

RECORD OF STRUCTURAL REVIEW FORM

M6 J29a

**Church Road North
Bridge**

Structure Key: STR_2658

Structure Ref. No. 29/M6//344.40//

Version – P01
14/07/23

Document Number:	84465-WSP-SBR-RP-CB-001
Rev Number:	P01
Date:	10/07/23
Document Status:	S0
Client Ref Number (PIN):	84465

Revision History

Revision	Date	Description	By	Check	Review	Approved
P01	14/07/23	Draft for comments	EE	-	GS	GS

1 STRUCTURE DETAILS

Structure Name	Church Road North Bridge
Structure Number	/29/M6//344.40//
Structure Key	STR_2658
Date Commissioned	1963
Obstacles Crossed	M6 Motorway
Bridge Carries	A6 Preston - Chorley trunk road over the M6
Brief Description of Structure	
<p>The M6 J29a roundabout consists of two bridges including the Church Road North Bridge and the Church Road South Bridge. The A6 dual carriageway, the entry/ exit slip roads from/ to the M6 J29, the entry/ exit slip roads from/ to M6 J30 respectively, and the Church Road are connected to the M6 J29a roundabout. The speed limit at the M6 J29a roundabout/church road is 40mph.</p> <p>As part of the proposed works, the existing north footway/cycleway of the Church Road North Bridge will be upgraded to a designated combined footway/cycleway.</p> <p>Church Road North Bridge was constructed in 1962 and carries the A6 Preston - Chorley trunk road over the M6 motorway at Junction 29a, at marker post 344.4. The structure is a two span simply supported steel composite structure with overall length of 34m (min. square width between supports is 33.2m) with the two spans @14.6m each. The overall width of the deck is 15.2m between parapets, consists of a 3.2m wide footway/cycleway at north side, a 1.83m wide footway at south side, a 9.14m wide carriageway and 2nos. 0.5m stringcourses. The structure has 7 degrees skew with the abutment. Footway/cycleway at north side is linked to the existing footway/cycleway network, refer to the Cycle Lane Inspection Report (unknown reference number) which has been carried out on the 19th of August 2008 and this is available on IAMIS.</p> <p>The deck is fixed at the east and west abutments with rubber pad bearings, and free at the centre pier resting on steel rocker bearings. Buried joints are located at the deck above the east and west abutments and the centre pier.</p> <p>The superstructure comprises of 10 No. steel universal beams at 1.5m centres composite with a 200mm thick in-situ concrete deck slab. The RC slab at both north and south sides is formed as U-shape to accommodate services ducts and a thin footway slab is present over the troughs. Both the north footway/cycleway and the south footway of this structure consist of a concrete slab of unknown thickness which is supported/connected with the parapet stringcourse to one end and the other end is resting on a Class C concrete backing adjacent to a 11"x6" kerb.</p> <p>The trough under the north footway/cycleway carries G.P.O. 3-way duct, G.P.O. 4-way duct, G.P.O. 6-way duct and 1no lighting cable. The trough under the south footway carries 3no electricity ducts and a 6" gas pipe.</p>	

<p>The substructure consists of masonry faced mass concrete abutments on piled foundations, and the centre pier is an RC leaf pier on piled foundations.</p> <p>1.0m high vehicle parapet is located to both north and south of the structure which consists of painted galvanised steel vertical posts at 3.65m centres with horizontal rails and mesh infill.</p> <p>Refer to Appendix A for the Structure Location Plan, Appendix B for the existing/ proposed drawings and Appendix C for Assessment Certificates.</p>	
<p>Elements to be Reviewed (where not the whole structure)</p>	
<ul style="list-style-type: none"> • Vehicle/ pedestrian parapet • Parapet supporting structure and RC deck including footway slab. 	
<p>Reason for Structural Review</p>	<p>As part of the proposed upgrading to a designated combined footway/cycleway for the existing north footway/cycleway, the existing 1.0m high vehicle parapet does not meet the DMRB requirements. This outlines the feasibility and other requirements to accommodate 1.5m high parapets for north side.</p>

2 EXISTING ASSESSMENT DETAILS OR DESIGN RECORDS

<p>Inspection for Assessment Date</p>	<p>Not available.</p>	<p>Recorded Condition</p>	<p>Fair - as per the most recent Principal Inspection Report (PI), dated 13/08/2021, with defects including, spalled area of concrete deck, cracking and debonding to the expansion joint, water seepage and corrosion to the main beam, diaphragm, and cross bracings. An area of settlement to surfacing and corrosion to the parapet mesh, shrinkage cracking and other spalled areas to concrete elements.</p> <p>Good - as per the most recent General Inspection Report (GI), dated 06/01/2020 - no further defects found.</p>
<p>AIP for Assessment</p>	<p>Carried out in April 1989.</p>	<p>Status</p>	<p>Signed by TAA on 14/09/1989.</p>
<p>Assessment Date</p>	<p>Carried out on the 09/08/1993.</p> <p>Carried out on the 01/11/1993.</p>	<p>Report Number</p>	<p>Not available.</p> <p>Not available.</p>

