Supplementary Information

The following information is associated with Network Rail Standard:
**NR CIV/SD/825** Rev A

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### CAD Drawing

- CIV/SD/825

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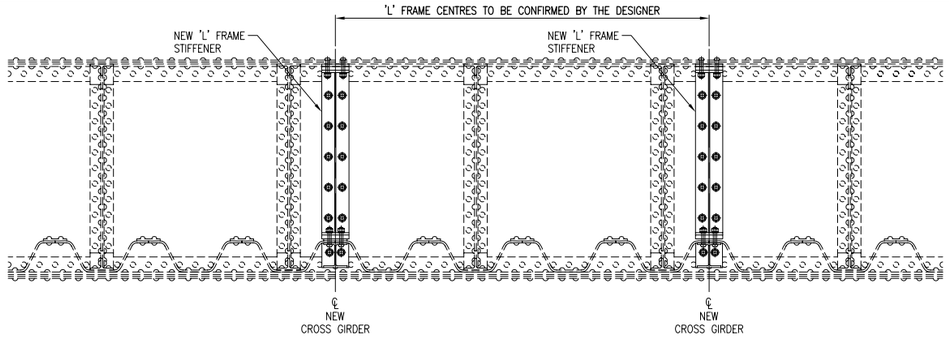



## TYPICAL ELEVATION ON OUTER GIRDER

SCALE 1:20

NOTE:
THE PURPOSE OF THIS DRAWING IS TO SHOW A TYPICAL ARRANGEMENT OF AN EXAMPLE OF PROVIDING ADDITIONAL 'L' FRAME STIFFENERS AND CROSS GIRDERS TO STRENGTHEN AN OUTER MAIN GIRDER AND FLOOR. THE DETAILS SHOWN HERE ARE INDICATIVE AND REQUIRE DETAILED DESIGN AND SUBSEQUENT MODIFICATIONS TO SUIT SITE SPECIFIC ARRANGEMENTS.

TYPICAL METHODOLOGY FOR 'L' FRAME STRENGTHENING

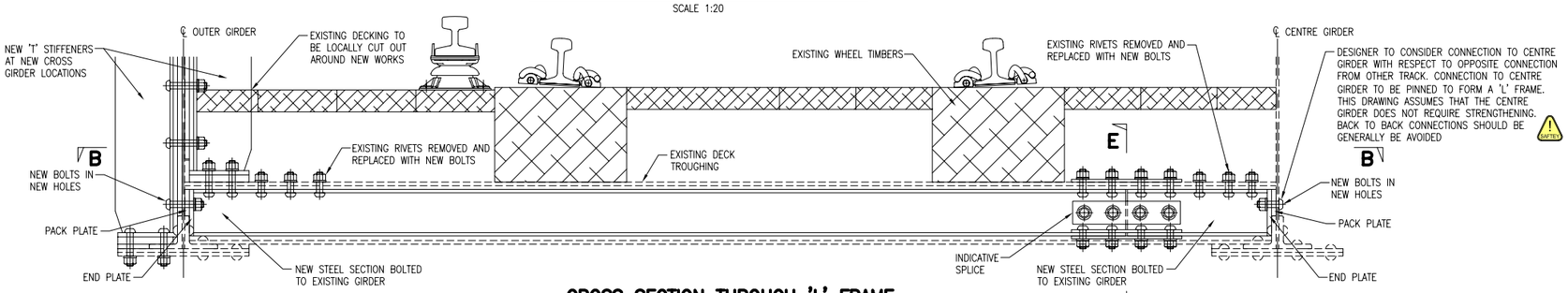
1. THE CROSS GIRDER STRENGTHENING WORK AT THE LOCATION OF THE PROPOSED 'L' FRAME MUST BE COMPLETED PRIOR TO INSTALLING THE 'L' FRAME CONNECTING STEELWORK.
2. THE FOLLOWING INSTALLATION SEQUENCE HAS BEEN DEVELOPED ON THE BASIS THAT:
   - SUBJECT TO DETAILED DESIGN THE WORKS MAY BE CARRIED OUT (IN THE MAIN) DURING NORMAL WORKING HOURS DURING WHICH TRAINS WILL BE OPERATING OVER THE STRUCTURE. THE CONTRACTOR IS TO BE AWARE THAT THE STRUCTURE WILL BE LIVE AND ALL NECESSARY PROTECTION TO TRAINS / WORKFORCE SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF THE WORKS.
   - ALL PREPARATORY WORKS AND ALL STEELWORK CAN BE INSTALLED OUTSIDE OF POSSESSIONS.
   - SUBJECT TO DETAILED DESIGN CONNECTIONS MAY BE CARRIED OUT DURING 'IN BETWEEN TRAIN PERIODS'.
   - THE ERECTION SEQUENCE OF EACH INDIVIDUAL PART AND THE CONNECTIONS TO THE EXISTING STEELWORK IS SUCH TO MAINTAIN THE EXISTING STRUCTURE'S INTEGRITY AND TO PREVENT THE BUILD UP OF LOCKED IN STRESSES.

