



**Assessment and Check Certificate
Category 0**

Name of Project: Monks Flood Masonry Arch Assessment

Name of Structure A38 Monks Flood South Bridge
A38 Monks Flood Bridge
A38 Monks Flood North Bridge

Structure reference no: STR_14727, 14729, and 14730

We certify that reasonable professional skill and care has been used in the preparation of the assessment and check of:

A38 Monks Flood South Bridge, A38 Monks Flood Bridge, and A38 Monks Flood North with a view to securing that:

- 1) It has been assessed and checked in accordance with
 - a) The following Standards:

Refer to TAS in Appendix A

- b) Inspection for assessment report No. NH611850-AMEY-SBR-A38_14727_14729_14730-RP-CB-01_IfA dated 01.07.2025.

including the following:

The unique numbers of drawings used in the Assessment are:

Relevant Archived Drawings

Monks Flood South STR_14727	A38 Monk's Flood and Monks Flood South – Land Ownership	11/070035/S.24.05
Monks Flood STR_14729	Monk's Flood (A38/433.70) & Monk's Flood South (A38/433.40) General Arrangements – Repair Works	11/070035/S/24/03
Monks Flood North STR_14730	A38 Monks Flood North	CM5013/TED/7106/106
	Existing General Arrangement	CM5013/TED/7106/01 Rev A
	Proposed Remedial Works Sheet 1	CM5013/TED/7106/02Rev B

2) It has been checked for compliance with:

a) The relevant standards in 1)

b) The assessed capacity of the structure, or element of the structure, is as follows:

Structure	Critical element	Location of failure	Capacity required	Structure capacity	Pass/Fail
Monks Flood South STR_14727	Barrel	Springing points and ¼ span points	40t ALL	40t ALL	Pass
Monks Flood STR_14729	Barrel	Springing points and ¼ span points	40t ALL	3t ALL	Pass (adequate for 3t)
Monks Flood North STR_14730	Barrel	Springing points and ¼ span points	40t ALL	7.5t ALL and FE2	Pass (adequate for 7.5t and FE2)

Notes

- characteristic material strength used in accordance with CS 454: Assessment of highway bridges and structures Version:1.1.0 Figure 4.2.7b.
- The abutments and wing walls have been assessed qualitatively on the basis of observations made during the inspection for assessment. They were generally in a good condition with no evidence of movement or settlement.
- Assumptions used in the Assessment refer to Appendix B.
- It is recommended to carry out FEA analysis 3-d model (subject to OD approval) which may improve the bridges capacity.

~~3) Carbon impact has been assessed, is in the range of the previous estimates~~

~~4) Information about the design, construction and maintenance of the structure has been provided to the Client.~~

Signed [Redacted] Digitally signed by [Redacted]
Date: 2025.09.30 16:38:24 +01'00'

Name [Redacted]

Assessment and Check Team Leader
Engineering Qualifications CEng, MICE

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Name [Redacted]

Position held Regional Structures Lead Midlands

Name of Organisation Amey Consultant

Date

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Position held

Engineering qualifications

TAA

Date

Amelia Mellagode
Senior Structures Advisor
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National Highways TAA

Appendix A: Technical Approval Schedule (TAS)

Schedule of Documents Relating to Design/Assessment of Highway Bridges and Structures

(All documents are taken to include revisions current as of 09 May 2024)

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
Eurocode 0	Basis of structural design		
BS EN 1990:2002 +A1:2005	Eurocode 0: Basis of structural design	+A1:2005 Incorporating corrigenda December 2008 and April 2010	See CD 350 section 7 for additional guidance. This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1990:2023
NA to BS EN 1990:2002 + A1:2005	UK National Annex to Eurocode 0 Basis of structural design	National Amendment No.1	See CD 350 section 7 for additional guidance.
Eurocode 1	Actions on structures		
BS EN 1991-1-1:2002	Eurocode 1: Actions on structures. General Actions. Densities, self-weight, imposed load for buildings	Corrigenda December 2004 and March 2009	
NA to BS EN 1991-1-1:2002	UK National Annex to Eurocode 1: Actions on structures. General Actions. Densities, self-weight, imposed load for buildings	Corrigenda July 2019	
BS EN 1991-1-3:2003 +A1:2015	Eurocode 1: Actions on structures. General Actions. Snow loads	+A1:2015 Incorporating corrigenda December 2004 and March 2009	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
NA + A2:18 to BS EN 1991-1-3:2003+A1:2015	UK National Annex to Eurocode 1: Actions on structures. General Actions. Snow loads	+A2:2018 Incorporating corrigenda June 2007, December 2015 and October 2018	
BS EN 1991-1-4:2005 +A1:2010	Eurocode 1: Actions on structures. General Actions. Wind actions	+A1:2010 Corrigenda July 2009 and January 2010	
NA to BS EN 1991-1-4:2005 + A1:2010	UK National Annex to Eurocode 1: Actions on structures. General Actions. Wind actions	National Amendment No.1	
BS EN 1991-1-5:2003	Eurocode 1: Actions on structures. General Actions. Thermal actions	Corrigenda December 2004 and March 2009	
NA to BS EN 1991-1-5:2003	UK National Annex to Eurocode 1: Actions on structures. General Actions. Thermal actions	-	
BS EN 1991-1-6:2005	Eurocode 1: Actions on structures. General Actions. Actions during execution	Corrigenda July 2008, November 2012 and February 2013	
NA to BS EN 1991-1-6:2005	UK National Annex to Eurocode 1: Actions on structures. General Actions. Actions during execution	-	
BS EN 1991-1-7:2006 +A1:2014	Eurocode 1: Actions on structures. General Actions. Accidental actions	+A1: 2014 Corrigendum February 2010	
NA+A1 to BS EN 1991-1-7:2006+A1:2014	UK National Annex to Eurocode 1: Actions on structures. Part 1-7: Accidental actions	+A1:2014 Incorporating corrigenda August 2014 and November 2015	See CD-350 for additional guidance.

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1991-2:2003	Eurocode 1: Actions on structures. Traffic loads on bridges	Corrigenda December 2004 and February 2010	See CD-350 section 7 for additional guidance. This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1991-2:2023
NA +A1:2020 to BS EN 1991-2:2003	UK National Annex to Eurocode 1: Actions on structures. Traffic loads on bridges	Corrigendum No.1 Amendment June 2020	See CD-350 section 7 for additional guidance.
Eurocode 2	Design of concrete structures		
BS EN 1992-1-1:2004 + A1:2014	Eurocode 2: Design of concrete structures— Part 1-1: General rules and rules for buildings	Incorporating corrigendum January 2008, November 2010 and January 2014	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1992-1-1:2023
NA + A2:2014 to BS EN 1992-1-1:2004 + A1:2014	UK National Annex to Eurocode 2: Design of concrete structures— Part 1-1: General rules and rules for buildings		
BS EN 1992-2:2005	Eurocode 2: Design of concrete structures— Part 2: Concrete bridges— Design and detailing rules	Corrigendum July 2008	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1992-1-1:2023

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
NA to BS EN 1992-2:2005	UK National Annex to Eurocode 2: Design of concrete structure – Part 2: Concrete bridges – Design and detailing rules	-	
BS EN 1992-3:2006	Eurocode 2: Design of concrete structures – Part 3: Liquid retaining and containment structures		This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1992-1-1:2023
NA to BS EN 1992-3:2006	UK National Annex to Eurocode 2: Design of concrete structures – Part 3: Liquid retaining and containment structures	-	
BS EN 1992-4:2018	Eurocode 2: Design of concrete structures – Part 4: Design of fastenings for use in concrete		
NA to BS EN 1992-4:2018	UK National Annex to Eurocode 2: Design of concrete structures – Part 4: Design of fastenings for use in concrete		
Eurocode 3	Design of steel structures		
BS EN 1993-1-1:2005 + A1:2014	Eurocode 3: Design of steel structures – Part 1-1 General rules and rules for buildings	Corrigenda February 2006 and April 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-1:2022
NA + A1:2014 to BS EN 1993-1-1:2005 + A1:2014	UK National Annex to Eurocode 3: Design of steel structures – Part 1-1 General rules and rules for buildings	-	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1993-1-3:2006	Eurocode 3: Design of steel structures — Part 1-3 General rules — Supplementary rules for cold-formed members and sheeting	Corrigendum November 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-3:2024
NA to BS EN 1993-1-3:2006	UK National Annex to Eurocode 3: Design of steel structures — Part 1-3 Supplementary rules for cold-formed members and sheeting	-	
BS EN 1993-1-4:2006 + A2:2020	Eurocode 3: Design of steel structures — Part 1-4 General rules — Supplementary rules for stainless steels	+ A1:2015 Amendment No. 1 + A2:2020 Amendment No. 2	Supersedes BS EN 1993-1-4:2006 + A1:2015
NA+A1:15 to BS EN 1993-1-4:2006+A1:2015	UK National Annex to Eurocode 3: Design of steel structures — Part 1-4 Supplementary rules for stainless steels	+ A1:2015 Amendment No. 1	
BS EN 1993-1-5:2006+A2:2019	Eurocode 3: Design of steel structures — Part 1-5 Plated structural elements	Corrigendum April 2009, +A1:2017 Amendment No. 2, +A2:2019	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-5:2024
NA+A1:2016 to BS EN 1993-1-5:2006	UK National Annex to Eurocode 3: Design of steel structures — Part 1-5 Plated structural elements	+ A1:2016 Amendment No. 1	
BS EN 1993-1-6:2007+ A1:2017	Eurocode 3: Design of steel structures — Part 1-6 Strength and stability of shell structures	+ A1:2017 Amendment No. 1	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1993-1-7:2007	Eurocode 3: Design of steel structures — Part 1-7 Plated structures subject to out of plane loading	Corrigendum April 2009	
BS EN 1993-1-8:2005	Eurocode 3: Design of steel structures — Part 1-8 Design of joints	Corrigenda December 2005, September 2006, July 2009 and August 2010	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-8:2024
NA to BS EN 1993-1-8:2005	UK National Annex to Eurocode 3: Design of steel structures — Part 1-8 Design of joints	-	
BS EN 1993-1-9:2005	Eurocode 3: Design of steel structures — Part 1-9 Fatigue	Corrigenda December 2005, September 2006 and April 2009	
NA to BS EN 1993-1-9:2005	UK National Annex to Eurocode 3: Design of steel structures — Part 1-9 Fatigue	-	
BS EN 1993-1-10:2005	Eurocode 3: Design of steel structures — Part 1-10 Material toughness and through-thickness properties	Corrigenda December 2005, September 2006 and March 2009	
NA to BS EN 1993-1-10:2005	UK National Annex to Eurocode 3: Design of steel structures — Part 1-10 Material toughness and through thickness properties	-	
BS EN 1993-1-11:2006	Eurocode 3: Design of steel structures — Part 1-11 Design of structures with tension components	Corrigendum April 2009	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
NA to BS EN 1993-1-11:2006	UK National Annex to Eurocode 3: Design of steel structures – Part 1-11 Design of structures with tension components	-	
BS EN 1993-1-12:2007	Eurocode 3: Design of steel structures – Part 1-12 Additional rules for the extension of EN 1993 up to steel grades S 700	Corrigendum April 2009	
NA to BS EN 1993-1-12:2007	UK National Annex to Eurocode 3: Design of steel structures – Part 1-12 Additional rules for the extension of EN 1993 up to steel grades S 700	-	
BS EN 1993-2:2006	Eurocode 3: Design of steel structures – Part 2 Steel bridges	Corrigendum July 2009	
NA + A1:2012 to BS EN 1993-2:2006	UK National Annex to Eurocode 3: Design of steel structures – Part 2 Steel bridges	+ A1:2012	
BS EN 1993-5:2007	Eurocode 3: Design of steel structures – Part 5 Piling	Corrigendum May 2009	
NA + A1:2012 to BS EN 1993-5:2007	UK National Annex to Eurocode 3: Design of steel structures – Part 5 Piling	+ A1:2012	
Eurocode 4	Design of composite steel and concrete structures		
BS EN 1994-1-1:2004	Eurocode 4: Design of composite steel and concrete structures – Part 1-1 General rules and rules for buildings	Corrigendum April 2009	
NA to BS EN 1994-1-1:2004	UK National Annex to Eurocode 4: Design of composite steel and concrete structures – Part 1-1 General rules and rules for buildings	-	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1994-2:2005	Eurocode 4: Design of composite steel and concrete structures— Part 2 General rules and rules for bridges	Corrigendum July 2008	
NA to BS EN 1994-2:2005	UK National Annex to Eurocode 4: Design of composite steel and concrete structures— Part 2 General rules and rules for bridges	-	
Eurocode 5	Design of timber structures		
BS EN 1995-1-1:2004 + A2:2014	Eurocode 5: Design of timber structures— Part 1-1 General— common rules and rules for buildings	+ A2:2014 Incorporating corrigendum June 2006	
NA to BS EN 1995-1-1:2004 + A2:2014	UK National Annex to Eurocode 5: Design of timber structures— Part 1-1 General— common rules and rules for buildings	+ A2:2014	
BS EN 1995-2:2004	Eurocode 5: Design of timber structures— Part 2 Bridges	-	
NA to BS EN 1995-2:2004	UK National Annex to Eurocode 5: Design of timber structures— Part 2 Bridges	-	
Eurocode 6	Design of masonry structures		
BS EN 1996-1-1:2005+A1:2012	Eurocode 6: Design of masonry structures— Part 1-1 General rules for reinforced and unreinforced masonry structures	+A1:2012 Corrigenda February 2006 and July 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1996-1-1:2022
NA to BS EN 1996-1-1:2005 +A1:2012	UK National Annex to Eurocode 6: Design of masonry structures— Part 1-1 General rules for reinforced and unreinforced masonry structures	+A1:2012	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1996-2:2006	Eurocode 6: Design of masonry structures — Part 2 Design considerations, selection of materials and execution of masonry	Corrigendum September 2009	
NA to BS EN 1996-2:2006	UK National Annex to Eurocode 6: Design of masonry structures — Part 2 Design considerations, selection of materials and execution of masonry	Corrigendum No.1	
BS EN 1996-3:2006	Eurocode 6: Design of masonry structures — Part 3 Simplified calculation methods for unreinforced masonry structures	Corrigendum October 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1996-3:2023
NA +A1:2014 to BS EN 1996-3:2006	UK National Annex to Eurocode 6: Design of masonry structures — Part 3 Simplified calculation methods for unreinforced masonry structures	+A1:2014	
Eurocode 7	Geotechnical design		
BS EN 1997-1:2004+A1:2013	Eurocode 7: Geotechnical design — Part 1 General rules	+A1:2013 Corrigendum February 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1997-1:2023
NA+A2:2022 to BS EN 1997-1:2004+A1:2013	UK National Annex to Eurocode 7: Geotechnical design — Part 1 General rules	+A1:2013 Incorporating Corrigendum No.1, Amendment 1 — July 2014 and Amendment 2 — 2022	Supersedes NA+A1:2014 to BS EN 1997-1:2004+A1:2013

