED N.E. ALGER		DATE	MARCH 2011
	CHECKED Q.C. TON	CHECKED Q.C. TON		DRAWING NO.	36 OF 63

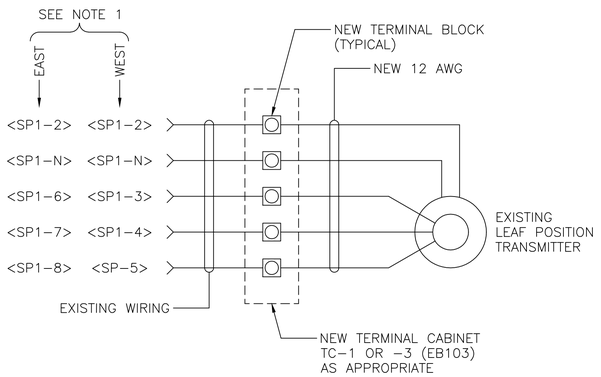
36-EB10-ES1.DWG



TYPICAL WIRING – BRAKE LIMIT SWITCHES

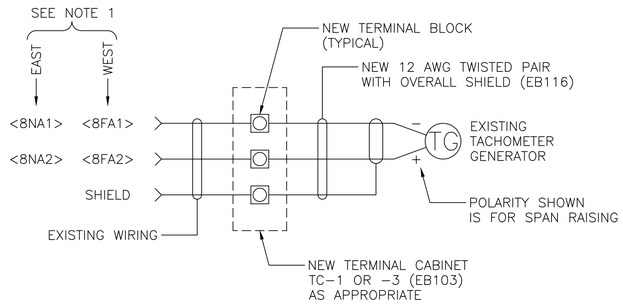
SCALE: NONE

LIMIT SWITCHES ARE PROVIDED WITH BRAKES; SEE MECHANICAL PLANS.



TYPICAL WIRING – LEAF POSITION TRANSMITTERS

SCALE: NONE



TYPICAL WIRING – TACHOMETERS

SCALE: NONE

NOTES:

1. NUMBERS IN ANGLE BRACKETS ARE EXISTING WIRE NUMBERS BASED ON WESTINGHOUSE ELECTRICAL SYSTEM SHOP DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY NUMBERING BEFORE PROCEEDING WITH ANY RELATED WORK.
2. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.

0 1 2 3
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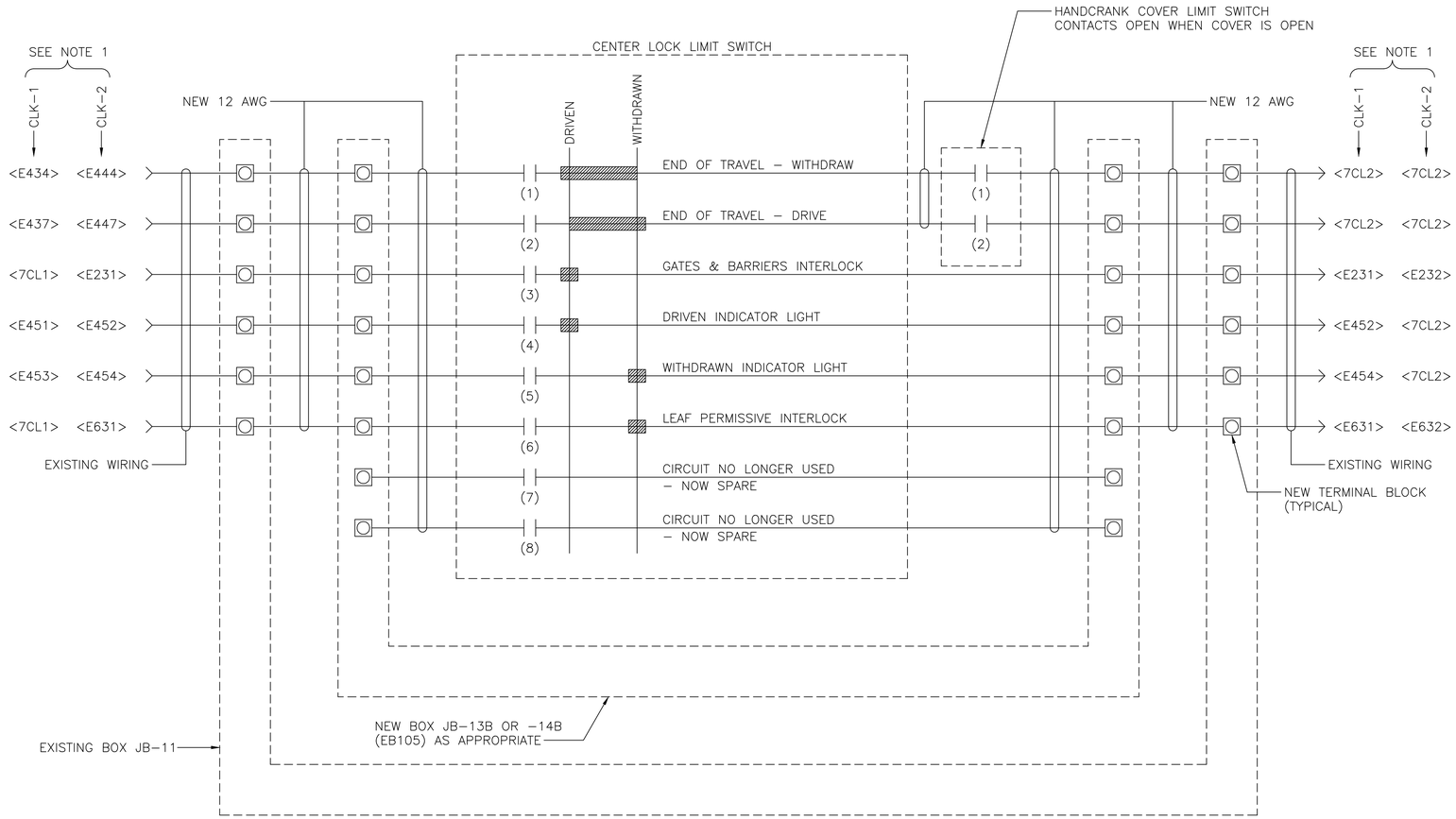
ELECTRICAL SCHEMATICS – 2

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
EB11	DESIGNED N.E. ALGER	DETAILED N.E. ALGER		DATE	MARCH 2011
	CHECKED Q.C. TON	CHECKED Q.C. TON		DRAWING NO.	37 OF 63

37-EB11-ES2.DWG



TYPICAL WIRING – CENTER LOCK LIMIT SWITCHES

SCALE: NONE

LIMIT SWITCHES ARE PROVIDED WITH CENTER LOCK ASSEMBLIES; SEE MECHANICAL PLANS.

NOTES:

1. NUMBERS IN ANGLE BRACKETS ARE EXISTING WIRE NUMBERS BASED ON WESTINGHOUSE ELECTRICAL SYSTEM SHOP DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY NUMBERING BEFORE PROCEEDING WITH ANY RELATED WORK.
2. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.

0 1 2 3
INCHES ON FULL SIZE SHEET

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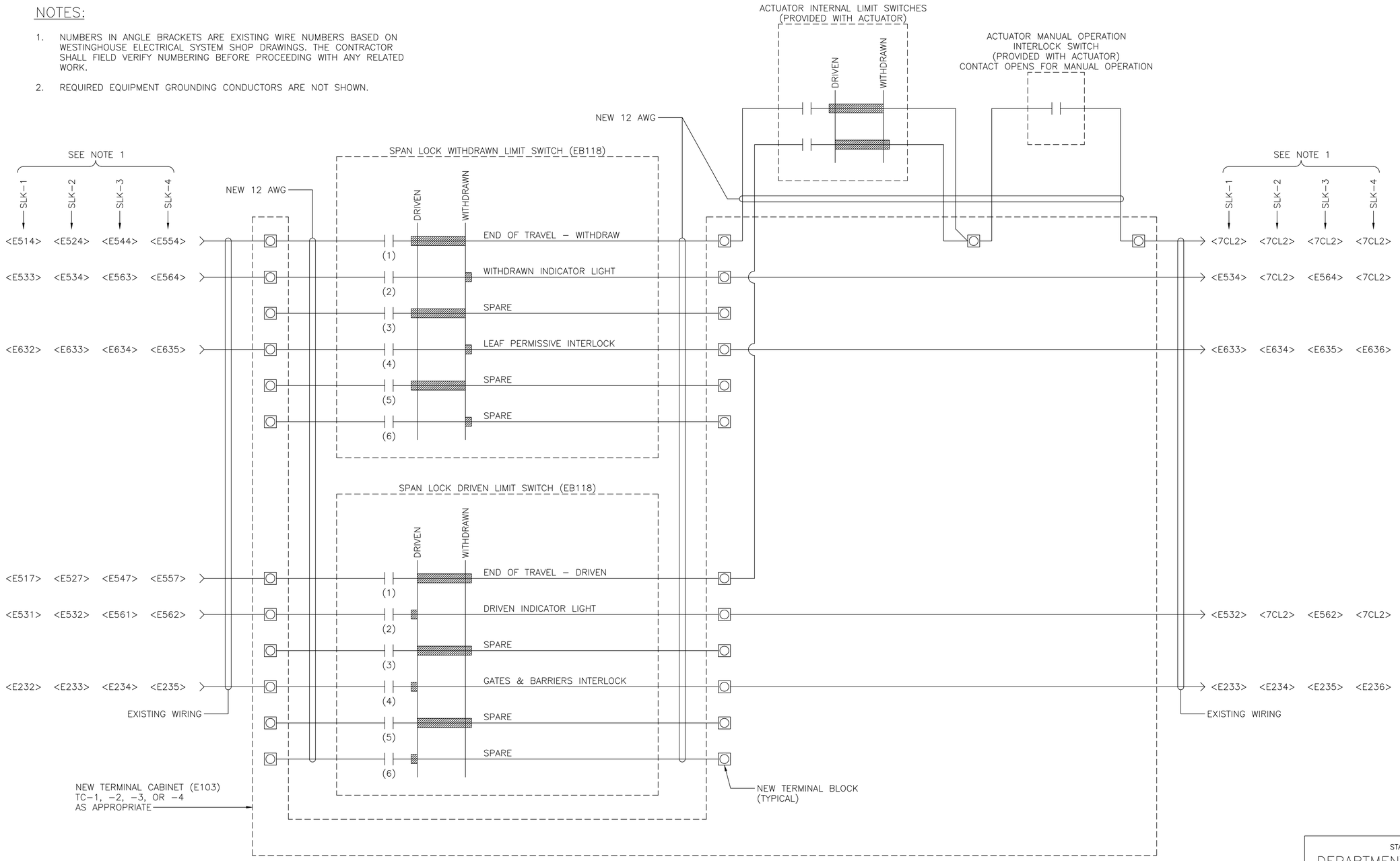
ELECTRICAL SCHEMATICS – 3

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
EB12	DESIGNED N.E. ALGER	DETAILED N.E. ALGER		DATE	MARCH 2011
	CHECKED Q.C. TON	CHECKED Q.C. TON		DRAWING NO.	38 OF 63

38-EB12-ES3.DWG

NOTES:

1. NUMBERS IN ANGLE BRACKETS ARE EXISTING WIRE NUMBERS BASED ON WESTINGHOUSE ELECTRICAL SYSTEM SHOP DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY NUMBERING BEFORE PROCEEDING WITH ANY RELATED WORK.
2. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.



TYPICAL WIRING – SPAN LOCK LIMIT SWITCHES

SCALE: NONE

0 1 2 3
INCHES ON FULL SIZE SHEET

39-EB13-ES4.DWG

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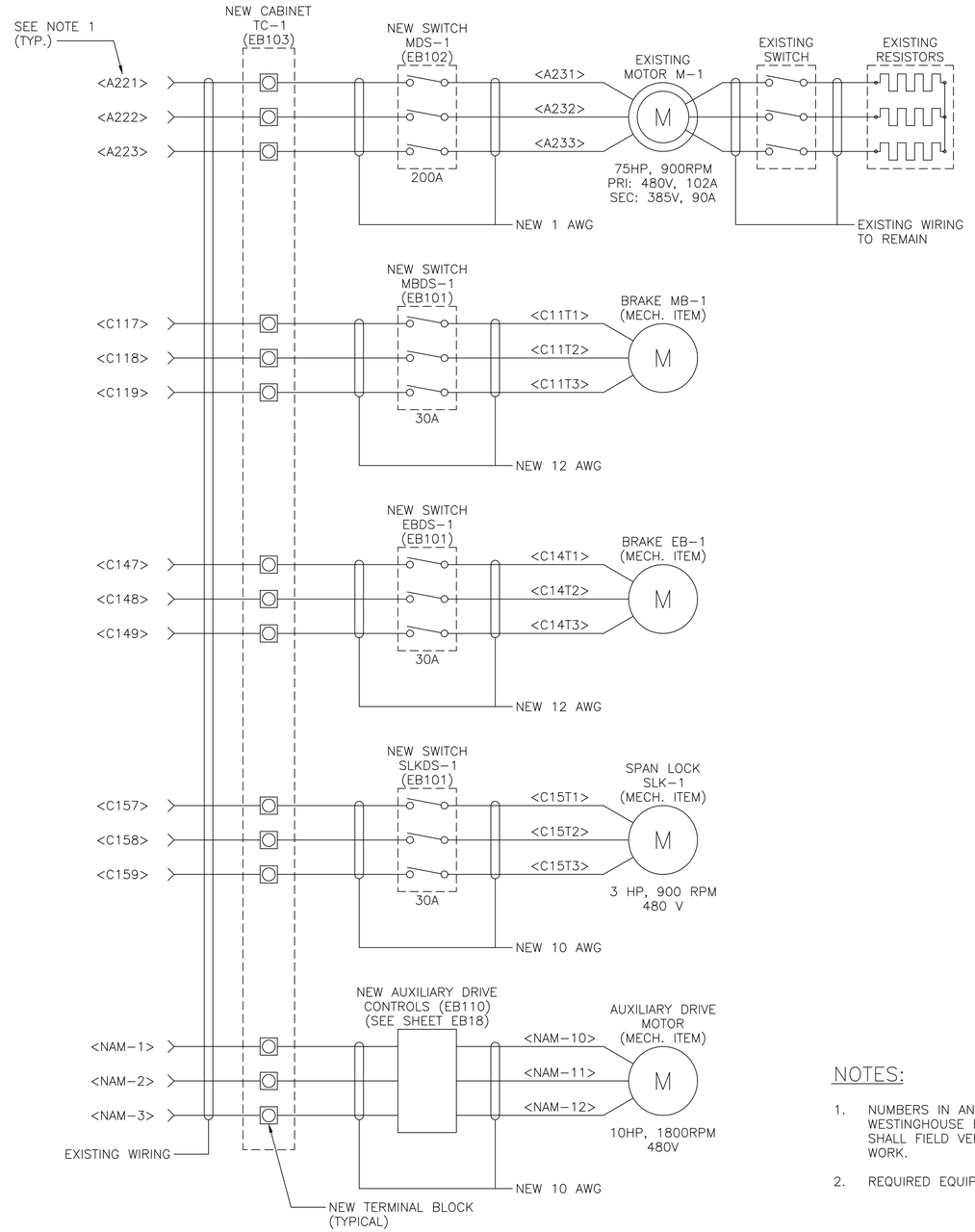
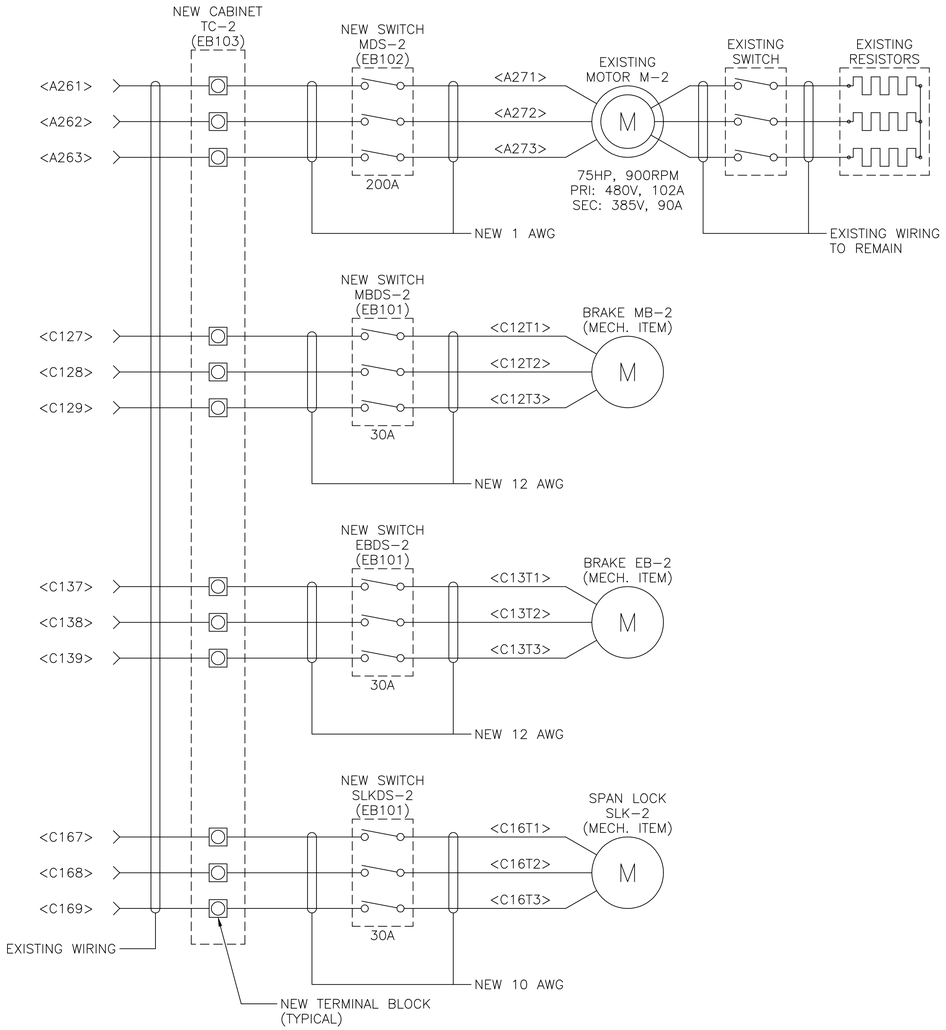
ELECTRICAL SCHEMATICS – 4

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
EB13	DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE MARCH 2011
	CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO. 39 OF 63





NOTES:

1. NUMBERS IN ANGLE BRACKETS ARE EXISTING WIRE NUMBERS BASED ON WESTINGHOUSE ELECTRICAL SYSTEM SHOP DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY NUMBERING BEFORE PROCEEDING WITH ANY RELATED WORK.
2. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.

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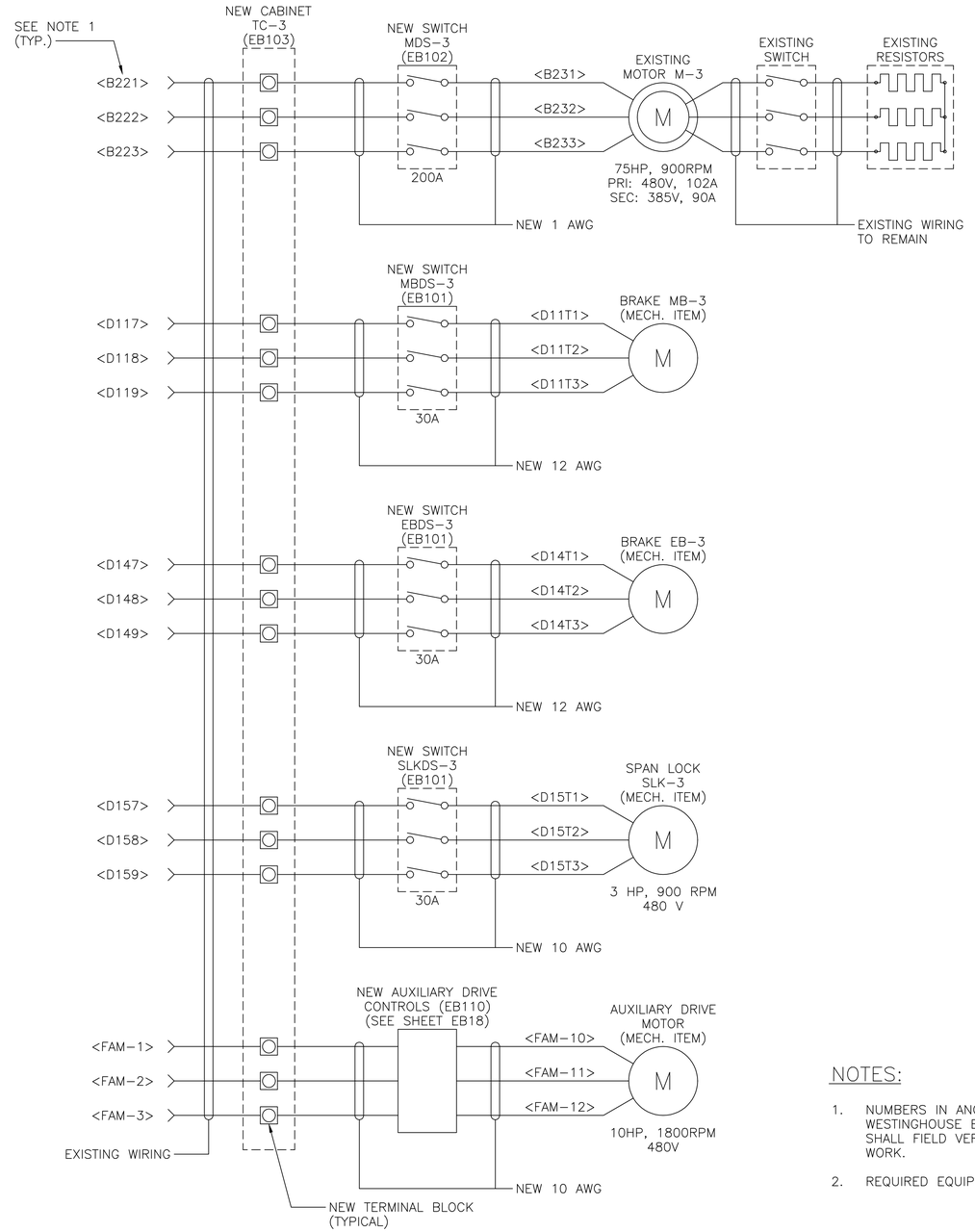
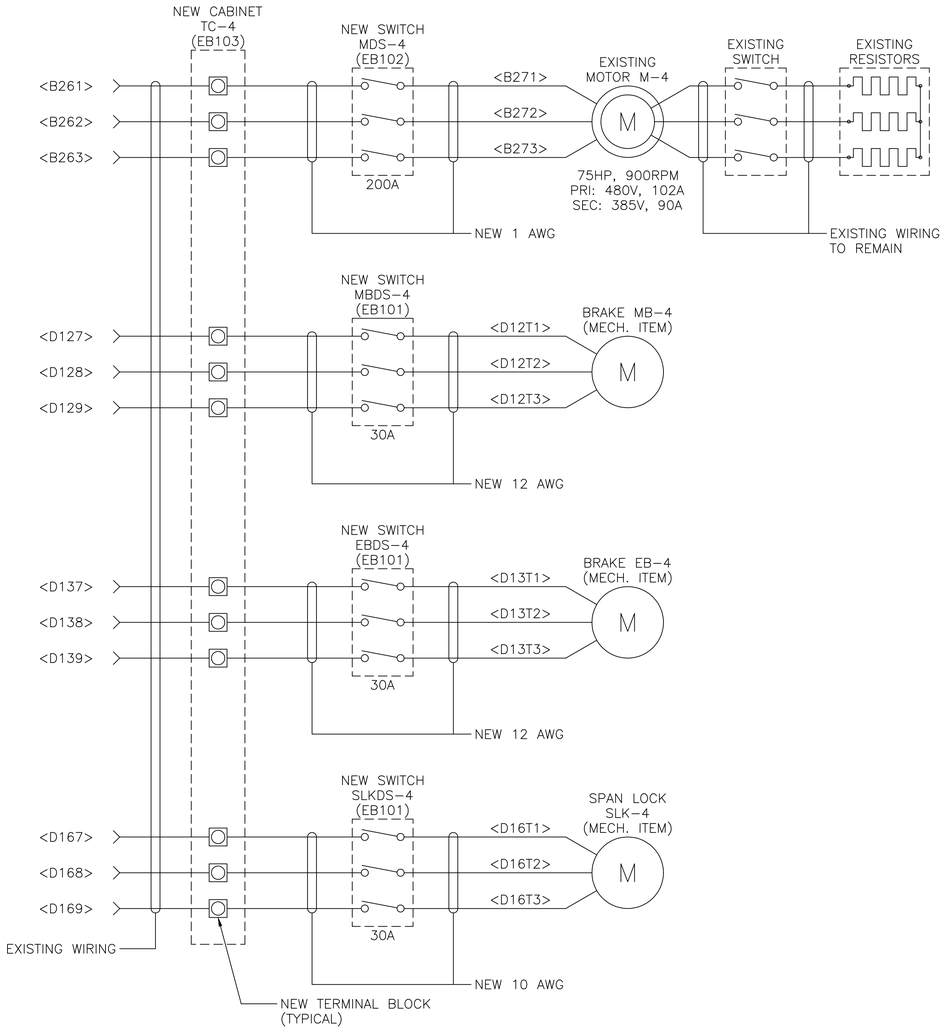
ELECTRICAL SCHEMATICS – 5

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
EB14	DESIGNED N.E. ALGER	DETAILED N.E. ALGER		DATE	MARCH 2011
	CHECKED Q.C. TON	CHECKED Q.C. TON		DRAWING NO.	40 OF 63

40-EB14-ES5.DWG





NOTES:

1. NUMBERS IN ANGLE BRACKETS ARE EXISTING WIRE NUMBERS BASED ON WESTINGHOUSE ELECTRICAL SYSTEM SHOP DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY NUMBERING BEFORE PROCEEDING WITH ANY RELATED WORK.
2. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.

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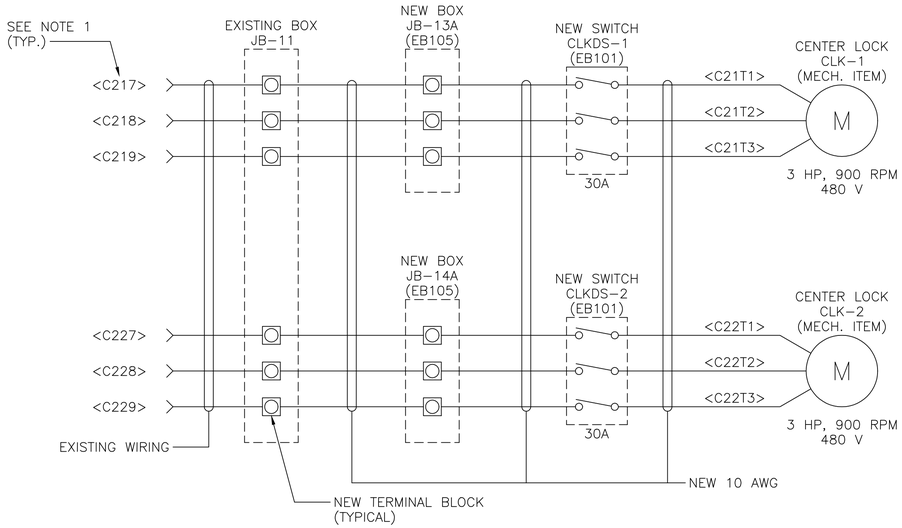
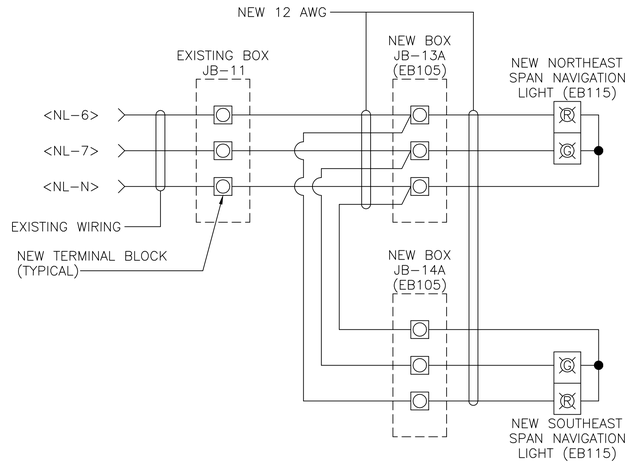
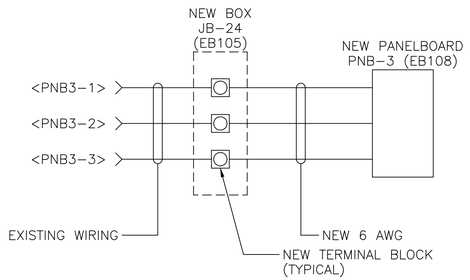
ELECTRICAL SCHEMATICS – 6

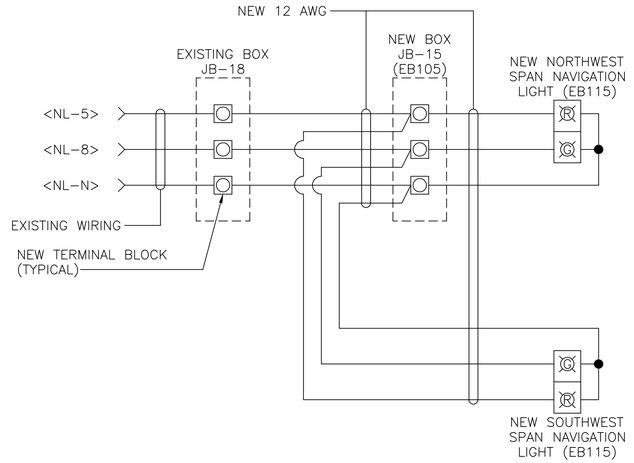
				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
EB15	DESIGNED N.E. ALGER	DETAILED N.E. ALGER		DATE	MARCH 2011
	CHECKED Q.C. TON	CHECKED Q.C. TON		DRAWING NO.	41 OF 63

41-EB15-ES6.DWG









NOTES:

1. NUMBERS IN ANGLE BRACKETS ARE EXISTING WIRE NUMBERS BASED ON WESTINGHOUSE ELECTRICAL SYSTEM SHOP DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY NUMBERING BEFORE PROCEEDING WITH ANY RELATED WORK.
2. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.