Current Assessed/Design Capacity (include Reserve Factors)																															
HA/ALL	40 tonnes ALL – 43 tonnes HB, based on assessment report carried out on 09/08/1993. 40 tonnes ALL – 39 tonnes HB, based on assessment report carried out on 01/11/1993.	SV/STGO/SO	Not applicable. Not applicable.																												
Critical Elements	No design/ assessment calculations available for the existing parapet for review. The bridge was constructed in 1962. However, no records found if any modifications been made since the construction.																														
Parapet	1.0m high vehicle/ pedestrian parapet with painted galvanised steel vertical posts at 3.65m centres with horizontal rails and mesh infill (at both sides of the bridge).																														
Pier Impact	Not available.																														
Certification	Assessment certificate for Cat II structure dated 21/02/1995 (included in Appendix C).																														
Calculations	Not available.																														
As built drawings	As-built drawings available on IAMIS are listed below and only the GA drawing is included in Appendix B.																														
	<table border="1"> <thead> <tr> <th>Drawing Number</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>5194 & 5195 1B</td> <td>General arrangement</td> </tr> <tr> <td>5194</td> <td>Details of piers and bearings</td> </tr> <tr> <td>5194/4B</td> <td>Pier Details</td> </tr> <tr> <td>5194/5B</td> <td>Details of deck</td> </tr> <tr> <td>5194/10A</td> <td>Replacement deck joints</td> </tr> <tr> <td>5194/14</td> <td>Details of beams</td> </tr> <tr> <td>5194/44</td> <td>-</td> </tr> <tr> <td>5195</td> <td>Details of abutments</td> </tr> <tr> <td>5195/8</td> <td>Service drawing</td> </tr> <tr> <td>5195/10</td> <td>Retaining walls, details of fixing safety fences to structures</td> </tr> <tr> <td>5195/11</td> <td>General arrangement</td> </tr> <tr> <td>5195/13</td> <td>Details of beams</td> </tr> <tr> <td>5195/15</td> <td>Details of beams</td> </tr> </tbody> </table>			Drawing Number	Description	5194 & 5195 1B	General arrangement	5194	Details of piers and bearings	5194/4B	Pier Details	5194/5B	Details of deck	5194/10A	Replacement deck joints	5194/14	Details of beams	5194/44	-	5195	Details of abutments	5195/8	Service drawing	5195/10	Retaining walls, details of fixing safety fences to structures	5195/11	General arrangement	5195/13	Details of beams	5195/15	Details of beams
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		5195/3/51	Numbered piling plan
		5195/2/51B	Revised wing wall details
		5195/2A	Details of piling
		5195/3A	Details of abutments
		5195/6A	Details of retaining walls
		5195/9A	Abutments and retaining walls
Comments on Assessment or Design			
No design or assessment calculations are available for this structure. However, existing assessment reports dated 09/08/1993 and 01/11/1993 state 40 Tonnes ALL/ 43 tonnes HB and 40 tonnes ALL/ 39 tonnes HB capacity respectively.			
3 EVALUATION			
Inspection Date	<p>The most recent Principal Inspection (PI) was carried out on 13/08/2021 and the PI report is available on IAMIS.</p> <p>The most recent General Inspection (GI) was carried out on 06/01/2020 and the GI report is available on IAMIS.</p>		
Change In Condition	<p>The latest PI highlighted that the 1No spalled/ hollow sounding area to the south end of the deck adjacent to the west face of the centre pier has been deteriorated since the last inspection.</p>		
Change In Standards	<p>The structure was built in 1962, the standards used at the time of the design have been superseded.</p> <p>Also, the structural assessment that has been carried out in 1995 was based on the standards of that time which have been superseded.</p> <p>The following key assessment standards are updated as below:</p> <ul style="list-style-type: none"> • Assessment of highway bridges and structures to CS 454; • Requirements for road restraint systems to CD 377; 		
Change In Loading	<p>The existing north footway/ cycleway and verge will be changed to a designated combined footway/ cycleway. There is no change in loading to the structure due to this proposal, assuming this was designed using footway loading specified at that time of design.</p> <p>There are no available information with regards to the containment level of the existing parapet. Based on the design speed of the road, it can be assumed that the containment level is N1, which is the minimum containment level that can be provided to parapets adjacent to carriageways with a speed limit less than 50mph in accordance with CD 377.</p> <p>Considering the speed limit (40mph) at that road, the containment level of the proposed parapet can remain as existing (i.e. N1), however height of parapet for the North side need to 1.5m to cater for designated cycleway provision.</p>		

	Therefore, it is anticipated that there will not be any significant change in parapet post capacities (depends on supplier and material chosen).
Required Capacity	<p>The load effects due the upgrading of the existing parapet are not expected to be significant, provided containment level and design speed are not altered. Therefore, the required capacity of the supporting structure and deck will not be anticipated to be critical.</p> <p>The existing north footway/cycleway slab is appears slim, and there is no record information on the design or assessment capacity for the slab.</p>
Vulnerable Details	Deck, parapet supporting structure (stringcourse) and footway slab.
Hidden Critical Elements	Existing parapet connections embedded in stringcourse, footway slab over service troughs including connections
Interim Measures	None recorded.
Condition	The most recent Principal Inspection Report (PI) dated 13/08/2021, stated that the structure is in fair condition due to a spalled area of concrete deck, cracking and other defects to various elements as detected during the inspection. Details of these defects can be found in Section 2 above.
Conclusion	<p>As discussed above and based on the loading information from various parapet products, upgrading parapet for the north side (assuming N1 containment) would not anticipate having a significant impact on deck and stringcourse assessment.</p> <p>As the existing north footway/cycleway slab is slim, further detailed information and investigation may be required to complete the detailed assessment.</p>

4 RECOMMENDATION

<p>A load comparison has been carried out between the existing N1 (assume as minimum) 1.0m high steel parapet and other N1/N2 1.5m high steel/ aluminium parapets to identify whether a structural assessment is required for the parapet supporting structure and the deck. Hence, it can be concluded that increase in load effects would be minimal assuming same parapet containments.</p> <p>It was found that the provision of a new steel 1.5m high parapet of the same containment level as the existing parapet (assume N1), will not increase the loading to the structure significantly, therefore, no detailed structural assessment may not be necessary, but simple capacity check for the stringcourse and deck would likely to be required subject to agreement with SES.</p> <p>In case where the existing parapet is replaced with a new N1 1.5m high steel parapet, then the loading to the parapet supporting structure and the deck is not anticipated to be increased (assuming existing containment as N1).</p> <p>In case where the existing steel parapet is replaced with a new N1 or N2 1.5m high aluminium parapet, then the loading to the parapet supporting structure and the deck will be significantly increased. If existing steel parapet is N2 containment, then increase in load effects for N2 aluminium would be in order of 20%.</p> <p>As the existing north footway/cycleway is quite slim and no record information on the design or assessment available, detailed information will be sought (or intrusive investigation may necessary if not available), and a structural assessment is recommended to verify the capacity and to ensure it fits for purpose.</p>

Based on the above discussion, it is recommended that both stringcourse and footway slab would require assessment for the next design stage, subject to agreement with SES.