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1997-2:2007	Eurocode 7: Geotechnical design – Part 2 Ground investigation and testing	Corrigendum June 2010	
NA to BS EN 1997-2:2007	UK National Annex to Eurocode 7: Geotechnical design – Part 2 Ground investigation and testing	-	
Eurocode 8	Design of structures for earthquake resistance		
BS EN 1998-1:2004 + A1:2013	Eurocode 8: Design of structures for earthquake resistance – Part 1 General rules, seismic actions and rules for buildings	Corrigendum June 2009, January 2011 and March 2013	
NA to BS EN 1998-1:2004	UK National Annex to Eurocode 8: Design of structures for earthquake resistance – Part 1 General rules, seismic actions and rules for buildings	-	
BS EN 1998-2:2005+A2:2011	Eurocode 8: Design of structures for earthquake resistance – Part 2 Bridges	Corrigenda February 2010 and February 2012	
NA to BS EN 1998-2:2005	UK National Annex to Eurocode 8: Design of structures for earthquake resistance – Part 2 Bridges	-	
BS EN 1998-5:2004	Eurocode 8: Design of structures for earthquake resistance – Part 5 Foundations, retaining structures and geotechnical aspects	-	
NA to BS EN 1998-5:2004	UK National Annex to Eurocode 8: Design of structures for earthquake resistance – Part 5 Foundations, retaining structures and geotechnical aspects	-	
Eurocode 9	Design of aluminium structures		

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1999-1-1:2007 + A2:2013	Eurocode 9: Design of aluminium structures— Part 1-1 General structural rules	+ A2:2013 Incorporating corrigendum March-2014	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1999-1-1:2023
NA to BS EN 1999-1-1:2007 + A1:2009	UK National Annex to Eurocode 9: Design of aluminium structures— Part 1-1 General structural rules	National Amendment No.1 Corrigendum No.1	
BS EN 1999-1-3:2007 + A1:2011	Eurocode 9: Design of aluminium structures— Part 1-3 Structures susceptible to fatigue	+ A1:2011	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1999-1-3:2023
NA to BS EN 1999-1-3:2007 + A1:2011	UK National Annex to Eurocode 9: Design of aluminium structures— Part 1-3 Structures susceptible to fatigue	+ A1:2011	
BS EN 1999-1-4:2007 + A1:2011	Eurocode 9: Design of aluminium structures— Part 1-4 Cold formed structural sheeting	+ A1:2011 Corrigendum November 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1999-1-4:2023
NA to BS EN 1999-1-4:2007	UK National Annex to Eurocode 9: Design of aluminium structures— Part 1-4 Cold formed structural sheeting	-	
Bsi Published Documents			
<i>For guidance only unless clauses are otherwise specified in CD 350 Appendix A.</i>			
Published Document reference	Title	Notes	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
PD-6687-1:2020	Background paper to the UK National Annexes to BS EN 1992-1 and BS EN 1992-3	Supersedes PD-6687-1:2010	See CD-350 clauses 3.6, 4.1, 4.2 and Appendix A for additional guidance. Clause 3.6 in CD-350 refers to clause 2.5 in PD-6687-1, this is now clause 4.5 in PD-6687-1 Clause 4.2 in CD-350 refers to clause 2.22 in PD-6687-1, this is now clause 4.21.4 in PD-6687-1
PD-6687-2:2008	Recommendations for the design of structures to BS EN 1992-2:2005	See CD-350 clauses 4.1, 4.2 and Appendix A for additional guidance.	
PD-6688-1-1:2011	Recommendations for the design of structures to BS EN 1991-1-1	See CD-350 Appendix A for additional guidance.	
PD-6688-1-4:2015	Background paper to the UK National Annex to BS EN 1991-1-4	See CD-350 Appendix A for additional guidance.	
PD-6688-1-7:2009 +A1:2014	Recommendations for the design of structures to BS EN 1991-1-7	See CD350 clause 3.7 and Appendix B for additional guidance.	
PD-6688-2:2011	Recommendations for the design of structures to BS EN 1991-2	See CD-350 Appendix A for additional guidance.	
PD-6694-1:2011 + A1:2020	Recommendations for the design of structures subject to traffic loading to BS EN 1997-1	Incorporating Corrigendum 1 Jan 2022 & Corrigendum 2 Jul 2023 See CD-350 Appendix A for additional guidance.	
PD-6695-1-9:2008	Recommendations for the design of structures to BS EN 1993-1-9	See CD-350 Appendix A for additional guidance.	
PD-6695-1-10:2009	Recommendations for the design of structures to BS EN 1993-1-10	See CD-350 Appendix A for additional guidance.	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
PD-6695-2:2008 + A1:2012 Incorporating Corrigendum No.1	Recommendation for the design of bridges to BS EN 1993	See CD-350 Appendix A for additional guidance.	
PD-6696-2:2007 + A1:2012	Background paper to BS EN 1994-2 and the UK National Annex to BS EN 1994-2	See CD-350 Appendix A for additional guidance.	
PD-6698:2009	Recommendations for the design of structures for earthquake resistance to BS EN 1998	See CD-350 section 7 for additional guidance.	
PD-6702-1:2009+A1:2019	Structural use of aluminium. Recommendations for the design of aluminium structures to BS EN 1999	Amended 31 May 2019	
PD-6703:2009	Structural bearings — Guidance on the use of structural bearings		
PD-6705-2:2020	Structural use of steel and aluminium. Execution of steel bridges conforming to BS EN 1090-2. Guide	Replaces PD-6705-2:2010 + A1:2013	
PD-6705-3:2009	Recommendations on the execution of aluminium structures to BS EN 1090-3		

Execution Standards referenced in British Standards or Eurocodes		
Execution Standard reference	Title	Notes
BS EN 1090-1:2009+A1:2011	Execution of steel structures and aluminium structures – Part 1: Requirements for conformity assessment of structural components	
BS EN 1090-2:2018+A1:2024	Execution of steel structures and aluminium structures. Technical requirements for the execution of steel structures	Supersedes BS EN 1090-2:2018
BS EN 1090-3:2019	Execution of steel structures and aluminium structures – Part 3: Technical requirements for aluminium structures	Supersedes BS EN 1090-3:2008
BS EN 13670:2009 Incorporating corrigenda October 2015 and November 2015	Execution of concrete structures	

Product Standards referenced in British Standards or Eurocodes		
Product Standard reference	Title	Notes
BS EN 206:2013+A2:2021	Concrete – Specification, performance, production and conformity	Supersedes BS EN 206:2013+A1:2016
BS EN 1317-1:2010	Road Restraint Systems – Part 1 – Terminology and general criteria for test methods	
BS EN 1317-2:2010	Road Restraint Systems – Part 2 – Performance classes, impact test acceptance criteria and test methods for safety barriers.	
BS EN 1317-3:2010	Road Restraint Systems – Part 3 – Performance classes, impact test acceptance criteria and test methods for crash cushions.	
DD ENV 1317-4:2002	Road Restraint Systems – Part 4 – Performance classes, impact test acceptance criteria and test methods for terminals and transitions of safety barriers.	<i>Draft BS EN 1317-4 for public comment published in June 2012</i>
BS EN 1317-5:2007+A2:2012	Road Restraint Systems – Part 5 – Product requirements and evaluation of conformity for vehicle restraint systems	Incorporating corrigendum August 2012 <i>Draft prEN 1317-5 for public comment published in December 2013</i>

Product Standards referenced in British Standards or Eurocodes

Product Standard reference	Title	Notes
PD-CEN/TR-16949:2016	Road Restraint System— Pedestrian restraint system— Pedestrian parapets	<i>Bsi-Published Document / CEN Technical Report published in July 2016</i> <i>(This document should not be used. The requirements of BS 7818:1995 apply.)</i>
PD-CEN/TS 1317 7:2023	Road restraint systems—Part 7: Performance characterisation and test methods for terminals of safety barriers	<i>Replaces Draft prEN 1317-7</i> <i>(All terminals should be in accordance with this document or ENV1317-4.)</i>
PD-CEN/TS 17342:2019	Road restraint systems— Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers	<i>Replaces PD-CEN/TS 1317- 8:2012</i> <i>(This document should not be used.)</i>
PD-CEN/TR 17081:2018	Design of fastenings for use in concrete—Plastic design of fastenings with headed and post- installed fasteners	
BS-EN 1337-1:2000	Structural bearings—Part 1: General Design Rules	
BS-EN 1337-2:2004	Structural bearings—Part 2: Sliding elements	
BS-EN 1337-3:2005	Structural bearings—Part 3: Elastomeric bearings	
BS-EN 1337-4:2004	Structural bearings—Part 4: Roller bearings	Corrigendum No.1 March 2007
BS-EN 1337-5:2005	Structural bearings—Part 5: Pot bearings	
BS-EN 1337-6:2004	Structural bearings—Part 6: Rocker bearings	
BS-EN 1337-7:2004	Structural bearings—Part 7: Spherical and cylindrical PTFE bearings	
BS-EN 1337-8:2007	Structural bearings—Part 8: Guide bearings and restraint bearings	
BS-EN 1337-9:1998	Structural bearings—Part 9: Protection	
BS-EN 1337-10:2003	Structural bearings—Part 10: Inspection and maintenance	Corrigendum No.1 November 2003
BS-EN 1337-11:1998	Structural bearings—Part 11: Transport, Storage and Installation.	
BS-EN 10025-1:2004	Hot rolled products of structural steels Part 1: General technical delivery conditions.	

Product Standards referenced in British Standards or Eurocodes

Product Standard reference	Title	Notes
BS EN 10025-2:2019	Hot rolled products of structural steels Part 2: Technical delivery conditions for non-alloy structural steels.	Supersedes BS EN 10025-1:2004
BS EN 10025-3:2019	Hot rolled products of structural steels Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels.	Supersedes BS EN 10025-3:2004
BS EN 10025-4:2019+A1:2022	Hot rolled products of structural steels Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels.	Supersedes BS EN 10025-4:2019
BS EN 10025-5:2019	Hot rolled products of structural steels — Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance	Supersedes BS EN 10025-5:2004
BS EN 10025-6:2019+A1:2022	Hot rolled products of structural steels — Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition.	Supersedes BS EN 10025-6:2019
BS EN 10080:2005	Steel for the reinforcement of concrete — Weldable reinforcing steel — General	
BS EN 10210-1:2006	Hot finished structural hollow sections of non-alloy and fine grain steels — Part 1: Technical delivery conditions	
BS EN 10210-2:2019	Hot finished structural hollow sections — Part 2: Tolerances, dimensions and sectional properties	Supersedes BS EN 10210-2:2006
BS EN 10248-1:2023	Hot rolled sheet piling of non-alloy steels. Technical delivery conditions	Supersedes BS EN 10248-1:1996
BS EN 10248-2:1996	Hot rolled sheet piling of non-alloy steels. Tolerances on shape and dimensions	
BS EN 12063:1999	Execution of special geotechnical work. Sheet pile walls.	
BS EN 13369:2023	Common rules for precast concrete products	Supersedes BS EN 13369:2018
BS EN 14388:2005	Road traffic noise reducing devices	There is a 2015 version, however the 2015 version is not harmonised.
BS EN 15050:2007 + A1:2012	Precast concrete products — Bridge elements	See CD 350 clause 3.8.1 for additional guidance.