0 1 2 3
INCHES ON FULL SIZE SHEET

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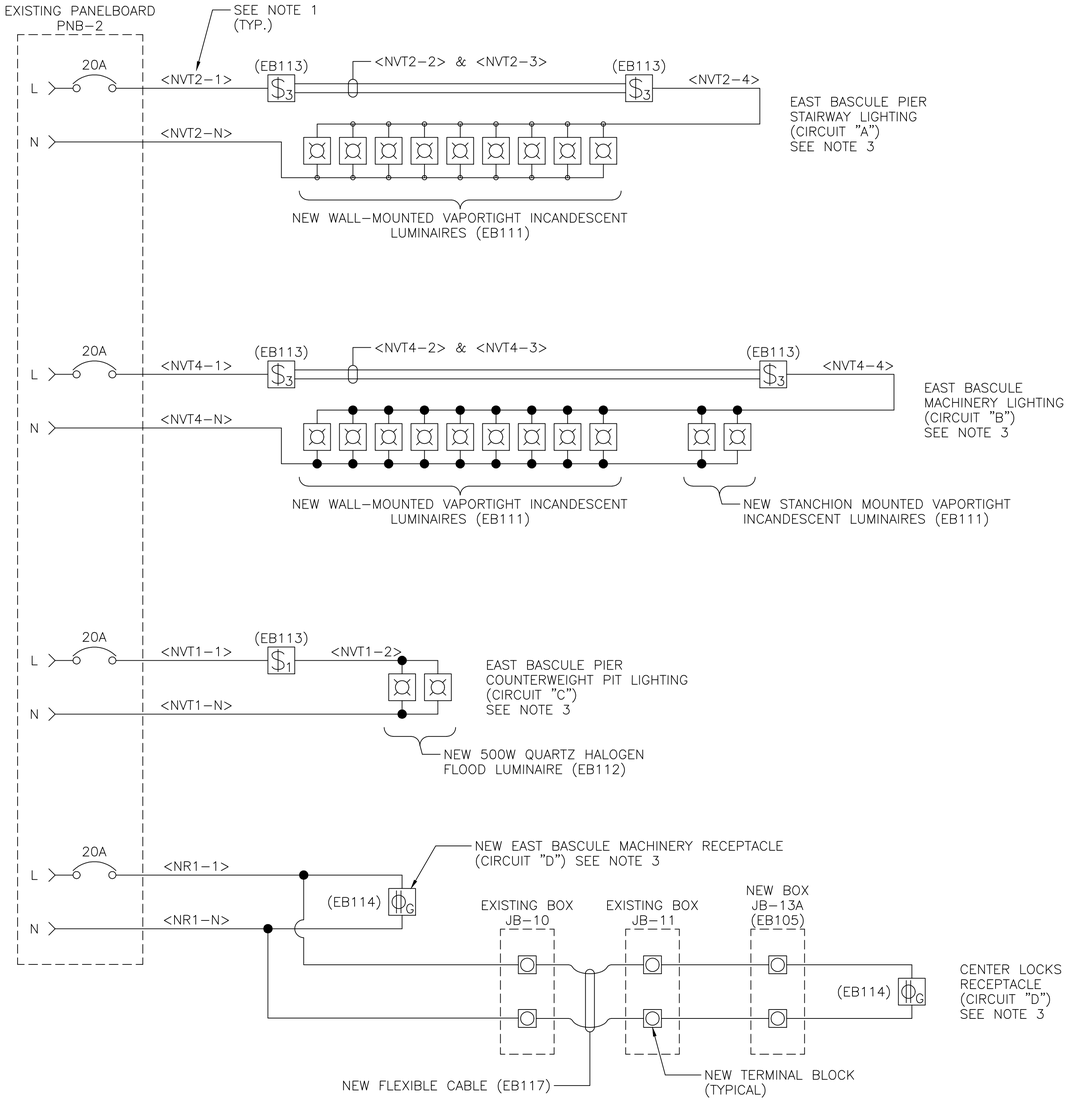
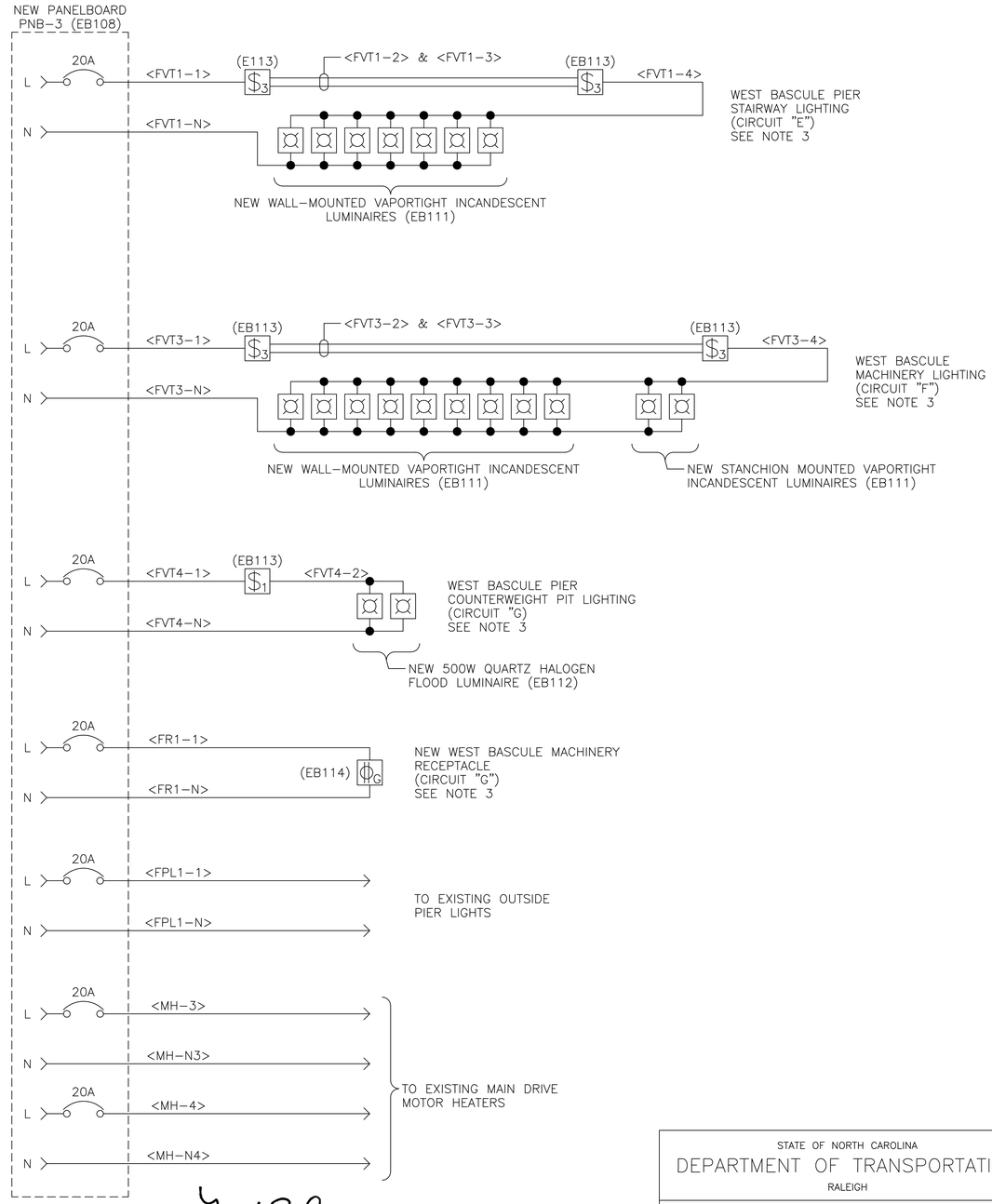
ELECTRICAL SCHEMATICS – 7

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
EB16	DESIGNED N.E. ALGER	DETAILED N.E. ALGER		DATE	MARCH 2011
	CHECKED Q.C. TON	CHECKED Q.C. TON		DRAWING NO.	42 OF 63

42-EB16-ES7.DWG





NOTES:

1. NUMBERS IN ANGLE BRACKETS ARE EXISTING WIRE NUMBERS BASED ON WESTINGHOUSE ELECTRICAL SYSTEM SHOP DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY NUMBERING BEFORE PROCEEDING WITH ANY RELATED WORK.
2. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.
3. ALL WIRING FOR LIGHTING AND RECEPTACLE CIRCUITS IS NEW, MINIMUM 12 AWG.

0 1 2 3
INCHES ON FULL SIZE SHEET

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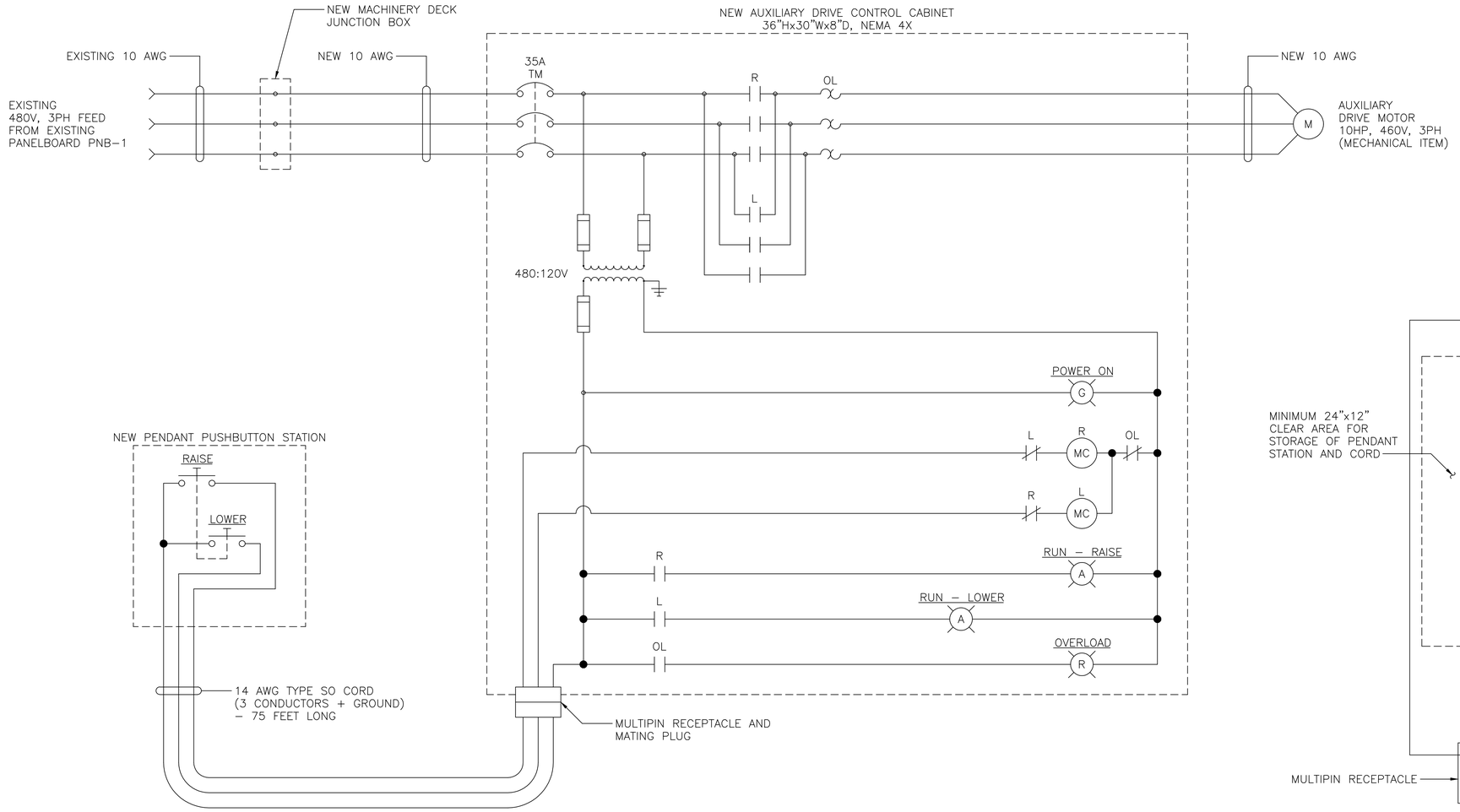
ELECTRICAL SCHEMATICS – 8

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE	MARCH 2011
CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO.	43 OF 63

EB17

43-EB17-ES8.DWG

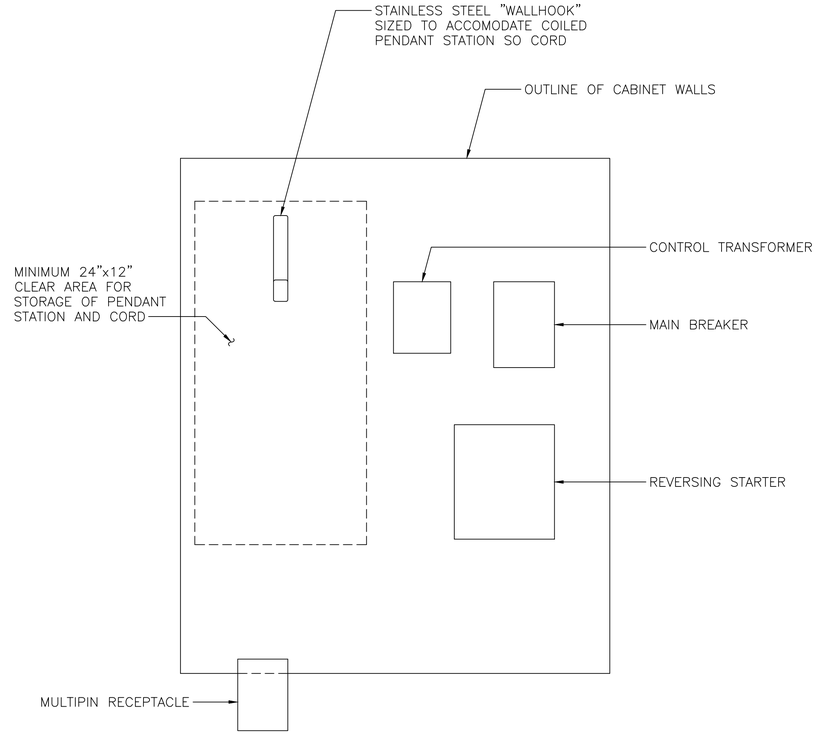


NEW AUXILIARY DRIVE CONTROL - SCHEMATIC

SCALE: NONE

TYPICAL NEW NEARSIDE AND FARSIDE CONTROLS.

(EB110)



NEW AUXILARY DRIVE CONTROL - CABINET LAYOUT

SCALE: NONE

TYPICAL NEW NEARSIDE AND FARSIDE CONTROLS.

NOTES:

1. CONTROLS FOR THE NEARSIDE AUXILIARY DRIVE ARE SHOWN. CONTROLS FOR THE FARSIDE AUXILIARY DRIVE ARE SIMILAR.
2. ALL ITEMS SHOWN ARE NEW, EXCEPT FOR THE AUXILIARY DRIVE MOTOR.
3. REQUIRED EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN.
4. ALL WIRING, INCLUDING CABINET INTERNAL WIRING, SHALL BE TYPE XHHW-2. MINIMUM SIZE SHALL BE 14 AWG.
5. CIRCUIT BREAKER SHALL BE THERMAL-MAGNETIC MOLDED CASE TYPE. STARTER SHALL BE FULL VOLTAGE REVERSING TYPE, NEMA SIZE 1. PILOT LIGHTS SHALL BE 30MM, TYPE 4/4X/13, PUSH-TO-TEST, WITH LED LAMPS. PILOT LIGHTS SHALL BE MOUNTED ON THE CABINET COVER. TERMINAL BLOCKS SHALL BE HEAVY DUTY, PHENOLIC INSULATED, WITH BOX TYPE LUGS. CABINET SHALL BE NEMA 4X TYPE 316 STAINLESS STEEL WITH FLANGE MOUNTED OPERATOR FOR MAIN BREAKER. CABINET SHALL BE PROVIDED WITH BREATHER AND DRAIN.
6. PENDANT PUSHBUTTON STATION SHALL BE RATED NEMA 4X, WITH TWO MECHANICALLY INTERLOCKED PUSHBUTTONS.
7. MULTIPIN RECEPTACLE AND MATING PLUG SHALL CONSIST OF SPRING LOADED SILVER-NICKEL CONTACTS IN POLYESTER HOUSINGS RATED NEMA 4X. A LATCHING PAWL SHALL HOLD THE RECEPTACLE AND PLUG TOGETHER WHEN ENGAGED. RECEPTACLE SHALL BE EQUIPPED WITH A FLIP-OPEN COVER AND BE MOUNTED IN THE BOTTOM WALL OF THE CABINET. PLUG SHALL BE MOUNTED IN A POLYESTER HANDLE ON THE END OF THE PENDANT STATION SO CORD.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd MAY 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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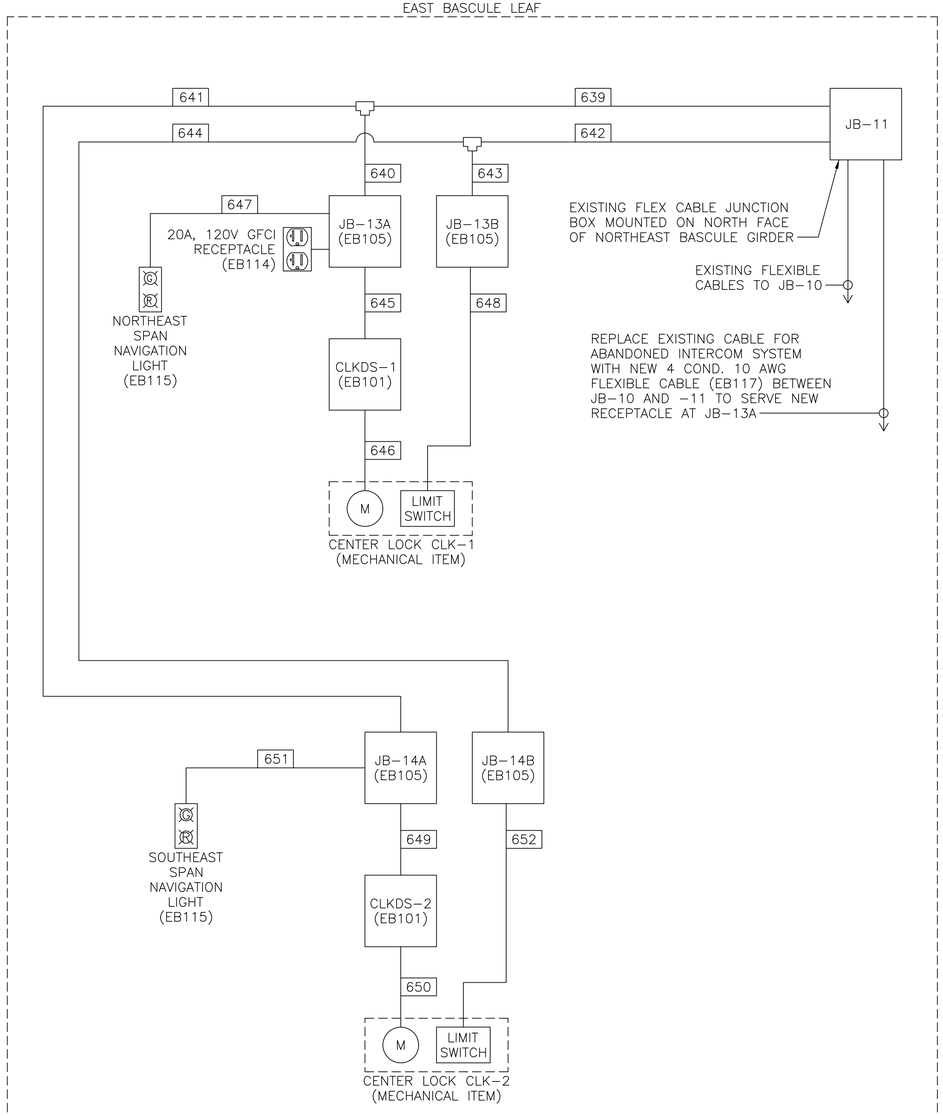
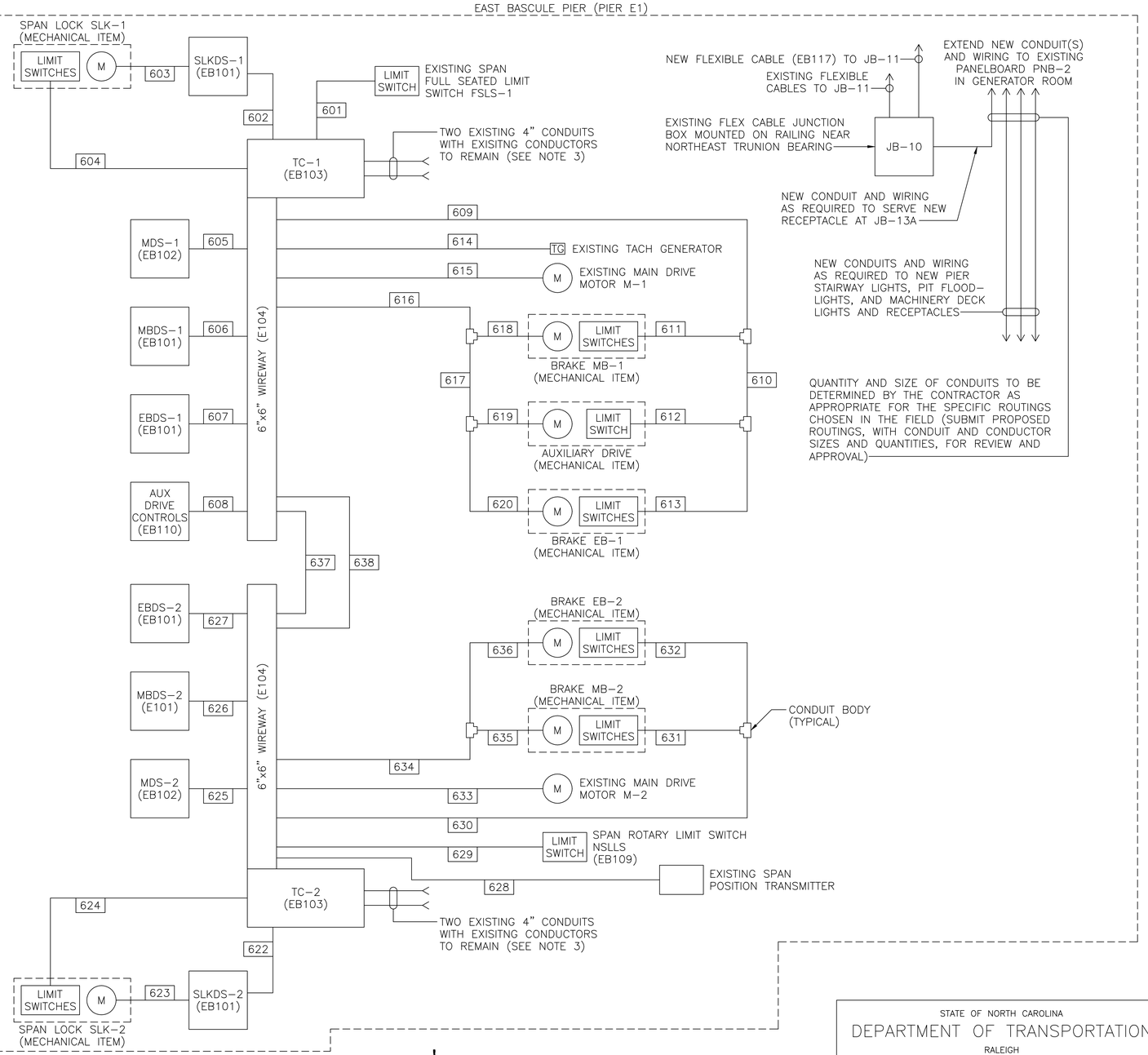
WILMINGTON, NORTH CAROLINA

NEW AUXILIARY DRIVE CONTOLS

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
EB18	DESIGNED N.E. ALGER	DETAILED N.E. ALGER		DATE	MARCH 2011
	CHECKED Q.C. TON	CHECKED Q.C. TON		DRAWING NO.	44 OF 63

44-EB18-NADC.DWG





NOTES:

1. THIS LAYOUT IS DIAGRAMMATIC, AND IS NOT INTENDED TO SHOW CONDUIT AND/OR EQUIPMENT IN THEIR EXACT PHYSICAL LOCATIONS OR RELATIONSHIPS.
2. ALL CONDUITS AND EQUIPMENT SHOWN ON THIS SHEET ARE NEW EXCEPT AS NOTED.
3. THE EXISTING CONDUCTORS ENTERING TERMINAL CABINETS TC-1 AND -2 VIA THE EXISTING 4" CONDUITS ARE TO REMAIN AND BE CONNECTED TO THE NEW WIRING ACCORDING TO THEIR EXISTING CONNECTIONS.

0 1 2 3
INCHES ON FULL SIZE SHEET

DEVICE DESIGNATIONS:

AMDS	AUXILIARY MOTOR DISCONNECT SWITCH
CLK	CENTER LOCK
CLKDS	CENTER LOCK DISCONNECT SWITCH
EBDS	EMERGANCY BRAKE DISCONNECT SWITCH
FSLS	FULLY SEATED LIMIT SWITCH
FSLLS	FAR SIDE LEAF LIMIT SWITCH
JB	JUNCTION BOX
MDS	MOTOR DISCONNECT SWITCH
MBDS	MOTOR BRAKE DISCONNECT SWITCH
NSLLS	NEAR SIDE LEAF LIMIT SWITCH
SLK	SPAN LOCK
SLKDS	SPAN LOCK DISCONNECT SWITCH
TC	TERMINAL CABINET

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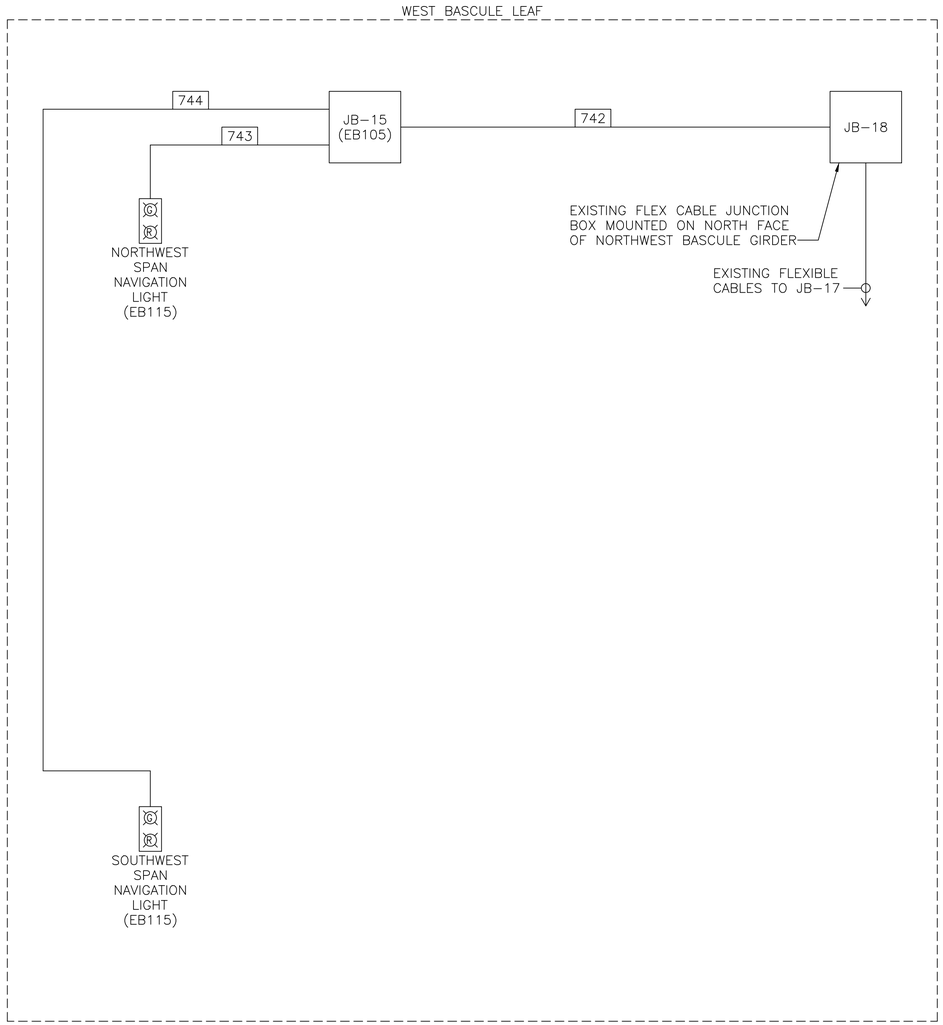
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

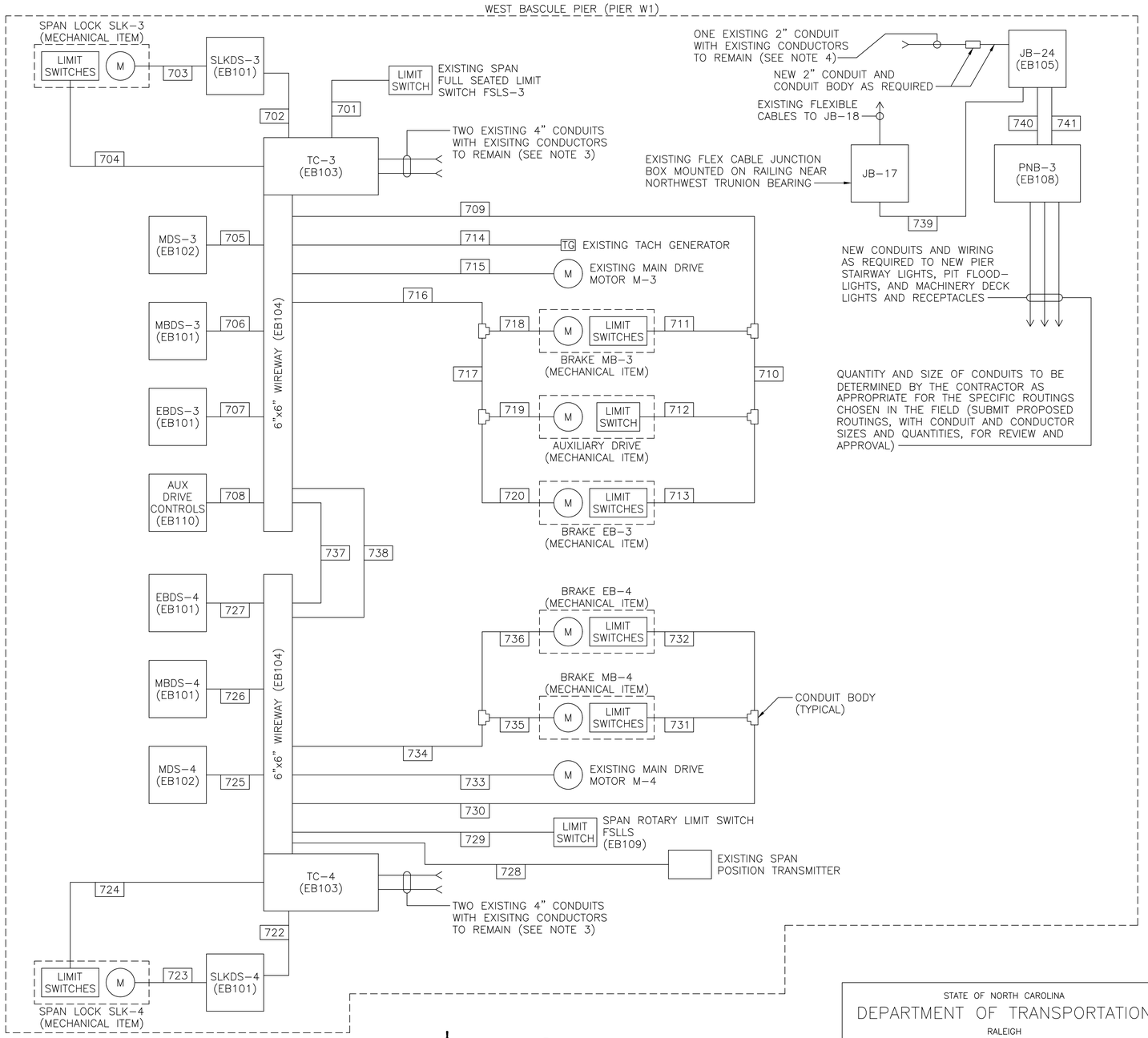
CONDUIT LAYOUT – 1

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE	MARCH 2011
CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO.	45 OF 63

EB19

45-EB19-CL1.DWG





NOTES:

1. THIS LAYOUT IS DIAGRAMMATIC, AND IS NOT INTENDED TO SHOW CONDUIT AND/OR EQUIPMENT IN THEIR EXACT PHYSICAL LOCATIONS OR RELATIONSHIPS.
2. ALL CONDUITS AND EQUIPMENT SHOWN ON THIS SHEET ARE NEW EXCEPT AS NOTED.
3. THE EXISTING CONDUCTORS ENTERING TERMINAL CABINETS TC–3 AND –4 VIA THE EXISTING 4" CONDUITS ARE TO REMAIN AND BE CONNECTED TO THE NEW WIRING ACCORDING TO THEIR EXISTING CONNECTIONS.
4. THE EXISTING CONDUCTORS WITHIN THIS CONDUIT ARE TO REMAIN AND BE CONNECTED TO THE NEW WIRING ACCORDING TO THEIR EXISTING CONNECTIONS.
5. SEE SHEET EB19 FOR DEVICE DESIGNATIONS.