TYPICAL 'L' FRAME STRENGTHENING (WORKS OUTSIDE OF POSSESSIONS)

3. REMOVE EXISTING PROTECTIVE PAINT FROM THE RIVER SIDE ELEVATION FROM AREAS OF THE MAIN GIRDER TO RECEIVE PLATES.
4. DRILL NEW HOLES THROUGH EXISTING MAIN GIRDER WEB PANEL.
5. REMOVE EXISTING RIVETS (2NO.) FROM TOP FLANGE OF MAIN GIRDER AND LEAVE BLANK.
6. INTRODUCE ONE 'L' FRAME STIFFENER AND INSTALL CONNECTING BOLTS TO EXISTING MAIN GIRDER WEB AND LEFT LOOSE THE BOLTS ARE TO BE INSERTED EITHER DURING A NIGHT NORMAL POSSESSION OR CONTRACTOR DESIGNED METHOD OUTSIDE OF POSSESSIONS FROM A ACCESS PLATFORM, TRACKSIDE OUTWARDS NOTING THAT THE TIGHTENING UP IS TO BE CARRIED OUT FROM THE OUTSIDE ELEVATION.
7. INTRODUCE CROSS GIRDER END STUBS.
8. INTRODUCE NEW CROSS GIRDER AND SPLICE. INSTALL CONNECTING BOLTS TO CROSS GIRDER SPLICE, TO BE LEFT LOOSE.
9. FULLY TIGHTEN UP CONNECTION BETWEEN NEW L-FRAME STIFFENER AND EXISTING GIRDER, NOTING THAT ALL 'L' FRAMES ARE TO BE FULLY TIGHTENED ON ANY ONE GIRDER.
10. REPEAT STAGES FOR ALL L-FRAME CONNECTIONS.

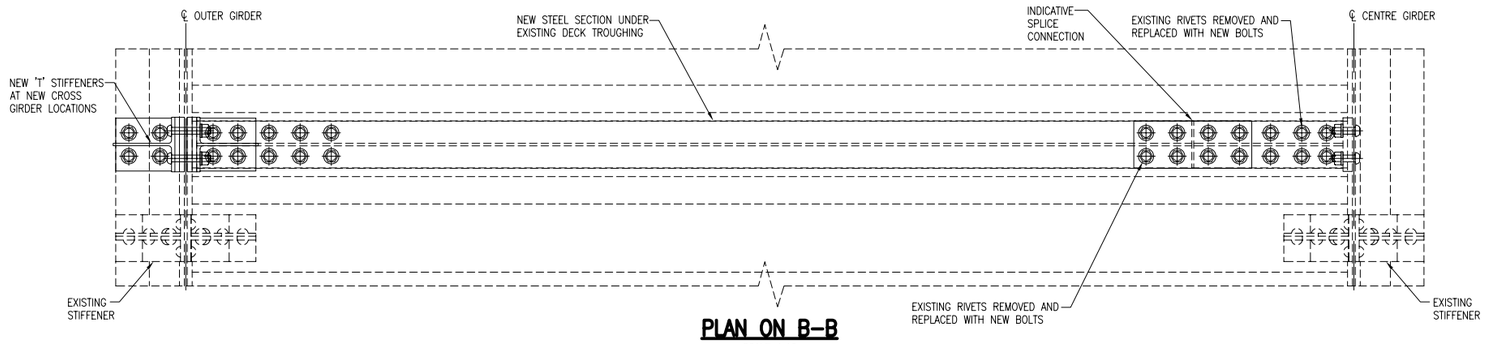
TYPICAL 'L' FRAME STRENGTHENING (WORKS DURING A POSSESSION)