Product Standards referenced in British Standards or Eurocodes

Product Standard reference	Title	Notes
BS-EN-15258:2008	Precast concrete products – Retaining wall elements	

British Standards

British Standard reference	Title	Notes
BS-4449:2005+A3:2016	Steel for the reinforcement of concrete	No longer covers plain round bar. (See BS4482 up to 12mm dia, see BS EN 10025-1 for larger sizes and dowels. See BS EN 13877-3 for dowel bars in concrete pavements.)
BS-5896:2012	Specification for high tensile steel wire and strand for the prestressing of concrete	
BS-7818:1995	Specification for pedestrian restraint systems in metal	Incorporating Corrigendum No.1 May 2004 and Corrigendum No.2 September 2006 Currently the requirements of BS 7818:1995 are to be used instead of PD CEN/TR 16949:2016
BS-8002:2015	Code of practice for earth retaining structures	
BS-8004:2015 +A1:2020	Code of practice for foundations	Amendment +A1:2020
BS-8006-1:2010+A1:2016	Code of practice for strengthened/reinforced soils and other fills	
BS-8500-1:2023	Concrete – Complementary British Standard to BS EN 206: Method of specifying and guidance for the specifier.	Supersedes BS-8500-1:2015+A2:2019
BS-8500-2:2023	Concrete – Complementary British Standard to BS EN 206: Specification for constituent materials and concrete.	Supersedes BS-8500-2:2015+A2:2019
BS-8666:2020	Scheduling, dimensioning, bending and cutting of steel reinforcement for concrete	Supersedes BS-8666:2005

The Manual Contract Document for Highway Works (MCHW)

MCHW reference	Title	Notes
MCHW Volume 1: October 2022	Specification for Highway Works	<i>Specification compliant with the execution standards must be used. A Departure is necessary</i>

		<i>for the parts where a compliant revision has not been published. Amendments October 2022 Supersedes April 2022 version</i>
MCHW Volume 2: October 2022	Notes for guidance on the Specification for Highway Works	<i>Notes for guidance compliant with the execution standards must be used. A Departure is necessary for the parts where a compliant revision has not been published. Amendments October 2022 Supersedes November 2021 version</i>
MCHW Volume 3: February 2017	Highway Construction Details	

The Design Manual for Roads and Bridges (DMRB)		
DMRB reference	Title	Notes
GG 101 Revision 0.1.0	Introduction to the Design Manual for Roads and Bridges	Replaces GG 101 Revision 0
GG 102 Revision 0	Quality Management Systems for Highway Design	Replaces GD 02/16
GG 103 Revision 0	Introduction and general requirements for sustainable development and design	
GG 104 Revision 0	Requirements for Safety Risk Assessment	Replaces GD04/12 and IAN 191/16
GG 184 Revision 0	Specification for the use of Computer Aided Design	Replaces IAN 184/16
CG 300 Revision 0.1.0	Technical approval of highway structures	Supersedes BD 2/12
CG 302 Revision 0	As-built, operational and maintenance records for highway structures	Supersedes BD 62/07
CG 303 Revision 0	Quality assurance scheme for paints and similar protective coatings	Supersedes BD 35/14
CG 305 Revision 0	Identification marking of highway structures	Supersedes BD 45/93
CG 501 Revision 2	Design of highway drainage systems	Supersedes HD 33/16, TA 80/99
CD 127 Revision 1.0.1	Cross-sections and headrooms	Replaces TD 27/05 and TD 70/08
CD 350 Revision 0	The design of highway structures	Supersedes BD 100/16, BA 57/01, BD 57/01 and IAN 124/11
CD 351 Revision 0	The design and appearance of highway structures	Supersedes BA 41/98
CD 352 Revision 0	Design of road tunnels	Supersedes BD 78/99
CD 353 Revision 0	Design criteria for footbridges	Supersedes BD 29/17
CD 354 Revision 1.1.0	Design of minor structures	Supersedes CD 354 Revision 1
CD 355 Revision 0	Application of whole-life costs for design and maintenance of highway structures	Replaces BD 36/92 and BA 28/92

The Design Manual for Roads and Bridges (DMRB)

DMRB reference	Title	Notes
CD 356 Revision 1	Design of highway structures for hydraulic action	Supersedes BA 59/94
CD 357 Revision 1	Bridge expansion joints	Replaces BD 33/94, BA 26/94, IAN 168/12 and IAN 169/12
CD 358 Revision 2.4.0	Waterproofing and surfacing of concrete bridge decks	Supersedes CD 358 Revision 2.3.0
CD 359 Revision 0	Design requirements for permanent soffit formwork	Supersedes BA 36/90 and IAN 131/11
CD 360 Revision 2	Use of compressive membrane action in bridge decks	Supersedes BD 81/02
CD 361 Revision 0	Weathering steel for highway structures	Supersedes BD 7/01
CD 362 Revision 1	Enclosure of bridges	Replaces BD 67/96 and BA 67/96
CD 363 Revision 0	Design rules for aerodynamic effects on bridges	Replaces BD 49/01
CD 364 Revision 0	Formation of continuity joints in bridge decks	Replaces BA 82/00
CD 365 Revision 1	Portal and cantilever signs/signals gantries	Replaces BD 51/14, IAN 193/16, BE 7/04
CD 366 Revision 0	Design criteria for collision protection beams	Replaces BD 65/14
CD 367 Revision 0	Treatment of existing structures on highways widening schemes	Replaces BD 95/07
CD 368 Revision 0	Design of fibre reinforced polymer bridges and highway structures	Replaces BD 90/05
CD 369 Revision 0	Surface protection for concrete highway structures	Replaces BA 85/04
CD 371 Revision 0	Strengthening highway structures using fibre-reinforced polymers and externally bonded steel plates	Replaces BD 85/08, BD 84/02
CD 372 Revision 0	Design of post-installed anchors and reinforcing bar connections in concrete	Supersedes IAN 104/15
CD 373 Revision 0	Impregnation of reinforced and prestressed concrete highway structures using hydrophobic pore-lining impregnants	Supersedes BD 43/03
CD 374 Revision 0	The use of recycled aggregates in structural concrete	Supersedes BA 92/07
CD 375 Revision 1	Design of corrugated steel buried structures	Supersedes BD 12/01
CD 376 Revision 0	Unreinforced masonry arch bridges	Replaces BD 91/04
CD 377 Revision 4	Requirements for road restraint systems	Supersedes TD 19/06
CD 622 Revision 1	Managing geotechnical risk	Replaces HD 22/08, BD 10/97 and HA 120/08
CS 451 Revision 0.1.0	Structural review and assessment of highway structures	Supersedes BD 101/11
CS 454 Revision 1.1.0	Assessment of highway bridges and structures	Supersedes CS 454 Revision 1

The Design Manual for Roads and Bridges (DMRB)

DMRB reference	Title	Notes
CS-455 Revision 1.1.1	Assessment of concrete highway bridges and structures	Supersedes CS-455 Revision 1.1.0
CS-456 Revision 0	Assessment of steel highway bridges and structures	Supersedes BD-56/10
CS-457 Revision 1	Assessment of composite highway bridges and structures	Supersedes BD-61/10
CS-458 Revision 0	Assessment of composite highway bridges and structures for the effects of special type general order (STGO) and special order (SO) vehicles.	Supersedes BD-86/11
CS-459 Revision 1	Assessment of bridge substructures, retaining structures and buried structures	Supersedes BA-55/06
CS-461 Revision 0	Assessment and upgrading of in-service parapets	Supersedes BA-37/92 and IAN 97/07
CS-462 Revision 0	Repair and management of deteriorated concrete highway structures	Supersedes BA-35/90 and BA-52/94
GD-304 Revision 2	Designing health and safety into maintenance	Replaces IAN-69/15
LA-104 Revision 1	Environmental assessment and monitoring	Supersedes HA-205/08, HD-48/08, IAN-125/15, and IAN-133/10
LA-106 Revision 1	Cultural heritage assessment	Supersedes HA-208/07, HA-60/92, HA-75/01
LA-110 Revision 0	Material assets and waste	Supersedes IAN-153/11
LA-113 Revision 1	Road drainage and the water environment	Supersedes HD-45/09
LD-119 Revision 0	Roadside environmental mitigation and enhancement	Formerly LA-119, which superseded HA-65/94 and HA-66/95

Interim Advice Notes

IAN reference	Title	Notes
IAN-105/08	Implementation of construction (design and management) 2007 and the withdrawal of SD-10 and SD-11	This document has been withdrawn without replacement.

Miscellaneous

Standard reference	Title	Notes
CIRIA C543	Bridge Detailing Guide	

Miscellaneous		
Standard reference	Title	Notes
CIRIA C656	Masonry arch bridges: Condition appraisal and remedial treatment 2006	
CIRIA C686	Safe Access for Maintenance and Repair	
CIRIA C760	Guidance on embedded retaining wall design	
CIRIA C766	Control of cracking caused by restrained deformation in concrete	Supersedes C660
CIRIA C777	General fixings — guidance on selection and whole-life management	
CIRIA C800	Guidance on the assessment of masonry arch bridges	
Contractor Report 284	Assessment of repair and strengthening techniques for brick and stone masonry arch bridges. Publication Year. 1992	
TRRL CR 244	Masonry properties for assessing arch bridges. Publication Year. 1990	

Additional Standards		
Additional standards needed for a particular design should be listed here.		
Reference	Title	Notes
BS 5400-2:2006	Steel, concrete and composite bridges. Specification for loads	Superseded by BS EN 1990:2002 and BS EN 1991-1-7:2006. Supersedes BS 5400-2:1978.
BS 5400-4:1990	Steel, concrete and composite bridges. Code of practice for design of concrete bridges	Superseded by BS EN 1992-2:2005. Supersedes BS 5400-4:1984.
BS 6779-3:1994	Highway Parapets for Bridges and other Structures	Used to design original parapets
BS EN 1504-3:2005	Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity. Structural and non-structural repair	

Additional Standards

Additional standards needed for a particular design should be listed here.

Reference	Title	Notes
BS-EN-10219-1:2006	Cold-formed welded structural hollow sections of non-alloy and fine grain steels	Supersedes BS-EN-10219-1:1997

Appendix B

Assumptions used for the Assessment of the Arch Bridges

- the bridges were assessed using an "Equilibrium-based analysis" in accordance with CS 454 Cl 7.10 and the Archie-M software program. The Archie-M software is based on the line of thrust (Equilibrium based on resultant forces). The arch barrel was assessed with any strength enhancement to the arch barrels provided by the spandrel walls will be ignored. Stiffening effects due to spandrel walls are to be ignored, i.e. the spandrel walls are considered to be beyond the width of the active arch barrel. The spandrel walls, abutments, wingwalls and foundations will be assessed qualitatively in accordance with CS 459 Clause 2.22. Brick masonry parapet capacities will be assessed quantitatively in accordance with "Guidance on the Design, Assessment and Strengthening of Masonry Parapets on Highway Structures" published by Department for Transport in 2012. Permanent actions arising from dead loading and superimposed dead loading will be calculated based on dimensions taken from the Inspection for Assessment and using the material densities in accordance with CS 454 Table 4.1.1a.

The traffic actions for normal traffic will be represented by the axle loads and be applied as specified in CS 454 Section 7. The road surface is assumed to be poor, and the traffic flow category is taken as high in accordance with CS 454 Cl. 2.16.5 and Cl. 5.5.

Action related to general order traffic under STGO regulation : Category 1 (GVW < 50T) – using ALL model 1 only (span <20m). Single, double and triple axles only from CS454 tbl.B1

However, due to the small span only the single axle is applicable.

- material strength based on as built, on site observation and CS 454 figure 4.2.7a.
- CS454, CS 455, and others listed in 4.1.a below.
- Effective width was based on CS454 Fig. 7.7.6. with the dispersal curtailed due the presence of the unbonded longitudinal joint at the interface between the different arch sections. Condition factor is taking account for within Archie M, by considering mortar loss, presence of longitudinal crack resulted in curtailment of the load dispersal width, joint bedding width if > 6mm we allowed for it by reducing the masonry strength.
- Longitudinal cracks will be quantified by limiting the transverse width of the barrel, limiting the load spread across the barrel.
- Lateral cracks are indicative of arch deformation or where hinges having formed in the barrel. In this instance the assessment will be referred back to the client for more detailed consideration.
- The effects of cracks in the spandrel walls and wing walls will be assessed qualitatively.
- Dampness of the barrel is indicative of inadequate waterproofing of the barrel extrados. This does not reduce the barrel masonry strength but will affect the durability of the structure and will be addressed within the assessment report.
- Spalling of the intrados and loss of face of the masonry will be allowed for directly by a reduction in ring thickness. Joint width factor, Fw
- The masonry strength was multiplied by the joint width factor from tbl.7.5.1 to account for joint width. Joint depth factor, Fd

- Loss of pointing in the joints will be directly input into the Archie-M program .