0 1 2 3
INCHES ON FULL SIZE SHEET

3RD MAR 17TH 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

CONDUIT LAYOUT – 2

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE	MARCH 2011
CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO.	46 OF 63

EB20

26–EB20–CL2.DWG

BRIDGE WIRING TABULATION – EAST

RUN NUMBER	CONDUIT TRADE SIZE	CONDUCTORS CIRCUIT	CONDUCTORS GROUND	SERVING
601	3/4	(4) 12 AWG	12 AWG	FULLY SEATED LIMIT SWITCH FSLS–1
602	3/4	(3) 10 AWG	10 AWG	SWITCH SLKDS–1
603	3/4	(3) 10 AWG	10 AWG	SPAN LOCK SLK–1 MOTOR
604	1–1/4	(30) 12 AWG	12 AWG	SPAN LOCK SLK–1 LIMIT SWITCHES
605	2	(3) 1 AWG	6 AWG	SWITCH MDS–1
		(3) 1 AWG	6 AWG	MOTOR M–1
606	3/4	(3) 12 AWG	12 AWG	SWITCH MBDS–1
		(3) 12 AWG	12 AWG	BRAKE MB–1
607	3/4	(3) 12 AWG	12 AWG	SWITCH EBDS–1
		(3) 12 AWG	12 AWG	BRAKE EB–1
608	1	(3) 10 AWG	10 AWG	AUXILIARY DRIVE CONTROLS
		(3) 10 AWG	10 AWG	AUXILIARY DRIVE MOTOR
609	1–1/4	(6) 12 AWG	12 AWG	BRAKE MB–1 LIMIT SWITCHES
		(6) 12 AWG	12 AWG	BRAKE EB–1 LIMIT SWITCHES
		(4) 12 AWG	12 AWG	AUXILIARY DRIVE COUPLING LIMIT SWITCH
610	1–1/4	(6) 12 AWG	12 AWG	BRAKE EB–1 LIMIT SWITCHES
		(4) 12 AWG	12 AWG	AUXILIARY DRIVE COUPLING LIMIT SWITCH
611	3/4	(6) 12 AWG	12 AWG	BRAKE MB–1 LIMIT SWITCHES
612	3/4	(4) 12 AWG	12 AWG	AUXILIARY DRIVE COUPLING LIMIT SWITCH
613	3/4	(6) 12 AWG	12 AWG	BRAKE EB–1 LIMIT SWITCHES
614	1	NOTE 1	12 AWG	TACHOMETER GENERATOR
615	1–1/2	(3) 1 AWG	6 AWG	MOTOR M–1
		(2) 10 AWG		MOTOR WINDING HEATERS
616	1	(3) 12 AWG	12 AWG	BRAKE MB–1
		(3) 12 AWG	12 AWG	BRAKE EB–1
		(3) 10 AWG	10 AWG	AUXILIARY DRIVE MOTOR
617	1	(3) 12 AWG	12 AWG	BRAKE EB–1
		(3) 10 AWG	10 AWG	AUXILIARY DRIVE MOTOR
618	3/4	(3) 12 AWG	12 AWG	BRAKE MB–1
619	3/4	(3) 10 AWG	10 AWG	AUXILIARY DRIVE MOTOR
620	3/4	(3) 12 AWG	12 AWG	BRAKE EB–1
621	NOT USED			
622	3/4	(3) 10 AWG	10 AWG	SWITCH SLKDS–2
623	3/4	(3) 10 AWG	10 AWG	SPAN LOCK SLK–2 MOTOR
624	1–1/4	(30) 12 AWG	12 AWG	SPAN LOCK SLK–2 LIMIT SWITCHES
625	2	(3) 1 AWG	6 AWG	SWITCH MDS–2
		(3) 1 AWG	6 AWG	MOTOR M–2
626	3/4	(3) 12 AWG	12 AWG	SWITCH MBDS–2
		(3) 12 AWG	12 AWG	BRAKE MB–2
627	3/4	(3) 12 AWG	12 AWG	SWITCH EBDS–2
		(3) 12 AWG	12 AWG	BRAKE EB–2
628	3/4	(5) 12 AWG	12 AWG	SPAN POSITION TRANSMITTER
629	1–1/4	(24) 12 AWG	12 AWG	SPAN ROTARY CAM LIMIT SWITCH
630	1	(6) 12 AWG	12 AWG	BRAKE MB–2 LIMIT SWITCHES
		(6) 12 AWG	12 AWG	BRAKE EB–2 LIMIT SWITCHES

BRIDGE WIRING TABULATION – EAST (CONTINUED)

RUN NUMBER	CONDUIT TRADE SIZE	CONDUCTORS CIRCUIT	CONDUCTORS GROUND	SERVING
631	3/4	(6) 12 AWG	12 AWG	BRAKE MB–2 LIMIT SWITCHES
632	3/4	(6) 12 AWG	12 AWG	BRAKE EB–2 LIMIT SWITCHES
633	1–1/2	(3) 1 AWG	6 AWG	MOTOR M–2
		(2) 10 AWG		MOTOR WINDING HEATERS
634	3/4	(3) 12 AWG	12 AWG	BRAKE MB–2
		(3) 12 AWG	12 AWG	BRAKE EB–2
635	3/4	(3) 12 AWG	12 AWG	BRAKE MB–2
636	3/4	(3) 12 AWG	12 AWG	BRAKE EB–2
637	1–1/2	(9) 10 AWG	10 AWG	POWER INTERCONNECTIONS AS REQUIRED
638	1–1/2	(20) 12 AWG	12 AWG	CONTROL INTERCONNECTIONS AS REQUIRED
639	1–1/4	(3) 10 AWG	10 AWG	SWITCH CLKDS–1
		(3) 10 AWG		SWITCH CLKDS–2
		(3) 10 AWG		SPAN NAVIGATION LIGHTS
		(2) 10 AWG		JB–13A RECEPTACLE
		(6) 10 AWG		SPARE
640	1–1/4	(3) 10 AWG	(2) 10 AWG	SWITCH CLKDS–1
		(6) 10 AWG		SPAN NAVIGATION LIGHTS
		(2) 10 AWG		JB–13A RECEPTACLE
		(3) 10 AWG		SPARE
641	1	(3) 10 AWG	10 AWG	SWITCH CLKDS–2
		(3) 10 AWG		SPAN NAVIGATION LIGHTS
		(3) 10 AWG		SPARE
642	2	(20) 12 AWG	12 AWG	CENTER LOCK CLK–1 CONTROL
		(20) 12 AWG		CENTER LOCK CLK–2 CONTROL
643	2	(20) 12 AWG	12 AWG	CENTER LOCK CLK–1 CONTROL
		(20) 12 AWG		CENTER LOCK CLK–2 CONTROL (FROM JB–11 TO JB–13B)
		(20) 12 AWG	12 AWG	CENTER LOCK CLK–2 CONTROL (FROM JB–13B TO JB–14B)
644	1–1/4	(20) 12 AWG	12 AWG	CENTER LOCK CLK–2 CONTROL
645	3/4	(3) 10 AWG	10 AWG	SWITCH CLKDS–1
646	3/4	(3) 10 AWG	10 AWG	CENTER LOCK CLK–1 MOTOR
647	3/4	(3) 10 AWG	10 AWG	NORTHEAST SPAN NAVIGATION LIGHT
648	1–1/4	(16) 12 AWG	12 AWG	CENTER LOCK CLK–1 LIMIT SWITCH
649	3/4	(3) 10 AWG	10 AWG	SWITCH CLKDS–2
650	3/4	(3) 10 AWG	10 AWG	CENTER LOCK CLK–2 MOTOR
651	3/4	(3) 10 AWG	10 AWG	SOUTHEAST SPAN NAVIGATION LIGHT
652	1–1/4	(16) 12 AWG	12 AWG	CENTER LOCK CLK–2 LIMIT SWITCH

NOTES:

1. ONE 12 AWG TWISTED PAIR WITH OVERALL SHIELD. (ITEM EB116)
2. SEE SHEET EB19 FOR EAST SIDE CONDUIT LAYOUT DIAGRAM.

0 1 2 3
INCHES ON FULL SIZE SHEET

47–EB21–CWT1.DWG

3rd MARCH 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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CONDUIT AND WIRING TABULATION – 1

EB21

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE	MARCH 2011
CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO.	47 OF 63

BRIDGE WIRING TABULATION – WEST

RUN NUMBER	CONDUIT TRADE SIZE	CONDUCTORS		SERVING
		CIRCUIT	GROUND	
701	3/4	(4) 12 AWG	12 AWG	FULLY SEATED LIMIT SWITCH FSLS–3
702	3/4	(3) 10 AWG	10 AWG	SWITCH SLKDS–3
703	3/4	(3) 10 AWG	10 AWG	SPAN LOCK SLK–3 MOTOR
704	1–1/4	(30) 12 AWG	12 AWG	SPAN LOCK SLK–3 LIMIT SWITCHES
705	2	(3) 1 AWG	6 AWG	SWITCH MDS–3
		(3) 1 AWG	6 AWG	MOTOR M–3
706	3/4	(3) 12 AWG	12 AWG	SWITCH MBDS–3
		(3) 12 AWG	12 AWG	BRAKE MB–3
707	3/4	(3) 12 AWG	12 AWG	SWITCH EBDS–3
		(3) 12 AWG	12 AWG	BRAKE EB–3
708	1	(3) 10 AWG	10 AWG	AUXILIARY DRIVE CONTROLS
		(3) 10 AWG	10 AWG	AUXILIARY DRIVE MOTOR
709	1–1/4	(6) 12 AWG	12 AWG	BRAKE MB–3 LIMIT SWITCHES
		(6) 12 AWG	12 AWG	BRAKE EB–3 LIMIT SWITCHES
		(4) 12 AWG	12 AWG	AUXILIARY DRIVE COUPLING LIMIT SWITCH
710	1–1/4	(6) 12 AWG	12 AWG	BRAKE EB–3 LIMIT SWITCHES
		(4) 12 AWG	12 AWG	AUXILIARY DRIVE COUPLING LIMIT SWITCH
711	3/4	(6) 12 AWG	12 AWG	BRAKE MB–3 LIMIT SWITCHES
712	3/4	(4) 12 AWG	12 AWG	AUXILIARY DRIVE COUPLING LIMIT SWITCH
713	3/4	(6) 12 AWG	12 AWG	BRAKE EB–3 LIMIT SWITCHES
714	1	NOTE 1	12 AWG	TACHOMETER GENERATOR
715	1–1/2	(3) 1 AWG	6 AWG	MOTOR M–3
		(2) 10 AWG		MOTOR WINDING HEATERS
716	1	(3) 12 AWG	12 AWG	BRAKE MB–3
		(3) 12 AWG	12 AWG	BRAKE EB–3
		(3) 10 AWG	10 AWG	AUXILIARY DRIVE MOTOR
717	1	(3) 12 AWG	12 AWG	BRAKE EB–3
		(3) 10 AWG	10 AWG	AUXILIARY DRIVE MOTOR
718	3/4	(3) 12 AWG	12 AWG	BRAKE MB–3
719	3/4	(3) 10 AWG	10 AWG	AUXILIARY DRIVE MOTOR
720	3/4	(3) 12 AWG	12 AWG	BRAKE EB–3
721	NOT USED			
722	3/4	(3) 10 AWG	10 AWG	SWITCH SLKDS–4
723	3/4	(3) 10 AWG	10 AWG	SPAN LOCK SLK–4 MOTOR
724	1–1/4	(30) 12 AWG	12 AWG	SPAN LOCK SLK–4 LIMIT SWITCHES
725	2	(3) 1 AWG	6 AWG	SWITCH MDS–4
		(3) 1 AWG	6 AWG	MOTOR M–4
726	3/4	(3) 12 AWG	12 AWG	SWITCH MBDS–4
		(3) 12 AWG	12 AWG	BRAKE MB–4
727	3/4	(3) 12 AWG	12 AWG	SWITCH EBDS–4
		(3) 12 AWG	12 AWG	BRAKE EB–4
728	3/4	(5) 12 AWG	12 AWG	SPAN POSITION TRANSMITTER
729	1–1/4	(24) 12 AWG	12 AWG	SPAN ROTARY CAM LIMIT SWITCH
730	1	(6) 12 AWG	12 AWG	BRAKE MB–4 LIMIT SWITCHES
		(6) 12 AWG	12 AWG	BRAKE EB–4 LIMIT SWITCHES

BRIDGE WIRING TABULATION – WEST (CONTINUED)

RUN NUMBER	CONDUIT TRADE SIZE	CONDUCTORS		SERVING
		CIRCUIT	GROUND	
731	3/4	(6) 12 AWG	12 AWG	BRAKE MB–4 LIMIT SWITCHES
732	3/4	(6) 12 AWG	12 AWG	BRAKE EB–4 LIMIT SWITCHES
733	1–1/2	(3) 1 AWG	6 AWG	MOTOR M–4
		(2) 10 AWG		MOTOR WINDING HEATERS
734	3/4	(3) 12 AWG	12 AWG	BRAKE MB–4
		(3) 12 AWG	12 AWG	BRAKE EB–4
735	3/4	(3) 12 AWG	12 AWG	BRAKE MB–4
736	3/4	(3) 12 AWG	12 AWG	BRAKE EB–4
737	1–1/2	(9) 10 AWG	10 AWG	POWER INTERCONNECTIONS AS REQ'D
738	1–1/2	(20) 12 AWG	12 AWG	CONTROL INTERCONNECTIONS AS REQ'D
739	3/4	(3) 10 AWG	10 AWG	SPAN NAVIGATION LIGHTS
740	1	(3) 6 AWG	6 AWG	FEED TO PNB–3
741	1–1/4	(12) 10 AWG	10 AWG	RE–FEED TO EXISTING–TO–REMAIN CIRCUITS
742	1	(3) 10 AWG	10 AWG	SPAN NAVIGATION LIGHTS
		(3) 10 AWG		SPARE
744	3/4	(3) 10 AWG	10 AWG	NORTHWEST SPAN NAVIGATION LIGHT
745	3/4	(3) 10 AWG	10 AWG	SOUTHWEST SPAN NAVIGATION LIGHT

NOTES:

1. ONE 12 AWG TWISTED PAIR WITH OVERALL SHIELD. (ITEM EB116)
2. SEE SHEET EB19 FOR EAST SIDE CONDUIT LAYOUT DIAGRAM.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd JUNE 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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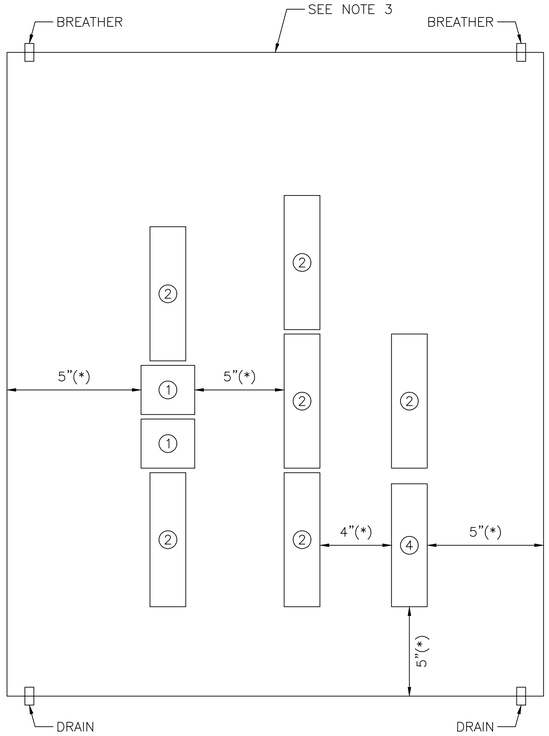
WILMINGTON, NORTH CAROLINA

CONDUIT AND WIRING TABULATION – 2

EB22

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE	MARCH 2011
CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO.	48 OF 63

48-EB22-CWT2.DWG



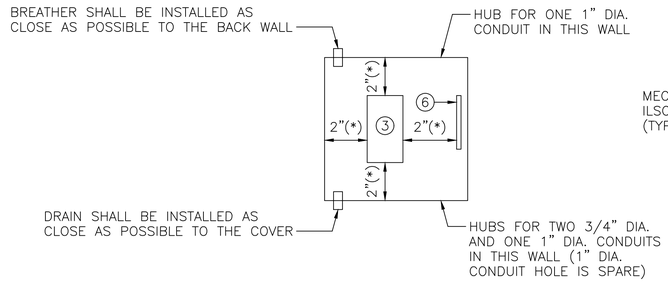
LAYOUT – NEW TYPICAL MACHINERY DECK TERMINAL CABINET

SCALE: NONE

TYPICAL OF NEW CABINETS TC–1, –2, –3, AND –4.

ITEM EB103

BOX IS 36"Hx30"Wx12"D.

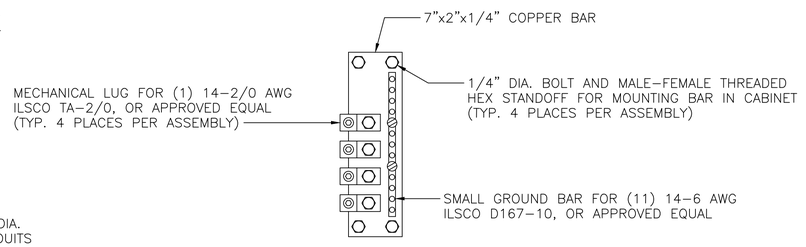


LAYOUT – NEW JUNCTION BOX JB–15

SCALE: NONE

ITEM EB105

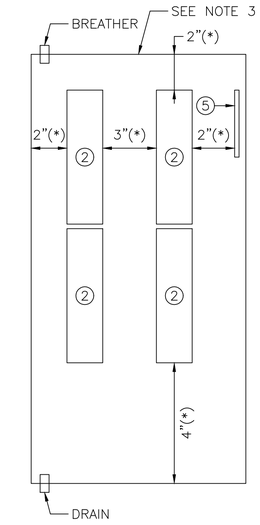
BOX IS 8"Hx8"Wx4"D.
SEE NOTE 4.



DETAIL – LARGE GROUND BAR ASSEMBLY

SCALE: NONE

ALL HARDWARE SHALL BE TYPE 316 STAINLESS STEEL. ALL BOLTED CONNECTIONS SHALL UTILIZE LOCKWASHERS.

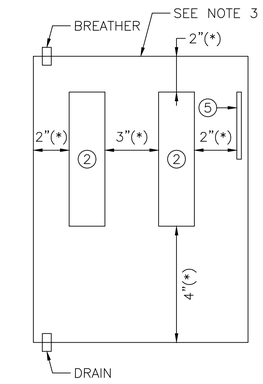


LAYOUT – NEW JUNCTION BOX JB–13A

SCALE: NONE

ITEM EB105

BOX IS 24"Hx12"Wx6"D.
SEE NOTE 4.

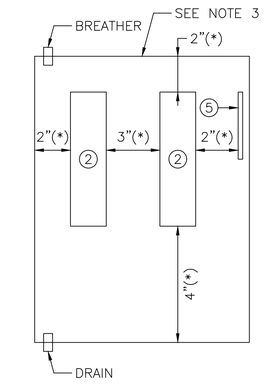


LAYOUT – NEW JUNCTION BOX JB–13B

SCALE: NONE

ITEM EB105

BOX IS 16"Hx12"Wx6"D.
SEE NOTE 4.

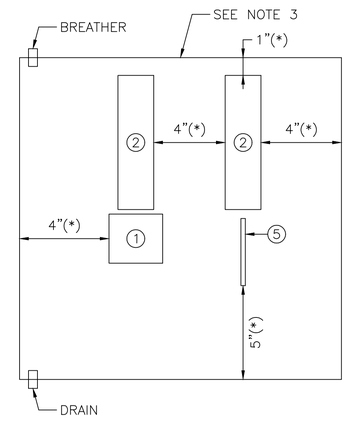


LAYOUT – NEW JUNCTION BOXES JB–14A & –14B

SCALE: NONE

ITEM EB105

BOX IS 16"Hx12"Wx6"D.
SEE NOTE 4.



LAYOUT – NEW JUNCTION BOX JB–24

SCALE: NONE

ITEM EB105

BOX IS 18"Hx18"Wx8"D.
SEE NOTE 4.

NOTES:

1. LAYOUT SHOWN FOR THE NEW MACHINERY DECK TERMINAL CABINETS IS CONCEPTUAL. THE ACTUAL LAYOUT SHALL BE AS REQUIRED TO PERMIT EXISTING CONDUCTORS WHICH ARE TO BE RE–USED TO REACH THEIR RESPECTIVE TERMINALS, AND SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD. THE ACTUAL LAYOUT SHALL CONFORM TO THE MINIMUM SPACINGS NOTED.
2. (*) INDICATES MINIMUM REQUIRED SPACING, NOT AN ACTUAL DIMENSION.
3. CONDUIT ENTRANCES SHALL NOT BE MADE IN THE TOP WALLS OF THE INDICATED BOXES.
4. THESE BOXES SHALL INCLUDE FACTORY MADE BOSSED, DRILLED, AND TAPPED HOLES FOR ALL REQUIRED CONDUITS, PLUS ONE SPARE HOLE FOR A 1" CONDUIT.
5. PRIOR TO ORDERING ANY BOXES, SUBMIT FOR APPROVAL DIMENSIONED DRAWINGS SHOWING THE LAYOUT OF ALL REQUIRED TERMINAL BLOCKS (BASED ON THE DIMENSIONS OF THE ACTUAL SUPPLIED TERMINAL BLOCKS) AND GROUND BARS. DRAWINGS SHALL ALSO SHOW THE LOCATIONS AND SIZES OF ALL REQUIRED CONDUIT HOLES, LOCATIONS OF BREATHERS AND DRAINS, AND ALL OTHER SIGNIFICANT FEATURES.

TERMINAL BLOCK LEGEND

(1) LARGE TERMINAL BLOCK. 3 POLES. 14–2/0 AWG. (EB107)

(2) SMALL TERMINAL BLOCK. 12 POLES. 18–4 AWG. (EB106)

(3) SMALL TERMINAL BLOCK. 6 POLES. 18–4 AWG. (EB106)

(4) LARGE GROUND BAR ASSEMBLY. SEE DETAIL THIS SHEET.

(5) SMALL GROUND BAR. (7) 14–6 AWG. ILSCO D167–6, OR APPROVED EQUAL.

(6) SMALL GROUND BAR. (5) 14–6 AWG. ILSCO D167–4, OR APPROVED EQUAL.

0 1 2 3
INCHES ON FULL SIZE SHEET

49–EB23–TCJB.DWG

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
TERMINAL CABINETS
AND JUNCTION BOXES

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
DESIGNED	N.E. ALGER	DETAILED	N.E. ALGER	DATE	MARCH 2011
CHECKED	Q.C. TON	CHECKED	Q.C. TON	DRAWING NO.	49 OF 63

EB23

ELECTRICAL EQUIPMENT SCHEDULE

ITEM NUMBER	QUANTITY	ITEM NAME	MANUFACTURER OR SUPPLIER	CATALOG NUMBER OR MODEL	DESCRIPTION
EB101	14	30A DISCONNECT SWITCH	CUTLER–HAMMER	DH361UWK	HEAVY DUTY, SINGLE THROW, NON–FUSED SAFETY SWITCH. UL LISTED. 3 POLE, 600VAC, 30A, 20HP (AT 480VAC, 3PH). NEMA 4X STAINLESS STEEL (TYPE 316) ENCLOSURE WITH VIEWING WINDOW OVER SWITCH BLADES. 10KA SYMMETRICAL SHORT CIRCUIT AT 480VAC.
EB102	4	200A DISCONNECT SWITCH	CUTLER–HAMMER	DH364UWK	HEAVY DUTY, SINGLE THROW, NON–FUSED SAFETY SWITCH. UL LISTED. 3 POLE, 600VAC, 200A, 125HP (AT 480VAC, 3PH). NEMA 4X STAINLESS STEEL (TYPE 316) ENCLOSURE WITH VIEWING WINDOW OVER SWITCH BLADES. 10KA SYMMETRICAL SHORT CIRCUIT AT 480VAC.
EB103	4	MACHINERY DECK TERMINAL CABINET	HOFFMAN	A–36H3012SS6LP	NEMA 4X STAINLESS STEEL (TYPE 316) WALL MOUNT JUNCTION BOX. UL LISTED. 36" HIGH, 30" WIDE, 12" DEEP. CONTINUOUSLY HINGED, CLAMPED COVER. 14 GAUGE BODY. STAINLESS STEEL BREATHERS AND DRAINS. STAINLESS STEEL INNER PANEL WITH TERMINAL BLOCKS AS INDICATED. SEE ELECTRICAL GENERAL NOTE 2.16.
EB104	4	WIREWAY	HOFFMAN	CUSTOM	NEMA 4X STAINLESS STEEL (TYPE 316) FEED–THROUGH WIREWAY. 6"x6" CROSS–SECTION, 60" LONG. HINGED, CLAMPED COVER. 16 GAUGE BODY. WITH CLOSURE PLATE, BOX CONNECTOR, SUPPORT BRACKETS FOR WALL MOUNTING, AND ALL OTHER NECESSARY HARDWARE.
EB105	6	JUNCTION BOX	O–Z/GEDNEY	YW–A	NEMA 4 CAST ALUMINUM BOX JUNCTION BOX. UL LISTED. DIMENSIONS AS INDICATED. STAINLESS STEEL COVER HINGE AND CLAMP BOLTS. EXTERNAL CAST MOUNTING LUGS. FACTORY SUPPLIED BOSSED, DRILLED, AND TAPPED CONDUIT HOLES AS REQUIRED. STAINLESS STEEL DRAIN AND BREATHER IN DRILLED AND TAPPED HOLES. ALUMINUM INNER PANEL WITH TERMINAL BLOCKS AS INDICATED. SEE ELECTRICAL GENERAL NOTE 2.16.
EB106	AS REQ'D	SMALL TERMINAL BLOCK	MARATHON SPECIAL PRODUCTS	985 GP	HEAVY DUTY TERMINAL BLOCK. UL RECOGNIZED. 600V, 85A, 150C. TIN PLATED ALUMINUM BOX TYPE LUGS WITH NICKEL PLATED STEEL SCREWS FOR VARIOUS COMBINATIONS OF 18 AWG – 4 AWG COPPER CONDUCTORS. PHENOLIC BASE. NUMBER OF POLES AS INDICATED.
EB107	AS REQ'D	LARGE TERMINAL BLOCK	MARATHON SPECIAL PRODUCTS	1423572	HEAVY DUTY 3 POLE TERMINAL BLOCK. UL RECOGNIZED. 600V, 175A, 90C. TIN PLATED COPPER OR ALUMINUM SCREW LUGS WITH ONE OPENING PER POLE FOR 14 AWG – 2/0 AWG COPPER CONDUCTORS. PHENOLIC BASE.
EB108	1	PANELBOARD PNB–3	CUTLER–HAMMER	P48G28T15P	MINI–POWER CENTER CONSISTING OF A DRY TYPE TRANSFORMER AND CIRCUIT BREAKER TYPE BRANCH CIRCUIT PANELBOARD. UL LISTED. 480:208Y/120VAC, 3 PHASE, 15KVA. WITH TWELVE 20A, 1 POLE BRANCH CIRCUIT BREAKERS. NEMA 3R ENCLOSURE. PANELBOARD SHALL BE MOUNTED INSIDE A NEMA 4X STAINLESS STEEL CABINET (SEE BELOW).
			HOFFMAN	A–48H3612SS6LP	NEMA 4X STAINLESS STEEL (TYPE 316) WALL MOUNT JUNCTION BOX. UL LISTED. 48" HIGH, 36" WIDE, 12" DEEP. CONTINUOUSLY HINGED, CLAMPED COVER. 14 GAUGE BODY. STAINLESS STEEL BREATHERS AND DRAINS. STAINLESS STEEL INNER PANEL.

ELECTRICAL EQUIPMENT SCHEDULE (CONTINUED)

ITEM NUMBER	QUANTITY	ITEM NAME	MANUFACTURER OR SUPPLIER	CATALOG NUMBER OR MODEL	DESCRIPTION
EB109	2	BASCULE LEAF ROTARY CAM LIMIT SWITCH	GEMCO	1980–412–D–SP–X	ROTARY CAM LIMIT SWITCH. SINGLE TURN. 12 CAMS, SPDT SWITCHES. CONTACTS RATED 10A AT 120VAC. NEMA 4/4X STAINLESS STEEL (TYPE 316) HOUSING. REAR SHAFT EXTENSION. CAMS ADJUSTABLE WITHOUT TOOLS, SETABLE FROM 4 TO 356 DEGREES.
			HELICAL PRODUCTS COMPANY	MC7C	HELICAL BEAM TYPE FLEXIBLE COUPLING. STAINLESS STEEL. INTEGRAL CLAMP ATTACHMENT. BORE(S) AND KEYWAY(S) TO MATCH SHAFTS. MISALIGNMENT CAPACITY: 5 DEGREES ANGULAR, 0.030 INCHES PARALLEL OFFSET, 0.010 INCHES AXIAL.
			GEMCO	3001	DIRECT DRIVE ADJUSTABLE COUPLING WITH BORE TO MATCH ROTARY CAM SWITCH INPUT SHAFT. INFINITELY ADJUSTABLE, WITH 50:1 ADJUSTMENT RATIO.
EB110	2	AUXILIARY DRIVE CONTROLS	CUSTOM	CUSTOM	CONTROLS FOR AUXILIARY DRIVE MOTOR, WITH ALL CHARACTERISTICS AS SHOWN.
EB111	38	VAPORTIGHT INCANDESCENT LUMINAIRE	HUBBELL INDUSTRIAL LIGHTING	NVB15GG–LT	ENCLOSED AND GASKETED WALLMOUNT INCANDESCENT LUMINAIRE. UL LISTED (1598). 120VAC. MAX 150W LAMP. NEMA 3 AND 4X GLASS FILLED (30%) THERMOPLASTIC POLYESTER BODY, GUARD, AND SPLICE BOX. GLASS GLOBE. SUITABLE FOR 90C SUPPLY WIRE. WITH 100W ROUGH–SERVICE LAMP.
EB112	4	COUNTERWEIGHT PIT FLOODLIGHT	PAULUHN	QA1605	QUARTZ HALOGEN FLOODLIGHT. UL LISTED (1598A – MARINE OUTSIDE TYPE SALTWATER). 120VAC. 500W LAMP. IP66 COPPER FREE ALUMINUM HOUSING WITH OVEN–CURED POLYESTER POWDER COAT FINISH. ONE–PIECE HIGH TEMPERETURE SILICONE GASKET. THERMAL AND SHOCK RESISTANT HIGH IMPACT TEMPERED GLASS LENS. HAMMERTONE ALUMINUM REFLECTOR. SPRING LOADED LAMPHOLDER. STAINLESS STEEL HARDWARE AND WIRE GUARD. WITH 500W LAMP.
EB113	10	LIGHT SWITCH	HUBBELL	HBL1221BLK HBL1223BLK	HEAVY DUTY SPECIFICATION GRADE, AC SWITCH. UL LISTED. 120–277VAC, 20A. SINGLE POLE OR THREE–WAY AS REQUIRED.
EB114	3	GFCI RECEPTACLE	HUBBELL	GF5362GYA	HEAVY DUTY SPECIFICATION GRADE DUPLEX AC GFCI RECEPTACLE. UL LISTED. 120VAC, 20A, NEMA 5–20R.
EB115	4	BASCULE SPAN NAVIGATION LIGHT	B&B ROADWAY	BS	WATERWAY NAVIGATION LIGHT FOR MARKING BASCULE SPANS. 180 DEGREE, 200MM O.D., GREEN FRESNEL LENS ABOVE 180 DEGREE, 200MM O.D., RED FRESNEL LENS. 120VAC, MINIMUM 840 CANDELAS LED LAMPS. CAST ALUMINUM HOUSING AND SWIVEL MOUNTING BASE WITH ANTI–SWING BRAKE. GALVANIZED SCH40 STEEL PIPE STEM. STAINLESS STEEL (TYPE 316) RETRIEVAL CHAIN. GALVANIZED STEEL PLATE COUNTERWEIGHT. JUNCTON BOX MATCHING MOUNTING BASE FOOTPRINT.
EB116	AS REQ'D	TACHOMETER CABLE	BELDEN	3103A	TYPE TC INSTRUMENTATION CABLE. UL LISTED. ONE 12 AWG PAIR, STRANDED (7X20) COPPER CONDUCTORS. OVERALL 100% COVERAGE FOIL SHIELD AND DRAIN WIRE. 600V PVC/NYLON INSULATION. OIL AND UV RESISTANT PVC OUTER JACKET.
EB117	AS REQ'D	FLEXIBLE CABLE	AMERICAN INSULATED WIRE CORP.	20734	TYPE SOOW FLEXIBLE CORD. UL LISTED. FOUR 10 AWG STRANDED (104X30) COPPER CONDUCTORS. 600V EPDM INSULATION AND CPE JACKET, RATED 90C. WEATHER, WATER, SUNLIGHT, OIL, AND FLAME RESISTANT.
EB118	8	LIVE LOAD SPAN LOCK LIMIT SWITCH	NAMCO	EA800–30140	HEAVY DUTY LEVER ARM LIMIT SWITCH. SIX CIRCUITS (3 N.O. AND 3 N.C.). CONTACTS RATED 20A AT 120VAC. NEMA 4X, 6P, 7, AND 9 CAST BRONZE HOUSING. –40C TO +90C SERVICE. CW AND CCW OPERATION.
				EL150–58901	SIDE ROLLER TYPE OPERATING LEVER COMPATIBLE WITH LIMIT SWITCH. 4 INCH BRONZE ARM AND 1 1/4 INCH DIAMETER NYLON ROLLER.

