

FORM B - Design and Check for Permanent Works

DJH 41 Whalley Viaduct



Document control				
Document No.	DJH 41 WHALLEY VIADUCT-WDC-FORM B			
Location	Whalley, Lancashire			
Revision	Author	Checked	Approved	Date Issued
01	Brendan Harrowing	Antony Horne	Brendan Harrowing	16/01/2024
02	Brendan Harrowing	Antony Horne	Brendan Harrowing	12/02/2024

NR/L2/CIV/003/FormB:**Certificate of Design and Check for permanent works.**

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		Date	12/02/2024	

Project Title	DJH Whalley Viaduct		
Project Nr	154359		
Location	Whalley, Lancashire		
ELR	DJH	Mileage	17.0594
Asset Nr	41	OS grid ref	SJ 95200 98571
Remit / Technical Work Scope (TWS) Nr	DJH-41_BV_22-23_SREMIT_M_v3		02/03/2020
Requirements documents reference Nr	-		-
CR-T Reference Nr	154359-NMA-1705-DJH-CRT-EST-000001 01 A2		22/06/2020
Other design and check certificates associated with this submission	N/A		

PART 1: DETAILS**Design organisation.....**

I certify that reasonable professional skill and care have been used with the objective of checking that the Design

- (a) complies with the Form A reference: ...154359-WDC-FormA
Signed by: *Fakhar Chaudry on 07/12/2023.*
- (b) complies with the Design standards, codes and methods stated in the FormA, with the following additions
None
- (c) is accurately described by the following drawings, models, schedules, performance, materials and workmanship specifications and other documents that have been prepared for issue as Approved for Construction pending the completion of **PARTS 4, 4A and 5** of FormA and incorporates all feedback from Network Rail on the submission.

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154359-WDC-DRG-CV-000	B02	Site Location and Photos
154359-WDC-DRG-CV-001	B02	Existing Pier 35 and Pier 36 General Arrangement Drawing
154359-WDC-DRG-CV-010	B02	Masonry Repairs Pier 35
154359-WDC-DRG-CV-011	B02	Masonry Repairs Pier 36
154359-WDC-DRG-CV-012	B02	Masonry Repairs Arch Barrell Spans 35 and 36
154359-WDC-DRG-CV-100	B02	Pier 35 Existing General Arrangement
154359-WDC-DRG-CV-101	B02	Pier 35 Ground Model and Piling Setting out
154359-WDC-DRG-CV-201	B02	Pier 35 Proposed Cintec Anchor and Needle Beam General Arrangement Drawing Sheet 1
154359-WDC-DRG-CV-202	B02	Pier 35 Proposed Cintec Anchor and Needle Beam General Arrangement Drawing Sheet 2
154359-WDC-DRG-CV-203	B02	Pier 35 Proposed Cintec Anchor and Needle Beam General Arrangement Drawing Sheet 3
154359-WDC-DRG-CV-204	B02	Pier 35 Ring Beam General Arrangement Details
154359-WDC-DRG-CV-205	B02	Pier 35 Ring Beam Reinforcement Details
154359-WDC-DRG-CV-206	B02	Pier 35 Ring Beam Bar Schedule and Pile Reinforcement Details
154359-WDC-DRG-CV-207	B02	Pier 35 Construction Sequence
154359-WDC-DRG-CV-300	B02	Pier 36 Ground Model and Piling Setting out
154359-WDC-DRG-CV-301	B02	Pier 36 Proposed Ring Beam General Arrangement Drawing
154359-WDC-DRG-CV-302	B02	Pier 36 Proposed Needle Beam General Arrangement Drawing
154359-WDC-DRG-CV-303	B02	Pier 36 Ring Beam & Pile General Arrangement Details
154359-WDC-DRG-CV-304	B02	Pier 36 Ring Beam Reinforcement Details
154359-WDC-DRG-CV-305	B02	Pier 36 Ring Beam Bar Schedule and Pile Reinforcement Details
154359-WDC-IDT-DRA	04	Designers Risk Assessment

(d) the following matters have been considered during the Design

The matters that do not apply to the Works to meet the particular CR-T & Requirements documents are to be struck out by the Contractor's Responsible Engineer appointed for the relevant Design phase

1. So far as is reasonably practicable, the Asset affected will be safe in use when used in accordance with its intended purpose.
2. Hazards are managed in accordance with requirements of the CDM Regulations and CSM Regulations. Residual risks are documented in a Risk Register. Risks

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to both (a) health and safety during construction, maintenance, use, railway operations and (b) occupational health and safety, are as low as reasonably practicable or better.