Mortar factor, F_{mo}

- Mortar condition will be accounted for by choice of brickwork strength (lime or cement mortar)

Appendix C: SES review comments sheet

National Highways SES Structures Comment Record Sheet (Brunel Ref: 100712, 101273, 101857)

Project Name: **Monks Flood Masonry Arch Assessment**
 Structure Name: **A38 Monks Flood South Bridge**
A38 Monks Flood Bridge
A38 Monks Flood North Bridge
 NH Structure Key: **STR_14727**
STR_14729
STR_14730
 Document: **CAT0 Assessment & Check Certificate**
 Report No.:
 First Issued: **01/07/2025**

Comment Sheet Document Control

Comment Sheet Version	Date NH Comment Sent	Date Designer's Response Sent	Notes
A	07-08-2025	11.08.25	Comments by SPD/AM
B	04-09-2025	04.09.25	Comments by SPD/AM
C	10-09-2025		Comments by SPD
D	22/09/2025	25.09.25	Comments by SPD
E	29/09/2025	30.09.25	Comments by SPD/AM

No.	Section	Initial NH Comment & Responses to Further comments on Designer's reply	Designer's Response to Initial NH Comments & Responses to Further NH comments	NH Acceptance
Major Comments				
1.	General	<p>A Whilst the required capacity of the in-service structures is 40T ALL, the 3T rating for STR_14729 and 7.5T rating for STR_14730 is questionable. This shall be identified as a <u>failure</u> in the certificate.</p> <p>If Archie-M software was used for the assessment, that shall be clearly stated in the certificate. SES suggest using a more refined higher method for assessment. The certificate doesn't provide adequate information about the assessment either. SES suggest providing an appendix to the certificate with as much as details of how the assessment was carried out to include at least the following.</p> <ul style="list-style-type: none"> the methodology of the assessment with loading considered and any <u>assumptions (if any)</u>, material properties referring to as-builts or relevant standards relevant standards/other technical documents considered (TAS). how inputs were derived and applied, especially the effective width and defects/condition factors. recommendations for risk mitigation measures/options. <p>Please refer to CG 300 cl 2.77 too.</p>	<ul style="list-style-type: none"> the bridges were assessed using an "Equilibrium-based analysis" in accordance with CS 454 Cl 7.10 and the Archie-M software program. The Archie-M software is based on the line of thrust (Equilibrium based on resultant forces). The arch barrel was assessed with any strength enhancement to the arch barrels provided by the spandrel walls will be ignored. Stiffening effects due to spandrel walls are to be ignored, i.e. the spandrel walls are considered to be beyond the width of the active arch barrel. The spandrel walls, abutments, wingwalls and foundations will be assessed qualitatively in accordance with CS 459 Clause 2.22. Brick masonry parapet capacities will be assessed quantitatively in accordance with "Guidance on the Design, Assessment and Strengthening of Masonry Parapets on Highway Structures" 	<p>Thank you for the clarification.</p> <p>This is all important information that should be appended to the design certificate, especially where a variable is applied in a manner that is at the judgement of the assessor.</p>

			<p>published by Department for Transport in 2012.</p> <p>Permanent actions arising from dead loading and superimposed dead loading will be calculated based on dimensions taken from the Inspection for Assessment and using the material densities in accordance with CS 454 Table 4.1.1a.</p> <p>The traffic actions for normal traffic will be represented by the axle loads and be applied as specified in CS 454 Section 7. The road surface is assumed to be poor, and the traffic flow category is taken as high in accordance with CS 454 Cl. 2.16.5 and Cl. 5.5.</p> <p>Action related to general order traffic under STGO regulation : Category 1 (GVW < 50T) – using ALL model 1 only (span <20m). Single, double and triple axles only from CS454 tbl.B1</p> <p>However, due to the small span only the single axle is applicable.</p> <ul style="list-style-type: none"> • material strength based on as built, on site observation and CS 454 figure 4.2.7a. • CS454, CS 455, and others listed in 4.1.a below. • Effective width was based on CS454 Fig. 7.7.6. with the dispersal curtailed due the presence of the unbonded longitudinal joint at the interface between the different arch sections. Condition factor
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			<p>is taking account for within Archie M, by considering mortar loss, presence of longitudinal crack resulted in curtailment of the load dispersal width, joint bedding width if > 6mm we allowed for it by reducing the masonry strength.</p> <ul style="list-style-type: none"> • Longitudinal cracks will be quantified by limiting the transverse width of the barrel, limiting the load spread across the barrel. • Lateral cracks are indicative of arch deformation or where hinges having formed in the barrel. In this instance the assessment will be referred back to the client for more detailed consideration. • The effects of cracks in the spandrel walls and wing walls will be assessed qualitatively. • Dampness of the barrel is indicative of inadequate waterproofing of the barrel extrados. This does not reduce the barrel masonry strength but will affect the durability of the structure and will be addressed within the assessment report. • Spalling of the intrados and loss of face of the masonry will be allowed for directly by a reduction in ring thickness. <p><u>Joint width factor, F_w</u></p> <ul style="list-style-type: none"> • The masonry strength was multiplied by the joint width factor from tbl.7.5.1 to account for joint width. <p><u>Joint depth factor, F_d</u></p>
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		B	<p>Please include an appendix to the certificates that provides the information that addresses the above bullet point from DMRB.</p> <p>Please also provide a clarification on whether addressing any of the assumed variables could be part of a refined assessment as part of an appendix to the certificate? If so, should a refined assessment be proposed?</p>	<ul style="list-style-type: none"> Loss of pointing in the joints will be directly input into the Archie-M program. <p><u>Mortar factor, F_{mo}</u></p> <ul style="list-style-type: none"> Mortar condition will be accounted for by choice of brickwork strength (lime or cement mortar) <p>Appendix will be included.</p> <p>For this single span structure, a refined analysis is not recommended as it will not improve the result.</p>	<p>Closed, subject to amendments</p> <p>Noted, Closed, subject to amendments/ inclusion in appendices.</p> <p>Closed</p>
2.	General commentary– Archie M and Effective width	A	<p>In the interest of time, based on experience, and without an assessment report to hand, many reported failures using Archie-M can be caused by how the effective width from CS 454 is applied to Archie.</p> <p>1) An effective width of axle distribution can be derived over the crown in accordance with CS 454, but this can be massively conservative for the quarter spans, springing points, and abutment, which, barring longitudinal cracking, can have a higher structural effective width due to internal redistributing of forces within the structure.</p> <p>2) When the failure load case is selected in Archie M, the real axle locations are likely at a location that produces a much higher effective width under CS 454.</p> <p>3) The text input file used for Archie M includes a limiter on effective width, this can mean that even if a higher effective width is used in the UI, the effective width is lowered due to the text file.</p>	<p>1) Default Archie M value for the effective width of 2.5m was used as it was the most appropriate due to the unbonded longitudinal joint at the interface between the original arch and the extended arch sections.</p> <p>2) The worst position for the axle load is at the $\frac{1}{4}$ point to cause hinge to develop. Due to the presence of longitudinal joint at the interface between arch extensions which curtail the dispersal in the transverse direction 2.5m effective was the most appropriate.</p> <p>3) noted.</p>	<p>Accepted and closed.</p> <p>Closed</p>

Commented [PC1]: Degradation can also be in the form of reduced material capacity. If degradation is widespread, a reduction in condition factor may be appropriate. Can a line be added to justify the proposed method to account for deterioration?

3.	General	<p>A Assuming no improvements can be made based on comment 2 above, has any consideration been given to using other software? This will require agreement with NH OD, but it might be worth doing a quick analysis of the structure using other software, such as LimitState RING, to see if the capacity can be improved further.</p> <p>Please state in the appended recommendations that FEA analysis 3-d model may produce higher capacity but that such analysis is unlikely to be justified for such structures.</p> <p>B NH OD can then make a decision if appropriate.</p>	<p>Ring is an upper bound solution based on the development of four hinges for single spans is not give any better results than Archie M (lower bound solution). Ring software can make difference namely gives better results than Archie M only for multi-span viaduct arches due to the interaction of the rigid blocks with the piers. FEA analysis 3-d model may produce higher capacity but for the location/usage of these bridges such rigours analysis is not justified.</p> <p>Added to the certificate.</p>	<p>Closed, subject to amendments</p> <p>Closed</p>
4.	Section 1) a)	<p>A Delete the standards given in 1) a) and refer it to TAS in the appendix. Include GG 101 to TAS.</p> <p>Was any consultation made with Ciria 800?</p>	<p>Deleted.</p> <p>Yes, including Contractor Report 284, TRRL CR244, CIRIA 656, CD 377, CS 459.</p>	<p>Closed, subject to amendments</p> <p>Closed</p>
5.	Section 1) b)	<p>A Please check IFA report ref and date.</p> <p>D This comment hasn't been addressed; the comment remains open.</p> <p>IFA is dated 14/06/2025 on the front page and signed on the 30th. Is the given report ref number correct?</p>	<p>Noted.</p> <p>Amended, Inspection for assessment report No. NH611850-AMEY-SBR-A38_14727_14729_14730-RP-CB-01_IFA dated 01.07.2025.</p>	<p>Closed, subject to amendments to the text in the Section.</p> <p>Closed, subject to amendments to the text in the Section.</p>
6.	Section 2) b)	<p>A Please state the mechanism within the barrel. Presumably, it's either at the quarter span or uncontained trust towards the springing point.</p>	<p>Noted, for the single span arch failure occur due to the development of four hinges at the two springing, under the wheel load (1/4 point) and at the other 1/4 point.</p>	<p>Noted</p> <p>Closed</p>
7.	Section 2) b)	<p>A Please expand the table to identify critical element, load effect, assessment loading, resistance, structural adequacy factor; please refer to per CS 451 Appendix C.</p> <p>Please reformat the tables as per CS 451 Appendix C to include the symbols for the assessment resistance and the assessment action effects to R*A and S*A, respectively.</p> <p>Please include a column in the tables to indicate whether the element is "passing" or "failing".</p>	<p>The table will be expanded, single arch the critical element is the arch barrel, assessment load single axle, double axle and triple axles load was applied.</p>	<p>Closed upon receipt of the updated certificate.</p>

		<p>D This comment hasn't been addressed; the comment remains open.</p> <p>E The provided information in the table is unclear/confusing and, as it is now, it concludes that the second arch can only accommodate the DL. Please can you see the table below and expand the assessment outcome appropriately.</p> <table border="1"> <thead> <tr> <th>Structure</th> <th>Critical element</th> <th>Location of failure</th> <th>Capacity required</th> <th>Structure capacity</th> <th>Pass/Fail</th> </tr> </thead> <tbody> <tr> <td>----</td> <td>Barrel</td> <td>Springing point, quarter span, crown etc.</td> <td>40t ALL</td> <td>40t ALL</td> <td>Pass</td> </tr> <tr> <td>---</td> <td>Barrel</td> <td>----</td> <td>40t ALL</td> <td>3t ALL</td> <td>Fail</td> </tr> <tr> <td>---</td> <td>Barrel</td> <td>----</td> <td>40t ALL</td> <td>7.5t ALL and FE2</td> <td>Fail</td> </tr> </tbody> </table>	Structure	Critical element	Location of failure	Capacity required	Structure capacity	Pass/Fail	----	Barrel	Springing point, quarter span, crown etc.	40t ALL	40t ALL	Pass	---	Barrel	----	40t ALL	3t ALL	Fail	---	Barrel	----	40t ALL	7.5t ALL and FE2	Fail	<p>Column added</p> <p>b) The assessed capacity of the structure, or element of the structure, follows:</p> <table border="1"> <thead> <tr> <th>Structure</th> <th>Arch Barrel</th> <th>Pass/Fail</th> </tr> </thead> <tbody> <tr> <td>Monks Flood South STR_14727</td> <td>40t ALL</td> <td>Pass</td> </tr> <tr> <td>Monks Flood STR_14729</td> <td>3t ALL</td> <td>Fail</td> </tr> <tr> <td>Monks Flood North STR_14730</td> <td>7.5t ALL and FE2</td> <td>Fail</td> </tr> </tbody> </table> <p>Table expanded as requested.</p> <table border="1"> <thead> <tr> <th>Structure</th> <th>Critical element</th> <th>Location of failure</th> <th>Capacity required</th> <th>Structure capacity</th> <th>Pass/Fail</th> </tr> </thead> <tbody> <tr> <td>Monks Flood South STR_14727</td> <td>Barrel</td> <td>Springing points and 1/4 span points</td> <td>40t ALL</td> <td>40t ALL</td> <td>Pass</td> </tr> <tr> <td>Monks Flood STR_14729</td> <td>Barrel</td> <td>Springing points and 1/4 span points</td> <td>3t ALL</td> <td>3t ALL</td> <td>Pass (adequate for 3t)</td> </tr> <tr> <td>Monks Flood North STR_14730</td> <td>Barrel</td> <td>Springing points and 1/4 span points</td> <td>40t ALL</td> <td>7.5t ALL and FE2</td> <td>Pass (adequate for 7.5t and FE2)</td> </tr> </tbody> </table>	Structure	Arch Barrel	Pass/Fail	Monks Flood South STR_14727	40t ALL	Pass	Monks Flood STR_14729	3t ALL	Fail	Monks Flood North STR_14730	7.5t ALL and FE2	Fail	Structure	Critical element	Location of failure	Capacity required	Structure capacity	Pass/Fail	Monks Flood South STR_14727	Barrel	Springing points and 1/4 span points	40t ALL	40t ALL	Pass	Monks Flood STR_14729	Barrel	Springing points and 1/4 span points	3t ALL	3t ALL	Pass (adequate for 3t)	Monks Flood North STR_14730	Barrel	Springing points and 1/4 span points	40t ALL	7.5t ALL and FE2	Pass (adequate for 7.5t and FE2)	
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8.	Page 1	A Please delete the table at the bottom with author, issue date etc.	Amended.	Closed upon receipt of the updated certificate. Closed																																																												
9.	Signatures	A Please change "Design and Check Team Leader" as "Assessment and Check Team Leader".	Amended.	Closed upon receipt of the updated certificate. Closed																																																												
10.	Signatures	A Please can you verify Ali Akarim's ICE membership status as CEng, MICE.	ICE MEMBERSHIP No. 47606630. (Abdulkarim Ali) abbreviated to Akarim Ali.	Thank for confirmation. Please be advised that Akarim should opt into the ICE																																																												