11. FULLY TIGHTEN UP CROSS GIRDER SPLICE CONNECTION.



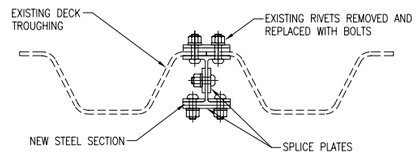

## CROSS SECTION THROUGH 'L' FRAME

SCALE 1:10



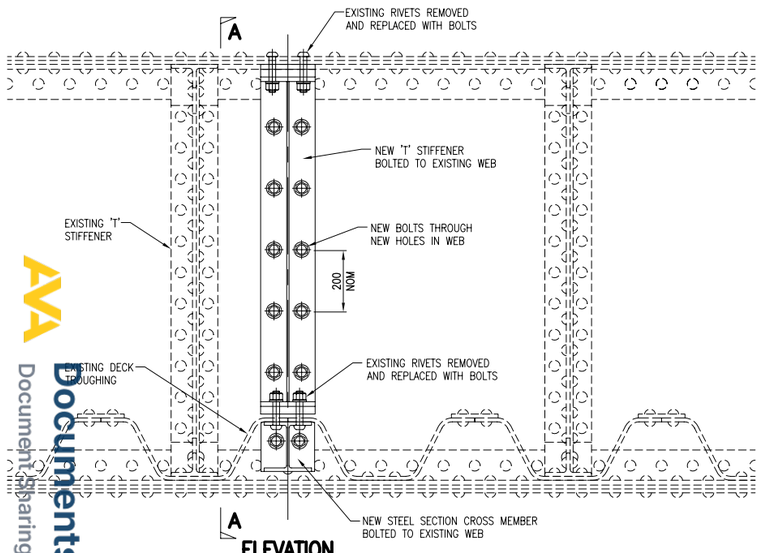

## PLAN ON B-B

SCALE 1:10



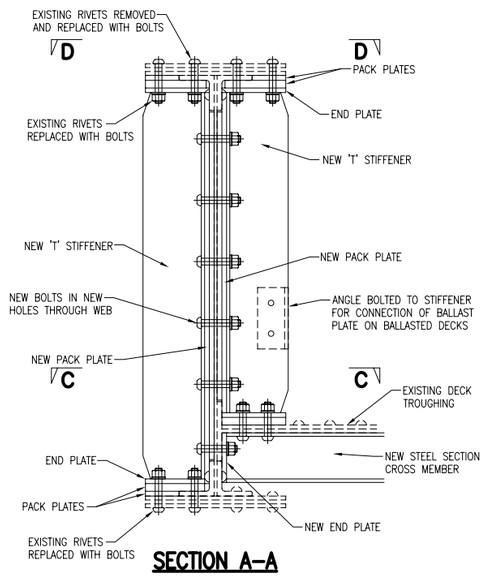

## SECTION E-E

SCALE 1:10



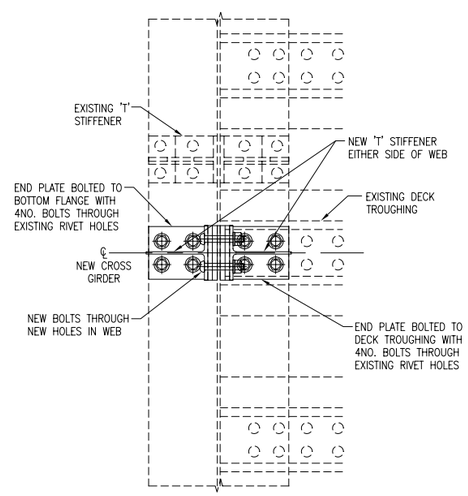

## ELEVATION

SCALE 1:10



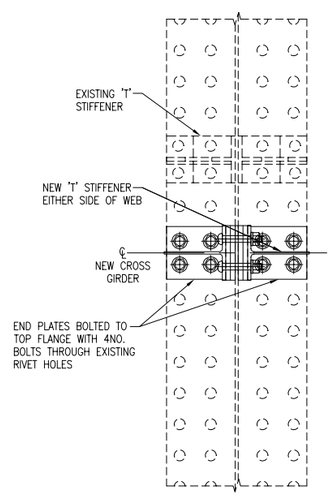

## SECTION A-A

SCALE 1:10




## SECTION C-C

SCALE 1:10




## SECTION D-D

SCALE 1:10

DRAWING No. NR/CIV/SD/825

NOTES

GENERAL NOTES

1. THIS DRAWING SHOWS A TYPICAL EXAMPLE OF OUTER GIRDER AND CROSS GIRDER STRENGTHENING USED TO GENERATE ADDITIONAL CAPACITY TO EXISTING METALLIC LONGITUDINAL GIRDERS.
2. THE SIZES AND DIMENSIONS SHOWN ON THIS DRAWING RELATE TO EITHER A TYPICAL EDGE OR CENTRE LONGITUDINAL GIRDER. THE CONFIGURATION OF STRENGTHENING PLATE IS THE RESPONSIBILITY OF THE DESIGNER.
3. ALL EXISTING PLATES, STIFFENERS AND CONFIGURATION OF THE GIRDER ARE TO BE CONFIRMED ON SITE BY THE DESIGNER.

SPECIFICATION

1. FOR SPECIFICATION REFER TO DRG. NR/CIV/SD/801.

DESIGN ASSUMPTIONS

1. THE DESIGNER SHALL BE RESPONSIBLE FOR THE DESIGN OF THE STRENGTHENING SYSTEM WHICH SHALL ADDRESS AS A MINIMUM THE FOLLOWING.
   - A) LATERAL CLEARANCES FOR ACCESS TO THE WORKS
   - B) 'LOCKED IN' PERMANENT LOAD STRESSES
   - C) CONDITION OF EXISTING STRENGTHENING