It is recommended that a Road Restraint Risk Assessment Process (RRRAP) to be carried out to confirm the required containment level of the proposed vehicle/ cyclist parapet.

It is recommended that monitoring of the defects identified in the latest inspections reports, and noted in Section 2 & 3, is to be continued with any outstanding repair works being undertaken, as part of the Lancashire County Council's current ongoing maintenance strategy.

5 THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed _____

Name Ganapati Sahoo

Engineering Qualifications Reviewer
CEng FICE MIStructE

Name of Organisation WSP

Date _____

6 THE ABOVE IS REJECTED/AGREED SUBJECT TO THE AMENDMENTS AND CONDITIONS SHOWN BELOW

Signed _____

Name _____

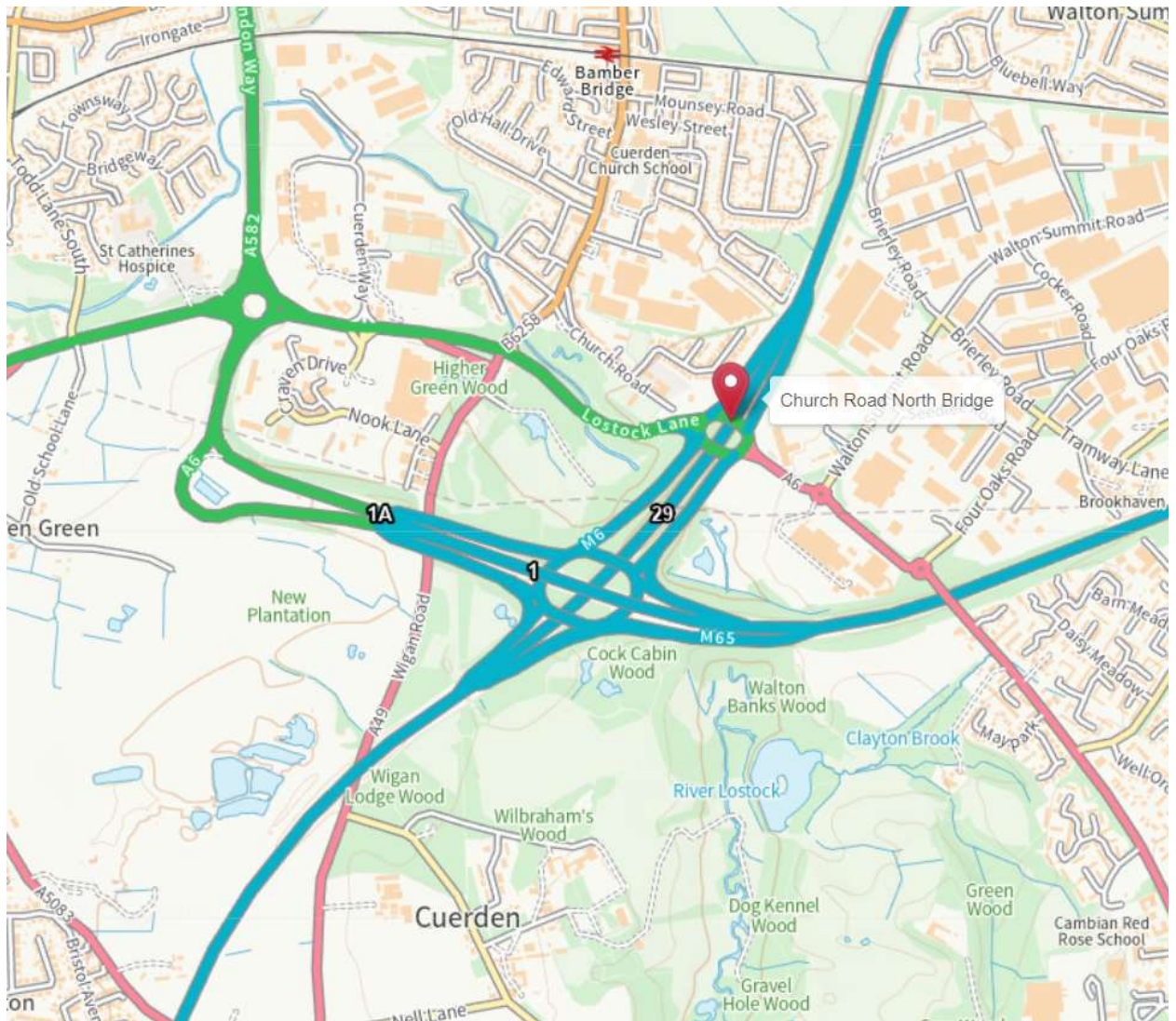
Position held _____

Engineering Qualifications _____

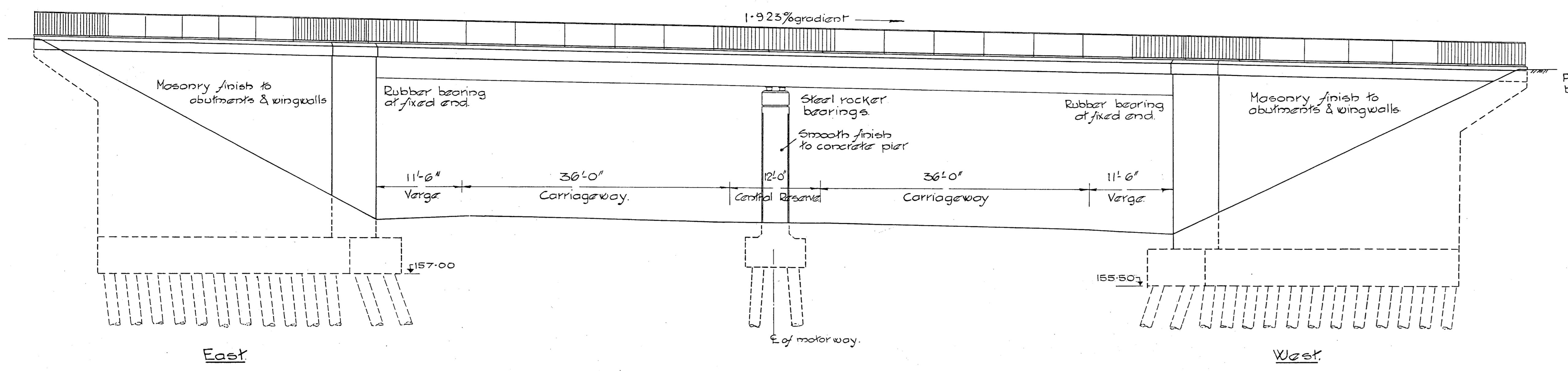
TAA _____

Date _____

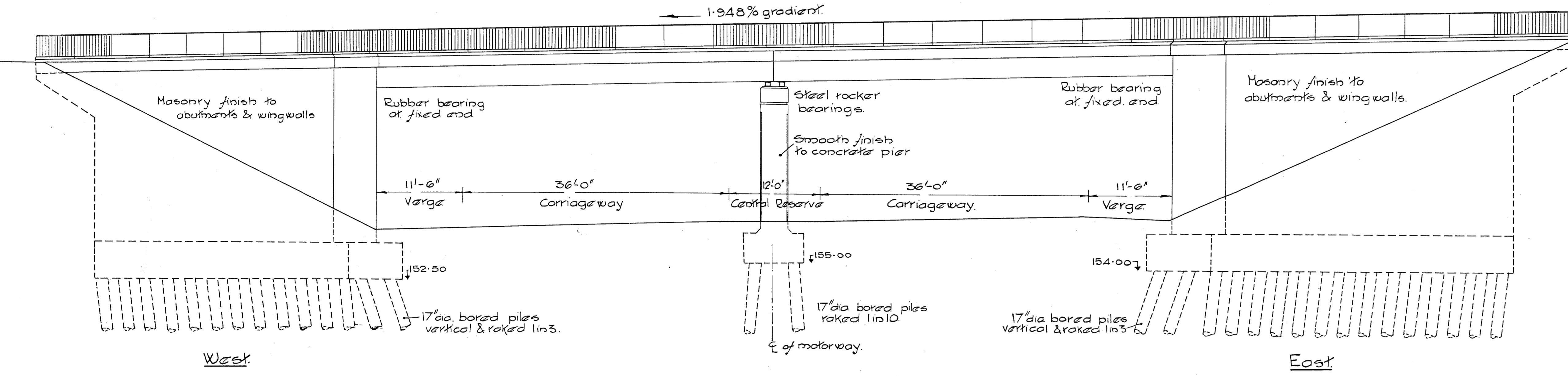
Appendix A: Structure Location Plan



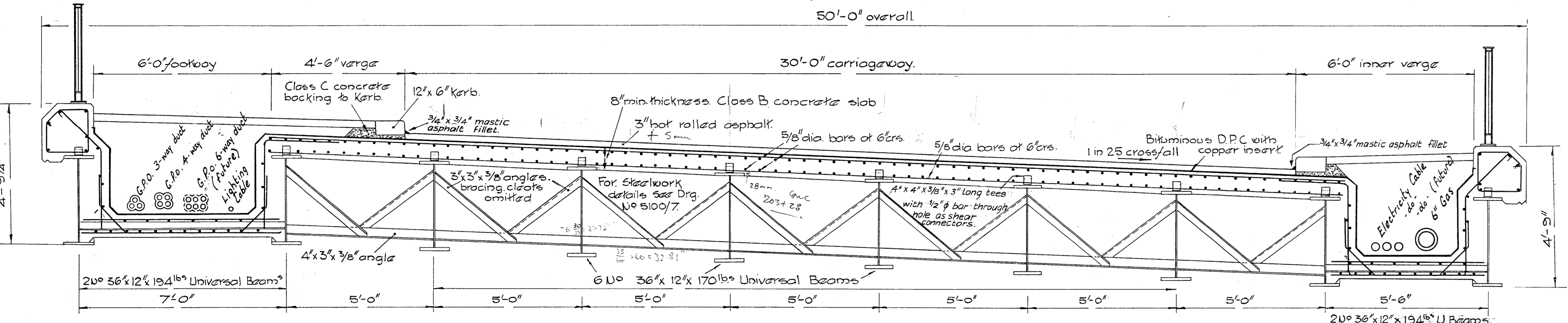
Appendix B: Existing and Proposed Drawings



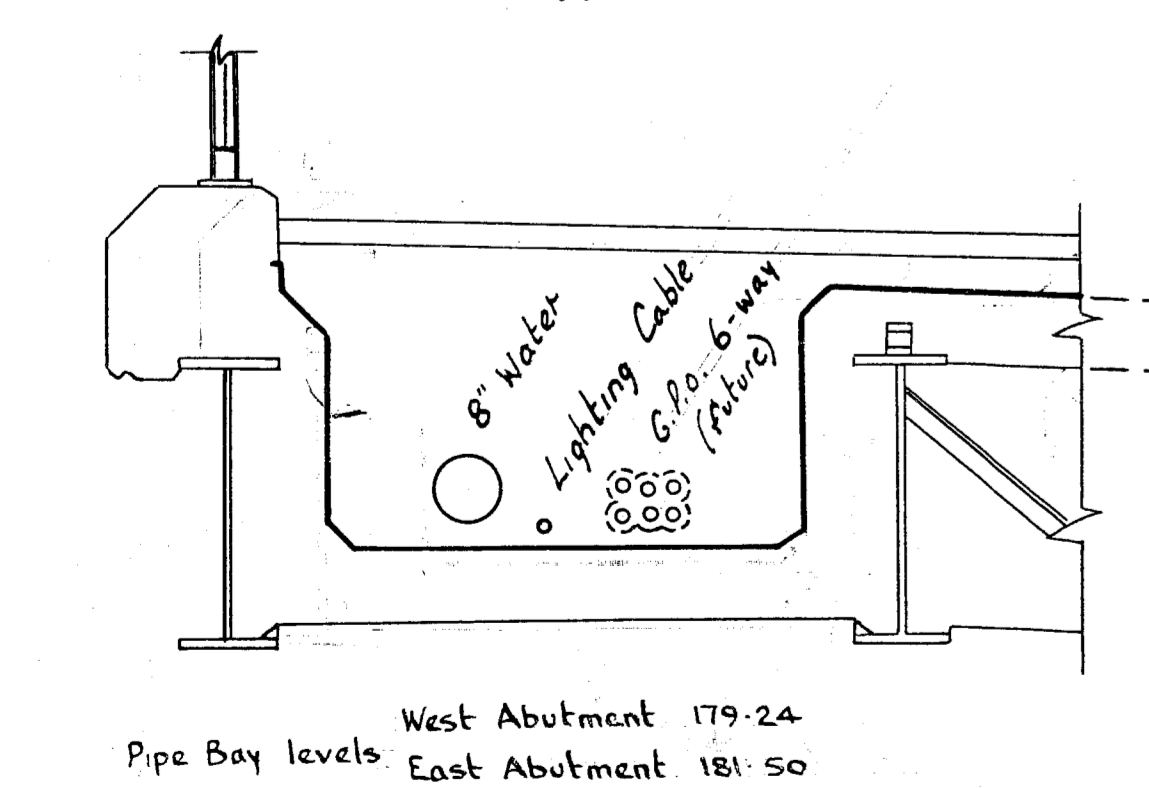
NORTH ELEVATION NORTH BRIDGE No 5195.
Scale 1/4 in to 1 foot