NOTES:

1. THESE EQUIPMENT SCHEDULES DO NOT NECESSARILY PROVIDE AN EXHAUSTIVE LISTING OF ALL EQUIPMENT REQUIRED.
2. REFERENCE TO A SPECIFIC MANUFACTURER'S NAME AND/OR CATALOG NUMBER IS INTENDED TO DENOTE THE QUALITY AND CHARACTERISTICS OF THE EQUIPMENT AND MATERIAL AND NOT TO SPECIFICALLY EXCLUDE OTHER ACCEPTABLE PRODUCTS, BUT ANY SUBSTITUTIONS TO REFERENCED ITEMS MUST BE APPROVED BY THE ENGINEER.
3. THE CONTRACTOR SHALL CONFIRM ALL QUANTITIES AND THE AVAILABILITY OF ALL SPECIFIED ITEMS.

0 1 2 3
INCHES ON FULL SIZE SHEET

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

ELECTRICAL EQUIPMENT SCHEDULE

		DRAWN BY	N.E. ALGER
		SCALE	AS NOTED
DESIGNED N.E. ALGER	DETAILED N.E. ALGER	DATE	MARCH 2011
CHECKED Q.C. TON	CHECKED Q.C. TON	DRAWING NO.	50 OF 63

EB24

50–EB24–EES.DWG

SCOPE OF MECHANICAL WORK

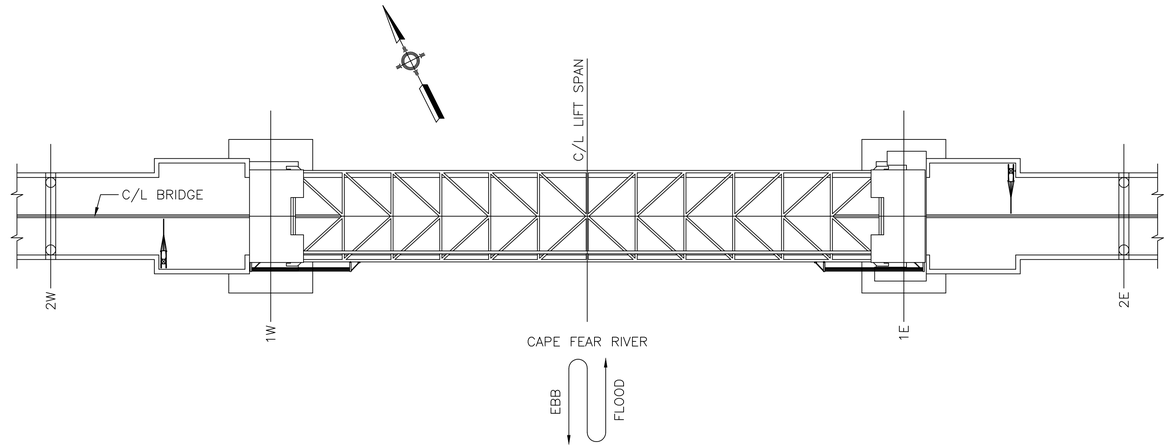
1. REHABILITATION OF THE EXISTING LIVE LOAD BEARINGS. CONSISTING OF REMOVAL OF EACH ASSEMBLY, REPLACEMENT OF

2. REPLACEMENT OF EXISTING MAIN COUNTERWEIGHT AND AUXILIARY COUNTERWEIGHT WIRE ROPES.

3. REMOVAL OF ALL OLD LUBRICANT, DEBRIS, ETC. FROM ALL MAIN AND AUXILIARY WIRE ROPE SHEAVE GROOVES, ROPE GUIDES, ROPE DEFLECTORS, CONNECTION RODS AND ATTACHMENT POINTS TO SSPC–SP1 AND SSPC–SP3 CONDITION, SEE SPECIAL PROVISIONS.

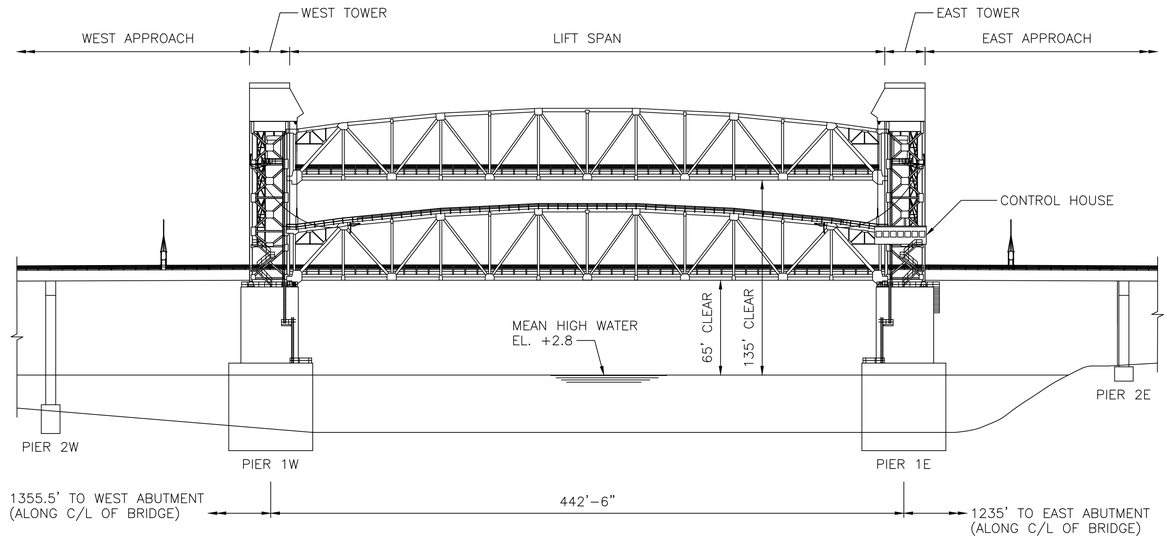
4. ALL INCIDENTAL WORK RELATED TO THE ITEMS LISTED ABOVE, AS WELL AS ALL MISCELLANEOUS WORK SHOWN OR IMPLIED HEREIN.

5. FOR ADDITIONAL REQUIREMENTS, SEE SHEETS ML1 THROUGH ML12 AND THE SPECIAL PROVISIONS.



PLAN

SCALE: 1" = 50'–0"



ELEVATION

SCALE: 1" = 50'–0"

3RD MAY 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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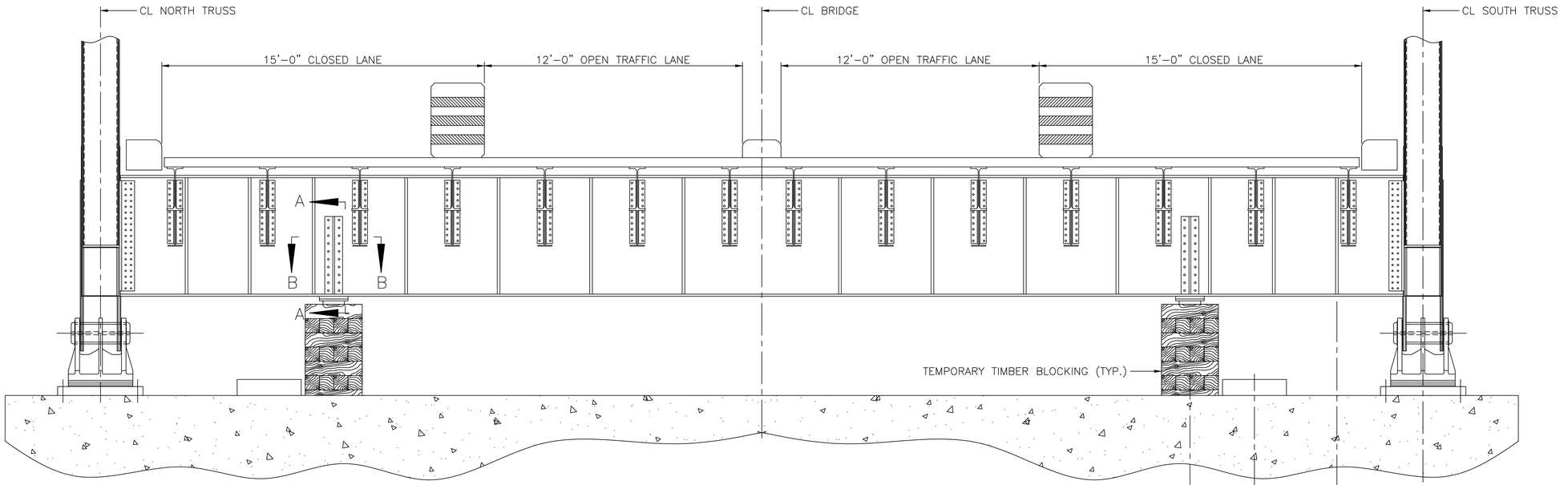
0 1 2 3
INCHES ON FULL SIZE SHEET

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
GENERAL PLAN AND ELEVATION
(MEMORIAL LIFT BRIDGE)

				DRAWN BY	N.E. ALGER
				SCALE	AS NOTED
GPEL	DESIGNED N.E. ALGER	DETAILED N.E. ALGER		DATE	MARCH 2011
	CHECKED C.D. VOGT	CHECKED C.D. VOGT		DRAWING NO.	51 OF 63

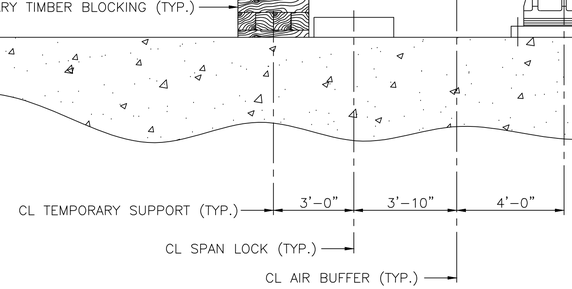
51-GPEL-GPEL.DWG

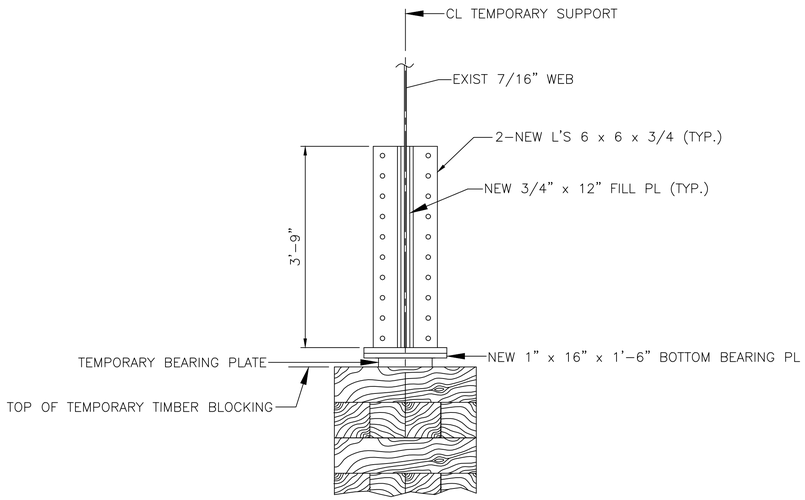


ELEVATION END FLOORBEAM

SCALE: 3/8" = 1'–0"

(PANEL POINT L0 SHOWN, PANEL POINT L0' SIMILAR)





SECTION A–A

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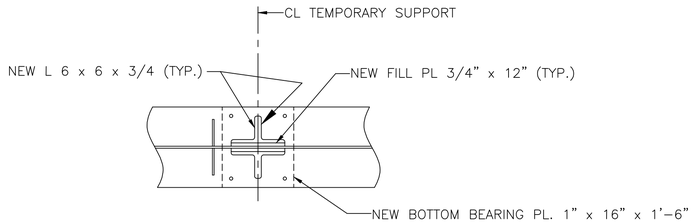

SECTION B–B

SCALE: 3/4" = 1'–0"

0 1 2 3

INCHES ON FULL SIZE SHEET

3rd 17th 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

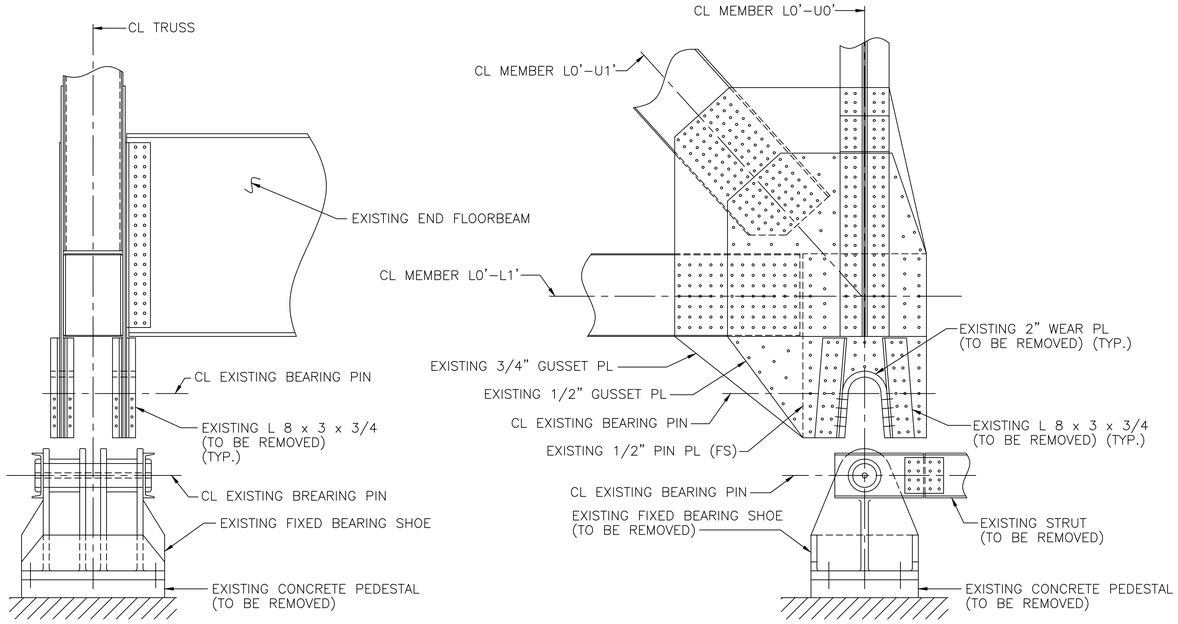
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
LIVE LOAD BEARING
REHABILITATION – 1

		DRAWN BY	L.R. LENTZ
		SCALE	AS NOTED
DESIGNED C.P. AHLSKOG	DETAILED L.R. LENTZ	DATE	MARCH 2011
CHECKED K.W. JOHNS	CHECKED K.W. JOHNS	DRAWING NO.	52 OF 63

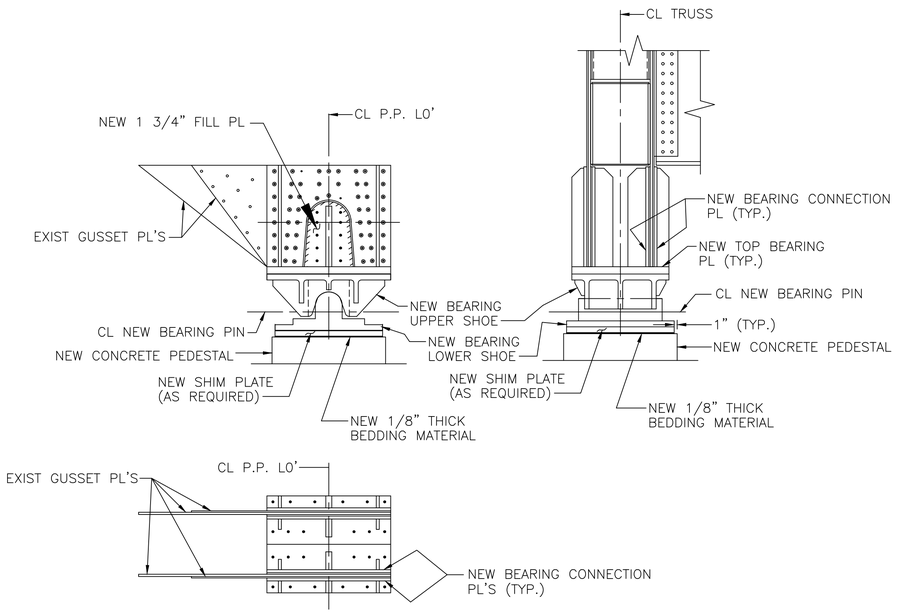
ML1

52-ML1-LLBR1.DWG



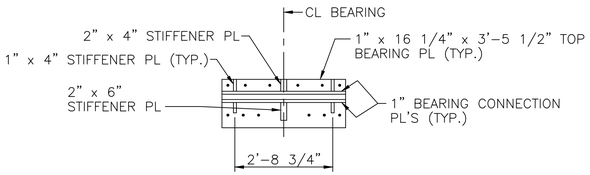
EXISTING FIXED BEARING – L0'

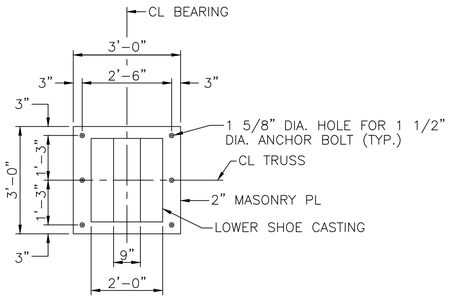
SCALE: 1/2" = 1'-0"

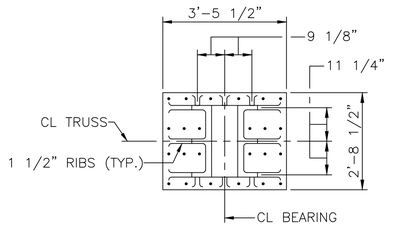


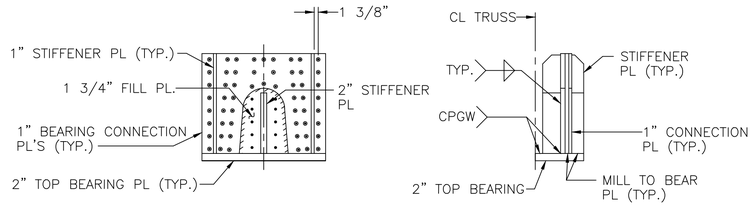
NEW FIXED BEARING – L0'

SCALE: 1/2" = 1'-0"



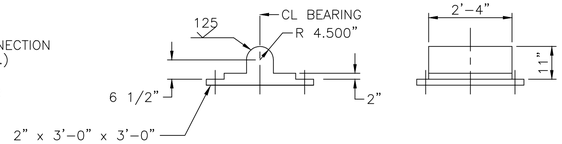






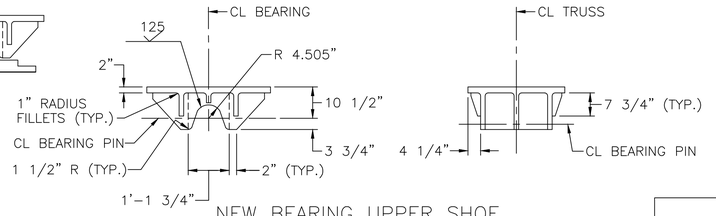
NEW BEARING DIAPHRAGM

SCALE: 1/2" = 1'-0"



NEW BEARING LOWER SHOE

SCALE: 1/2" = 1'-0"



NEW BEARING UPPER SHOE

SCALE: 1/2" = 1'-0"

0 1 2 3

INCHES ON FULL SIZE SHEET

53-ML2-LLBR2.DWG

3/11/2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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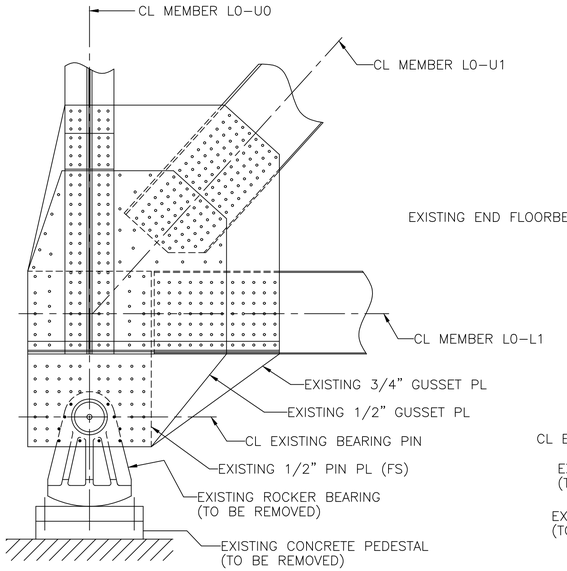
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

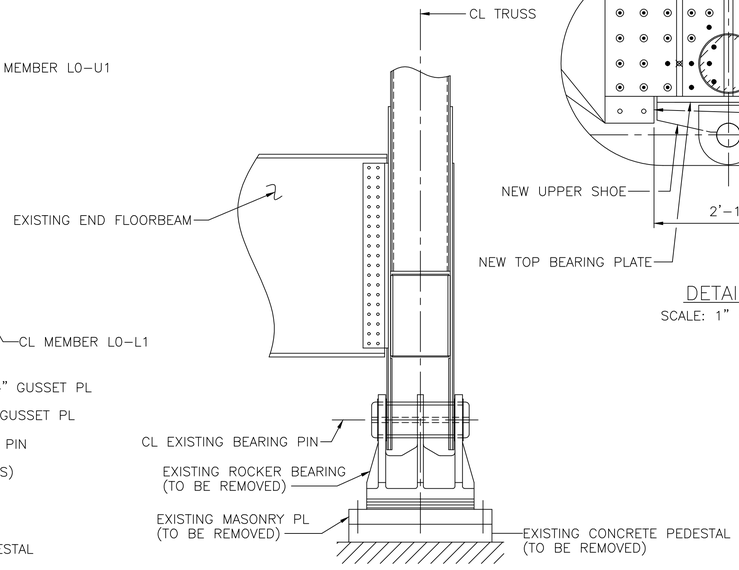
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
LIVE LOAD BEARING
REHABILITATION – 2

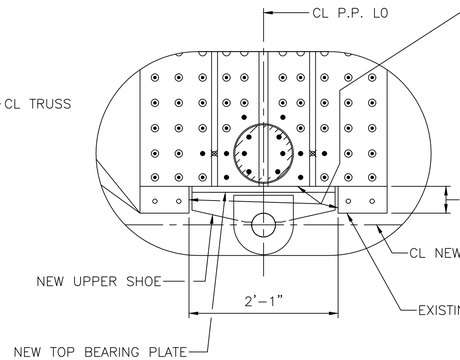
		DRAWN BY	L.R. LENTZ
		SCALE	AS NOTED
ML2	DESIGNED C.P. AHLSKOG	DETAILED L.R. LENTZ	DATE MARCH 2011
	CHECKED K.W. JOHNS	CHECKED K.W. JOHNS	DRAWING NO. 53 OF 63



EXISTING EXPANSION BEARING – L0

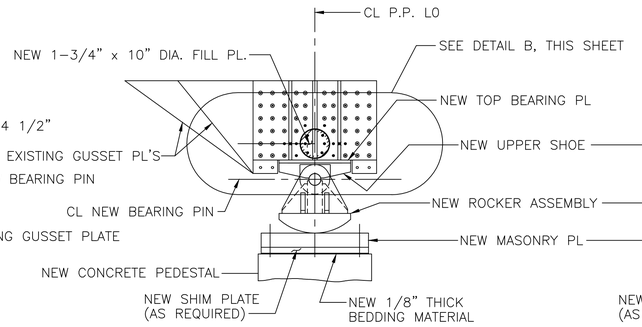
SCALE: 1/2" = 1'–0"

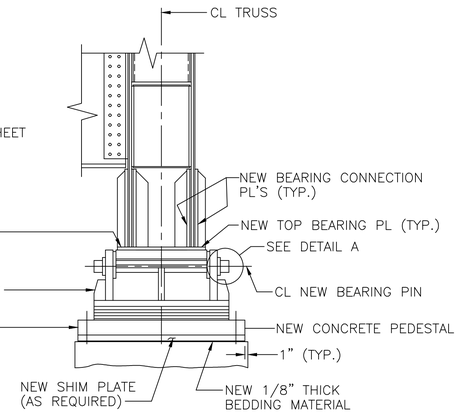


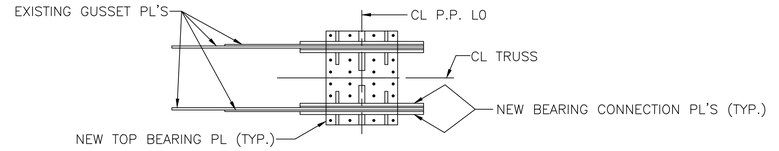


DETAIL B

SCALE: 1" = 1'–0"

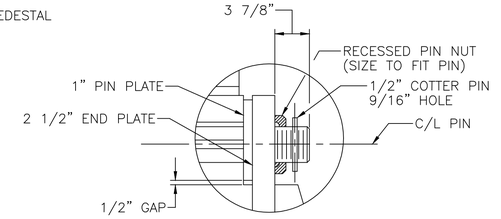






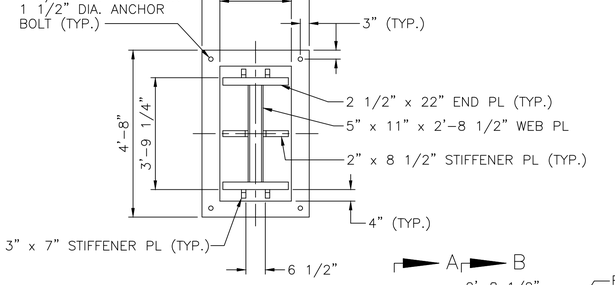
NEW EXPANSION BEARING – L0

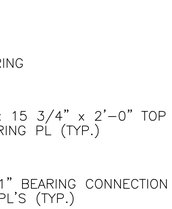
SCALE: 1/2" = 1'–0"

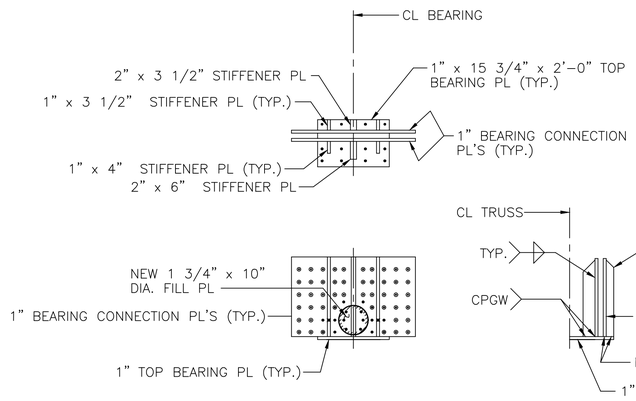


DETAIL A

SCALE: 1 1/2" = 1'–0"

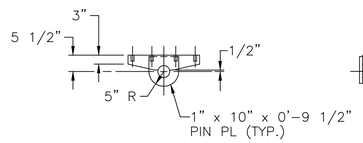






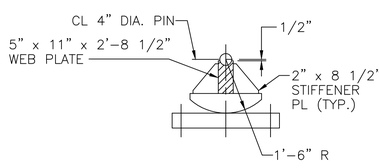
NEW BEARING CONNECTION PLATES

SCALE: 1/2" = 1'–0"



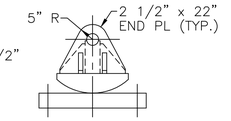
NEW BEARING UPPER SHOE

SCALE: 1/2" = 1'–0"



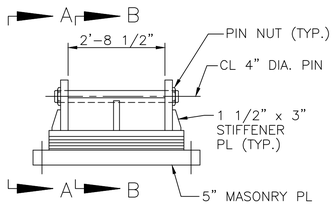
SECTION B–B

SCALE: 1/2" = 1'–0"



SECTION A–A

SCALE: 1/2" = 1'–0"



NEW BEARING ROCKER ASSEMBLY

0 1 2 3

INCHES ON FULL SIZE SHEET

54–ML3–LLBR3.DWG

3RD MAY 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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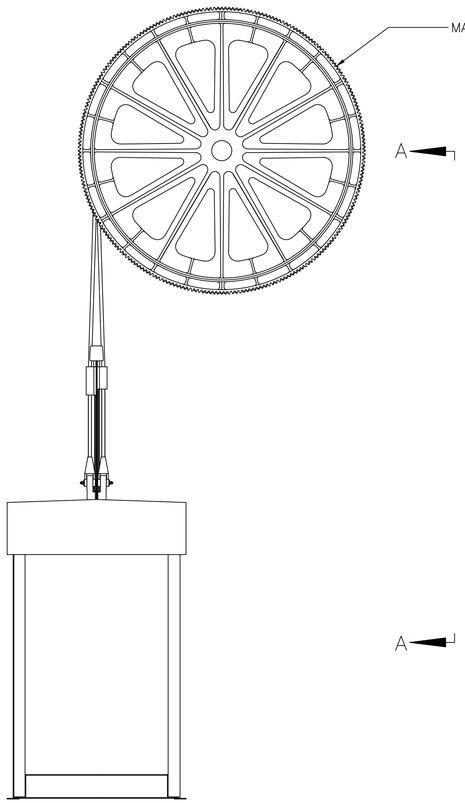
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
LIVE LOAD BEARING
REHABILITATION – 3

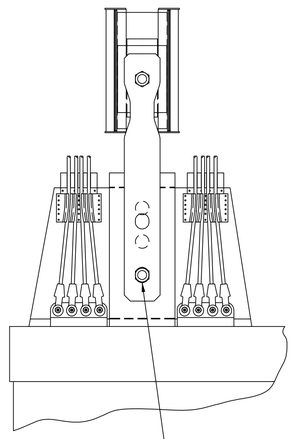
		DRAWN BY	L.R. LENTZ
		SCALE	AS NOTED
DESIGNED C.P. AHLSKOG	DETAILED L.R. LENTZ	DATE	MARCH 2011
CHECKED K.W. JOHNS	CHECKED K.W. JOHNS	DRAWING NO.	54 OF 63

ML3



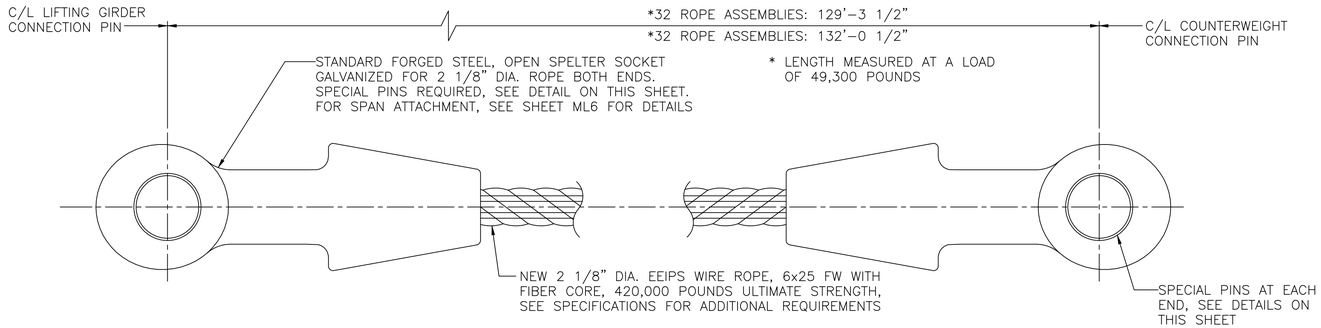
MAIN COUNTERWEIGHT

SCALE: 1/4" = 1'–0"



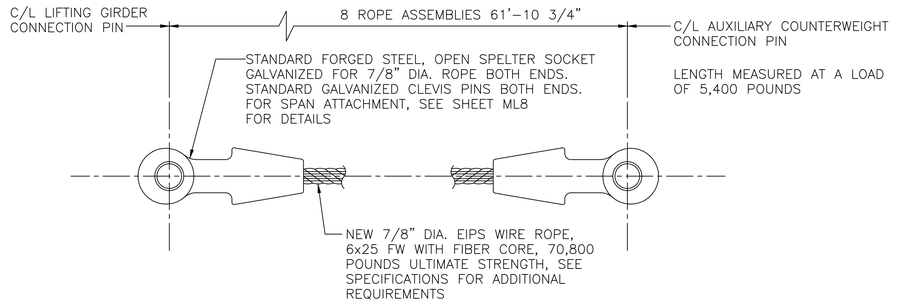
VIEW A–A

SCALE: 1/4" = 1'–0"
ONE (1) CORNER OF MAIN COUNTERWEIGHT SHOWN



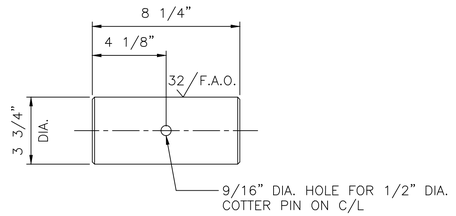
NEW COUNTERWEIGHT ROPE AND SOCKETS

SCALE: 3" = 1'–0"



NEW AUXILIARY COUNTERWEIGHT ROPE AND SOCKETS

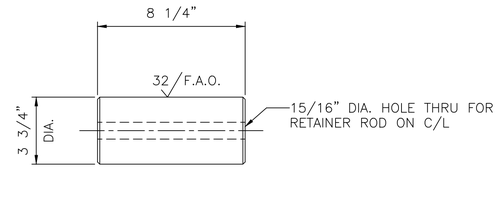
SCALE: 3" = 1'–0"



NEW PIN FOR LIFTING GIRDER CONNECTION

SCALE: 3" = 1'–0"
(64 REQUIRED)

MATERIAL:
STAINLESS STEEL, ASTM A276, TYPE 410, CONDITION H



NEW PIN FOR COUNTERWEIGHT CONNECTION

SCALE: 3" = 1'–0"
(64 REQUIRED)

MATERIAL:
STAINLESS STEEL, ASTM A276, TYPE 410, CONDITION H

NOTES:

1. CONTRACTOR SHOULD NOTE THAT THE NEW COUNTERWEIGHT ROPE LENGTHS ARE PER THE ORIGINAL DESIGN. THE JACKING PLAN MUST ACCOUNT FOR THE EXISTING ROPE STRETCH PLUS THE RELAXED STATE OF THE NEW ROPES. THE RELAXED STATE IS ESTIMATED TO REQUIRE 4 INCHES OF JACKING. THE JACKING REQUIRED FOR THE EXISTING ROPE STRETCH WILL BE DETERMINED BY THE CONTRACTOR'S FIELD MEASUREMENTS OF THE EXISTING ROPE LENGTHS AND COUNTERWEIGHT HANGER HOLE LOCATIONS.
2. CONTRACTOR MUST VERIFY AND SUBMIT ALL EXISTING ROPE LENGTHS IN THE FIELD TO AN ACCURACY OF ± 1/4".
3. CONTRACTOR MUST SUBMIT DETAILED PROCEDURE FOR REPLACEMENT OF COUNTERWEIGHT ROPES.
4. ALL DIMENSIONS MUST BE FIELD VERIFIED FOR PROPER FIT WITH EXISTING COMPONENTS.
5. CONTRACTOR SHALL REMOVE ALL OLD LUBRICANT, DEBRIS, ETC. FROM EXISTING COUNTERWEIGHT SHEAVE GROOVES BEFORE INSTALLATION OF NEW ROPES.