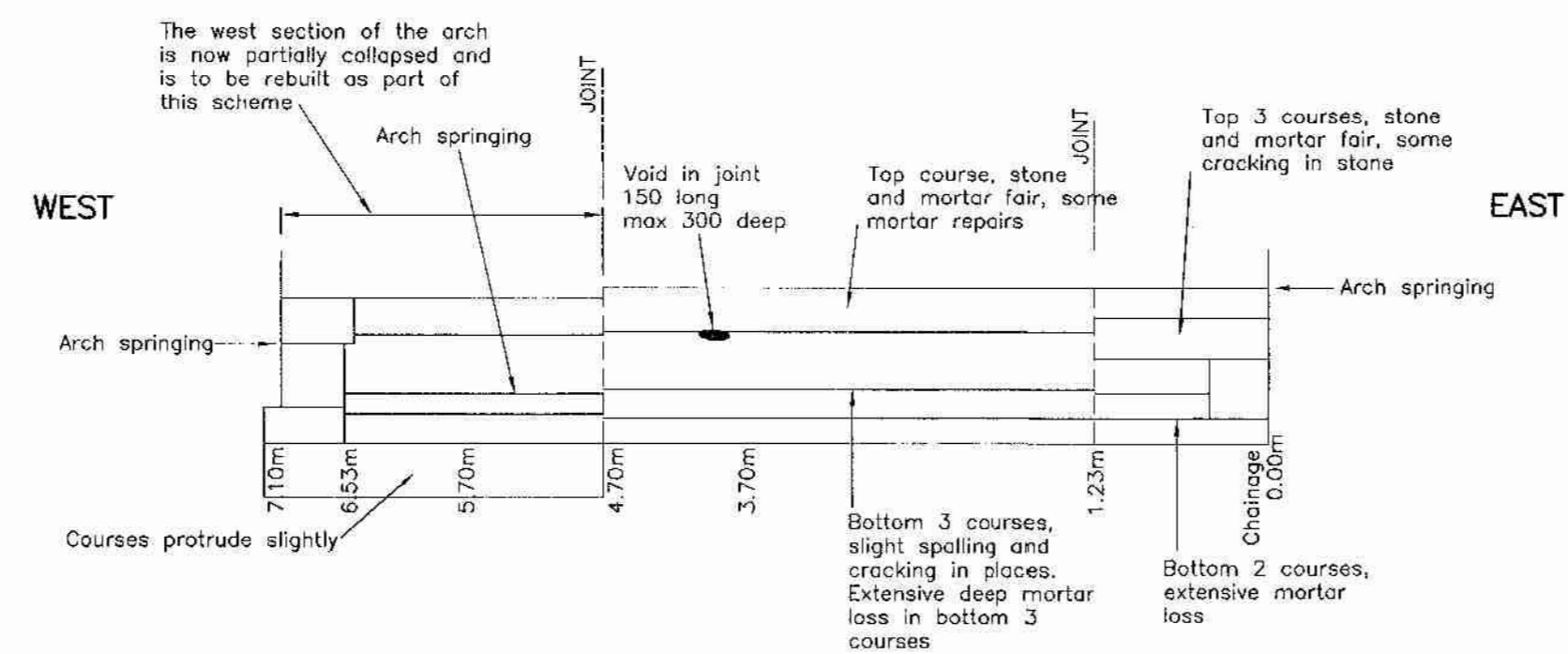
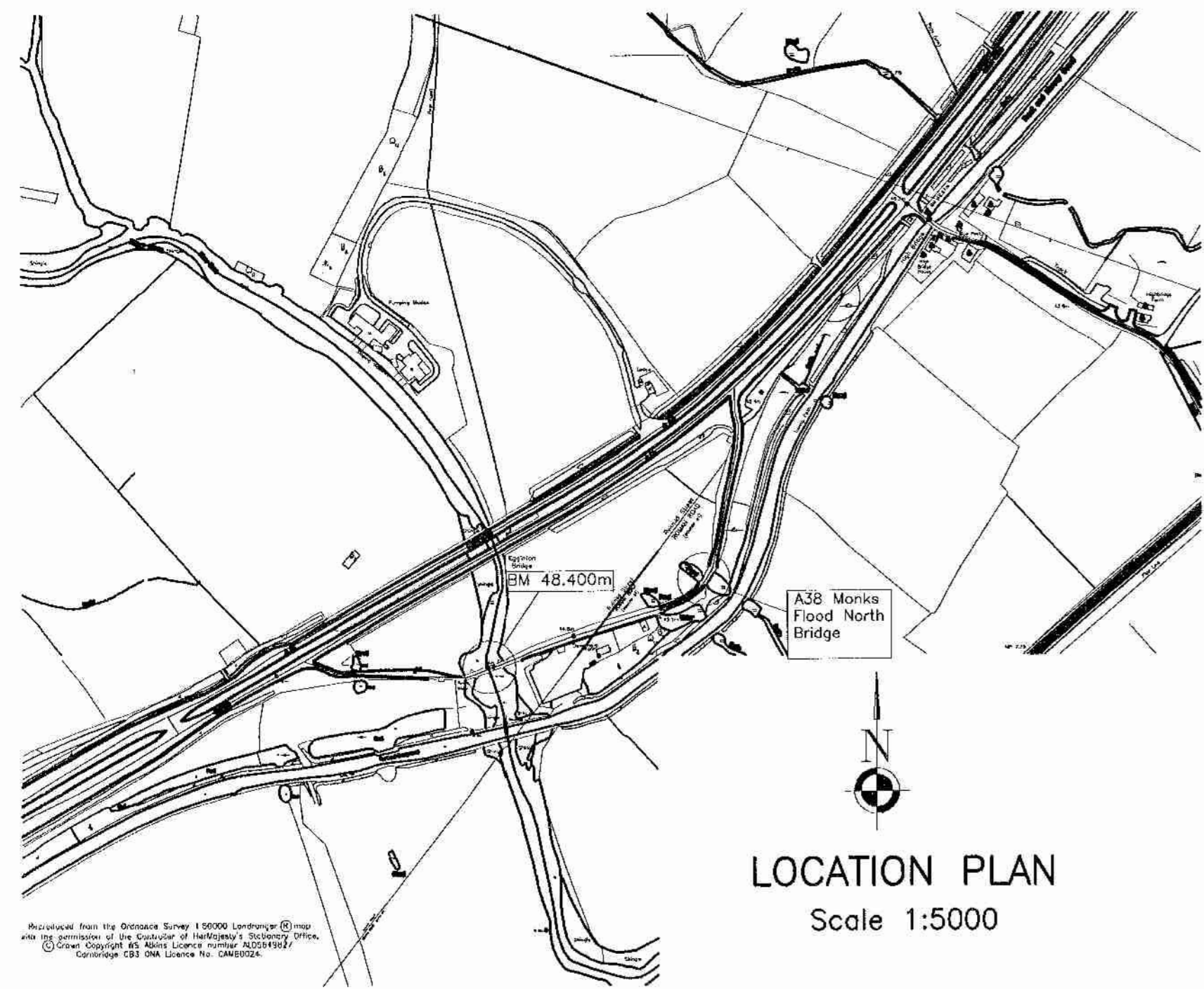
					<p>members' directory "Professionally qualified members: tick box to display your ICE region, employer and full title"</p> <p>Without it ticked members of the ICE are not listed as CEng or IEng.</p> <p>The tick box is in MyICE>my profile>members' directory opt in (drop down)</p> <p>Closed</p>
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Minor Comments

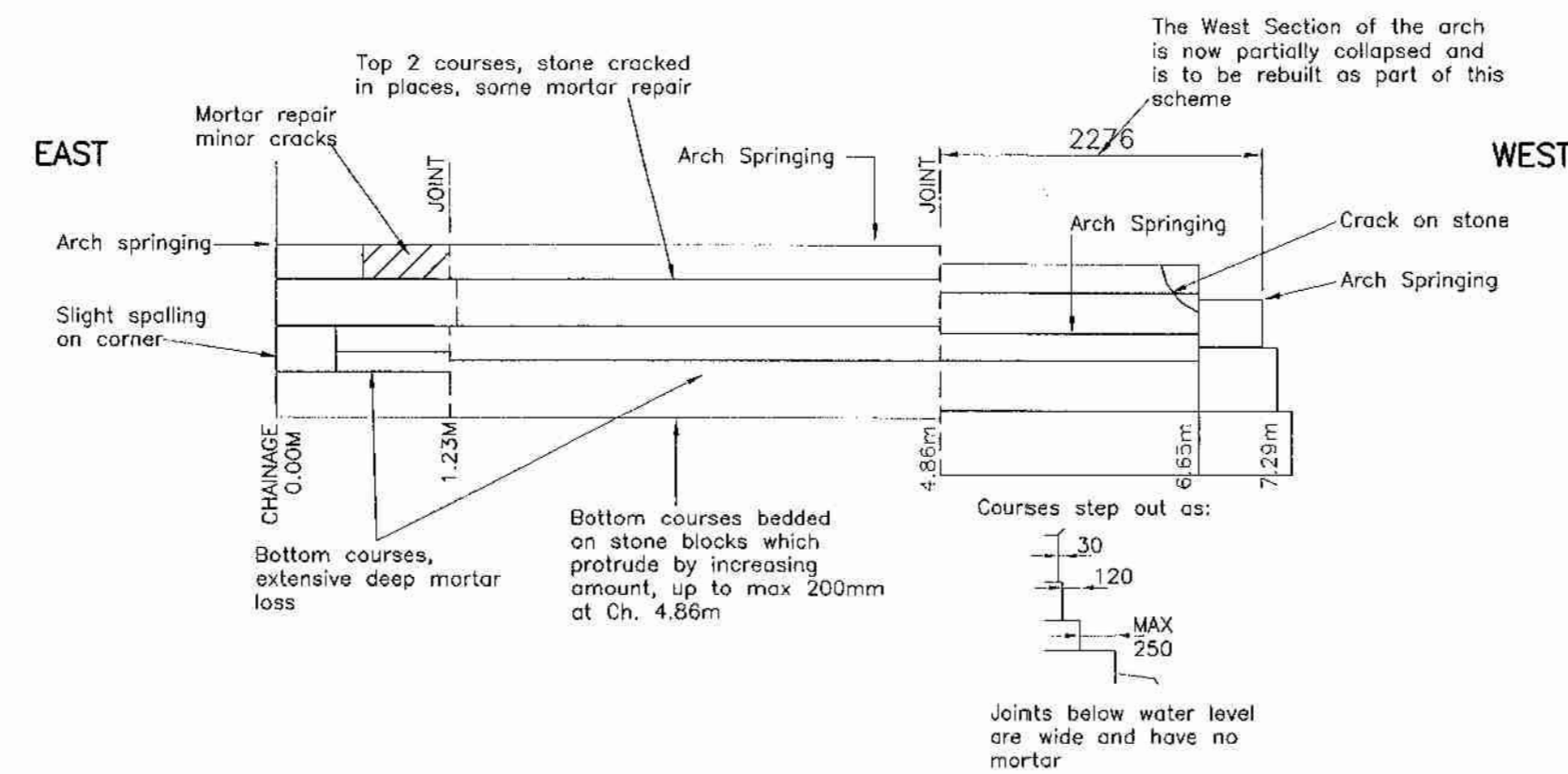
M1.	First Paragraph	A	Please remove the brackets for (name of structure) and merge first three paragraphs as one paragraph.	Amended.	Closed, subject to amendments. Closed
M2.	Section 2) b)	A	<p>Multiple formatting issues with line spacing</p> <ul style="list-style-type: none"> • Indent difference between Note and Assessment • Line spacing between the abutment line and the Observation line. 	<ul style="list-style-type: none"> • Noted. • Noted 	Closed, subject to amendments. Closed
M3.	Appendix B	D	Bullet point at start (followed by no capital letter) looks to be an error.		