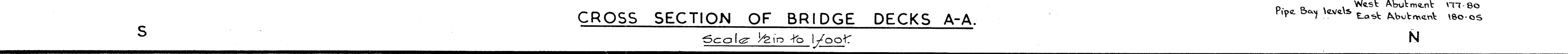
SOUTH ELEVATION SOUTH BRIDGE No 5194.
Scale 1/4 in to 1 foot



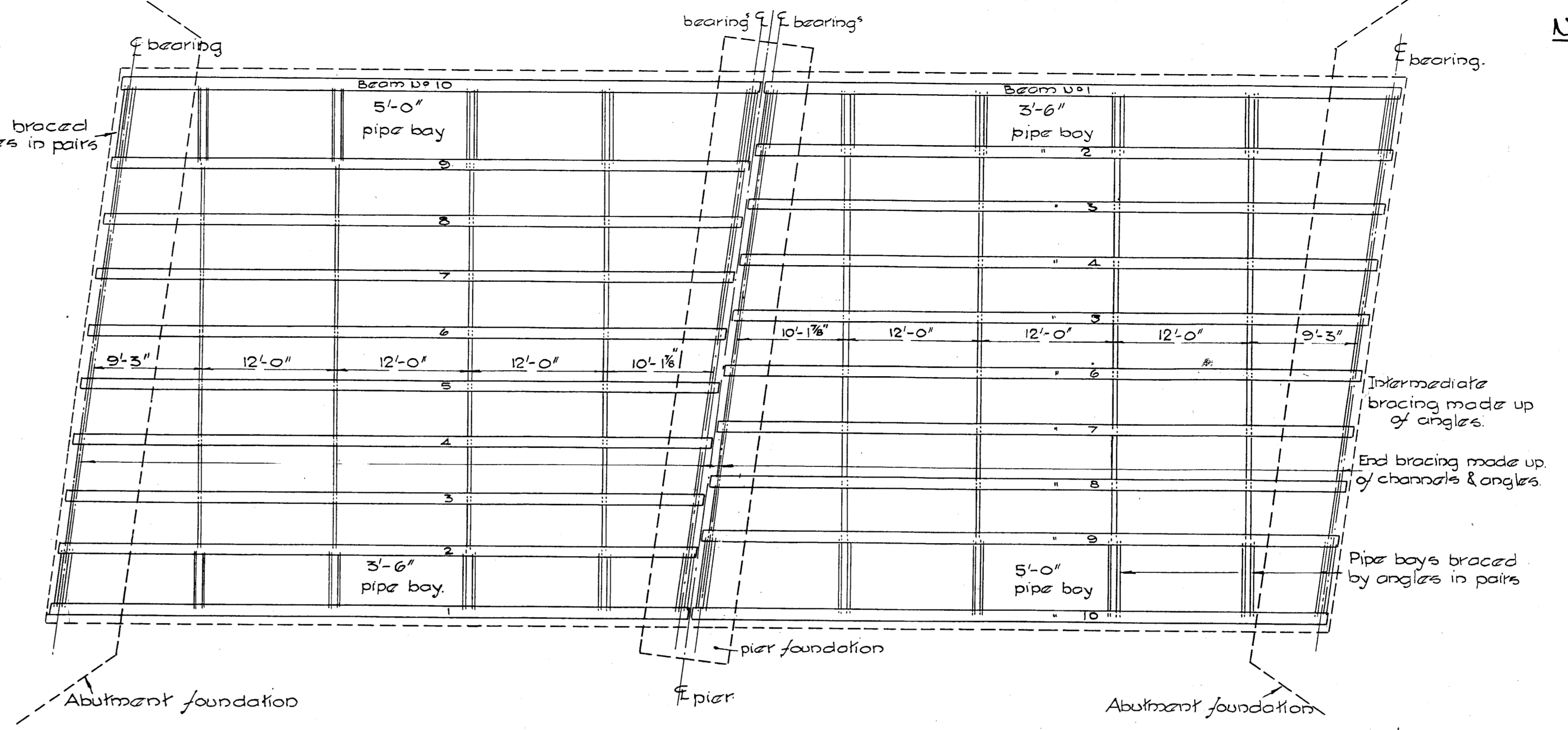
Service Accommodation in North Bridge.



Service Accommodation in South Bridge
(Detail as for North Bridge above).