0 1 2 3
INCHES ON FULL SIZE SHEET

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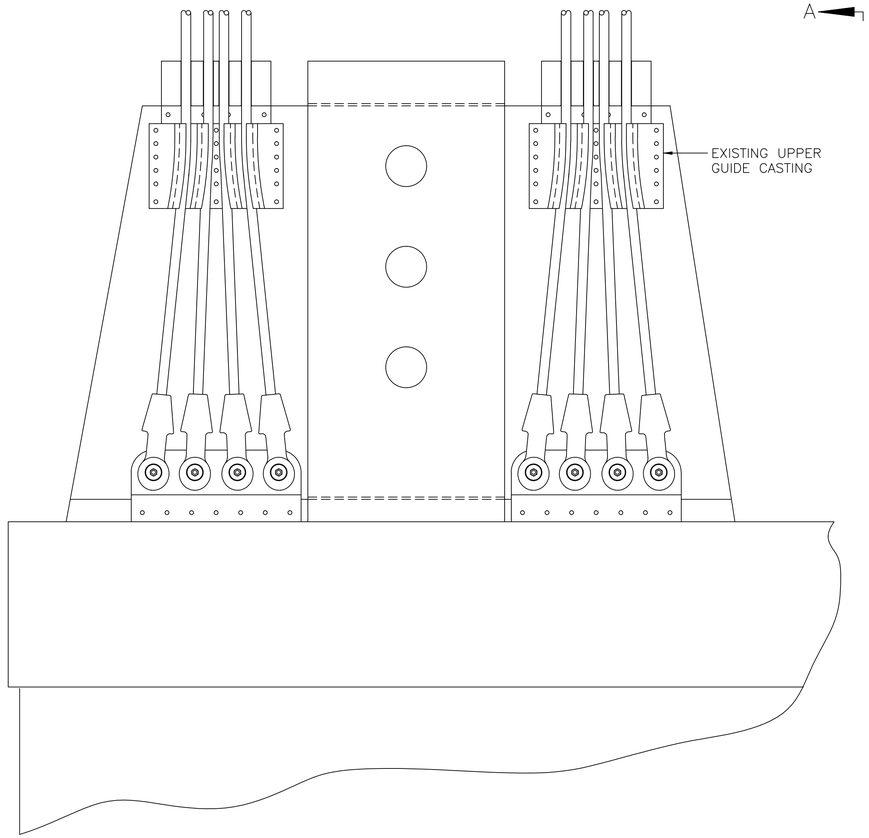
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
NEW MAIN AND AUXILIARY
COUNTERWEIGHT ROPES

		DRAWN BY	R.L. REED
		SCALE	AS NOTED
DESIGNED D.L. MILLER	DETAILED R.L. REED	DATE	MARCH 2011
CHECKED A.M. BRODSKY	CHECKED R.L. REED	DRAWING NO.	55 OF 63

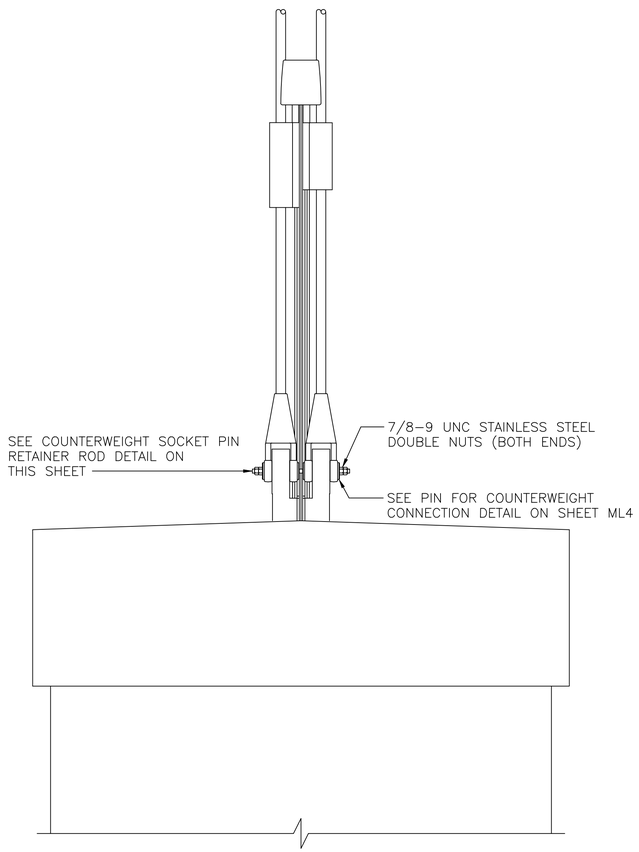
ML4

55-ML4-NMACR.DWG



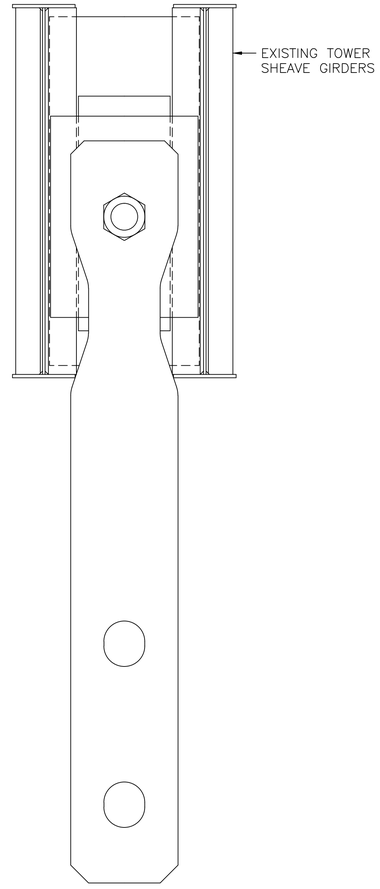
ELEVATION
MAIN COUNTERWEIGHT ROPE CONNECTION

SCALE: 3/4" = 1'–0"



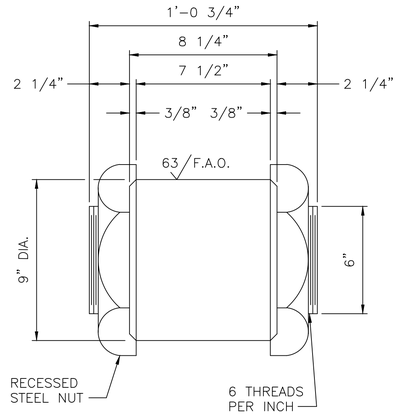
VIEW A–A

SCALE: 3/4" = 1'–0"



EXISTING MAIN COUNTERWEIGHT HANGERS

SCALE: 3/4" = 1'–0"



LOWER HANGER PIN DETAIL

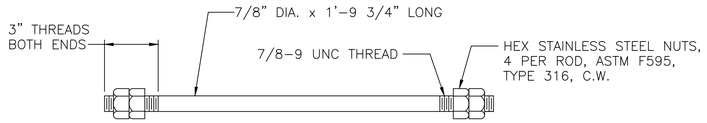
SCALE: 3" = 1'–0"

NOTE: 4 OF THESE PINS ARE REQUIRED FOR HANGING THE MAIN COUNTERWEIGHTS. IF EXISTING PINS ARE AVAILABLE, USE THEM. IF NOT, THE CONTRACTOR MUST FABRICATE THE HANGER PIN AND NUTS.

MATERIAL: FORGED STEEL, ASTM A668, CLASS D OR EQUAL.

NOTES:

1. CONTRACTOR MUST SUBMIT DETAILED PROCEDURE FOR REPLACEMENT OF COUNTERWEIGHT ROPES.
2. ALL DIMENSIONS MUST BE FIELD VERIFIED FOR PROPER FIT WITH EXISTING COMPONENTS.
3. CONTRACTOR SHALL REMOVE OLD LUBRICANT, DEBRIS, ETC. FROM ALL EXISTING UPPER GUIDE CASTINGS.



NEW COUNTERWEIGHT SOCKET PIN RETAINER ROD

SCALE: 3" = 1'–0"
(32 REQUIRED)
STAINLESS STEEL ASTM F593, TYPE 316, CONDITION SH2

0 1 2 3
INCHES ON FULL SIZE SHEET

56–ML5–RAMC.DWG

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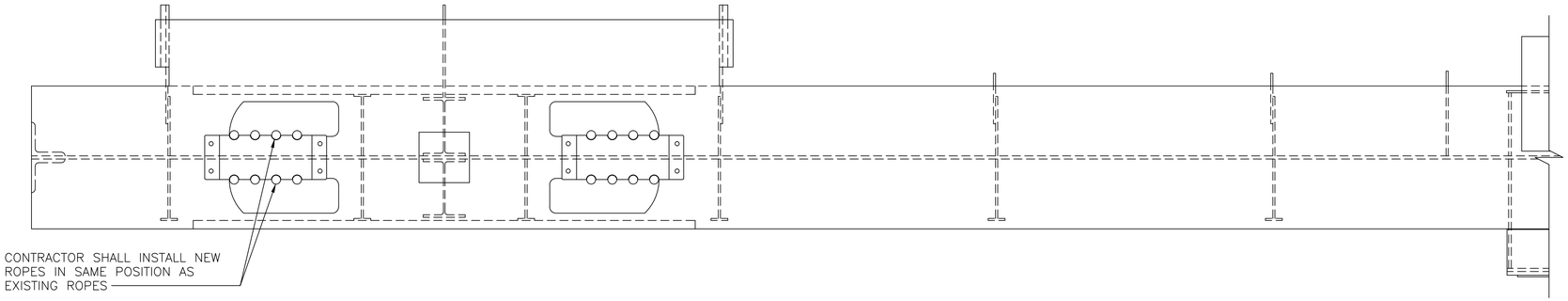
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
ROPE ATTACHMENTS AT
MAIN COUNTERWEIGHT

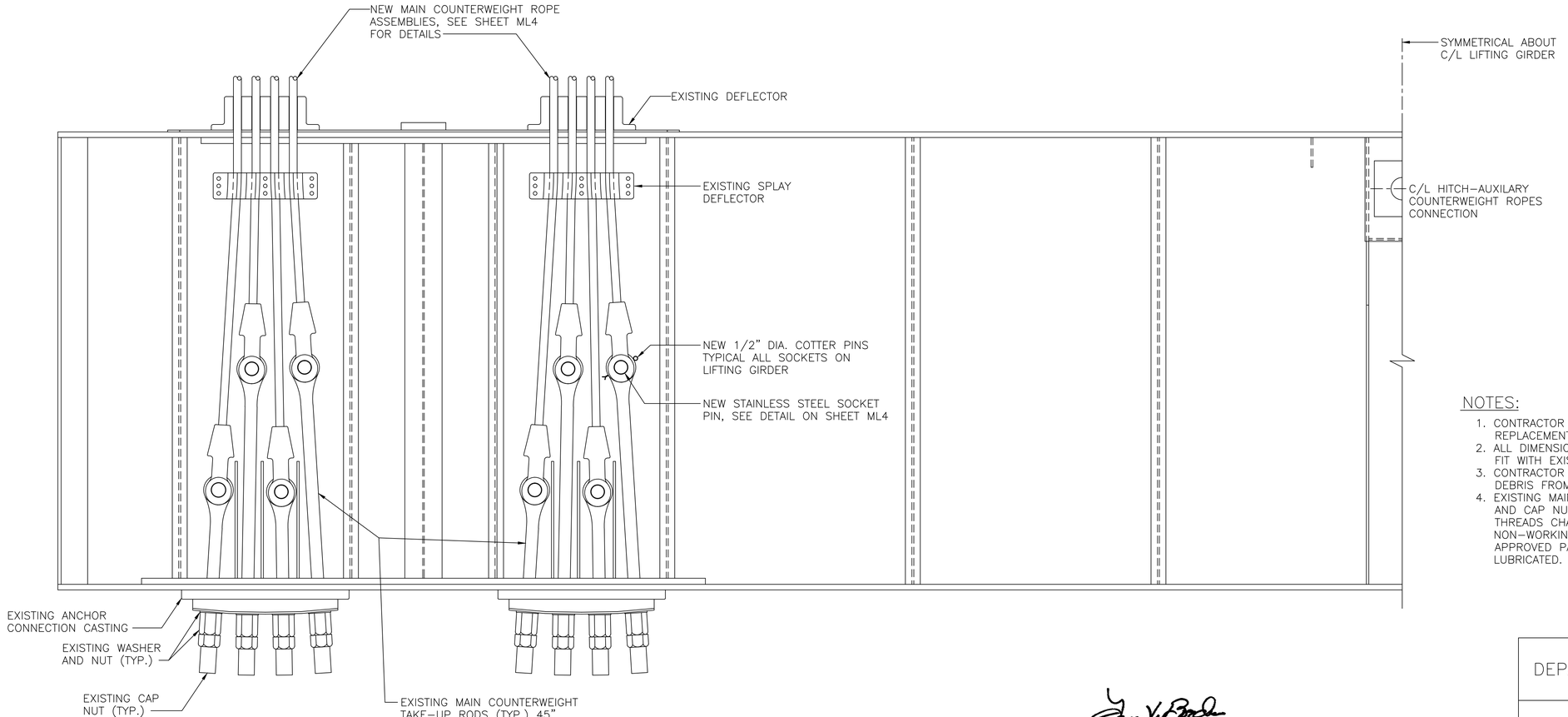
		DRAWN BY	R.L. REED
		SCALE	AS NOTED
DESIGNED D.L. MILLER	DETAILED R.L. REED	DATE	MARCH 2011
CHECKED A.M. BRODSKY	CHECKED R.L. REED	DRAWING NO.	56 OF 63

ML5



PLAN

SCALE: 3/4" = 1'-0"



EXISTING LIFTING GIRDER

SCALE: 3/4" = 1'-0"

NOTES:

1. CONTRACTOR MUST SUBMIT DETAILED PROCEDURE FOR REPLACEMENT OF COUNTERWEIGHT ROPES.
2. ALL DIMENSIONS MUST BE FIELD VERIFIED FOR PROPER FIT WITH EXISTING COMPONENTS.
3. CONTRACTOR SHALL REMOVE ALL OLD LUBRICANT AND DEBRIS FROM EXISTING SPLAY DEFLECTORS.
4. EXISTING MAIN COUNTERWEIGHT TAKE-UP RODS, NUTS, AND CAP NUTS TO BE REMOVED, CLEANED, AND THREADS CHASED FULL LENGTH BEFORE REINSTALLATION. NON-WORKING SURFACES TO BE PAINTED WITH APPROVED PAINT SYSTEM AND THREADS TO BE WELL LUBRICATED.

0 1 2 3

INCHES ON FULL SIZE SHEET

3rd MAR 2011

NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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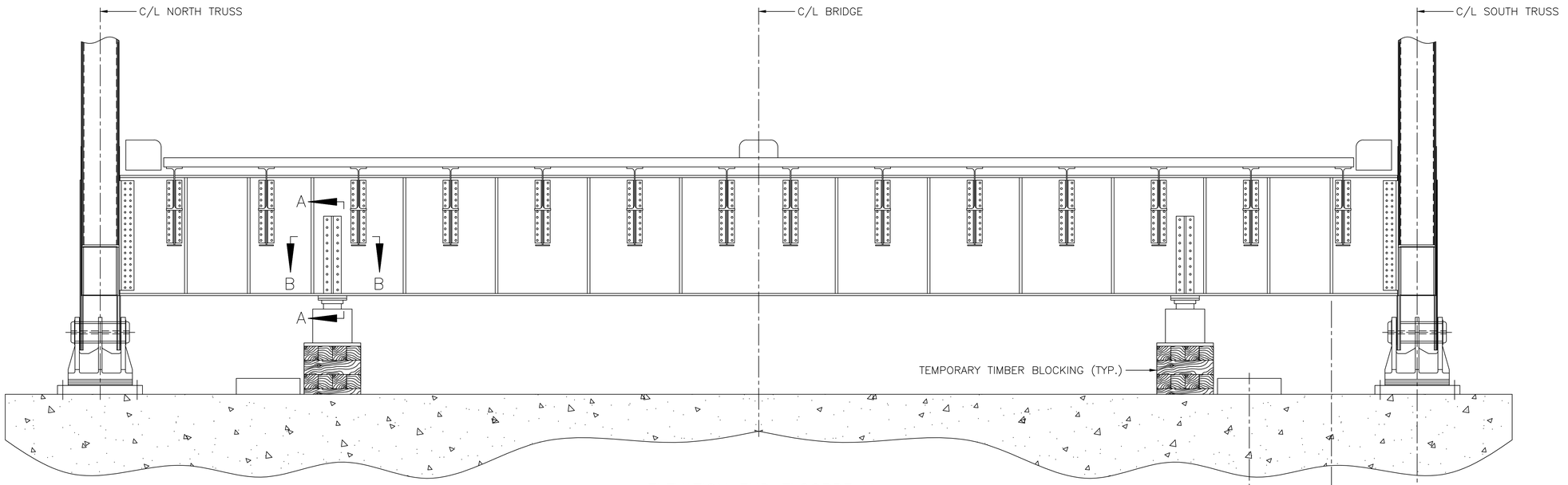
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
ROPE ATTACHMENTS AT
SPAN LIFTING GIRDER

		DRAWN BY	R.L. REED
		SCALE	AS NOTED
DESIGNED D.L. MILLER	DETAILED R.L. REED	DATE	MARCH 2011
CHECKED A.M. BRODSKY	CHECKED R.L. REED	DRAWING NO.	57 OF 63

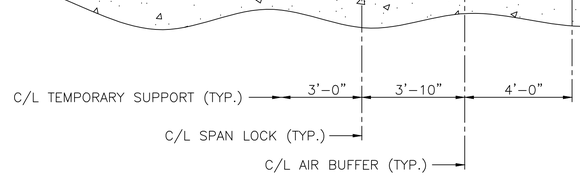
ML6

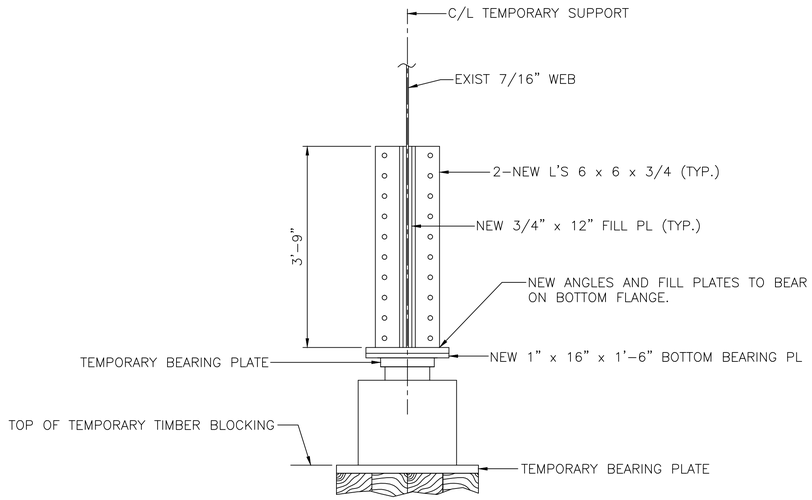
57-ML6-RASLG.DWG



ELEVATION END FLOORBEAM

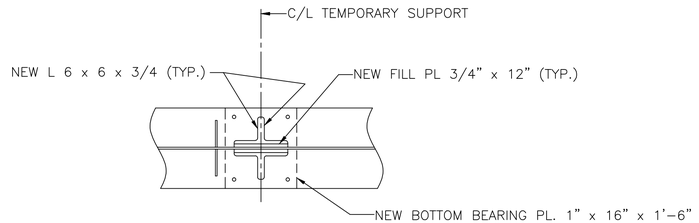
SCALE: 3/8" = 1'-0"
(PANEL POINT LO SHOWN, PANEL POINT LO' SIMILAR)





SECTION A-A

SCALE: 3/4" = 1'-0"



SECTION B-B

SCALE: 3/4" = 1'-0"

NOTES:

1. ALL CALCULATIONS, JACKING HYDRAULIC DIAGRAM, AND JACKING PROCEDURE SHALL BE PREPARED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA.
2. FOR REFERENCE, THE TOTAL LIFT SPAN WEIGHT IS APPROXIMATELY 3,160,000 LBS.

0 1 2 3
INCHES ON FULL SIZE SHEET

3rd MARCH 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

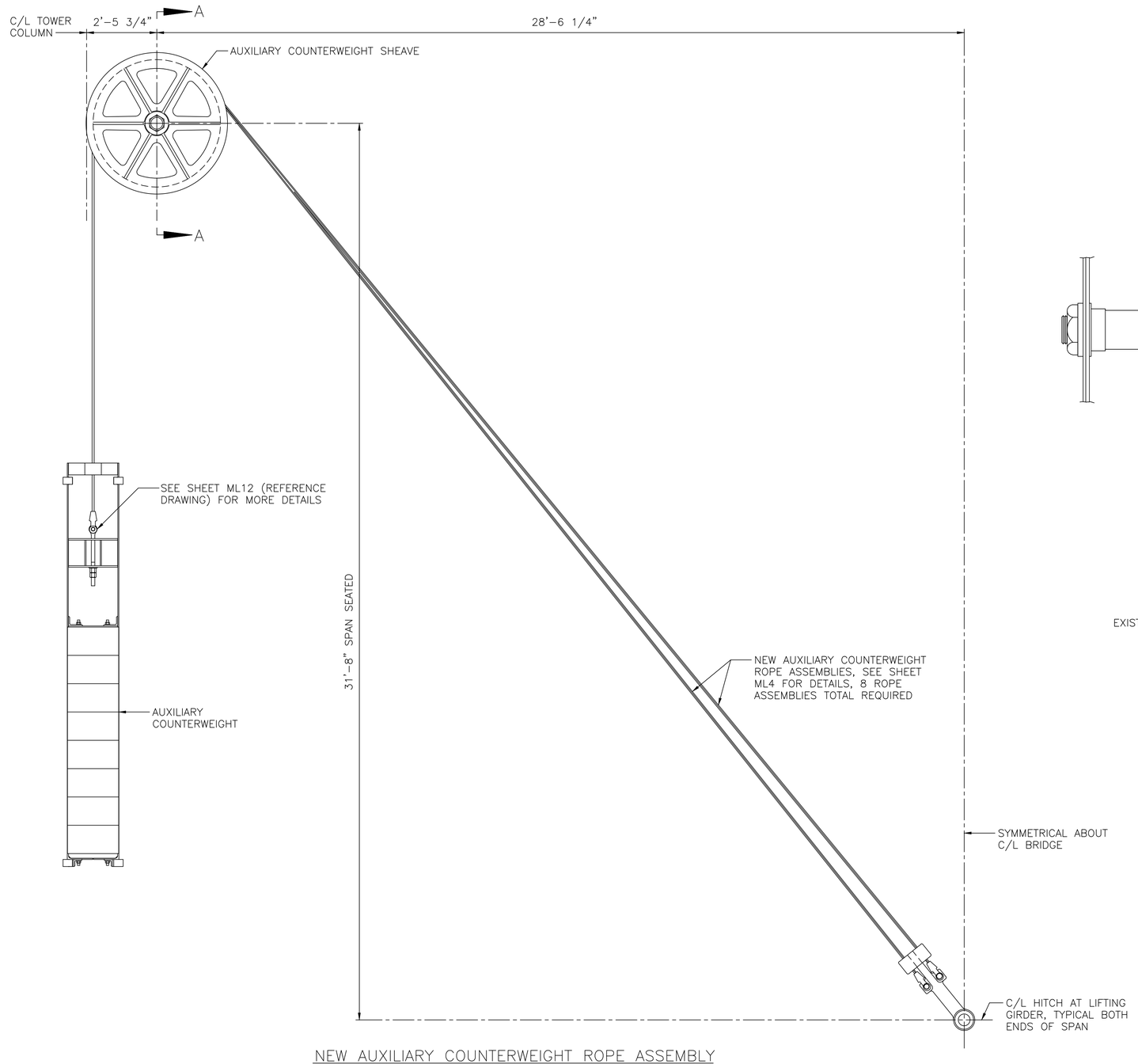
CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA

JACKING OF LIFT SPAN

		DRAWN BY	R.L. REED
		SCALE	AS NOTED
DESIGNED C.P. AHLSKOG	DETAILED R.L. REED	DATE	MARCH 2011
CHECKED D.M. BARRETT	CHECKED R.L. REED	DRAWING NO.	58 OF 63

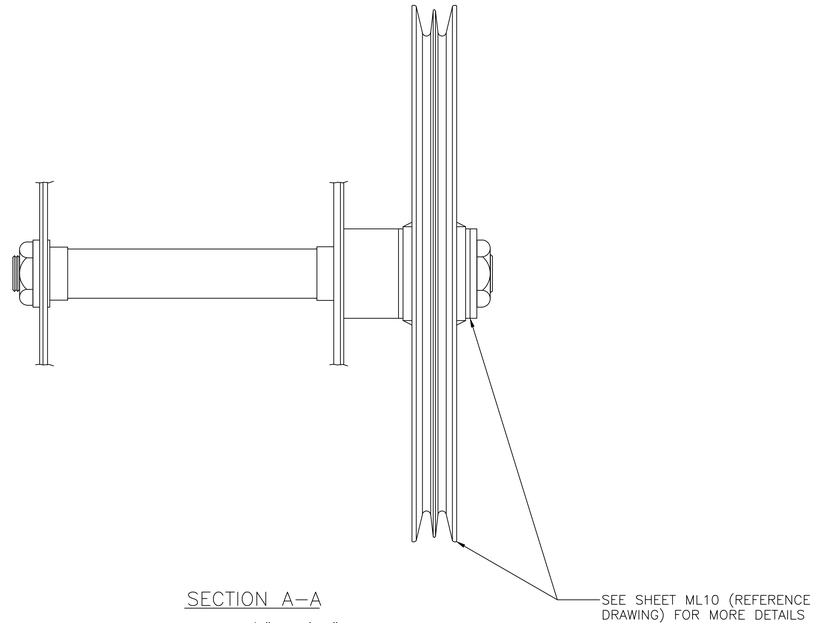
ML7

58-ML7-JLS.DWG



NEW AUXILIARY COUNTERWEIGHT ROPE ASSEMBLY

SCALE: 1/2" = 1'-0"



SECTION A-A

SCALE: 1 1/2" = 1'-0"
EXISTING AUXILIARY COUNTERWEIGHT ROPE SHEAVE AT TOWER (TYPICAL 4 LOCATIONS)

NOTES:

1. CONTRACTOR MUST VERIFY AND SUBMIT ALL EXISTING ROPE LENGTHS AND PROPOSED NEW ROPE LENGTHS FOR APPROVAL. EXISTING ROPE LENGTHS MUST HAVE AN ACCURACY OF ± 1/4".
2. CONTRACTOR MUST SUBMIT DETAILED PROCEDURE FOR REPLACEMENT OF COUNTERWEIGHT ROPES.
3. ALL DIMENSIONS MUST BE FIELD VERIFIED FOR PROPER FIT WITH EXISTING COMPONENTS.
4. CONTRACTOR SHALL REMOVE ALL OLD LUBRICANT, DEBRIS, ETC. FROM EXISTING AUXILIARY COUNTERWEIGHT SHEAVES BEFORE INSTALLATION OF NEW ROPES.
5. EXISTING AUXILIARY COUNTERWEIGHT TAKE-UP RODS AND NUTS TO BE REMOVED, CLEANED, AND THREADS CHASED FULL LENGTH BEFORE REINSTALLATION. NON-WORKING SURFACES TO BE PAINTED WITH APPROVED PAINT SYSTEM AND THREADS TO BE WELL LUBRICATED.