3. The provisions for examination, maintenance and eventual renewal/removal are included in the design and are satisfactory.
4. The overall Design concept and the appearance of the infrastructure are appropriate for their purpose, location and site conditions.
5. Where the proposal includes the strengthening, partial renewal or removal of structures, the stability of the whole structure and all its parts/elements at all stages of the Works are addressed, including the long-term adequacy of the remaining parts/elements of the structure and supporting soil.
6. The effects of the proposals on existing infrastructure are adequately considered.
7. Arrangements for liaison and consultation with external bodies (such as Local Authorities, statutory undertakers, the British Transport Police, the Environmental Regulators and landowners) are satisfactory and the likely effects of the proposals on external organisations are addressed. Required Permissions/Approvals have been obtained to support the proposals.
8. The impact of the proposals on services and service routes is adequately investigated and appropriate mitigation measures have been agreed with the relevant Authority and incorporated into the Design.
9. The effects on other rail engineering disciplines including track, gauging, signalling (including signal sighting), telecommunications, electrification, lighting and other operational electrical and mechanical equipment have been satisfactorily considered.
10. Mining related risks have been assessed in the development of the design and are considered acceptable.
11. The requirements/recommendations of Railway Group Standards, Network Rail standards and Department for Transport Design Standards for Accessible Railway Stations have been addressed and proposed departures from these standards are identified and justified.
12. The requirements of the Building Regulations and any planning conditions have been met in full where applicable
13. The proposed Design loadings are appropriate, and any non-standard accidental loadings are correctly identified.
14. The requirements of **NR/L2/CIV/003/F1990 to NR/L2/CIV/003/F1994 and NR/L2/CIV/003/F1997** have been considered and the selected options/choice recorded in Appendix A1.3 of this certificate.
15. The proposed Design standards and methods of Design are suitable and in accordance with NR requirements, standards and legislation, with a list of standards provided in Appendix A1.2 of this certificate.
16. The GIR/GDR information presented in or referred to in the FormA is appropriate for the detailed design and assumptions have been verified or measures for verification of assumptions have been incorporated in the detailed design.

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17. A plan of geotechnical related construction supervision and monitoring (including details of items to be checked during construction or requiring maintenance or monitoring) have been incorporated in the detailed design and meet the requirements of **BS EN 1997**.
18. The Design complies with structure clearance and platform stepping distance requirements.
19. Important Design matters not covered by standards are identified.
20. The proposals are economical and sustainable.
21. The proposed works will not compromise the structural robustness of any existing structures.
22. The proposals have considered requirements for environmental and sustainable development.
23. All materials specified in the design of structures are compatible with the intended application and environment. This includes, but is not limited to:
 - fixing metallic structures to masonry with studs bonded with resin, grout or other chemical bonding products
 - fixing design is to current standards and guidance
 - design and installation comply with manufacturer's requirements, are compatible with substrate and includes appropriate verification testing
 - building fabric design and associated fixings are appropriate for the security risk and associated requirements
 - suitable and sufficient investigation, as far as reasonably practical, has been carried out to determine that materials to be used will be compatible.
 - Coatings are in accordance with NR standards and suitable for design life agreed in FormA
24. Design calculations have been completed where applicable and checked in accordance with the Design Check Category(s) agreed in the FormA.
25. Design and design check calculations will be provided for incorporation into the Project Health and Safety File.
26. ~~The proposals have considered requirements for environmental and sustainable development. The design has adequately considered the results and actions required from the Environmental and Social Appraisal and the Environmental and Social Management Plan, where required by NR/L2/ENV/015.~~
27. The selection of post-installed anchors in concrete and masonry meets the requirements of BS 8539.
28. A completed IDC certificate has been provided with this design to comply with **NR/L2/RSE/02009** clause 15.3
29. A Designers Risk Assessment has been provided with this detailed design.
30. The Permanent Works designer has outlined their proposed construction methodology and envisaged temporary works requirements in order to facilitate construction of the Permanent Works, including proposals to maintain stability at all times.
31. The Permanent Works designer has outlined their proposed construction methodology and all envisaged temporary works requirements in order to facilitate

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compliance with the DIA, e.g., provision of temporary structures such as accessible temporary footbridges

32. The provision of new assets has taken account of the effects on existing assets, such as effects on cuttings, embankments, other structures or GSM-R.
33. The design has adequately considered pedestrian flow, fire risk, means of escape and security requirements.
34. A specification of workmanship and materials has been provided with the detailed design submission.