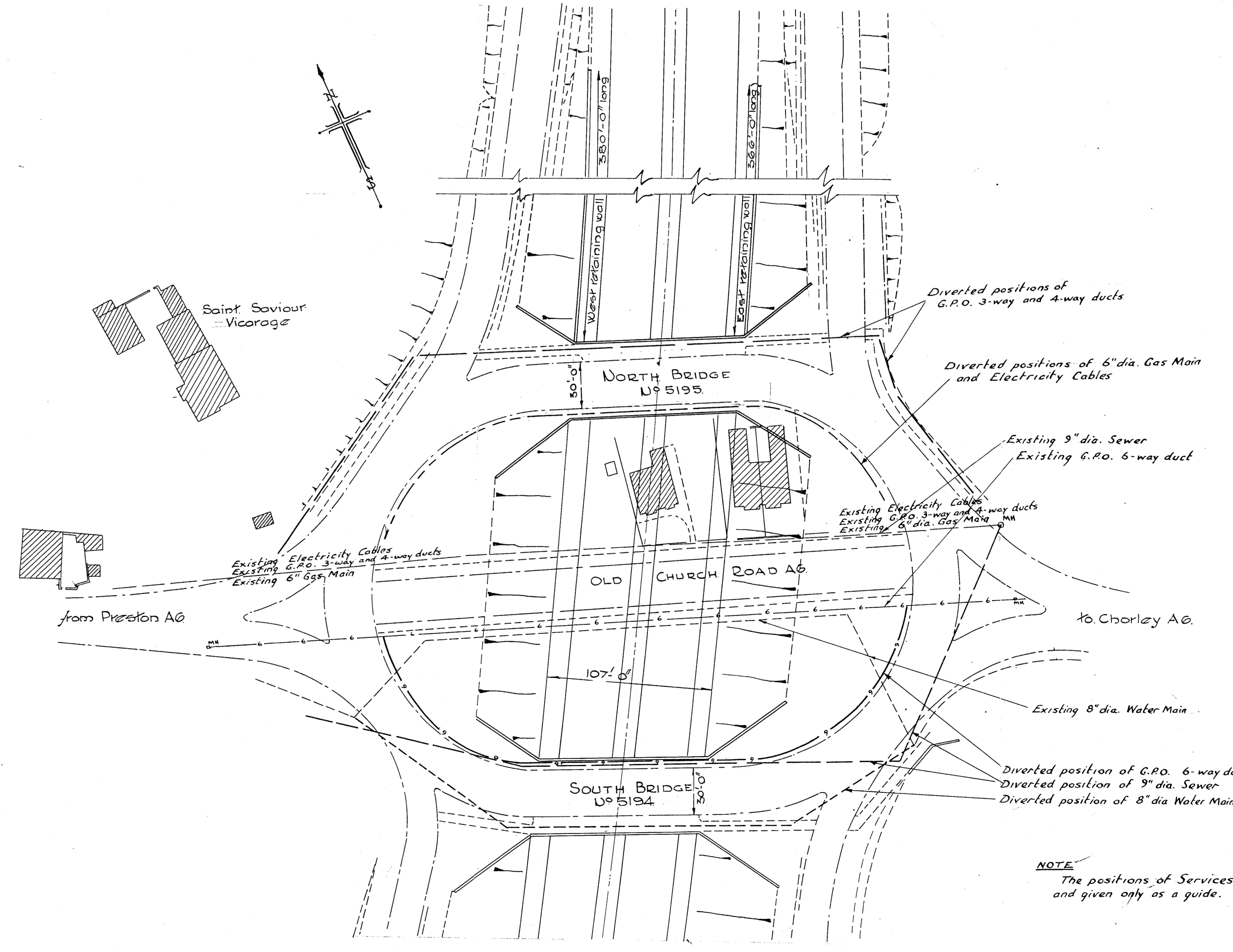


CROSS SECTION OF BRIDGE DECKS A-A.
Scale 1/4 in to 1 foot



HALF PLAN OF DECK NORTH BRIDGE. HALF PLAN OF DECK SOUTH BRIDGE.