   - D) CLEARANCES BETWEEN BOLTS
   - E) EXTENT AND SEQUENCE OF RIVET REPLACEMENT IF REQUIRED
   - F) INTEGRITY OF FLOOR CONNECTIONS
2. THE DESIGNER SHALL CHECK THE VARIOUS STAGES IN THE CONSTRUCTION SEQUENCE TO ENSURE THE INTEGRITY OF THE GIRDER AND OTHER CONNECTING PARTS ARE MAINTAINED THROUGHOUT THE WORKS.
3. THE DESIGNER SHALL SPECIFY THE SLIP FACTOR ($\mu$) REQUIRED FOR FAYING SURFACES TO SATISFY THE DESIGN.
4. THE DESIGNER SHALL CHECK THE NUMBER OF RIVETS OR BOLTS THAT CAN BE REMOVED AT ANY ONE TIME UNDER THE LOADING REGIME FOR THE GIVEN WORK ITEM.

| Rev | Date | Description of revision | Design'd | C'kd |
|---|---|---|---|---|
| A | 22.06.12 | FIRST ISSUE | MK | AGW |
| P2 | 01.07.11 | DRAFT PUBLICATION ISSUE | MK | AGW |
| P1 | 24.01.11 | DRAFT ISSUE | MK | AGW |

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|---|---|---|---|---|
| | Paul Clark | Head of Engineering Infrastructure Projects Central Region | P.C. | June 12 |

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CIVIL ENGINEERING STANDARD DESIGN

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# METALLIC STRUCTURE REPAIRS STANDARD DRAWINGS

## L-FRAME STRENGTHENING NEW CROSS GIRDER FRAME WITHIN A TROUGH FLOOR TYPE 2

| Scale | AS SHOWN | |
|---|---|---|
| Drawing Number | NR/CIV/SD/825 | A |

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