3-17-2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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0 1 2 3
INCHES ON FULL SIZE SHEET

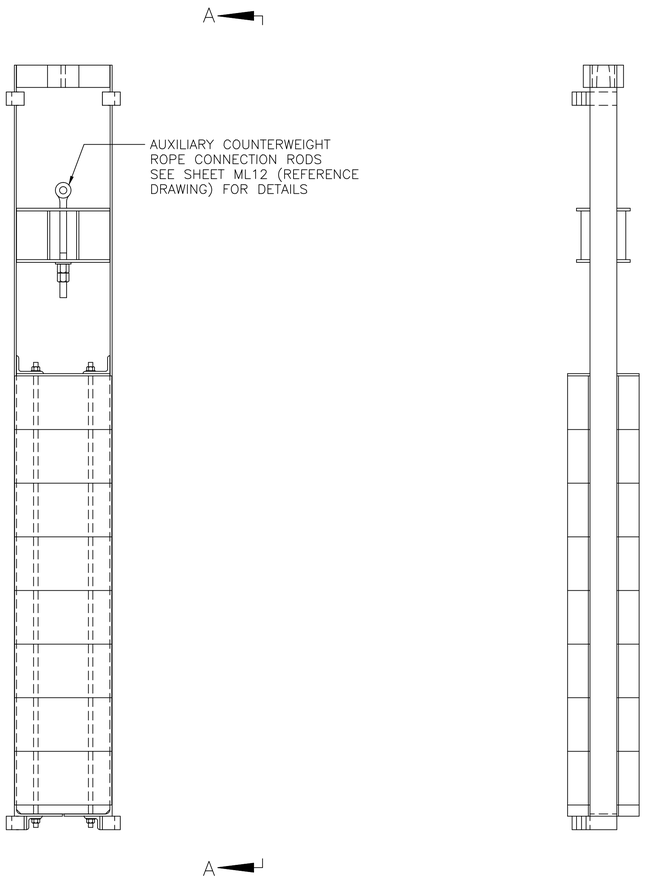
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
ROPE ATTACHMENTS FOR
AUXILIARY COUNTERWEIGHT

		DRAWN BY	R.L. REED
		SCALE	AS NOTED
DESIGNED D.L. MILLER	DETAILED R.L. REED	DATE	MARCH 2011
CHECKED A.M. BRODSKY	CHECKED R.L. REED	DRAWING NO.	59 OF 63

ML8

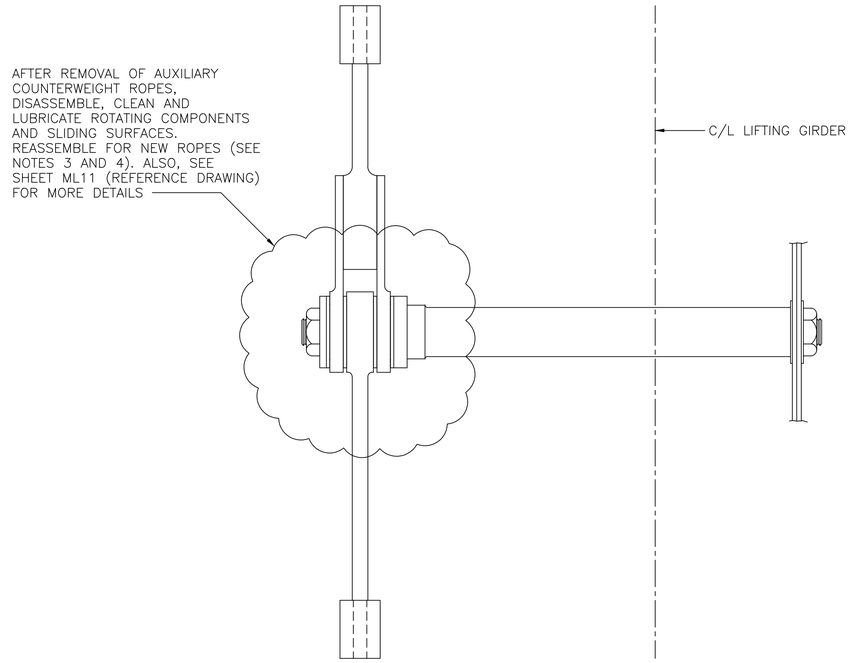
59-ML8-RAAC.DWG



EXISTING AUXILIARY COUNTERWEIGHT (4 LOCATIONS)

ELEVATION — SCALE: 3/4" = 1'–0"

VIEW A–A — SCALE: 3/4" = 1'–0"



ARM SHAFT AND HITCH CONNECTION AT SPAN LIFTING GIRDER FOR AUXILIARY COUNTERWEIGHT (2 LOCATIONS)

SCALE: 1 1/2" = 1'–0"

NOTES:

1. AUXILIARY COUNTERWEIGHT SHOWN FOR REFERENCE ONLY.
2. EACH AUXILIARY COUNTERWEIGHT WEIGHS APPROXIMATELY 10,800 POUNDS.
3. CONTRACTOR SHALL REMOVE ALL OLD LUBRICANT, DEBRIS, ETC. FROM AUXILIARY COUNTERWEIGHT GUIDES AND THE ARM SHAFT AND HITCH CONNECTION.
4. THE ARM SHAFT AND HITCH CONNECTION SHALL BE THOROUGHLY LUBRICATED WITH ROPES REMOVED.

3rd March 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

0 1 2 3
INCHES ON FULL SIZE SHEET

60-ML9-ACA.DWG

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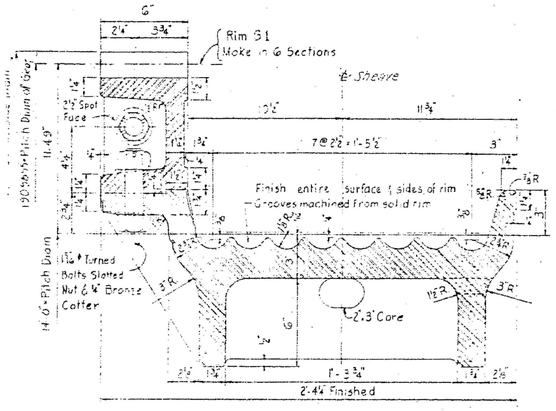
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
AUXILIARY COUNTERWEIGHT ASSEMBLY

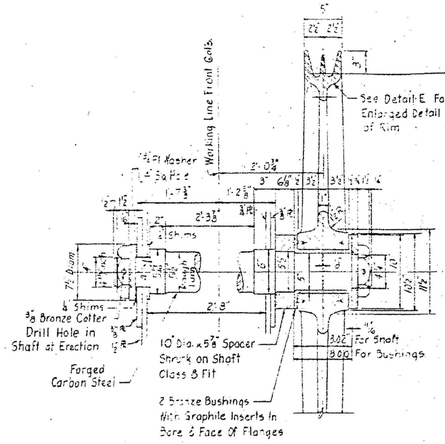
		DRAWN BY	R.L. REED
		SCALE	AS NOTED
DESIGNED D.L. MILLER	DETAILED R.L. REED	DATE	MARCH 2011
CHECKED A.M. BRODSKY	CHECKED R.L. REED	DRAWING NO.	60 OF 63

ML9

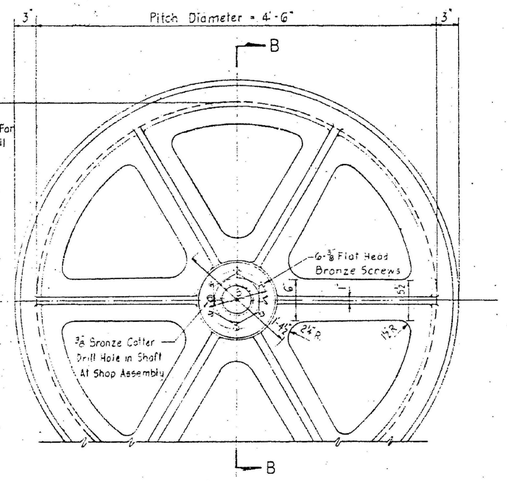
FED. ROAD DIV. NO.	STATE	PROJECT NO.
3	N.C.	8.1355105
F.A. PROJECT	F-75-2(8)	



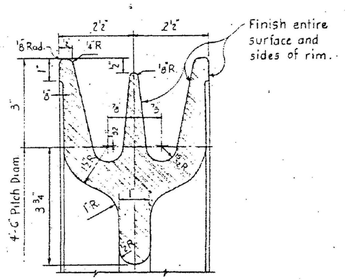
RIM SECTION FOR MAIN SHEAVES
Cast Carbon Steel
3/4" = 1'-0"



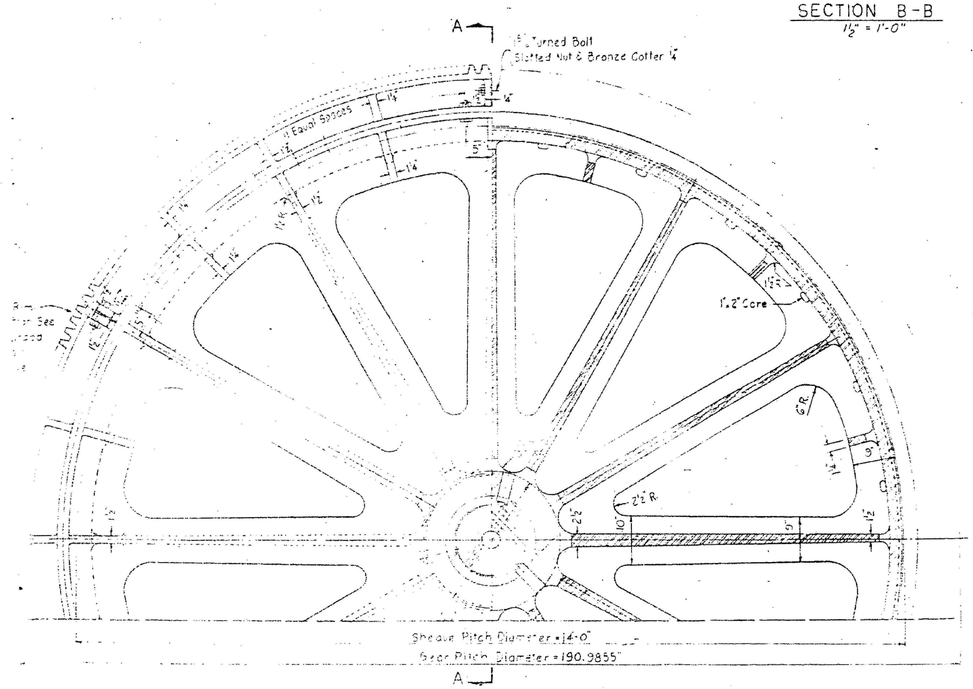
SECTION B-B
1½" = 1'-0"



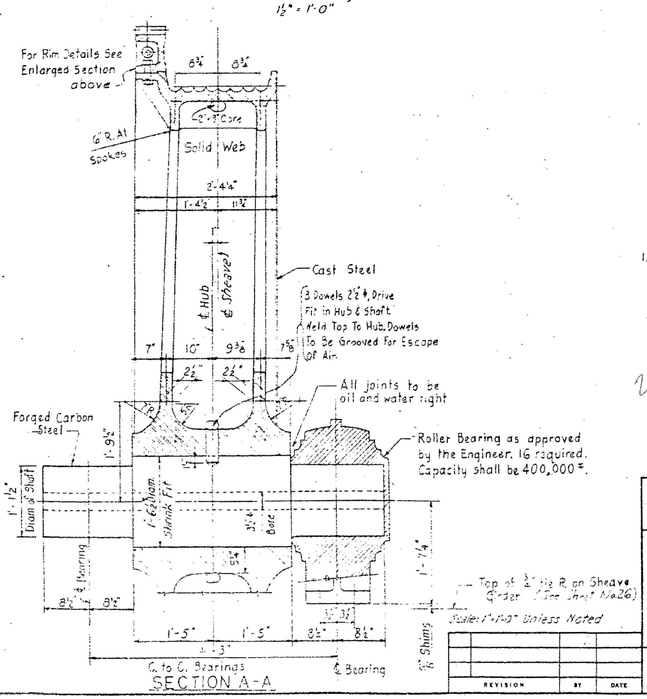
AUXILIARY COUNTERWEIGHT SHEAVES
Cast Carbon Steel - 4 Required
½" = 1'-0"



DETAIL E
Half Size



MAIN COUNTERWEIGHT SHEAVES
Cast Carbon Steel - 8 Required



Notes:
1. For additional details of Gear Rim, see Sheet No. 37.

20.625 ℄ Sheave to Top of S.G.

REVISION	BY	DATE

PROJECT No. 8.1355105
NEW HANOVER COUNTY

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
RALEIGH

CAPE FEAR RIVER CROSSING
AT WILMINGTON

LIFT BRIDGE SUPERSTRUCTURE

SHEAVES AND SHAFTS

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK

DATE: March, 1967
SHEET NO. 34 OF 67

REFERENCE DRAWING FROM ORIGINAL DESIGN – INCLUDED FOR

REFERENCE PURPOSES ONLY.

ALL DIMENSIONS MUST BE FIELD VERIFIED.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
REFERENCE DRAWING – SHEAVES AND SHAFTS

		DRAWN BY	E.J.POE
		SCALE	AS NOTED
DESIGNED D.M. BARRETT	DETAILED E.J. POE	DATE	MARCH 2011
CHECKED D.M. BARRETT	CHECKED D.M. BARRETT	DRAWING NO.	61 OF 63

ML10

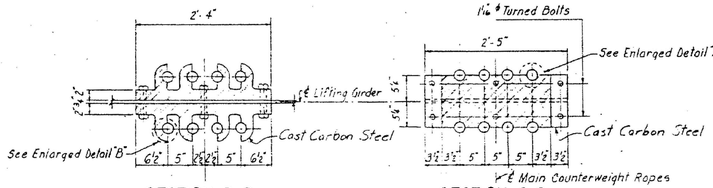
0 1 2 3
INCHES ON FULL SIZE SHEET

61-ML10-REF-SS.DWG

3/17/2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

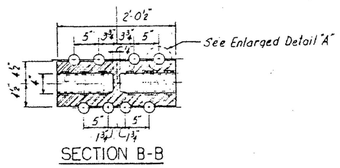
MODJESKI and MASTERS
Experience great bridges.

FED. ROAD DIV. NO.	STATE	PROJECT NO.
3	N.C.	8.1355105
F.A. PROJECT	F-75-2(8)	

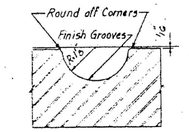


SECTION D-D

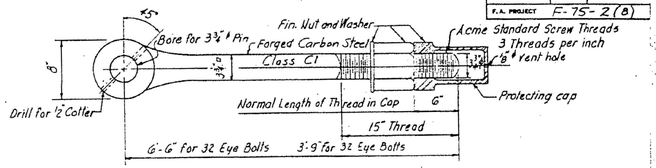
SECTION C-C

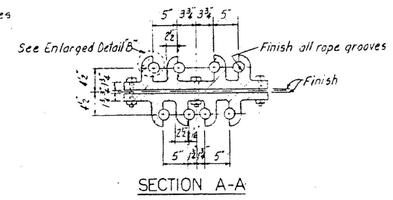


SECTION B-B

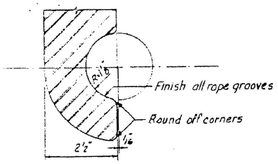


DETAIL 'A' OF ROPE GROOVE
Scale: Half Size

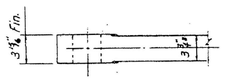




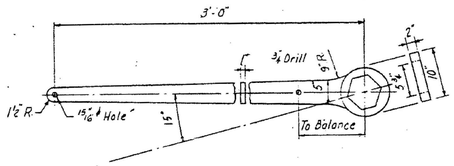
SECTION A-A



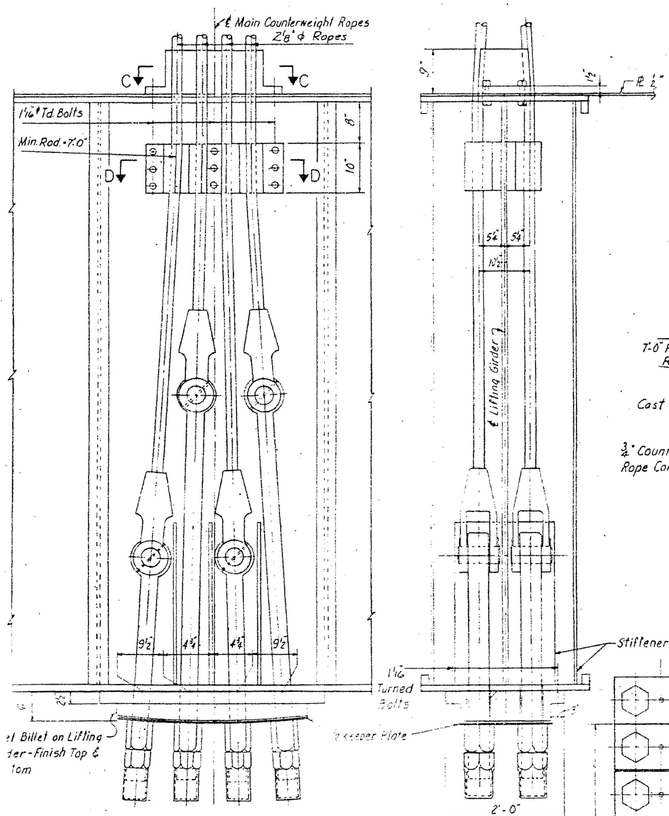
DETAIL 'B' OF ROPE GROOVE
Scale: Half Size



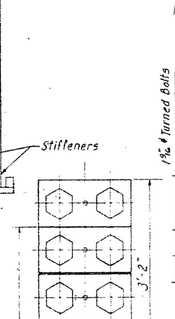
TAKE-UPS FOR MAIN COUNTERWEIGHT ROPES
Scale: 1½"=1'-0"



WRENCH FOR MAIN COUNTERWEIGHT ROPE TAKE-UPS
Not to Scale

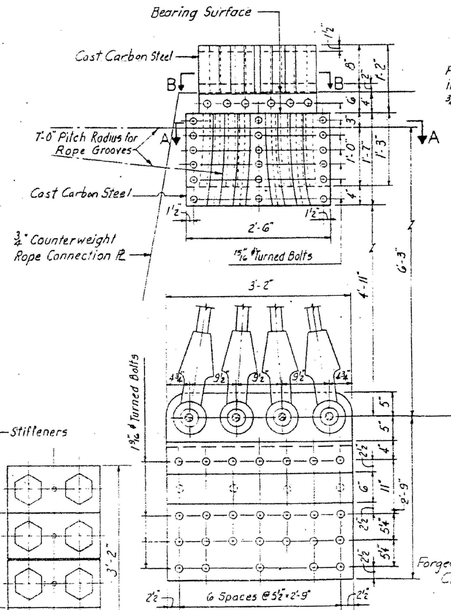


CONNECTION OF COUNTERWEIGHT ROPES TO SPAN
(8 Sets Required)

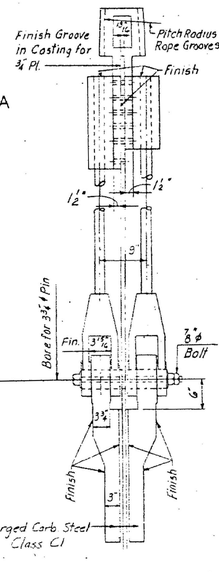


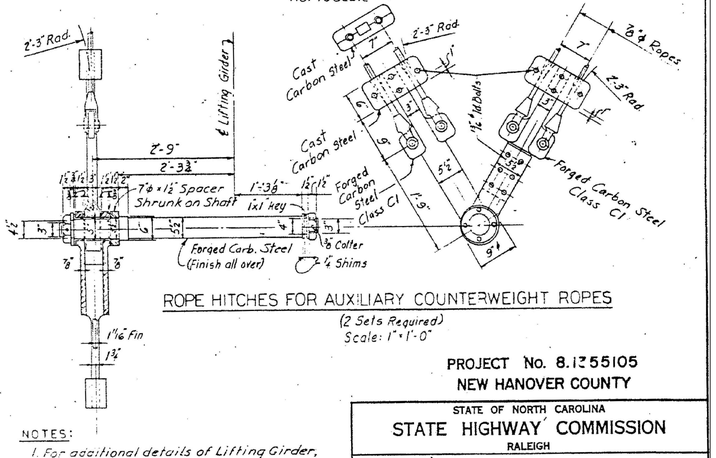
½" Keeper Pls. for Nuts on Rope Take-Ups, Holes to fit Nuts on Eye Bolts. Fasten to Billet with ¾" ϕ Top Bolts having lock washers under heads. Furnish 2 Socket wrenches for these Top Bolts.

DETAIL OF KEEPER ℞



CONNECTION OF ROPES TO COUNTERWEIGHTS
(8 Sets Required)
Scale: 1"=1'-0"





ROPE HITCHES FOR AUXILIARY COUNTERWEIGHT ROPES
(2 Sets Required)
Scale: 1"=1'-0"

NOTES:
1. For additional details of Lifting Girder, see Sheet No. 14.
2. For details of Main Counterweights, see Sheet No. 31.

PROJECT No. 8.1355105
NEW HANOVER COUNTY

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
RALEIGH

CAPE FEAR RIVER CROSSING
AT WILMINGTON
LIFT BRIDGE SUPERSTRUCTURE
ROPE CONNECTIONS

REVISION	BY	DATE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. — DATE: March, 1967
ENGINEERS — NEW YORK — SHEET NO. 36 OF 67

Scale: 1"=1'-0" Unless Noted

REFERENCE DRAWING FROM ORIGINAL DESIGN – INCLUDED FOR

REFERENCE PURPOSES ONLY.

ALL DIMENSIONS MUST BE FIELD VERIFIED.

0 1 2 3
INCHES ON FULL SIZE SHEET

62-ML11-REF-RG.DWG

3rd March 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE
AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
REFERENCE DRAWING –
ROPE CONNECTIONS

		DRAWN BY	E.J. POE
		SCALE	AS NOTED
DESIGNED D.M. BARRETT	DETAILED E.J. POE	DATE	MARCH 2011
CHECKED D.M. BARRETT	CHECKED D.M. BARRETT	DRAWING NO.	62 OF 63

ML11

FED. ROAD DIV. NO.	STATE	PROJECT NO.
3	N.C.	8.1355105
F.A. PROJECT	F-75-2 (8)	

1 1/16" Turned Bolts with Lockwasher. Spotface. Holes to be reamed while assembled to Steel Work.

Bottom Lift Span End Floorbeam Flange (Span Buffer) See Sheet No. 7

Bottom G2 or G2A Flange (Tower Buffer) See Sheet No. 28

Drain Plug

1/2" Pipe Plug Bass 2 1/2" x 1/4" ø Drill.

12-1 1/16" Turned Bolts with Lock-washers. 23 1/2" Bolt Circle Equal Spaces

Tower Buffer 3'-9 1/2"
Span Buffer 6"

SECTION B-B

Oil hole here & diagonally opposite

Needle valve this side. Check valve opposite side.

1 - Angle needle valve - 1/4" opening. (To be adjusted to obtain a maximum pressure of 100 #/□" in buffer when span strikes at reduced closing speed.)
2 - 1/2" Thumbscrews with lead washers for oil holes.
1 - 1/2" Swing check valve suitable for 1000 #/□" pressures.
1 - Pressure gage suitable for pressures of 1000 #/□".
Supply cap screws and lead washers to close opening when gage is removed.

See Detail

6 Ribs ℄ Thk.

Cast Carbon Steel

17 15/16" Piston Dia.

18" Bore ± 0.001

Core

Cast Carbon Steel

Forged Carbon Steel
1/4" x 1/8" Grease Grooves
Bronze Bushing - Alloy C
Piston Rod Finish all over
1/4" Chamfer

P.T. Lub. Fitting with 1/4" Pipe & Coupling. 9/16" Drilled Hole.

Span Buffer 3'-9 1/2"
Tower Buffer 7'-1"
Span Buffer 4'-7"
Tower Buffer 7'-10 1/2"
7'-8 7/5"

SECTION A-A
AIR BUFFER
Scale: 1 1/2" = 1'-0"
8 Required

Steel Billet

PLAN

ELEVATION

DETAIL OF ROPE DEFLECTOR
Scale: 1" = 1'-0"

1" ø Round off edge of holes at bottom

1 7/8" ø Sq. Hole Top — 3/8" Cont. Weld All around

1 5/8" ø Hole Bottom

HALF SECTION C-C (UPPER)
HALF SECTION D-D (LOWER)
Scale: 1" = 1'-0"

Symm. about ℄ Bridge

℄ Hitch Shaft Span Open El. 172.96

7/8" ø Wire Rope

℄ Tower Column

℄ Sheave Shaft

Auxiliary Counterweight Sheave

El. 134.63

For Details of connection to Tower, see Sheet No. 22

7/8" ø Wire Rope

℄ Hitch Shaft Span Closed El. 102.96

Top of Auxiliary Counterweight Span Closed

Top of Auxiliary Counterweight Span Open

Top of Auxiliary Counterweight at Lowest Point

℄ Top of B.H. on Pier El. 64.12

SPAN FACE OF TOWER SHOWING AUXILIARY COUNTERWEIGHT
Scale: 1/8" = 1'-0"

3/8" Cont. Weld

Rope Deflector

Guide Casting

Bar 6" x 2"

L 6" x 4" x 5/8" (Weld to 5/8" R after assembly in shop)

12 WF 65

3/4" Turned Bolt Countersunk Heads

1" ø Rod - 8'-8" Lg. 3" Thrd each end

Guide Casting (See detail)

See Detail 'C'

FRONT ELEVATION

SIDE VIEW

Scale: 1/2" = 1'-0"

PLAN

ELEVATION

℄ 1 5/8" ø Holes

Plane opposed areas at top and bottom faces of blocks for even wearing

CAST IRON BLOCKS
Scale: 1" = 1'-0"
8 Blocks required for each Auxiliary Counterweight. Weight of each block = 1020 lbs.

Grind Plate to Fit Bend in Bar

Bar 6" x 2 1/2" x 1'-8 3/8" R = 1"

3/8" Cont. Weld

Bar 6" x 2 1/2"

L 3 1/2" x 3" x 5/8"

Butt Weld

1'-6 3/8" B.B. Ls

5/8" Shim

DETAIL C
Scale: 1" = 1'-0"

Forged Carbon Steel Class C1

3 1/2" ø x 3/8" Bronze Washer

Bore for 1 5/8" ø Pin

Fin. Nuts

Acme Std. Screw Thrds. - 5 Thrds per inch

10" Thread

6 Eye Bolts @ 2'-0"

TAKE-UPS FOR AUXILIARY COUNTERWEIGHT ROPES
Scale: 1 1/2" = 1'-0"
2 REQUIRED FOR EACH AUX. COUNTERWEIGHT

W.L. Front Cols.

℄ Col.

3" Guide L's

℄ Cwt.

Shims 1/2"

SECTION E-E
Scale: 3/4" = 1'-0"

5/8" Socket Head Screw

1/16" Saw cut

4 per ℄

PISTON ROD NUT
ASA Std. semi finished Heavy Series. Cut to 1 3/4" thick with washer face.
Scale: 3" = 1'-0"
8 Required

℄ Aux. Counterweight

Cast Carbon Steel

NOTE: Set Guide Castings to clear the Guide L's by 3/8" all around.

ELEVATION

DETAIL OF GUIDES
Scale: 1 1/2" = 1'-0"
4 Required for each Auxiliary Counterweight

Notes:

1. For details of Auxiliary Counterweight Sheaves, see Sheet No. 34.
2. 4 Auxiliary Counterweights are required. Weight of each = 9,200 lbs. approximately.

PROJECT No. 8.1355105
NEW HANOVER COUNTY

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
RALEIGH

CAPE FEAR RIVER CROSSING
AT WILMINGTON

LIFT BRIDGE SUPERSTRUCTURE

AUXILIARY COUNTERWEIGHTS AND AIR BUFFERS

REVISION	BY	DATE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. — ENGINEERS — NEW YORK

DATE: March, 1947

SHEET NO. 33 OF 67

REFERENCE DRAWING FROM ORIGINAL DESIGN — INCLUDED FOR REFERENCE PURPOSES ONLY.

ALL DIMENSIONS MUST BE FIELD VERIFIED.

0 1 2 3
INCHES ON FULL SIZE SHEET

63-ML12-REF-AC.DWG

3rd March 2011
NORTH CAROLINA PROFESSIONAL SEAL 025801 ENGINEER LANCE V. BORDEN

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CAPE FEAR BASCULE BRIDGE AND MEMORIAL LIFT BRIDGE
WILMINGTON, NORTH CAROLINA
REFERENCE DRAWING — AUXILIARY COUNTERWEIGHTS

		DRAWN BY	E.J. POE
		SCALE	AS NOTED
ML12	DESIGNED D.M. BARRETT	DETAILED E.J. POE	DATE MARCH 2011
	CHECKED D.M. BARRETT	CHECKED D.M. BARRETT	DRAWING NO. 63 OF 63

STATE PROJECT REFERENCE NO.	SHEET NO.
15B.13.12	TCP-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
TRAFFIC CONTROL, MARKING & DELINEATION

NEW HANOVER COUNTY

PROJECT: 15B.13.12

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS"-ROADWAY DESIGN UNIT-N.C. DEPARTMENT OF TRANSPORTATION-RALEIGH, N.C., DATED JULY 2006 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW PANELS
1130.01	DRUMS
1145.01	BARRICADES
1165.01	TRUCK MOUNTED IMPACT ATTENUATOR

INDEX OF SHEETS

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- NORTH ARROW

TRAFFIC CONTROL DEVICES

- TYPE III BARRICADE
- DRUM
- FLASHING ARROW PANEL (TYPE C)
- STATIONARY SIGN
- PORTABLE SIGN
- CHANGEABLE MESSAGE SIGN
- TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)

PROJECT PHASING

NOTE: CONTRACTOR MAY WORK ON BOTH THE ISABEL HOLMES BRIDGE AND THE CAPE FEAR MEMORIAL BRIDGE AT THE SAME TIME, HOWEVER, ONLY ONE BRIDGE LOCATION MAY BE CLOSED AT ONE TIME.

NOTE: CONTRACTOR SHALL ONLY BE ALLOWED TO CLOSE EACH BRIDGE TWO TIMES. CLOSURES DO NOT HAVE TO BE CONSECUTIVE WEEKENDS. SEE SHEET TCP-2, GENERAL NOTE "C" FOR ROAD/BRIDGE LOCATION CLOSURE RESTRICTIONS AND GENERAL NOTE "B" FOR HOLIDAY/SPECIAL EVENT RESTRICTIONS.

STEP 1: PERFORM ALL WORK AS SHOWN IN THE CONTRACT AND CONSTRUCTION PLANS IN ACCORDANCE WITH ALL COAST GUARD REGULATIONS & REQUIREMENTS.

ALL LANE CLOSURES AND ROAD CLOSURES SHALL BE IN ACCORDANCE WITH THE "NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES - JULY 2006" AND THE FOLLOWING TCP SHEETS AS REQUIRED.

FOR THE ISABEL HOLMES BRIDGE (US 74):

TCP-2 (GENERAL NOTES)
TCP-3, 4 & 5 (LANE CLOSURES)
TCP-6 & 7 (ROADWAY/BRIDGE CLOSURE & DETOUR)

FOR THE CAPE FEAR MEMORIAL BRIDGE (US 76):

TCP-2 (GENERAL NOTES)
TCP-8, 8A, 9 & 9A (ROADWAY/BRIDGE CLOSURE & DETOUR)
TCP-10 (LANE CLOSURES)

TCP-11 (WORK ZONE ADVANCE WARNING SIGNS)

NOTE: INSTALL PORTABLE SIGNS ONLY WHEN WORK IS BEING PERFORMED WITH OR WITHOUT A LANE CLOSURE ON US 76. DO NOT INSTALL THE PORTABLE SIGNS WHEN US 76 IS CLOSED.

STEP 2: REMOVE ALL TRAFFIC CONTROL DEVICES FOR LANE CLOSURES AND/OR ROAD CLOSURES AS DIRECTED BY THE ENGINEER AND RETURN TRAFFIC BACK TO ITS EXISTING LANE/TRAFFIC CONFIGURATION AT THE END OF EACH WORK PERIOD.

APPROVED: _____
DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 6873 ENGINEER GILL GETTIER

PLAN PREPARED BY: N.C.D.O.T. WORK ZONE TRAFFIC CONTROL UNIT

J. S. Bourne, P.E.	*TRAFFIC CONTROL ENGINEER*
G. L. Gettier, P.E.	*TRAFFIC CONTROL PROJECT ENGINEER*
J. W. Gilstrap	*TRAFFIC CONTROL PROJECT DESIGN ENGINEER*
S. N. Green	*TRAFFIC CONTROL DESIGN ENGINEER / TECHNICIAN*

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-2

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS, OR RESULT IN DUPLICATE, OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING OR REMOVAL OF DEVICES, AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR AS DIRECTED BY THE ENGINEER.

TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS **(NOTE: CONTRACTOR SHALL NOT HAVE LANE CLOSURES IN THE SAME DIRECTION ON BOTH BRIDGES AT THE SAME TIME.):**

ROAD NAME	DAY AND TIME RESTRICTIONS
1. US 74 & US 76	MONDAY THRU FRIDAY 6:00AM TO 9:00AM AND 3:00 PM TO 7:00 PM

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME

1. US 74 & US 76

HOLIDAY

1. FOR ANY UNEXPECTED OCCURRENCE THAT CREATE UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER.
2. FOR NEW YEAR'S, BETWEEN THE HOURS OF 6:00 AM DECEMBER 31st TO 9:00 AM JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 9:00 AM THE FOLLOWING TUESDAY.
3. FOR EASTER, BETWEEN THE HOURS OF 6:00 AM THURSDAY AND 9:00 AM MONDAY.
4. FOR CHRISTMAS, BETWEEN THE HOURS OF 6:00 AM THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 9:00 AM THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.
5. FOR AZALEA FESTIVAL, BETWEEN THE HOURS OF 3:00 PM THE TUESDAY BEFORE THE WEEKEND OF THE AZALEA FESTIVAL AND 9:00 AM THE MONDAY AFTER THE WEEKEND OF THE AZALEA FESTIVAL.

C) DO NOT CLOSE ROADS AS FOLLOWS **(NOTE: CONTRACTOR SHALL BE ALLOWED TO CLOSE EACH BRIDGE LOCATION TWICE, HOWEVER, ONLY ONE BRIDGE LOCATION MAY BE CLOSED AT ONE TIME.):**

ROAD NAME	DAY AND TIME RESTRICTIONS
1. US 74, ISABEL HOLMES BRIDGE	5:00 AM MONDAY THRU 9:00 PM FRIDAY
2. US 76, CAPE FEAR MEMORIAL BRIDGE	5:00 AM MONDAY THRU 11:00 PM FRIDAY

D) DO NOT CONDUCT ANY HAULING OPERATIONS AGAINST THE FLOW OF TRAFFIC OF AN OPEN TRAVELWAY UNLESS THE HAULING OPERATION IS PROTECTED BY BARRIER OR GUARDRAIL OR AS DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

E) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED, OR AS DIRECTED BY THE ENGINEER.

F) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING DETAILS ON SHEETS TCP-3, TCP-4 & TCP-5 AND ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

G) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

TRAFFIC PATTERN ALTERATIONS

H) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

I) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

J) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

K) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

L) SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH), EXCEPT 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY, WHEN LANE CLOSURES ARE NOT IN EFFECT.

M) PLACE TYPE III BARRICADES WITH "ROAD CLOSED" SIGN R11-2 ATTACHED OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

N) PLACE ADDITIONAL SETS OF THREE CHANNELIZING DEVICES (DRUMS) PERPENDICULAR TO THE EDGE OF TRAVELWAY ON 100 FT CENTERS WHEN UNOPENED LANES ARE CLOSED TO TRAFFIC.

MISCELLANEOUS

O) LAW ENFORCEMENT MAY BE USED TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND/OR INTERSECTIONS, AS DIRECTED BY THE ENGINEER.

P) RETURN TRAFFIC BACK TO ITS EXISTING LANE/TRAFFIC CONFIGURATION AT THE END OF EACH WORK PERIOD.

Q) COORDINATE WITH THE ENGINEER TO UTILIZE OVERHEAD DYNAMIC MESSAGE SIGNS (DMS), IF AVAILABLE, FOR ADVANCE WARNING TO MOTORIST OF IMPENDING & ACTUAL ROADWAY/BRIDGE CLOSURES.

R) INSTALL CHANGEABLE MESSAGE SIGNS (CMS) AT LEAST 10 FT FROM THE EDGE OF THE TRAVEL LANE AND IN ADVANCE OF THE PORTABLE WORK ZONE SIGNS AS SHOWN IN THE TRAFFIC CONTROL PLANS, OR AS APPROVED BY THE ENGINEER, ONE WEEK PRIOR TO THE ROADWAY/BRIDGE BEING CLOSED TO INFORM THE TRAVELLING PUBLIC OF THE IMPENDING CLOSURE. SEE BELOW FOR SUGGESTED MESSAGES.

MESSAGE NO.1	MESSAGE NO. 2
MEMORIAL BRIDGE TO CLOSE	11PM FRI TO 5AM MON
US 76 BRIDGE TO CLOSE	11PM FRI TO 5AM MON
ISABEL BRIDGE TO CLOSE	9PM FRI TO 5AM MON
US 74 BRIDGE TO CLOSE	9PM FRI TO 5AM MON

S) WHEN CHANGEABLE MESSAGE SIGNS (CMS) ARE NOT IN USE, THEY SHALL EITHER BE REMOVED OR TURNED OFF AND THE DISPLAY PANEL TURNED PARALLEL TO TRAFFIC.

APPROVED: _____ DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 8973 ENGINEER J. G. GETTIER

PROJECT NOTES

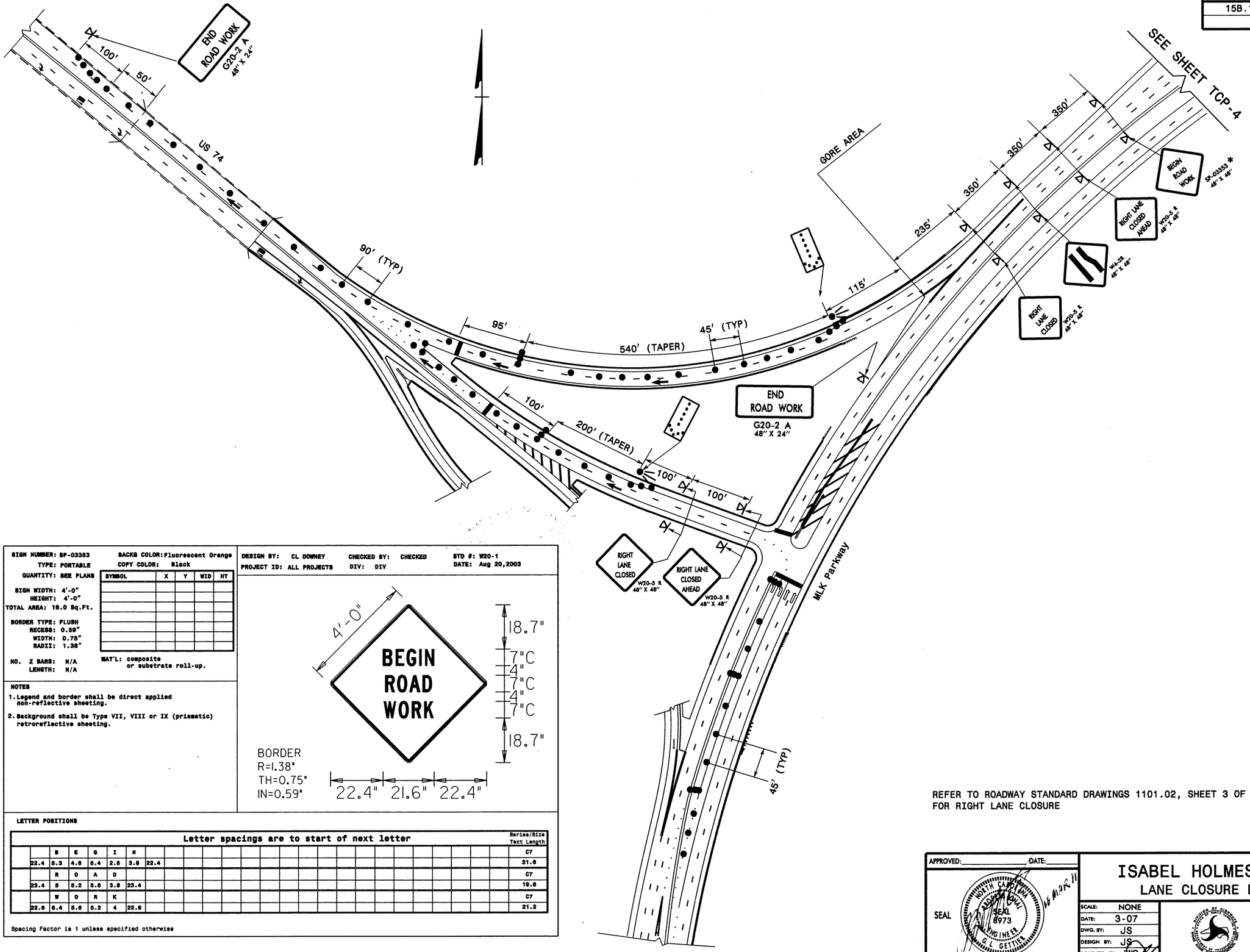
SCALE:	NONE
DATE:	1/11
DWG. BY:	SNG
DESIGN BY:	JWG
REVIEWED BY:	JWG

REVISIONS

CADD FILE

10-MAR-2011 10:50
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TC_TCP-2.dgn
sngreen AT TE244735

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-3



SIGN NUMBER: SP-03353
TYPE: PORTABLE
QUANTITY: SEE PLANS

SIGN WIDTH: 4'-0"
HEIGHT: 4'-0"
TOTAL AREA: 16.0 Sq.Ft.

BORDER TYPE: FLUSH
RECESS: 0.59"
WIDTH: 0.75"
RADII: 1.38"

NO. Z BARS: N/A
LENGTH: N/A

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: composite or substrate roll-up.

DESIGN BY: CL DOWNEY
PROJECT ID: ALL PROJECTS
CHECKED BY: CHECKED
DIV: DIV
STD #: W20-1
DATE: Aug 20,2003

NOTES

1. Legend and border shall be direct applied non-reflective sheeting.
2. Background shall be Type VII, VIII or IX (prismatic) retroreflective sheeting.

LETTER POSITIONS

Letter spacings are to start of next letter

																										Series/Size Text Length
		B	E	G	I	N																				C7
	22.4	5.3	4.6	5.4	2.5	3.8	22.4																			21.6
		R	O	A	D																					C7
	23.4	5	5.2	5.6	3.8	23.4																				19.6
		W	O	R	K																					C7
	22.6	6.4	5.6	5.2	4	22.6																				21.2

Spacing Factor is 1 unless specified otherwise

REFER TO ROADWAY STANDARD DRAWINGS 1101.02, SHEET 3 OF 9, FOR RIGHT LANE CLOSURE

APPROVED: _____ DATE: _____

SEAL

NORTH CAROLINA REGISTERED SEAL 8973 ENGINEER G.L. GETTIER

ISABEL HOLMES BRIDGE
LANE CLOSURE DETAIL

SCALE:	NONE
DATE:	3-07
DWG. BY:	JS
DESIGN BY:	JS
REVIEWED BY:	JWG

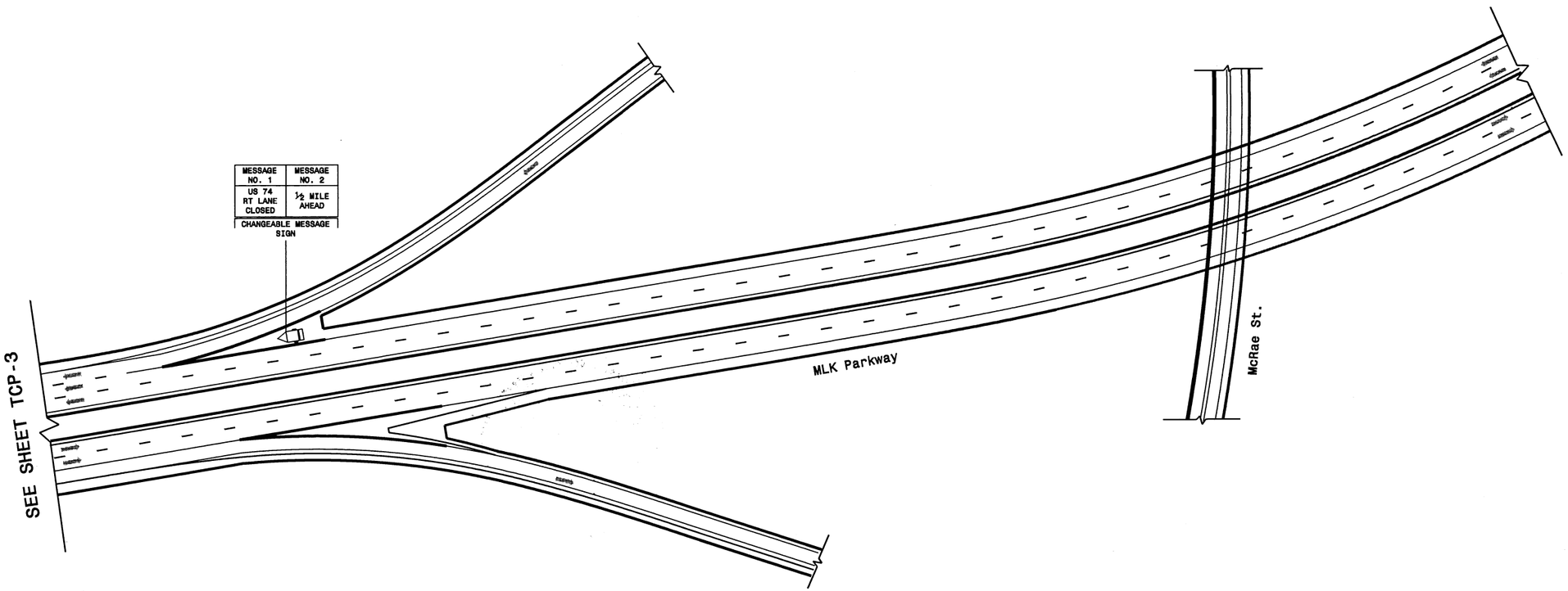
REVISIONS

CADD FILE

09-MAR-2011 12:20
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TC_TCP-3.dgn
sngreen AT TE244733

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-4

MESSAGE NO. 1	MESSAGE NO. 2
US 74 RT LANE CLOSED	½ MILE AHEAD
CHANGEABLE MESSAGE SIGN	



REFER TO ROADWAY STANDARD DRAWINGS 1101.02, SHEET 3 OF 9, FOR RIGHT LANE CLOSURE

APPROVED: _____ DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 8973 ENGINEER G. L. GETTIER

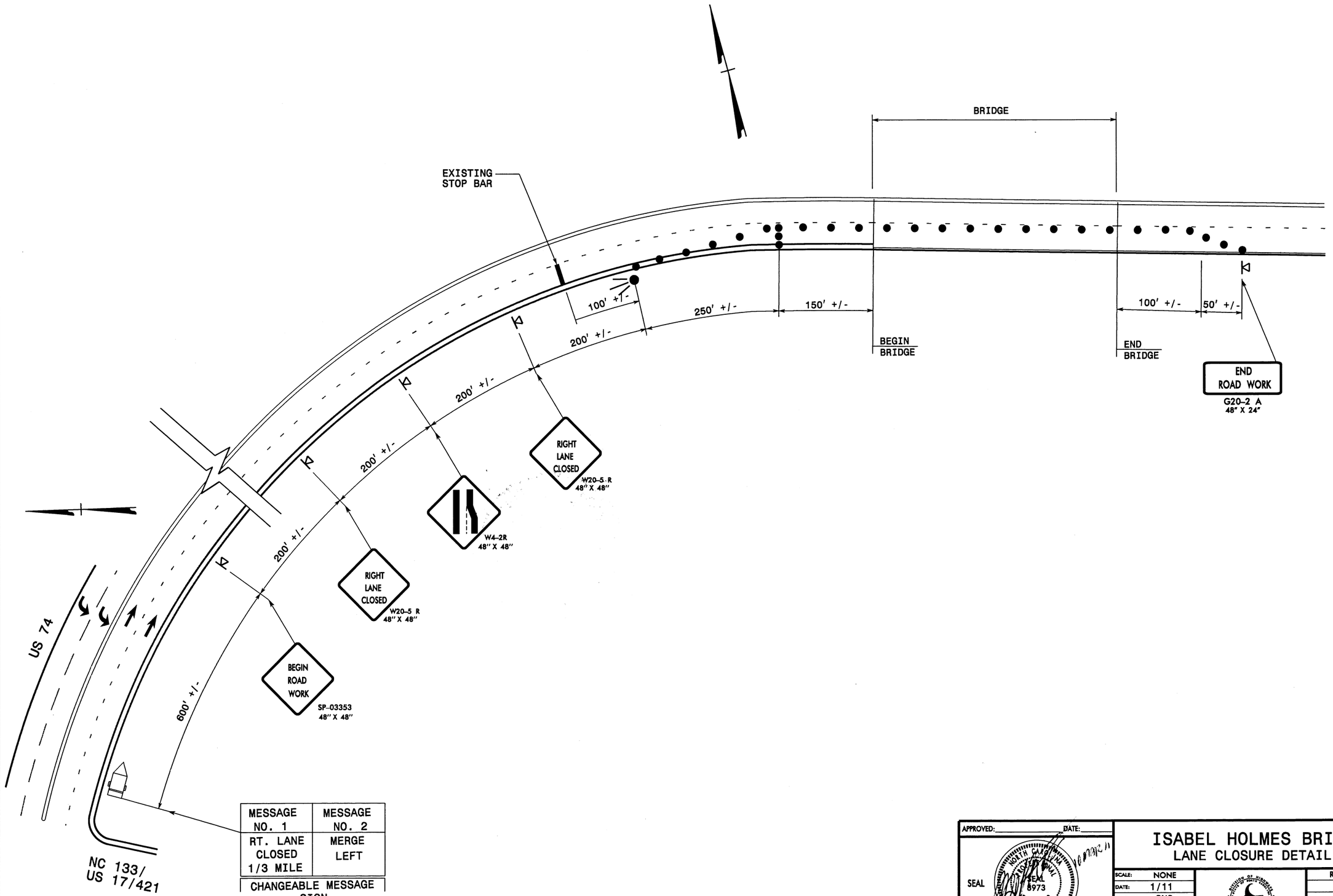
ISABEL HOLMES BRIDGE
LANE CLOSURE DETAIL

SCALE:	NONE
DATE:	1/11
DWG. BY:	JS
DESIGN BY:	JS
REVIEWED BY:	JWG

REVISIONS	
CADD FILE	

09-MAR-2011 12:22
\\DOT\DFSROOT\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TC_TCP-4.dgn
sngreen AT TE24733

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-5



APPROVED: _____ DATE: _____

SEAL

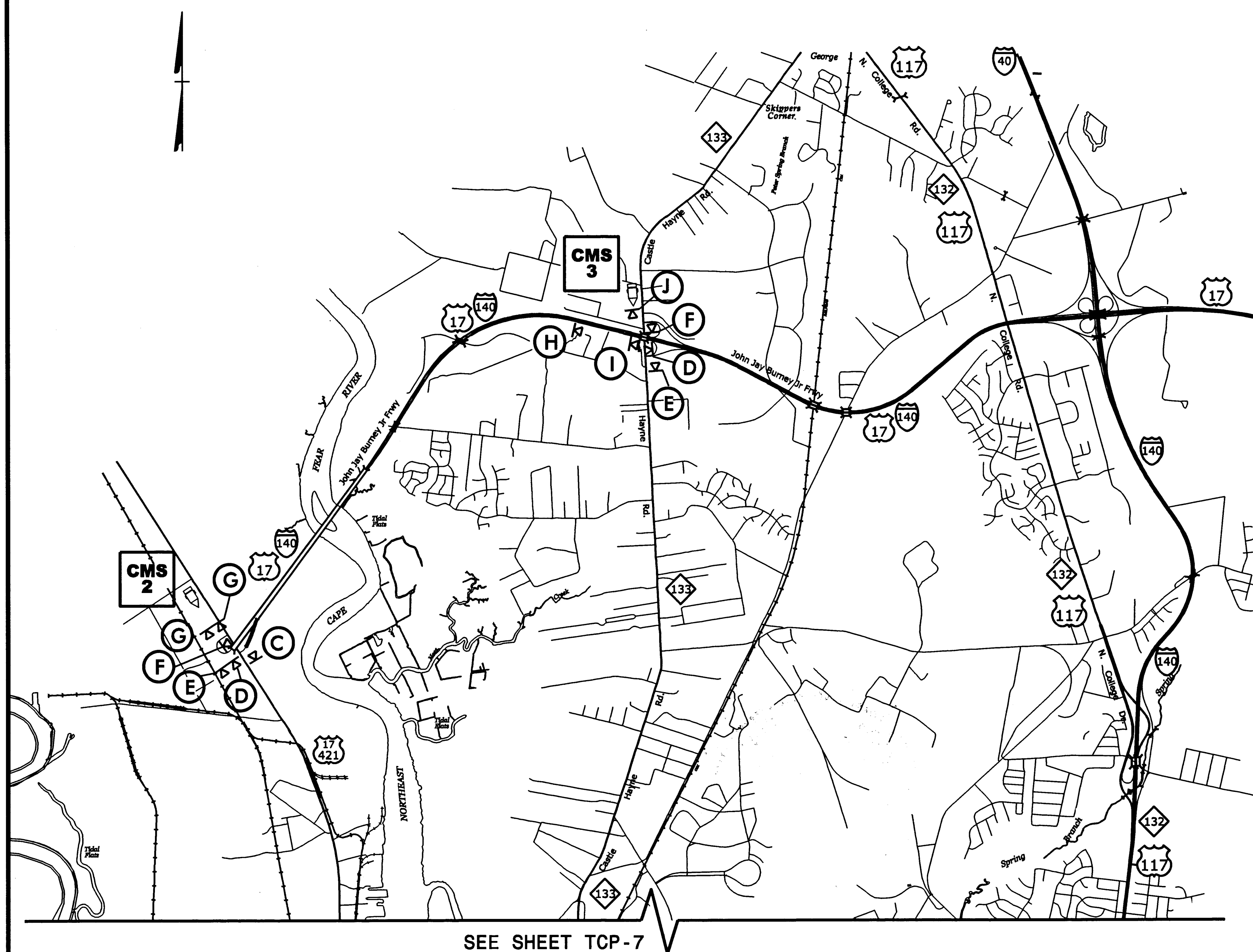
NORTH CAROLINA PROFESSIONAL SEAL 8973 ENGINEER G. I. GETTIER

ISABEL HOLMES BRIDGE
LANE CLOSURE DETAIL

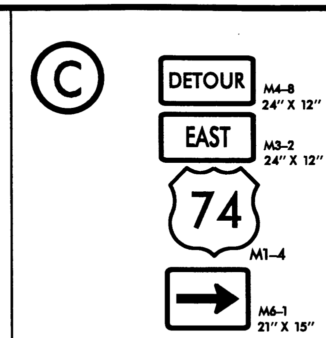
SCALE:	NONE
DATE:	1/11
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

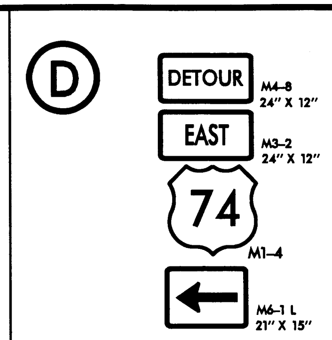
REVISIONS	
CADD FILE	

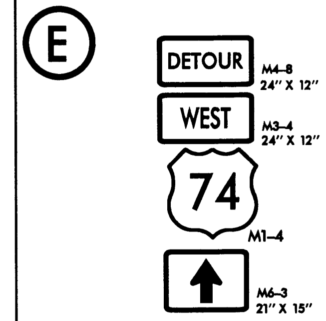
09-MAR-2011 12:23
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TC_TCP-5.dgn
sngreen AT TE24733

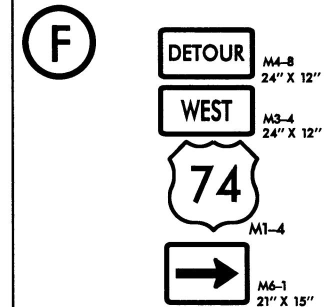


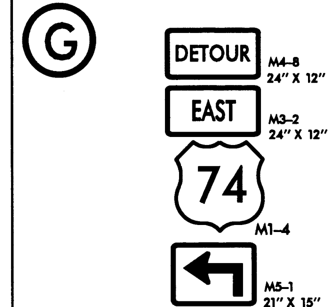
SEE SHEET TCP-7

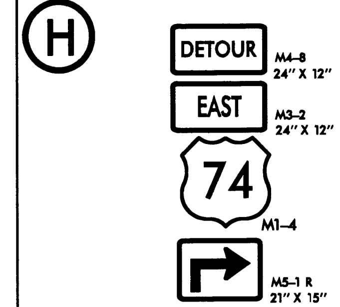


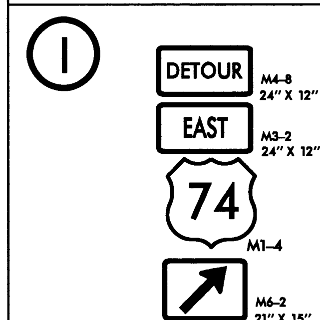


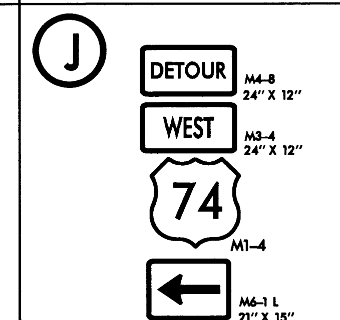












CHANGEABLE MESSAGE SIGN MESSAGES FOR BRIDGE CLOSURE

CMS 2

MESSAGE NO. 1	MESSAGE NO. 2
ISABEL BRIDGE CLOSED	FOLLOW I 140 E NEXT LFT

CMS 3

MESSAGE NO. 1	MESSAGE NO. 2
ISABEL BRIDGE CLOSED	FOLLOW I 140 W NEXT LFT

NOTES:

* ALL ROAD CLOSURE SIGNS AND DETOUR SIGNS SHALL BE PORTABLE.

APPROVED: DATE:

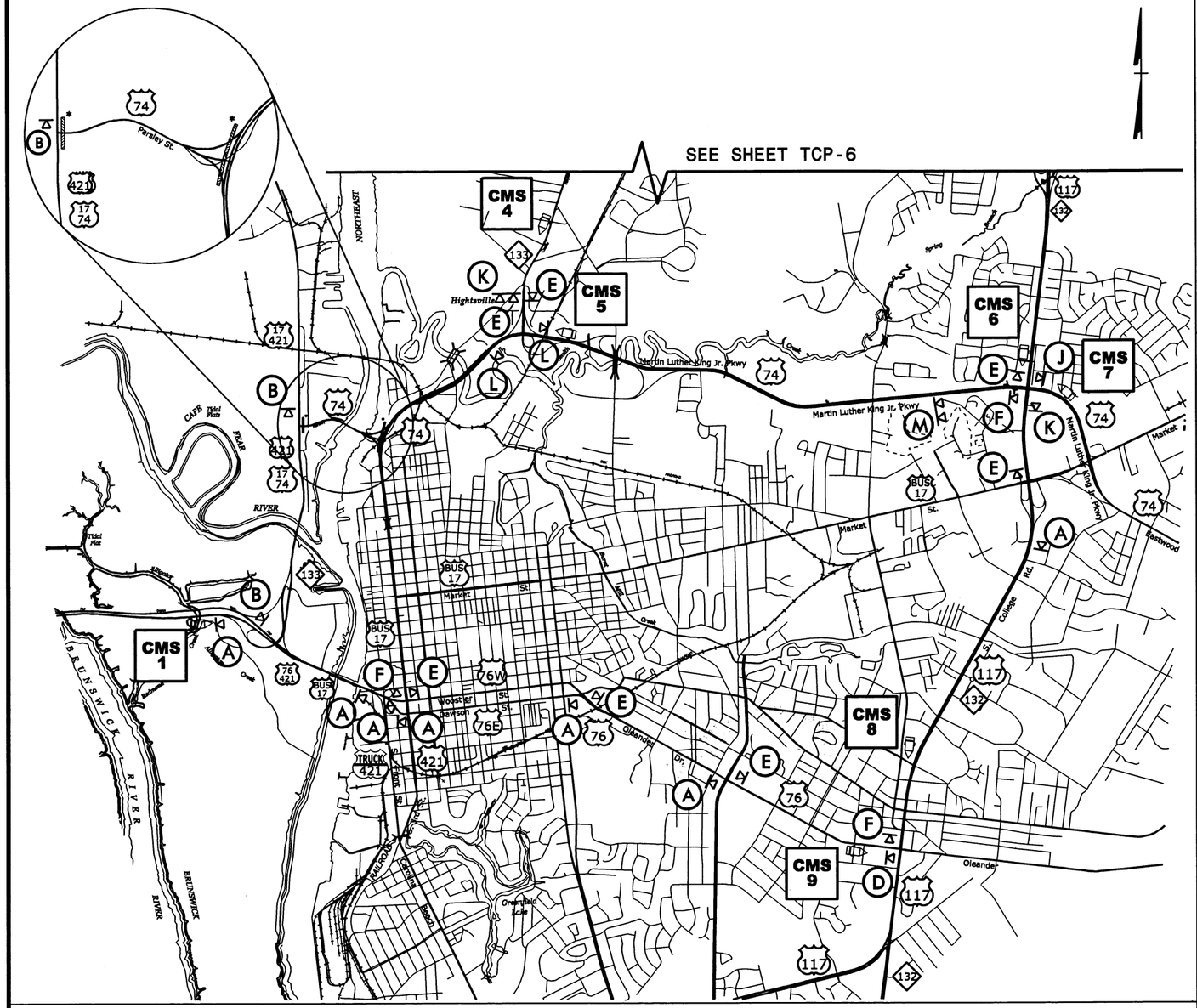
SEAL

ISABEL HOLMOES BRIDGE & US 74 CLOSURE & DETOUR

SCALE:	NONE
DATE:	1/11
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

REVISIONS

09-MAR-2011 12:26
\\DOT\DFSROOT01\GROUPS-WZTCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TC_TCP-6-7.dgn
sngreen AT TE244733



CHANGEABLE MESSAGE SIGN MESSAGES
FOR BRIDGE CLOSURE

CMS 1

MESSAGE NO. 1	MESSAGE NO. 2
ISABEL BRIDGE CLOSED	FOLLOW US 76 EAST

CMS 4

MESSAGE NO. 1	MESSAGE NO. 2
ISABEL BRIDGE CLOSED	FOLLOW US 74 EAST

CMS 5

MESSAGE NO. 1	MESSAGE NO. 2
ISABEL BRIDGE CLOSED	FOLLOW US 133 W NEXT RT

CMS 6

MESSAGE NO. 1	MESSAGE NO. 2
ISABEL BRIDGE CLOSED	FOLLOW US 117 SOUTH

CMS 7

MESSAGE NO. 1	MESSAGE NO. 2
ISABEL BRIDGE CLOSED	FOLLOW US 117 S NEXT LFT

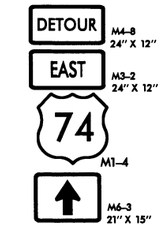
CMS 8

MESSAGE NO. 1	MESSAGE NO. 2
US 74 W DETOUR NEXT RT	FOLLOW US 76 WEST

CMS 9

MESSAGE NO. 1	MESSAGE NO. 2
US 74 E DETOUR NEXT LFT	FOLLOW US 117 NORTH

A



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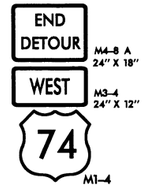

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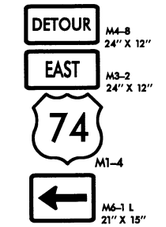

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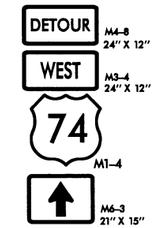

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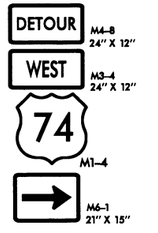

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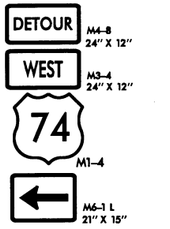

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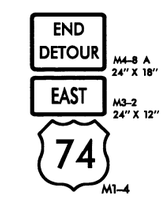
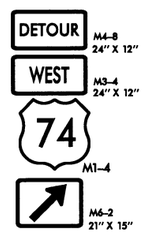


L



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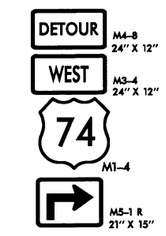


NOTES:

* USE RSD 1101.03, SHEET 2 OF 9 TO CLOSE US 74/NE CAPE FEAR BRIDGE. ALL ROAD CLOSURE SIGNS AND DETOUR SIGNS SHALL BE PORTABLE.