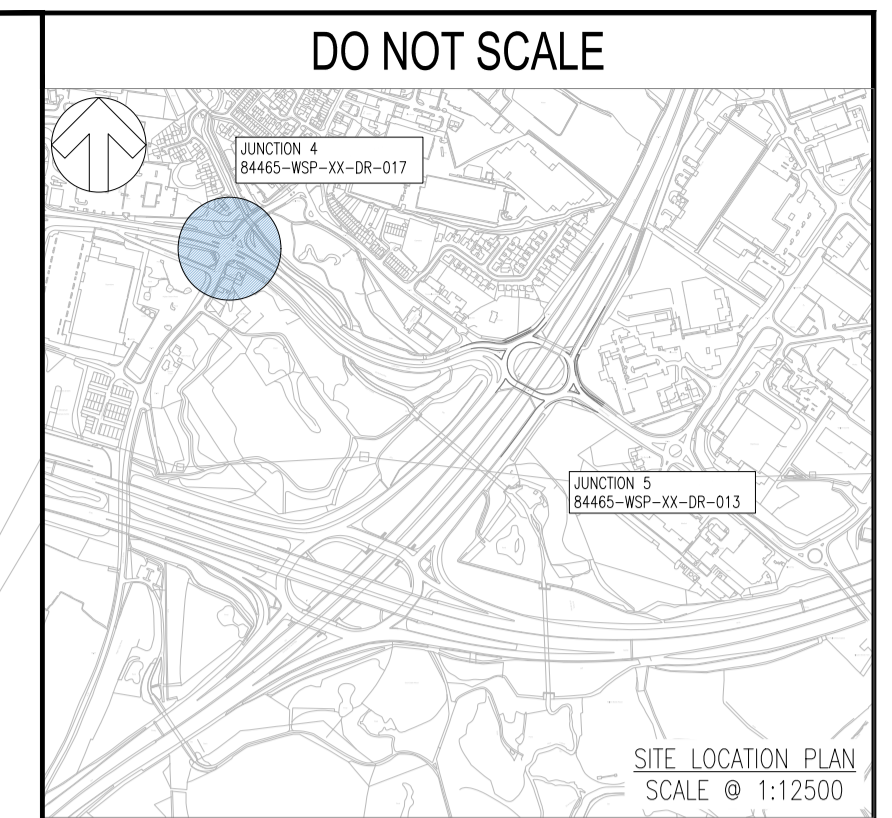
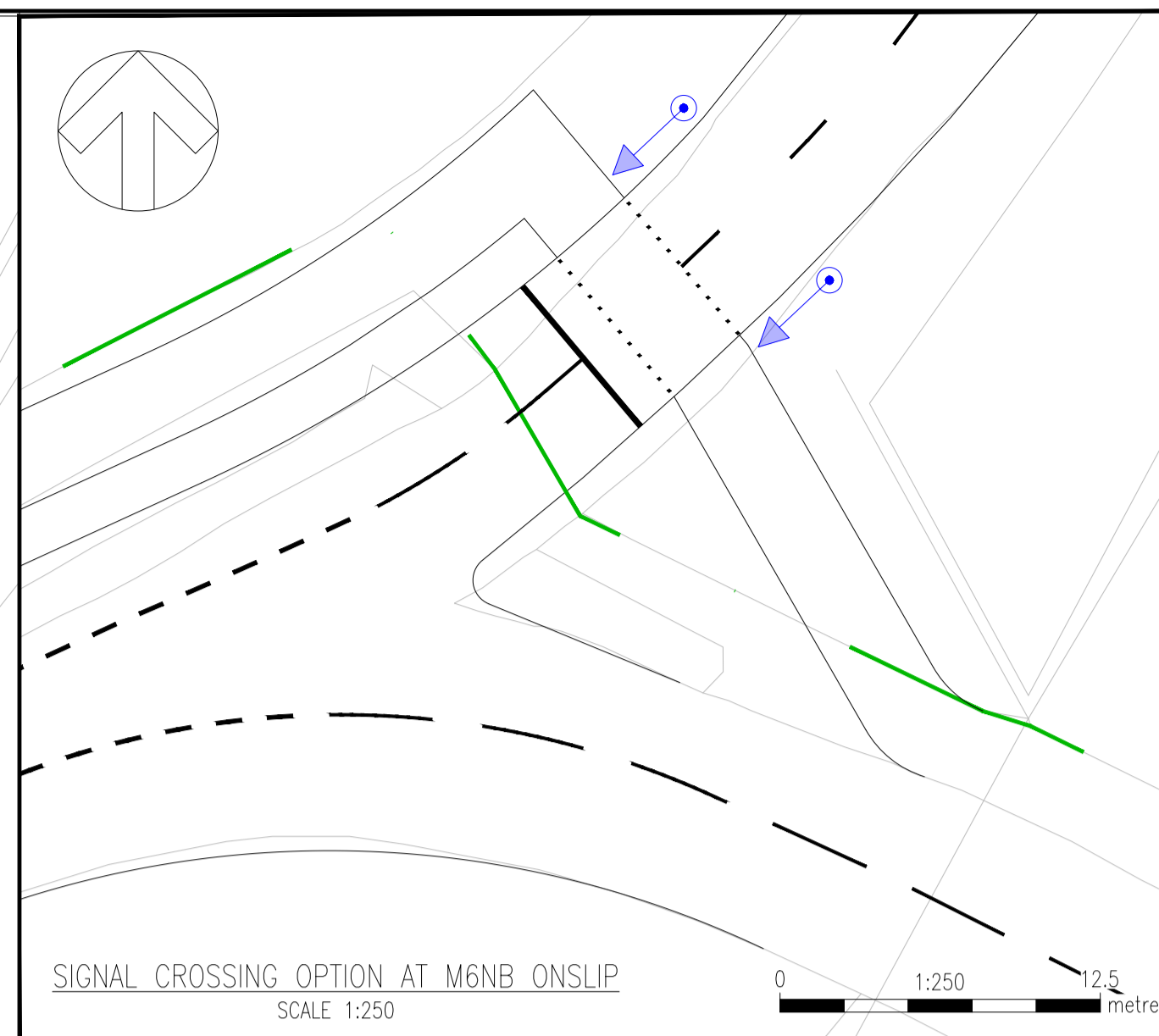
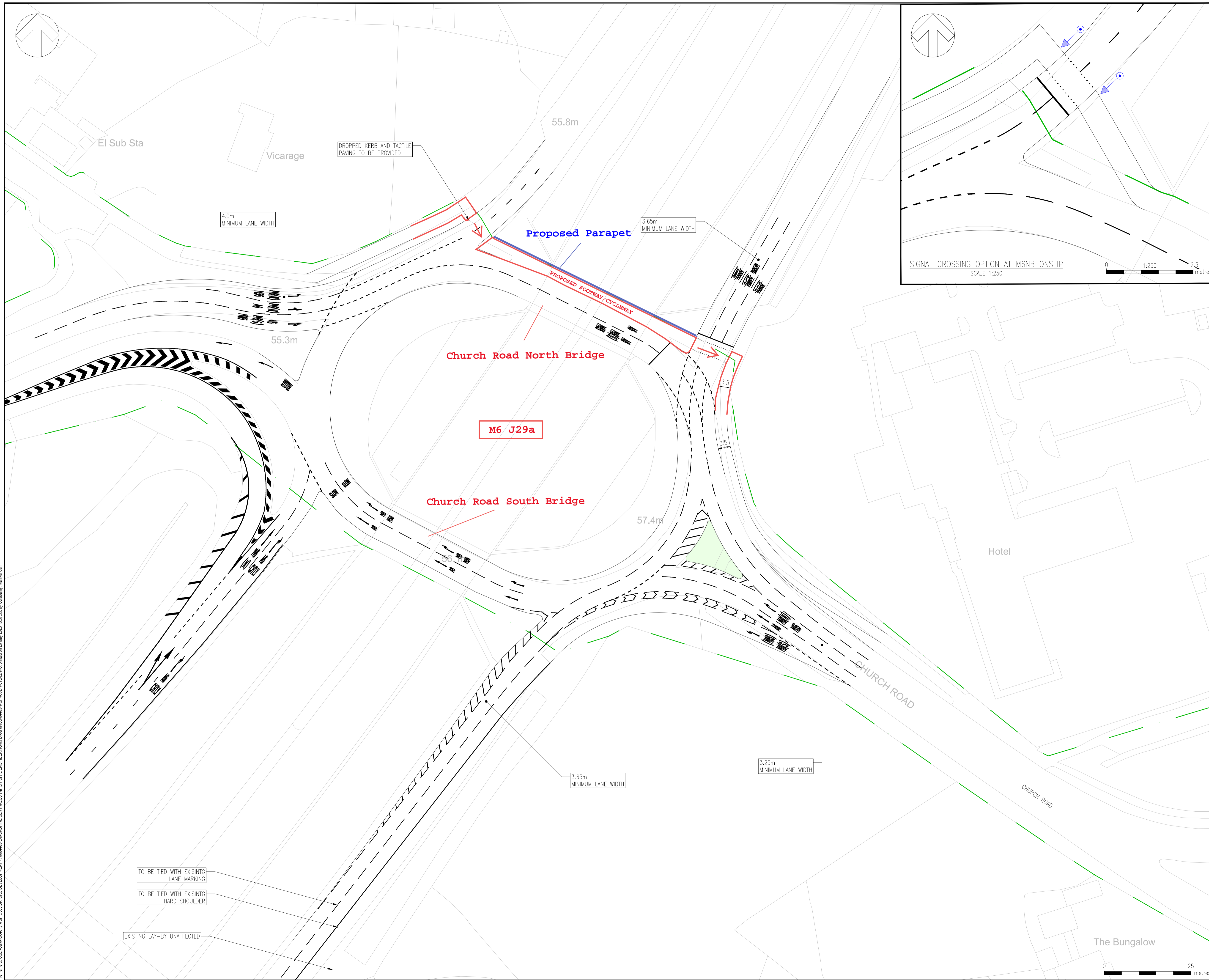
PLAN SHOWING ARRANGEMENT OF STEELWORK.
Scale 1/4 in to 1 foot