Appendix D: Location Plan

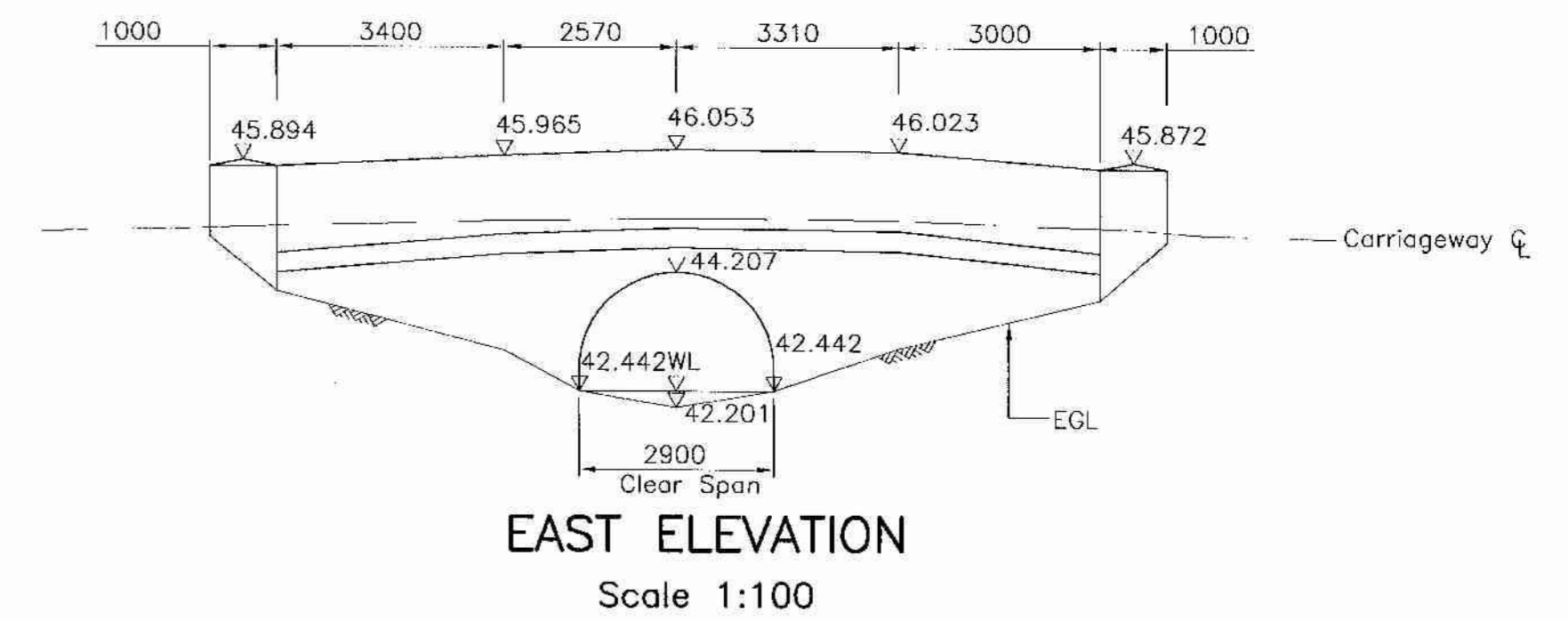
Appendix E: As Built Drawings



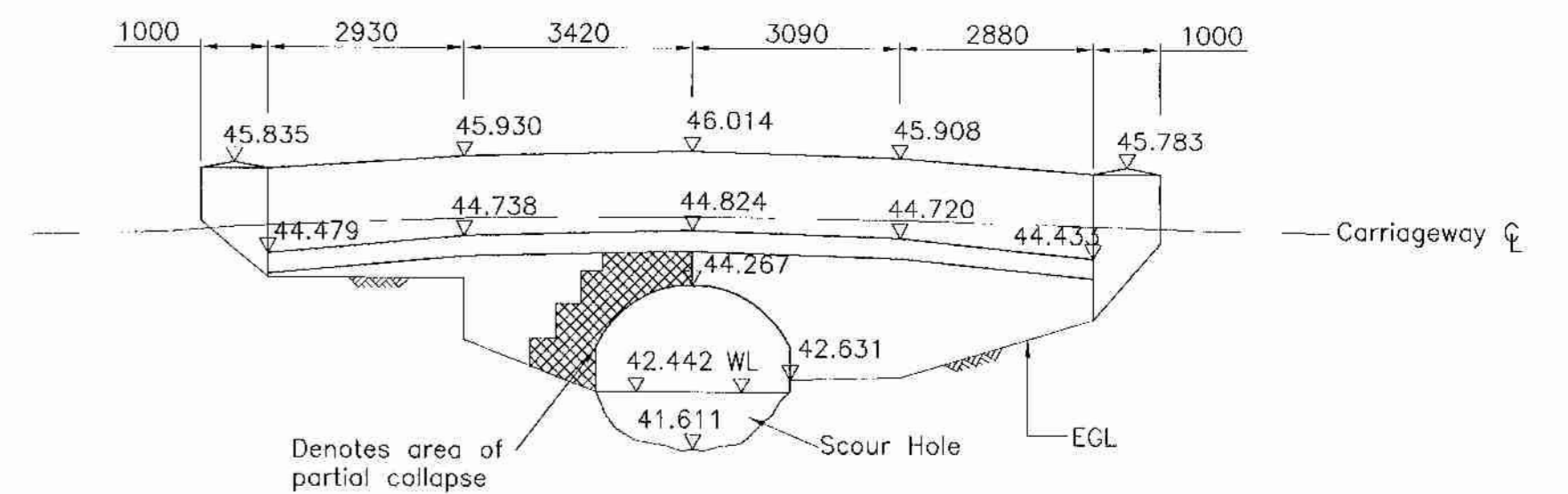
ELEVATION NORTH ABUTMENT
Scale N.T.S.
(REPRODUCED FROM PI REPORT 1995)



ELEVATION SOUTH ABUTMENT
Scale N.T.S.
(REPRODUCED FROM PI REPORT 1995)

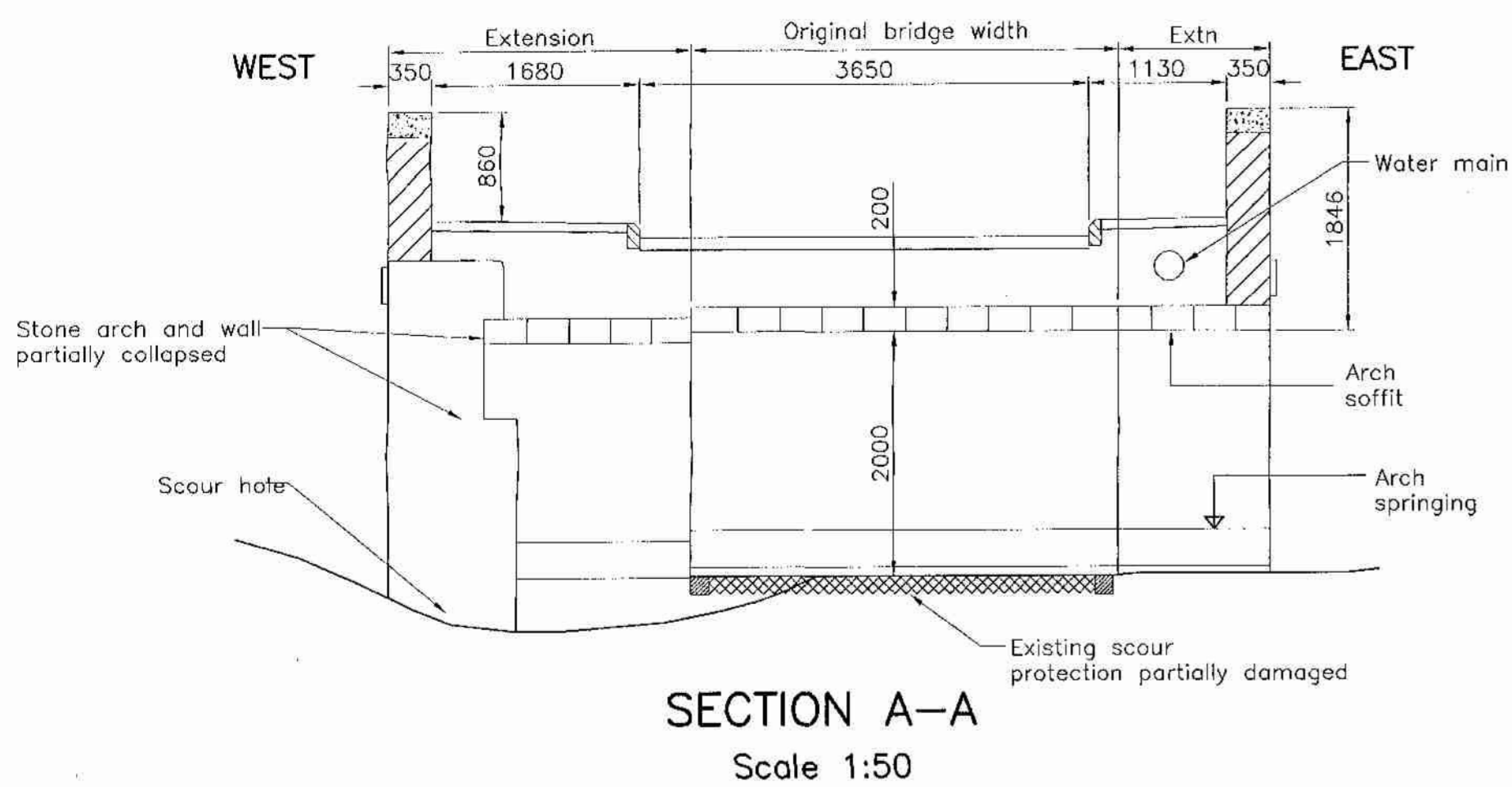


EAST ELEVATION
Scale 1:100

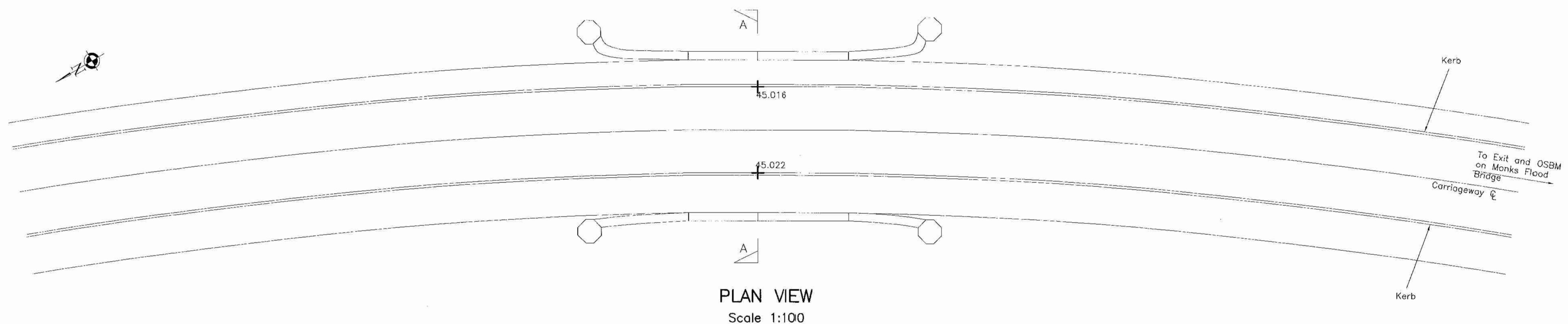


WEST ELEVATION
Scale 1:100

- NOTES:
1. Arch originally constructed in 3 sections. The west section is partially collapsed.
 2. The centre and east sections have a different profile and springing level to the west section.
 3. The soffit level of the west section is 60mm higher than the centre and east sections.
 4. Springing level for the outer voussoirs of the west section is higher than for the rest of west section.
 5. Elevations of abutments showing layout of masonry and defects are diagrammatic only.
 6. Scour damage extends into centre section of arch beneath north and south abutments.
 7. The level of the existing foundations is unknown. The contractor will need to be aware that additional temporary measures may be necessary to protect the structure if their excavations expose or continue below the base of the existing foundations.



SECTION A-A
Scale 1:50



PLAN VIEW
Scale 1:100

Notes
DO NOT SCALE FROM THIS DRAWING
All dimensions to be checked on site
1. WL denotes water level as recorded on 14/8/01

A1

Rev	Description	by	Date	Chk'd	Auth
FOR CONSTRUCTION		A	11.02		
FOR APPROVAL		A	07.02	SBH	
Purpose of Issue		Rev	Date	Auth	
PRELIMINARY					

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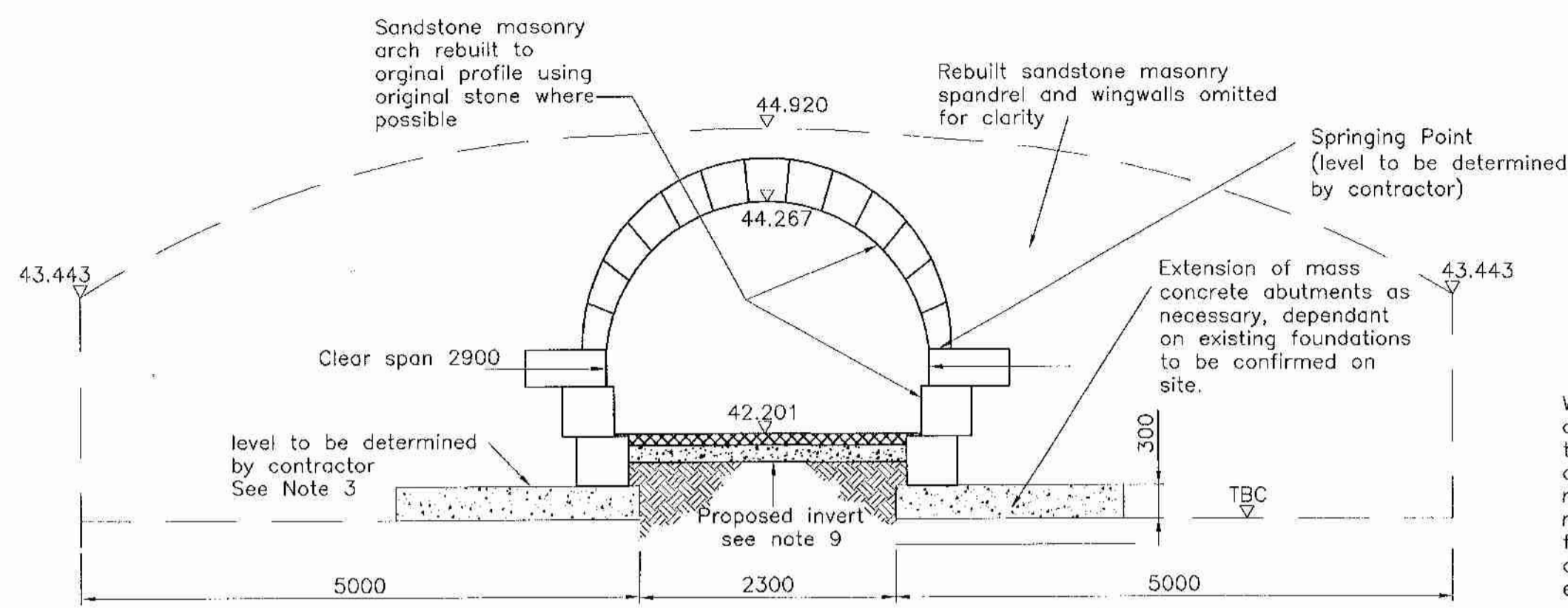
Client
HIGHWAYS AGENCY