Signed 	Title: Senior Design Engineer
Name (print) Brendan Harrowing	Date 16/01/2024
To be signed by the Contractor's Responsible Engineer appointed for the relevant Design phase	

PART 2: CHECK**Checking organisation.....**

I certify that reasonable professional skill and care have been used in checking the Design identified in **PART 1** of this Certificate, with the objective of checking that the Design

(a) complies with the Form A reference: ...154359-WDC-FormA
Signed by: *Fakhar Chaudry on 07/12/2023.*

(b) complies with the Design standards, codes and methods stated on the above Form A (including any stated variations or dispensations) and with any additions stated in **PART 1** of this Certificate: the justification given for these additions is acceptable.

I confirm that the Design was checked as stated below and that the Design Check has been carried out with the level of independence specified in **NR/L2/CIV/003** as agreed in the FormA.

Description of asset	Permanent Works	Design Check Category
Underbridge	Yes	1

Signed 	Title: Programme Manager
Name (print) Antony Horne	Date 16/01/2024

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To be signed by the Checker

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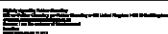
Document reference	154359 FORM B	Revision	02	
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PART 3: CONSTRUCTION ORGANISATION'S ACKNOWLEDGEMENT OF SUBMISSION BY A SUB-CONTRACT DESIGNER*Not Required***PART 4: ACCEPTANCE ON BEHALF OF NETWORK RAIL**

I accept that, so far as can reasonably be ascertained from the information submitted, the relevant procedures for the Design and Design Check as specified in **NR/L2/CIV/003** have been followed properly.

I have considered the Design Check statement provided in accordance with clause 15 of **NR/L2/CIV/003** and confirm that the stated method of checking was suitable.

I have reviewed the submission and confirm that it fulfils the CR-T, Requirements documents and) FormA

Signed	Fakhar Chaudhry		Title
Name (print)	Fakhar Chaudhry		Date 22/02/2024
To be signed by the Project Engineer (Building and Civil Engineering)			

Signed		Title
Name (print)		Date
To be signed by other responsible person <i>(if applicable)</i>		

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PART 5: ASSET MANAGER'S APPROVAL

(Part 5 is optional and only required where there have been significant changes from AIP; See NR/L2/CIV/003 clause 12)

I have considered the submission and confirm that the proposed variations to the Requirements documents/CR-T *(delete as appropriate)* are acceptable subject to any comments listed below being addressed prior to proceeding to Approved for Construction (AFC) Design as defined in NR/L2/RSE/02009.

(Statement to be struck out where variation from the Project Requirements is not being sought).

I have considered the Permanent Works design submission FormB and confirm that this is approved subject to the comments given below being addressed prior to proceeding to Approved for Construction (AFC) Design as defined in NR/L2/RSE/02009.

Signed	Title
Name (Print)	Date
To be signed by the Asset Manager (Structures)	

Signed	Title
Name (Print)	Date
To be signed by the Asset Manager (Geotechnical)	

Signed	Title
Name (Print)	Date
To be signed by the Asset Manager (Drainage)	

Signed	Title
Name (Print)	Date
To be signed by the Asset Manager (Buildings)	

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APPENDIX A**A1.1 LIST OF BUILDINGS AND CIVILS ENGINEERING ASSETS AFFECTED****1. DJH 41 Whalley Viaduct****Asset No 1**

Description	Whalley Viaduct		
Location	Whalley, Lancashire		
ELR	DJH	Mileage	17.0594
Asset Nr	41	OS grid ref	SJ 95200 98571