NOTE
The positions of Services are approximate and given only as a guide.

- Notes:-**
- 5194/1 General Arrangement.
 - 5195/2 Detail of Piling.
 - 5194/3 Details of Abutments.
 - 5195/3
 - 5194/4 Details of Piers & Bearings.
 - 5195/4
 - 5194/5 Details of Deck.
 - 5195/5
 - 5195/6 Detail of Retaining Walls.

REVISIONS		DATE
SHEET	NATURE OF REVISION	
A	Dimension intermediate bracing amended to 10' 1 1/8"	13/6/60
B	Shear connectors & mastic asphalt fillets.	



KEY

- ADOPTABLE HIGHWAY BOUNDARY
- SIGNAL WITH PRIMARY VIZOR

0 1:250 12.5 metres

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PO1	01/01/1901	XXX	FIRST ISSUE	XXX	XXX
REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: **S0 - WORK IN PROGRESS**

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wsp.com

CLIENT: **MAPLE GROVE DEVELOPMENTS**

ARCHITECT: **FLETCHER RAE**

SITE/PROJECT: **LANCASHIRE CENTRAL, CUERDEN**

TITLE: **M6 JUNCTION 29**

SCALE @ A1:	CHECKED:	APPROVED:
AS SHOWN		
PROJECT NO:	DESIGNED:	DATE:
70084465		May 23

DRAWING NO: **84465-WSP-XX-DR-013A** REV: **P01**

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File name: C:\USERS\NIGOL\WSP\0856\UK\CRIC DEVELOPMENT - 70084465 LANCSHIRE CENTRAL\03 IMPROV CIVIL ENGINEERING\03 DRAWINGS\84465-WSP-XX-DR-013A.DWG, printed on 28 May 2023 13:57:55, by Gaudamy, Manjunaath

Appendix C: Assessment Certificate

CERTIFICATE F

DATE
SEPT 1994

Structure Name & Department No

CHURCH ROAD NORTH BRIDGE DOT No 29/M6/344.40

ASSESSMENT DESIGN CERTIFICATE FOR CATEGORY II STRUCTURE

1. We certify that reasonable professional skill and care have been used in the assessment of CHURCH ROAD NORTH BRIDGE with a view to securing that:-

i) It has been assessed in accordance with:-

a) The Approval in Principle as recorded in Form TA1 dated 14 September 1989 addendum thereto dated 12 November 1990 and including the following:-

Revisions to Addenda signed on 21 January 1994 and 8 September 1994

Departures from Standard:-

BS 5400: Part 4 as directed in DTp letter dated 1 November 1988.

BS 5400: Part 2: 1978 and BD 14/82

40 tonnes Assessment Live Loading in place of HA Live Loading as appropriate applied in lanes adjacent to HB vehicle with load factor of 1.3 applied to HB vehicle.

b) The BE Directive for the items listed in 2.2 below

ii) The assessment capacity of the structure is as quoted in the Structure Assessment Report Form dated 26 September 1994 (copy attached)

iii) The unique numbers of the drawings used for the assessment are:-

5195/1B, 2A, 3, 4B, 5B and 7

5100/14A, 32A, 33C, 34B, 36C, 37D, 40A and 43A

Signed for and on behalf of
Lancashire County Council

R Howes
.....

Name

R HOWES
ASSESSMENT DESIGN TEAM LEADER

Signed

A.M. Dunsmore
.....

Name

A.M. DUNSMORE
COUNTY SURVEYOR AND BRIDGEMASTER

Date

31 JAN 1995

CERTIFICATE F

DATE
SEPT 1994

Structure Name & Department No

CHURCH ROAD NORTH BRIDGE DOT No 29/M6/344.40

2. Endorsement by BE

- * 2.1 The departure from the Standards and additional criteria given in paragraph 1.i.a above are agreed.
- * 2.2 It has been directed that the following items shall be dealt with as follows:-

Signed
 Name
 Date

/ N/A /
 Head of Division BE

3. The certificate is accepted by the TAA

Signed
 Name
 Date

Williams
A Williams
 21. 2. 95

DOT NWRO
 HA LTP

* Delete as appropriate