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-7

APPROVED: _____ DATE: _____

SEAL — NORTH CAROLINA — GEOFFREY L. GETTIER — 16973 — ENGINEER — G. L. GETTIER

16 MAR 11

ISABEL HOLMES BRIDGE & US 74 CLOSURE & DETOUR

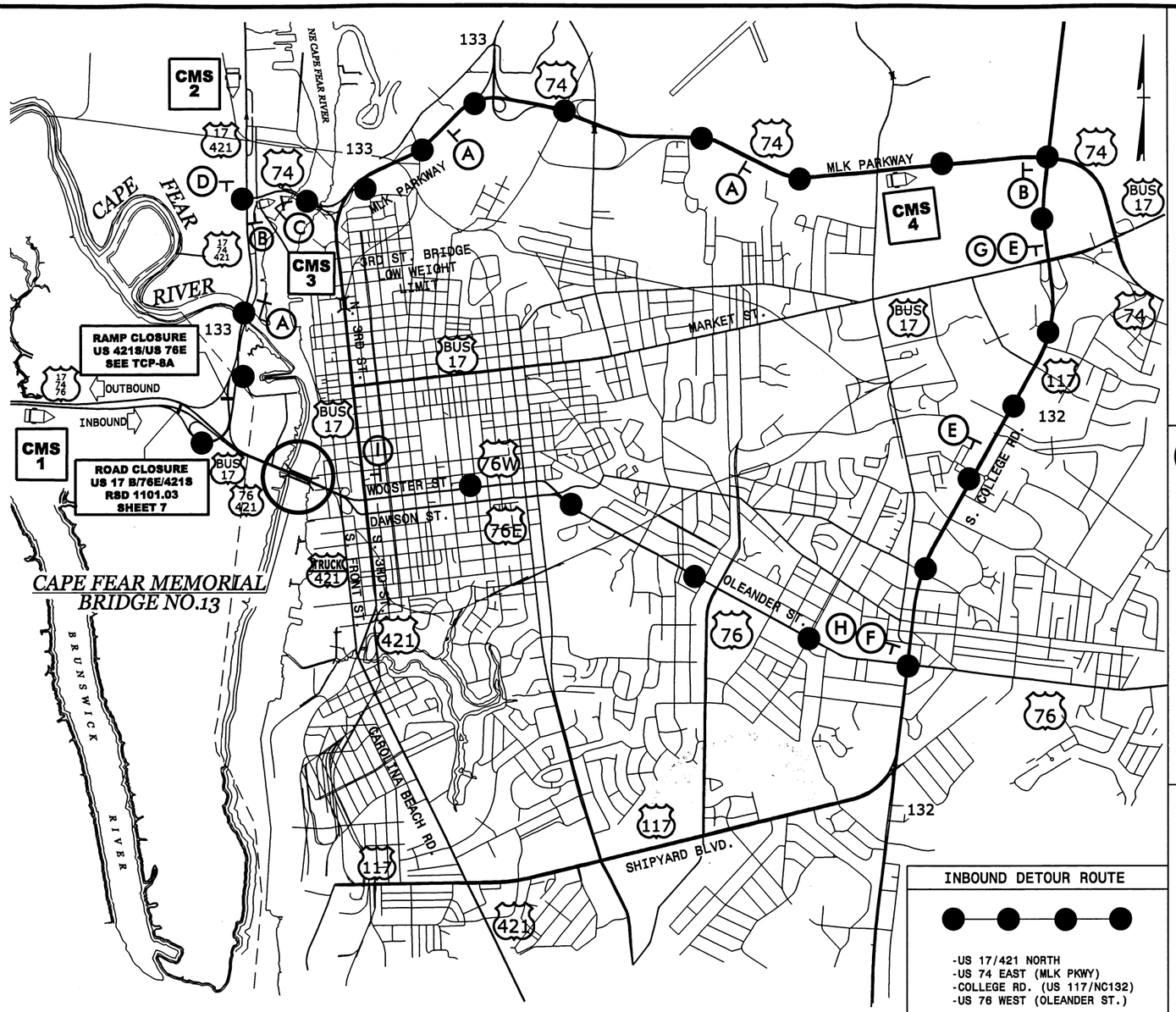
SCALE:	NONE
DATE:	1/11
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

DIVISION OF HIGHWAYS — TRAFFIC ENGINEERING BRANCH — STATE TRAFFIC ENGINEER

REVISIONS

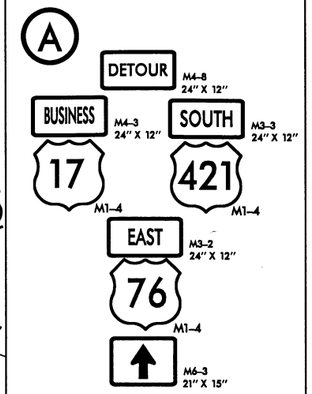
CADD FILE

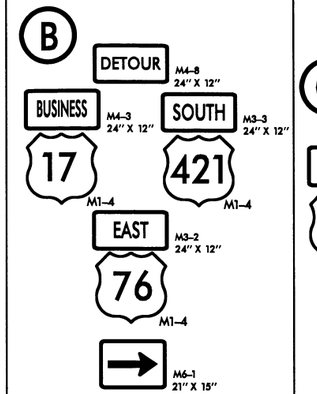
09-MAR-2011 12:28
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TC_TCP-7.dgn
snagreen AT TE244733



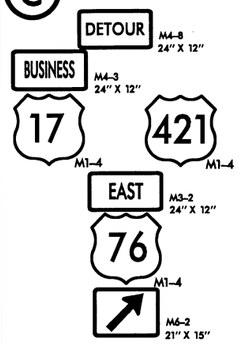
INBOUND DETOUR ROUTE

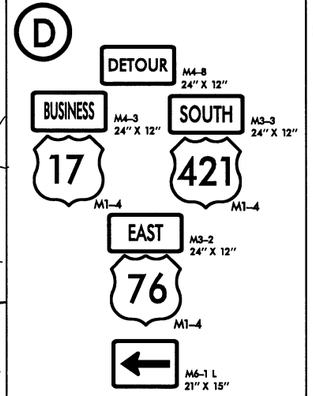
-US 17/421 NORTH
-US 74 EAST (MLK PKWY)
-COLLEGE RD. (US 117/NC132)
-US 76 WEST (OLEANDER ST.)

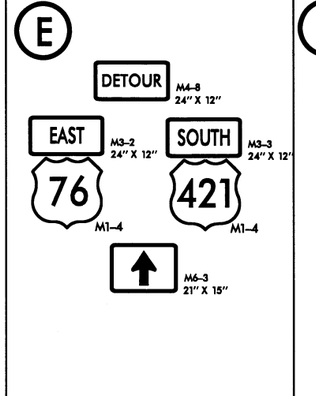


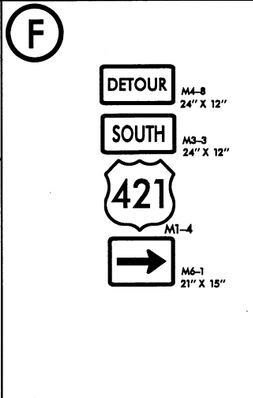


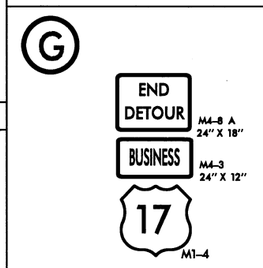
PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-8

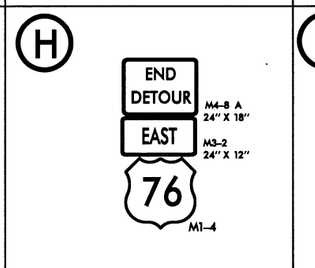


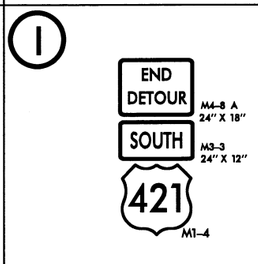












CHANGEABLE MESSAGE SIGN MESSAGES FOR INBOUND BRIDGE CLOSURE

CMS 1

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
MEMORIAL BRIDGE CLOSED	17 BUS 76 EAST 421SOUTH	DETOUR VIA 74 EAST

CMS 2

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
17 BUS 76 EAST 421SOUTH	EXIT CLOSED	DETOUR NEXT LEFT

CMS 3

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
17 BUS 76 EAST 421SOUTH	DETOUR EXIT RIGHT	FOLLOW US 74 EAST

CMS 4

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
17 BUS 76 EAST 421SOUTH	DETOUR NEXT RIGHT	

EXAMPLE MESSAGES FOR PERIODS JUST PRIOR TO BRIDGE CLOSURE

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
NEXT TUESDAY	MEMORIAL BRIDGE CLOSURE	7 P.M. TO 6 A.M.

INBOUND ROAD CLOSURE IMPLEMENTATION SEQUENCE

1. APPLY INBOUND CMS ROAD CLOSURE MESSAGES AND UNCOVER DETOUR ROUTE SIGNS.
2. CLOSE INBOUND US 17 BUS, US 76 EAST AND US 421 SOUTH ROADWAY IN ACCORDANCE WITH ROADWAY STANDARD DRAWING 1101.03, SHEET 7.
3. CLOSE US 421 SOUTH/US 76 EAST RAMP.

NOTE:
ALL ROAD CLOSURE SIGNS AND DETOUR SIGNS SHALL BE PORTABLE

APPROVED:_____ DATE:_____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 8973 ENGINEER G. L. GETTIER

8 FEB 11

CAPE FEAR MEMORIAL BRIDGE NO. 13
INBOUND BRIDGE CLOSURE DETOUR ROUTE

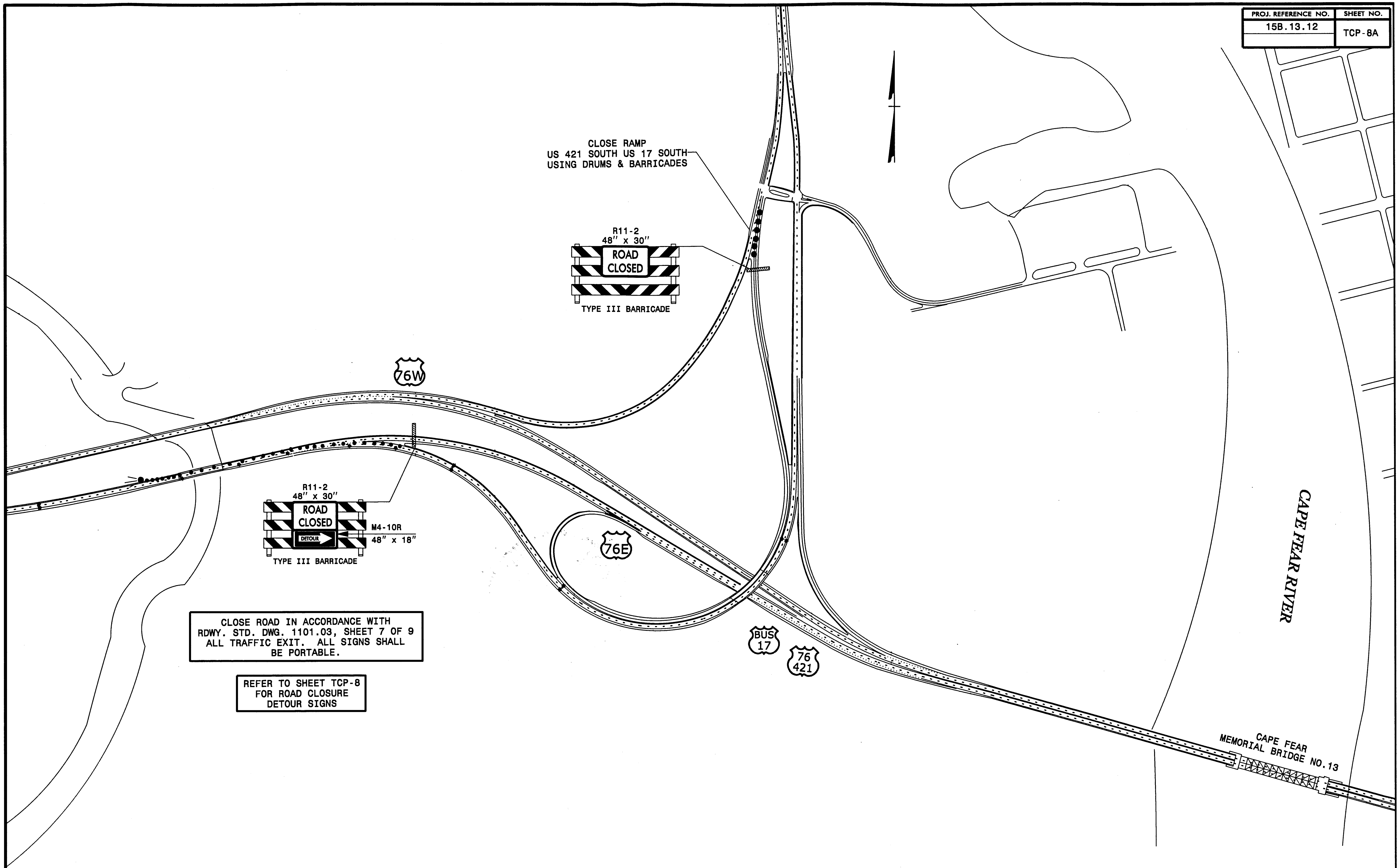
SCALE:	NONE
DATE:	11/01
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

DIVISION OF HIGHWAYS TRAFFIC ENGINEERING BRANCH

REVISIONS	
CADD FILE	

08-FEB-2011 08:53
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TCP_TCP-8.dgn
snggreen AT TE244733

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-8A



CLOSE ROAD IN ACCORDANCE WITH RDWY. STD. DWG. 1101.03, SHEET 7 OF 9 ALL TRAFFIC EXIT. ALL SIGNS SHALL BE PORTABLE.

REFER TO SHEET TCP-8 FOR ROAD CLOSURE DETOUR SIGNS

APPROVED: ______ DATE: ______

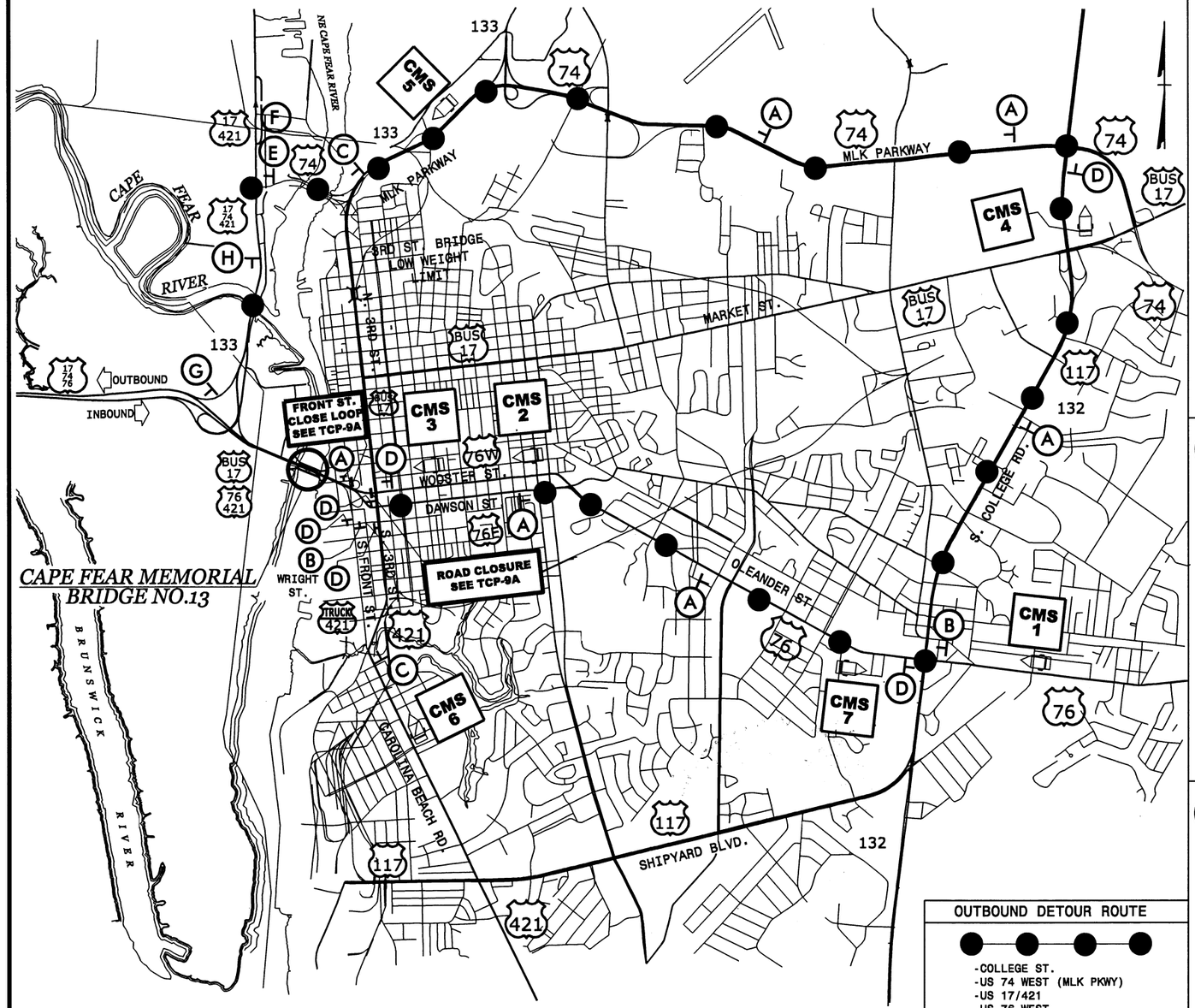
SEAL

INBOUND
US 17 BUS/76 EAST/421 SOUTH
ROAD CLOSURE DETAIL

SCALE:	NONE
DATE:	11/01
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

REVISIONS

08-FEB-2011 08:52
\\DOT\DFSROOT01\GROUPS-WZTCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TCP_TCP-8A.dgn
sngreen AT TE244733



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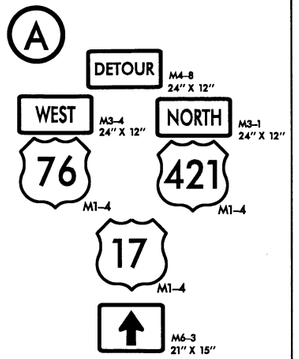
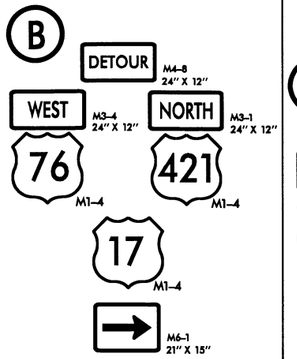
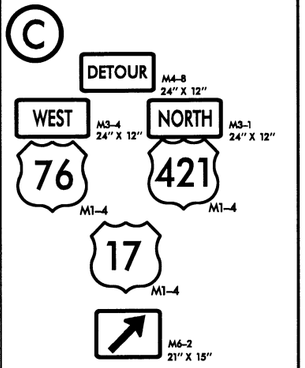


B

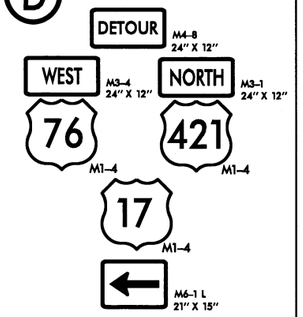


C

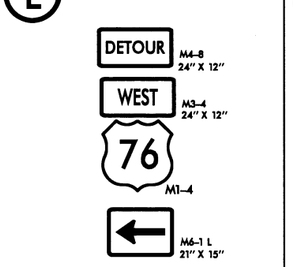


PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-9

D



E



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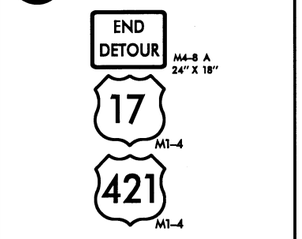
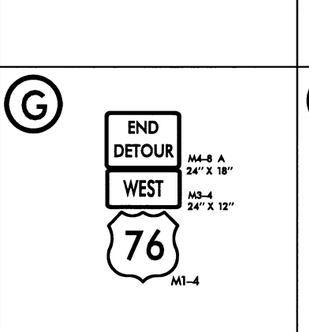


G



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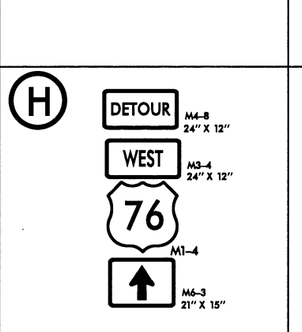


CHANGEABLE MESSAGE SIGN MESSAGES FOR OUTBOUND BRIDGE CLOSURE

CMS 1

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
MEMORIAL BRIDGE CLOSED	US 17 76 WEST 421NORTH	DETOUR NEXT RIGHT

CMS 2

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
ROAD CLOSED	NO THRU TRAFFIC	DETOUR USE LEFT LANE

CMS 3

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
MEMORIAL BRIDGE CLOSED	US 17 76 WEST 421NORTH	DETOUR USE LEFT LANE

CMS 4

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
US 17 76 WEST 421NORTH	DETOUR NEXT LEFT	USE MLK PKWY

CMS 5

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
US 17 76 WEST 421NORTH	DETOUR NEXT RIGHT	

EXAMPLE MESSAGES FOR PERIODS JUST PRIOR TO BRIDGE CLOSURE

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
NEXT TUESDAY	MEMORIAL BRIDGE CLOSURE	7 P.M. TO 6 A.M.

CMS 6

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
MEMORIAL BRIDGE CLOSED	US 17 76 WEST 421NORTH	DETOUR RIGHT ON 76 EAST

CMS 7

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
US 17 76 WEST 421NORTH	DETOUR LEFT ON COLLEGE	

OUTBOUND ROAD CLOSURE IMPLEMENTATION SEQUENCE

1. APPLY OUTBOUND CMS ROAD CLOSURE MESSAGES AND UNCOVER DETOUR ROUTE SIGNS.
2. CLOSE OUTBOUND US 76 WEST AND US 421 NORTH AT 3RD STREET AS SHOWN ON SHEET TCP-9A.
3. CLOSE FRONT STREET LOOP.

NOTE:
ALL ROAD CLOSURE SIGNS AND DETOUR SIGNS SHALL BE PORTABLE

APPROVED:_____ DATE:_____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 16973 ENGINEER G. L. GETTIER

8/13/11

CAPE FEAR MEMORIAL BRIDGE NO. 13
OUTBOUND BRIDGE CLOSURE DETOUR ROUTE

SCALE:	NONE
DATE:	11/01
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

DIVISION OF HIGHWAYS TRAFFIC ENGINEERING BRANCH

REVISIONS	
CADD FILE	

08-FEB-2011 08:54
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\Special Projects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TCP_TCP-9.dgn
sngreen AT TE244733

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-9A

OPTIONAL SIGN
PLACE AS DIRECTED
BY ENGINEER

MESSAGE NO. 1	MESSAGE NO. 2	MESSAGE NO. 3
US 17 76 WEST 421NORTH	DETOUR LEFT ON WRIGHT	

CLOSE
LEFT TURN LANE
USING DRUMS

R11-2
48" x 30"
ROAD
CLOSED
DETOUR
M4-10R
48" x 18"
TYPE III BARRICADE

CLOSE
EXIT AREA
USING DRUMS

CLOSE LOOP

R11-2
48" x 30"
ROAD
CLOSED
TYPE III BARRICADE

CLOSE
RIGHT TURN LANE
USING DRUMS

BUS 17

WOOSTER ST.

76W

S. FRONT ST.

BUS 17

76
421

PROVIDE
LAW ENFORCEMENT
AT INTERSECTION

CLOSE
LEFT TURN LANE
USING DRUMS

S. 3RD ST.

REFER TO SHEET TCP-9
FOR ROAD CLOSURE AND
DETOUR SIGNS. ALL
SIGNS SHALL BE
PORTABLE

DAWSON ST.

76E

WRIGHT ST.

WRIGHT ST.

APPROVED: _____ DATE: _____

SEAL

NORTH CAROLINA
PROFESSIONAL
SEAL
18973
ENGINEER
G. L. GETTIER

8/29/11

OUTBOUND
US 17 BUS/76 EAST/421 SOUTH
ROAD CLOSURE DETAIL

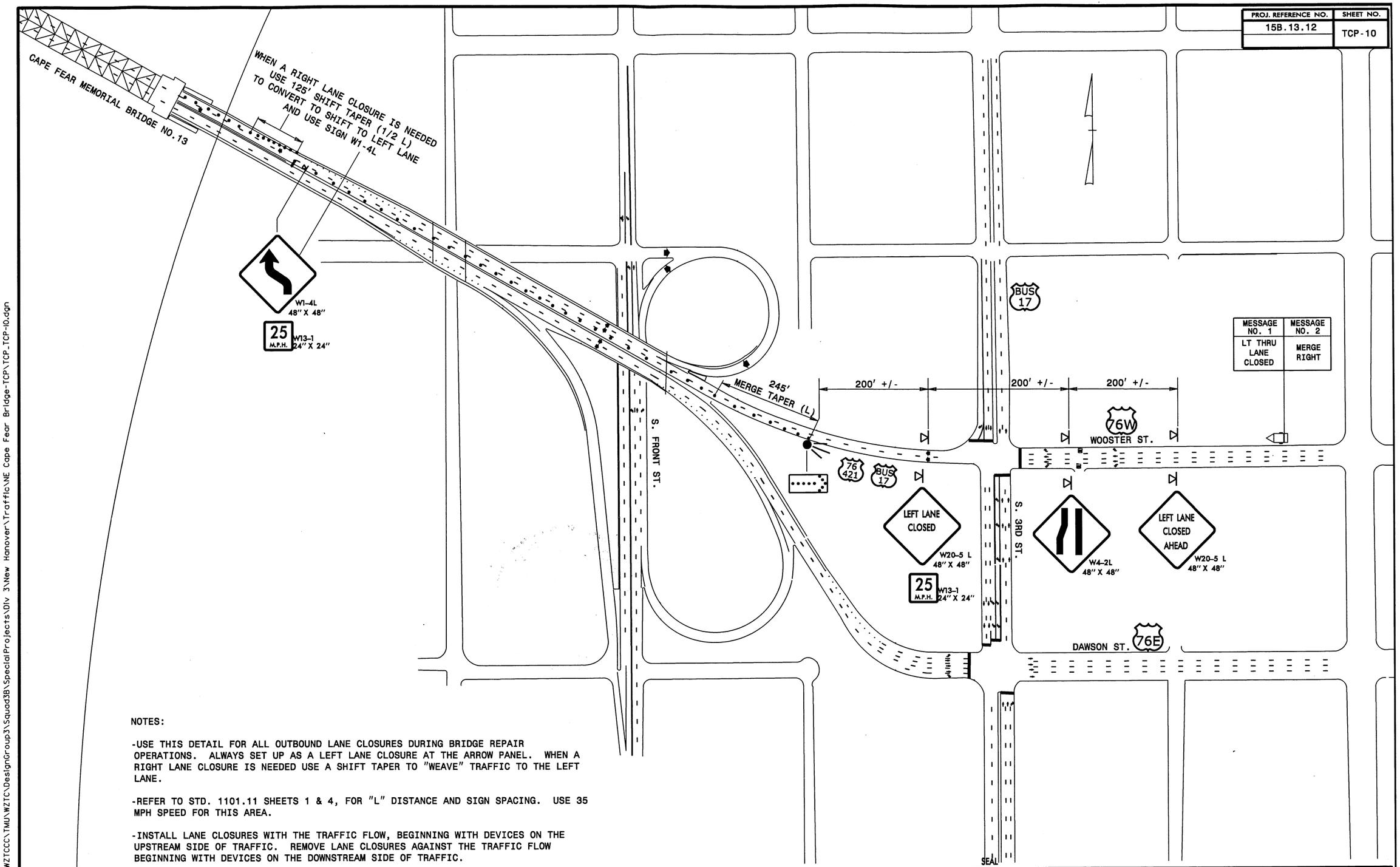
SCALE:	NONE
DATE:	11/01
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

REVISIONS

CADD FILE

08-FEB-2011 08:55
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TCP_TCP-9A.dgn
sngreen AT TE244733

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-10



NOTES:

-USE THIS DETAIL FOR ALL OUTBOUND LANE CLOSURES DURING BRIDGE REPAIR OPERATIONS. ALWAYS SET UP AS A LEFT LANE CLOSURE AT THE ARROW PANEL. WHEN A RIGHT LANE CLOSURE IS NEEDED USE A SHIFT TAPER TO "WEAVE" TRAFFIC TO THE LEFT LANE.

-REFER TO STD. 1101.11 SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING. USE 35 MPH SPEED FOR THIS AREA.

-INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

-ARROW PANEL MAY BE PLACED IN THE MERGE TAPER IF IT CAN NOT BE PLACED ON THE SHOULDER.

-PLACE DRUMS AT A MAXIMUM SPACING OF 35' IN TAPERS, AND A MAXIMUM SPACING OF 70' ALONG THE WORK AREA.

-USE ROADWAY STANDARD DRAWING 1101.02, SHEET 3 FOR LANE CLOSURE ON US 76 EB.

APPROVED:_____ DATE:_____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 8973 ENGINEER JAMES W. GETTIER 8 FEB 11

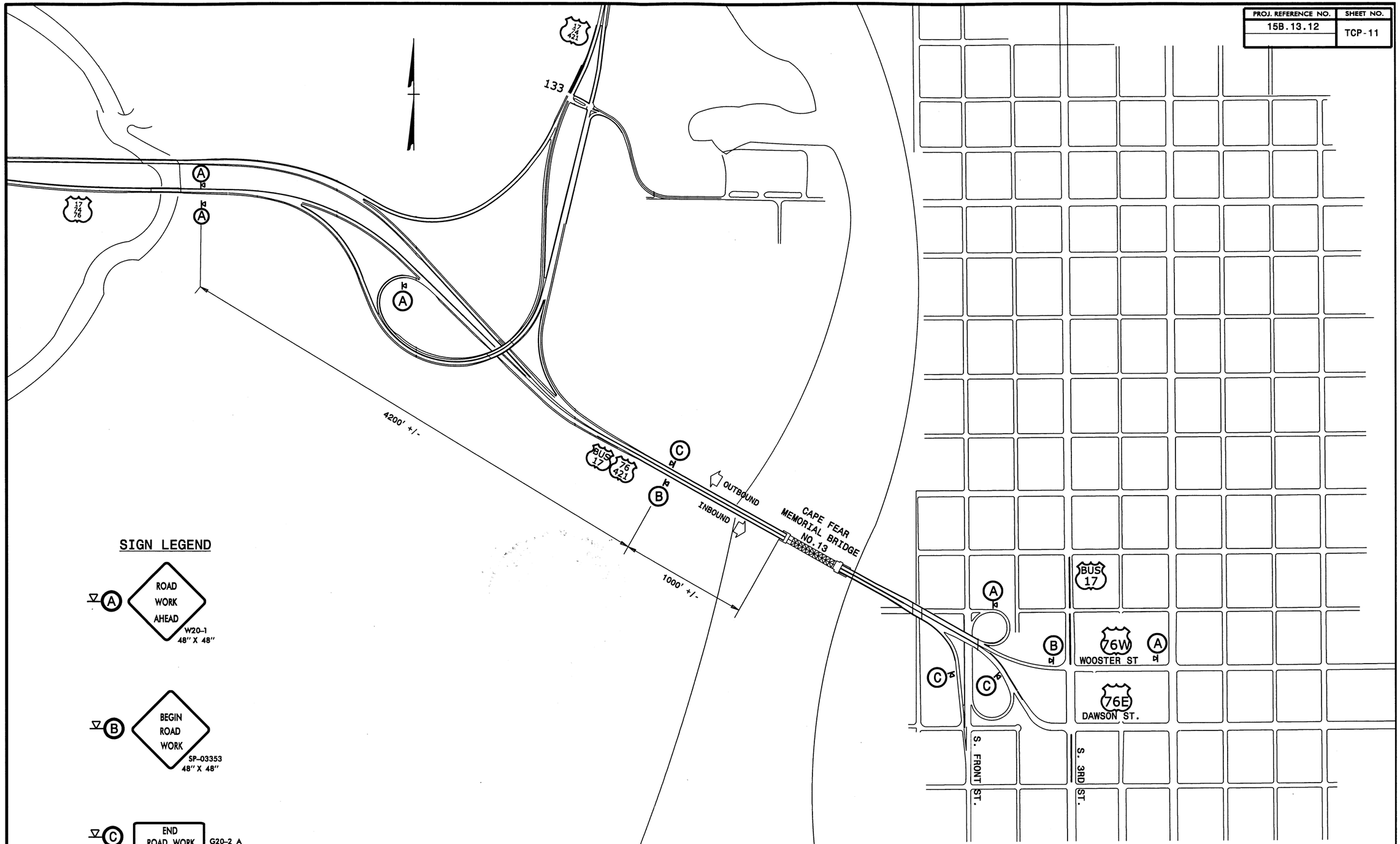
CAPE FEAR MEMORIAL BRIDGE LANE CLOSURE DETAIL

SCALE:	NONE
DATE:	11/01
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

REVISIONS	
CADD FILE	

08-FEB-2011 10:46
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TCP_TCP-10.dgn
sngreen AT TE244733

PROJ. REFERENCE NO.	SHEET NO.
15B.13.12	TCP-11



SIGN LEGEND

A — ROAD WORK AHEAD — W20-1 48" X 48"

B — BEGIN ROAD WORK — SP-03353 48" X 48"

C — END ROAD WORK — G20-2 A 48" X 24"

NOTE: INSTALL PORTABLE SIGNS ONLY WHEN WORK IS BEING PERFORMED WITH OR WITHOUT A LANE CLOSURE. DO NOT INSTALL THESE SIGNS WHEN US 76 IS CLOSED.

APPROVED: _____ DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 8973 ENGINEER GIL GETTER

CAPE FEAR MEMORIAL BRIDGE
WORK ZONE
ADVANCED WARNING SIGNS

SCALE:	NONE
DATE:	11/01
DWG. BY:	SNG
DESIGN BY:	SNG
REVIEWED BY:	JWG

DIVISION OF HIGHWAYS TRAFFIC ENGINEERING BRANCH

REVISIONS	
CADD FILE	

08-FEB-2011 08:58
\\DOT\DFSROOT01\GROUPS-WZTCCC\TMU\WZTC\DesignGroup3\Squad3B\SpecialProjects\Div 3\New Hanover\Traffic\NE Cape Fear Bridge-TCP\TCP_TCP-11.dgn
sngreen AT TE244733