Project
A38 MONKS FLOOD NORTH BRIDGE

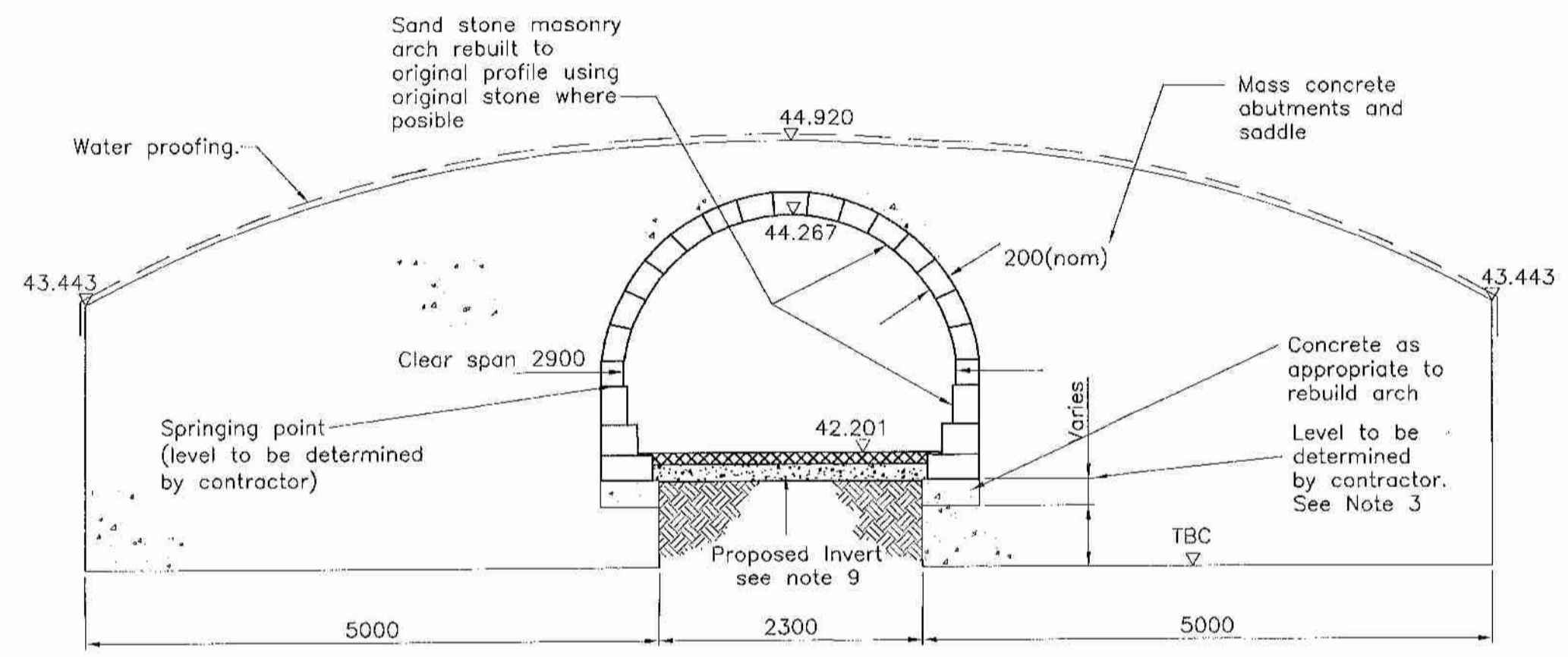
Drawing Number
A38/433.80/Q

EXISTING GENERAL ARRANGEMENT			
Scale	Drawn	Checked	Authorised
As Shown	ISM	MDA	SBH
Date	08.01	Date	07.02
Drawing Number			Rev
CM5013/TED/7106/01			A

Key 14730

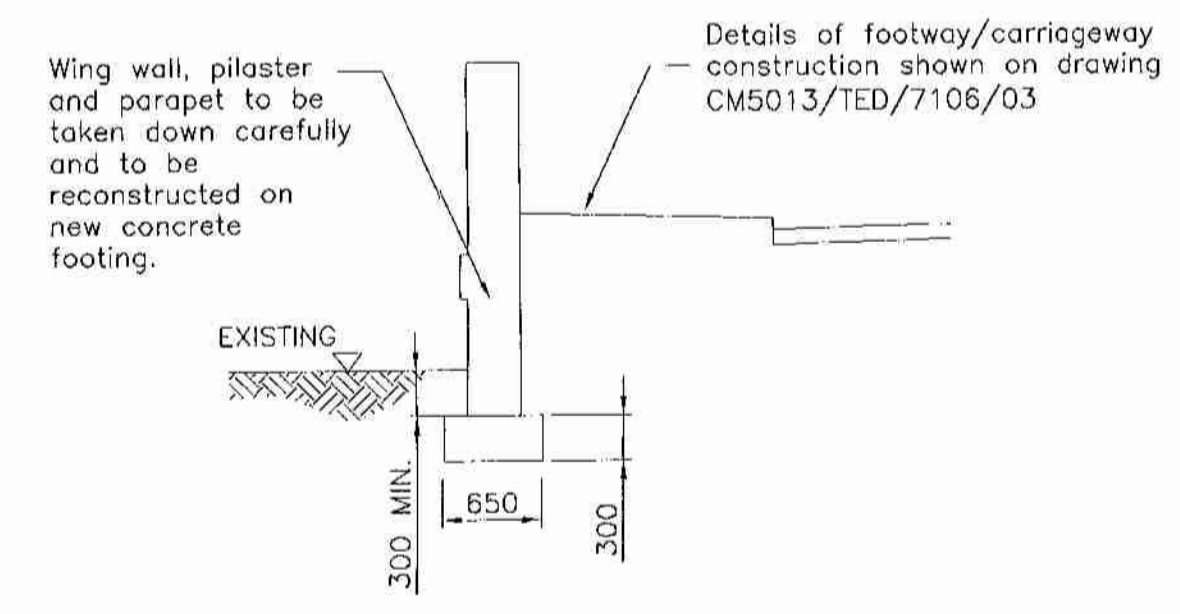


SECTION A-A THROUGH OUTER VOUSOIRS
Scale 1:50



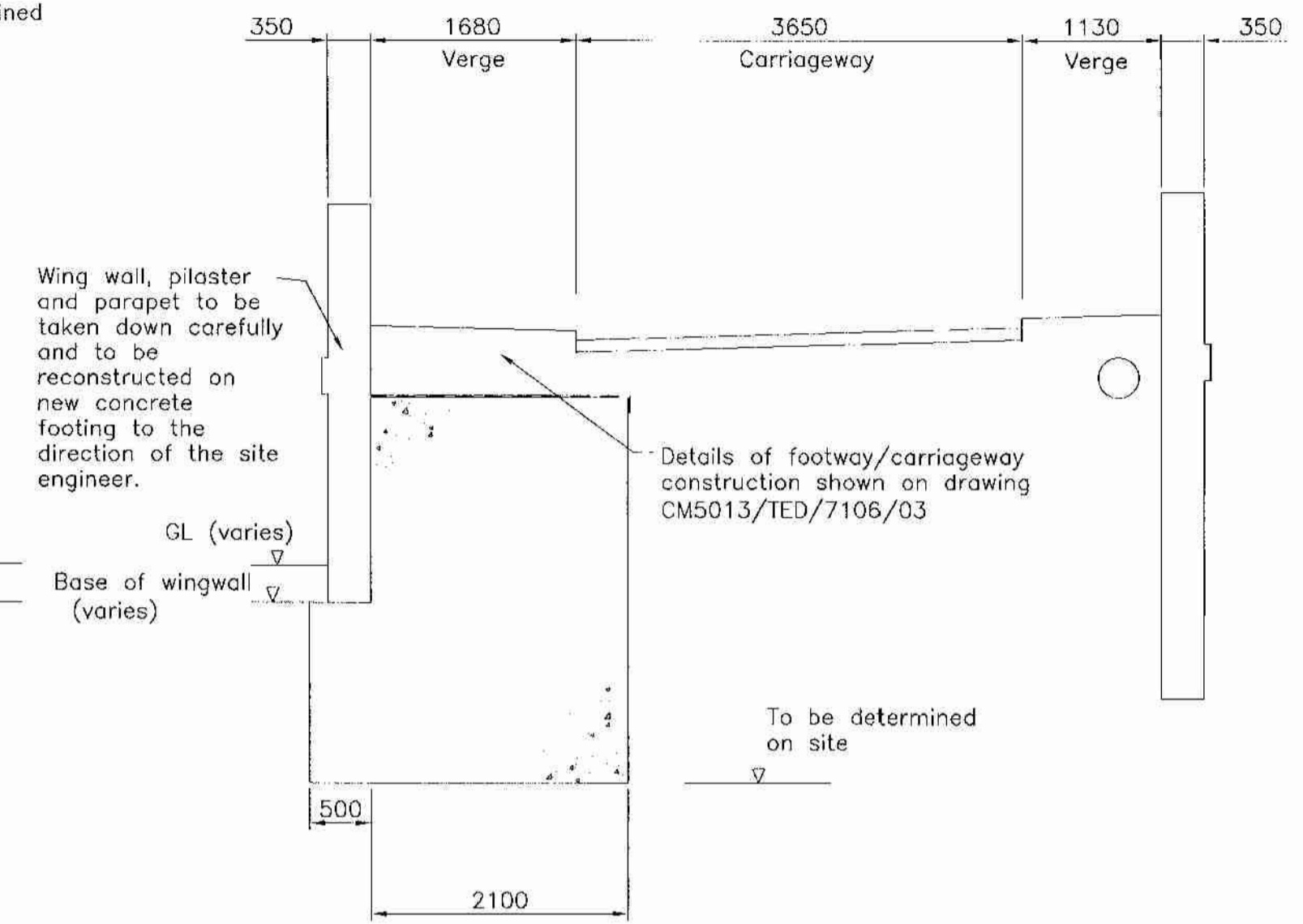
SECTION B-B THROUGH REBUILT ARCH BARREL
Scale 1:50