A1.2 – List of standards used for the development of this design

BS EN 1990	Eurocode 0: Basis of structural design
NA to BS EN 1990	UK National Annex to Eurocode 0 Basis of structural design
BS EN 1991-1-1	Eurocode 1: Actions on structures – Part 1-1: General actions - Densities, self-weight, imposed load for buildings
NA to BS EN 1991-1-1	UK National Annex to Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings
EN 1991-1-4	Eurocode 1: Actions on structures - Part 1-4: General actions Wind actions
BS EN 1991-2	Eurocode 1: Actions on structures - Part 2: Traffic loads on bridges
NA to BS EN 1991-2	UK National Annex to Eurocode 1: Actions on structures - Part 2: Traffic loads on bridges
BS EN 1992-1-1	Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings
NA to BS EN 1992-1-1	UK National Annex to Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings

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EN 1996-1-1 NA to BS EN 1996-1-1 BS EN 1997-1-2004	Eurocode 6: Design of masonry structures UK National Annex to Eurocode 6: Design of masonry structures Eurocode 7: Geotechnical Design - General Rules
NA to BS EN 1997-1:	UK National Annex to Eurocode 7: Geotechnical Design – Part 1: General Rules
BS 8002-2015	Code of practice for earth retaining structures
NR/L3/CIV/020	Design of Bridges
NR/L3/CIV/071	Geotechnical Design
NR/CIV/SD101 to 110	Network Standard Details for Brickwork Repair
NR/GN/CIV/025	The Structural Assessment of Underbridges

A1.3- NR/L2/CIV/003/F1990 to NR/L2/CIV/003/F1994 & NR/L2/CIV/003/F1997 selected options/choice to be recorded on this detailed design submission,

N/A

A1.4 DETAILED DESIGN DRAWINGS AND MODELS OF PROPOSALS

154359-WDC-DRG-CV-000	B02	Site Location and Photos
154359-WDC-DRG-CV-001	B02	Existing Pier 35 and Pier 36 General Arrangement Drawing
154359-WDC-DRG-CV-010	B02	Masonry Repairs Pier 35
154359-WDC-DRG-CV-011	B02	Masonry Repairs Pier 36
154359-WDC-DRG-CV-012	B02	Masonry Repairs Arch Barrell Spans 35 and 36
154359-WDC-DRG-CV-100	B02	Pier 35 Existing General Arrangement
154359-WDC-DRG-CV-101	B02	Pier 35 Ground Model and Piling Setting out
154359-WDC-DRG-CV-201	B02	Pier 35 Proposed Cintec Anchor and Needle Beam General Arrangement Drawing Sheet 1
154359-WDC-DRG-CV-202	B02	Pier 35 Proposed Cintec Anchor and Needle Beam General Arrangement Drawing Sheet 2

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154359-WDC-DRG-CV-203	B02	Pier 35 Proposed Cintec Anchor and Needle Beam General Arrangement Drawing Sheet 3
154359-WDC-DRG-CV-204	B02	Pier 35 Ring Beam General Arrangement Details
154359-WDC-DRG-CV-205	B02	Pier 35 Ring Beam Reinforcement Details
154359-WDC-DRG-CV-206	B02	Pier 35 Ring Beam Bar Schedule and Pile Reinforcement Details
154359-WDC-DRG-CV-207	B02	Pier 35 Construction Sequence
154359-WDC-DRG-CV-300	B02	Pier 36 Ground Model and Piling Setting out
154359-WDC-DRG-CV-301	B02	Pier 36 Proposed Ring Beam General Arrangement Drawing
154359-WDC-DRG-CV-302	B02	Pier 36 Proposed Needle Beam General Arrangement Drawing
154359-WDC-DRG-CV-303	B02	Pier 36 Ring Beam & Pile General Arrangement Details
154359-WDC-DRG-CV-304	B02	Pier 36 Ring Beam Reinforcement Details
154359-WDC-DRG-CV-305	B02	Pier 36 Ring Beam Bar Schedule and Pile Reinforcement Details
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A1.5 – GEOTECHNICAL CONSIDERATION (IF APPLICABLE)

N/A

A1.6 - ACCOMPANYING DRAWINGS AND OTHER DOCUMENTS

N/A

A1.7 Certificate of IDCSee IDC/IDR Certificate: *NR_L2_RSE_02009_F0047 DJH 41 Whalley Viaduct Form B***A1.8 Designers Risk Assessment***154359-WDC-IDT-DRA*