Note: Actual foundation level to be determined on site through testing

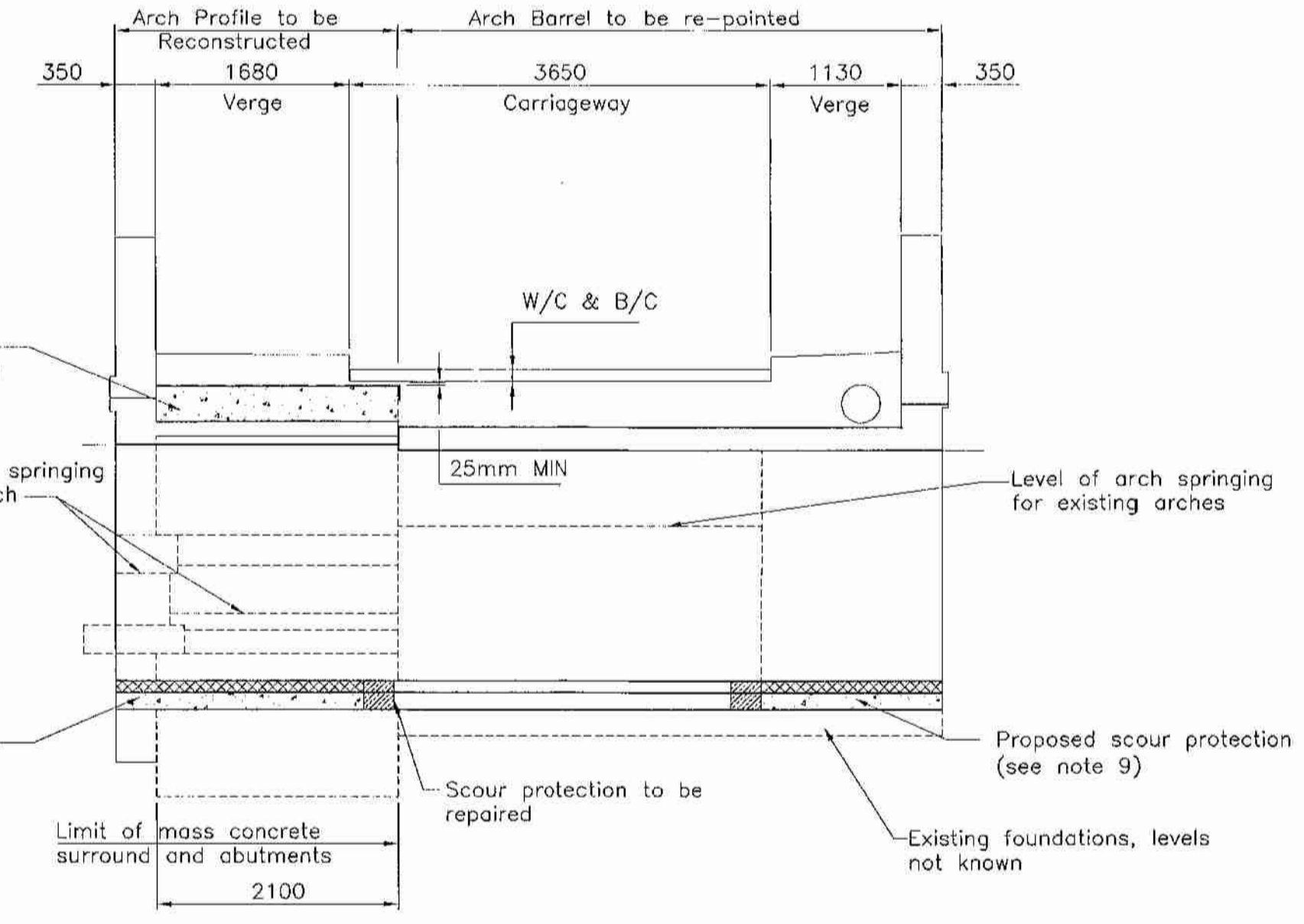


SECTION E-E THROUGH WINGWALLS
Scale 1:50

Note: Detail to be confirmed on site



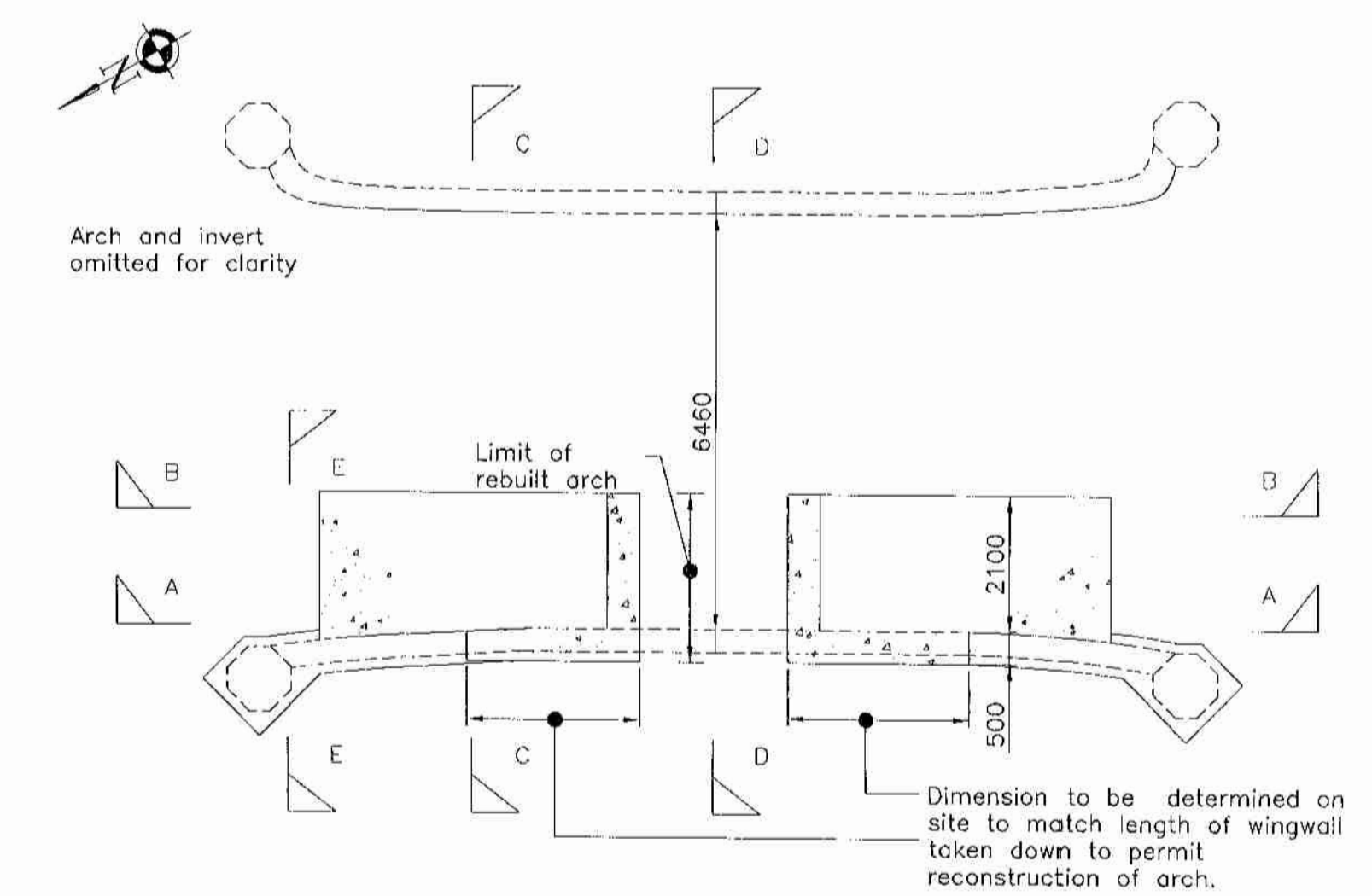
SECTION C-C THROUGH MASS CONCRETE ABUTMENTS
Scale 1:50



SECTION D-D THROUGH ARCH CROWN
Scale 1:50

Notes

- Traffic management:**
Traffic management shall be designed by the contractor to suit their proposed method of retaining the highway during the works. Traffic management on the A38 shall be limited to a lane one closure between the hours of 9:30am to 4:30pm.
- Excluding water from works:**
The Contractor shall design and implement temporary works to exclude water from the working area.
- Masonry:**
The Contractor shall measure and record levels of existing arch springing points and masonry foundations relative to a known benchmark. All masonry work to be in accordance with specification prepared by the Contractor and approved by South Derbyshire District Council via the Engineer. The Contractor shall allow in his programme and costs for gaining approval to any replacement masonry and to all mortar from South Derbyshire District Council. The time scale for approval shall be assumed as 2 weeks for masonry and 1 week for mortar samples. The compressive strength of any replacement masonry shall be determined by the contractor and reported to the Engineer prior to it being incorporated in the works. The mortar shall be 1:1:6 lime mortar in accordance with the specification.
- Concrete abutments:**
Proposed abutments and arch ring & wing wall foundations:
Mix Reference: A
Class of Concrete (Grade/Max Agg. Size): 30/20
Minimum cement content (kg / cu. m): 325
Maximum Free Water/Cement Ratio: 0.45
Required Type & Class of Cement: BS 12 (Portland Cement)
Required Source/Special type of aggregate: Lightweight aggregate to BS 3979.
Required Final density of concrete: 1750 ± 50kg/m³
Proposed invert scour protection
Mix Reference: 30/20
Cover: N/A
- Support to existing arch:**
The Contractor shall take steps to ensure that the central and eastern sections of the arch do not suffer damage due to their works on the western portion. Timber centring shall also be positioned to aid reconstruction of the western arch. An independent check certificate will be required for temporary works in accordance with annex C3 of BD2/02, a proforma certificate can be obtained from the Engineer.
- Removal of fill and casting of foundations:**
Fill shall be removed in a controlled manner to prevent the arch becoming unstable (Removal shall be in 300mm maximum deep layers. The levels of fill either side of the arch shall not differ by more than 300mm). Removal of fill shall be carried out in conjunction with the retrieval of collapsed masonry from the west arch barrel and abutments and the taking down of part of the western parapet, wing walls and spandrel walls. Limits of stone removal to be agreed with the Engineer on site. Each stone removed shall be identified and marked to aid subsequent re-erection. No markings shall be visible on completion of reconstruction.
To ensure that the spandrel/wing walls and the existing arch foundations do not become unstable the removal of fill and ground material below arch springing level shall be carried out sequentially with the casting of new concrete. The spandrel/wing walls shall be temporarily propped to stabilise them against movement. Details of the foundations to the wing walls are unknown. If the foundations of the existing wing walls do not extend to the bottom of the new abutments then trench sheets shall be used on the 'inside' of the wing walls to prevent undermining of the wall as the fill is removed. The trench sheets shall be progressively removed as the concrete is placed.
- Reconstruction of masonry elements:**
The Contractor shall rebuild the west section of the arch and the western spandrel and wing walls to the original profile and appearance (refer to photographs of structure prior to and after collapse) using original stone where possible. Any replacement masonry required shall be subject to approval as note 3. Any damaged or loose areas of mortar on other sections of masonry shall be re-pointed.
- Casting of proposed foundations, abutments and saddle:**
Placing of concrete to foundations and abutments shall be carried out in 300mm lifts. To ensure stability of the arch masonry, the levels of new concrete either side of the arch shall not differ by more than 300mm. When the level of new concrete reaches the level of the arch springing, the timber centring shall be lowered by 15mm.
- Proposed invert and scour protection:**
The existing hard invert shall be made good and extended with stone rubble (nominal size 250mm) set in 150mm thick, concrete mix reference 30/20.
- Water proofing:**
The concrete saddle is to be protected with a spray applied waterproofing membrane. The extent of the water proofing is to be the whole of the top surface, the east side of the saddle to the arch and 300mm down each end of the new abutments.
- Carrigeway Protection:**
The contractor shall design and implement temporary works to retain the existing carrigeway over the central and eastern portions of the arch so as to maintain a minimum 2.5 m traffic lane. Such temporary works shall require Approval in Principle in accordance with BD 2/02.
- Foundation level to be determined on site based on in situ testing to be advised by the Designers Geotechnical Engineer.**



PLAN OF PROPOSED MASS CONCRETE ABUTMENTS
Scale 1:100

Notes
DO NOT SCALE FROM THIS DRAWING
All dimensions to be checked on site

TBC Denotes:- To Be Confirmed on site

A1

Rev	Description	By	Date	CHK'd	Auth	Purpose of issue
B	Anotation amended	cat	21.11			FOR CONSTRUCTION
						FOR APPROVAL
						Purpose of issue
						PRELIMINARY

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HIGHWAYS AGENCY
Client
Project
A38 MONKS FLOOD NORTH BRIDGE
A38/433-30/6

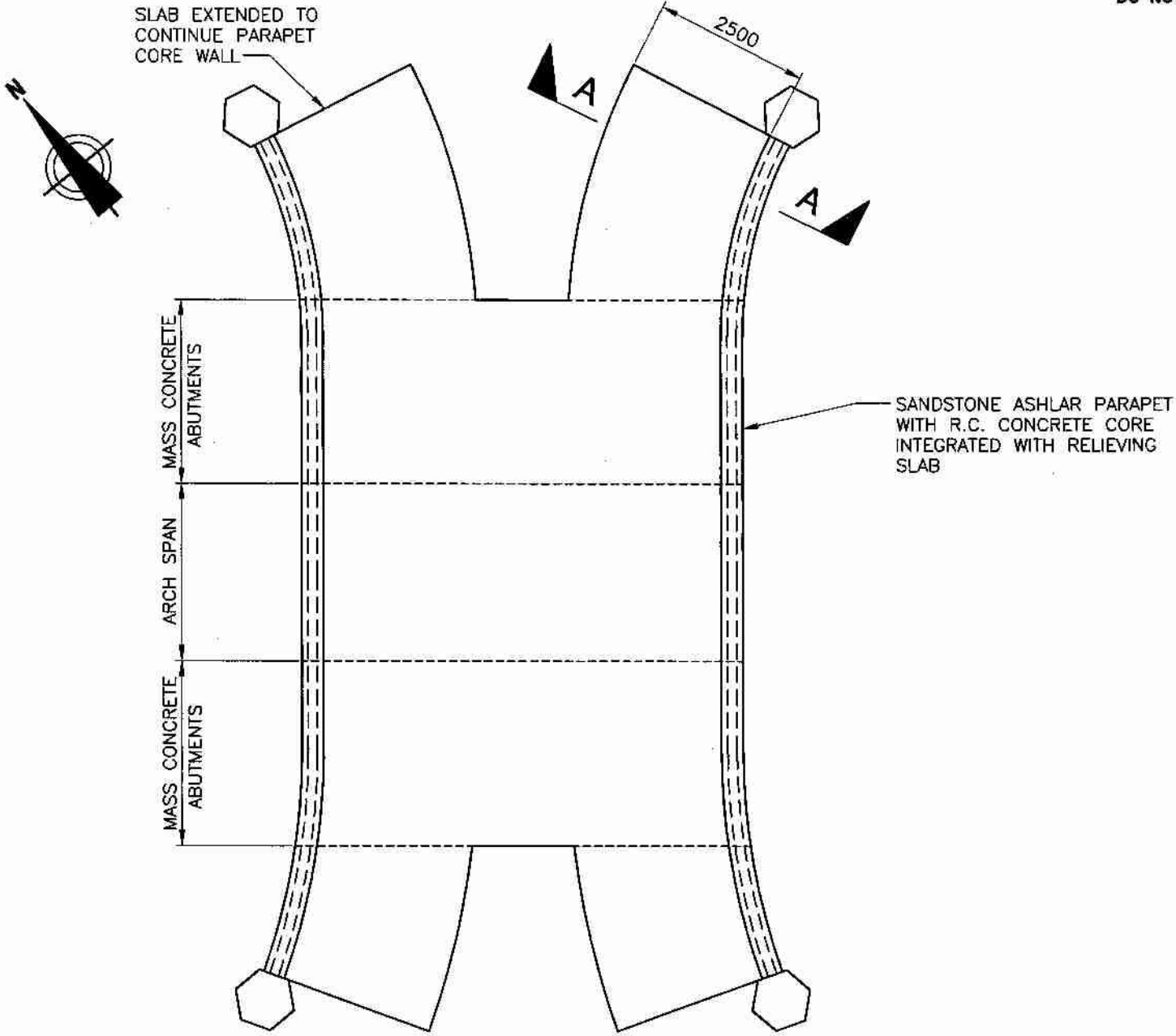
Scale	Drawn	Checked	Authorised
	JRN	MDA	SBH
As Shown	Date 08.01	Date 07.02	Date 07.02
Drawing Number	CM5013/TED/7106/02		Rev B

key 14730

DO NOT SCALE



NOTES.



PLAN
1:100

Rev	Description	By	Date	Ch'd	Auth

PRELIMINARY

Purpose of issue	Rev	Date	Authorised



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A38 MONKS FLOOD NORTH
Ka 14730
A38/4343

**OPTION 3
PLAN**

Original Scale	Drawn	Checked	Authorised
1:200	ISM	Date 19/7/01	Date

Drawing Number	Rev
CM5013/TED/7106/106	-