Allbrook Road Bridge

Bridge Replacement to accommodate PBA road improvements

Technical Note

June 2019

1.0 Introduction

1.1 Paul Basham Associates (PBA) have prepared proposals for a realignment of the B3335 to the east of the existing Railway Bridge at Allbrook, Eastleigh. The proposals being presented in their 'Highbridge Road to Bishopstoke Lane Review', May 2019 and 'Allbrook Appraisal', October 2018 reports.

1.2 This Technical Note provides further supporting information on the proposed bridge which is to support the realigned road as it crosses the Itchen Navigation circa 40m east of the Railway Bridge. It will also describe future actions with respect to approvals by the Highway Authority when the proposals move into a more developed design.

2.0 Proposed Bridge Location

2.1 The B3335 is currently carried across the Itchen Navigation by a reinforced concrete slab bridge spanning between brick abutments, with brick parapets. Eastleigh Borough Council provided limited record drawings for the bridge, and after a site visit, we concluded they were not fully correct but were useable for the purpose of this note. The drawings are in annexe A. The clear bridge spans vary from circa 4.5m (North - upstream elevation) to 4.2m (South -downstream elevation).

2.2 Noted on site was a fast-moving cascade of water running in the Itchen Navigation on the upstream side of the existing road bridge. This full width cascade appears to have been introduced to replace the Allbrook Lock, when the canal was decommissioned and comprises five stairs, with a monitoring station adjacent to the top weir. The navigation is constrained by brick walls circa 4.5m apart. By the time the cascading water has reached the upstream face of the bridge a lot of the turbulence has been dissipated and though running fast the water is fairly calm and emerges on the downstream side into a much wider channel (9 to 10m wide) circa 700mm deep when dipped by a plumb-bob circa 10m downstream of the bridge. The wider watercourse then turns west to pass under the arched railway bridge in a circa 4.6m wide channel running circa 1.2m deep.

2.3 The proposed realignment of the B3335 will move the road slightly downstream of the current crossing, to provide a straighter and safer alignment on the approach to the Railway Bridge. The road realignment is illustrated on the Bridge General Arrangement drawing in Annexe B

3.0 Bridge Options

3.1 In considering potential bridge options two principles governed the consideration:

- Supporting the Highway Geometry Proposals from PBA
- Minimising Environmental impact, including flooding, flora and fauna.

3.2 Three Options were considered:

- Option S – 4.2m span - The smallest span – as a continuation of the canalised watercourse. This would involve filling in part of the current wider downstream watercourse
- Option T – 12.5m span - The largest span necessary to avoid filling in the current watercourse.
- Option U – 9m span - as implied, but not stated in earlier considerations

3.3 All Options would support the PBA Highway proposals, but Option T in spanning the wider downstream watercourse was considered the best solution as far as Environmental Impact.

4.0 Proposed Bridge Option

4.1 The bridge is illustrated on the General Arrangement drawing in Annexe B.

4.2 In summary the 12.5m clear span bridge will have concrete abutments integral with a concrete deck to avoid the need for inspection and maintenance of bearings and bespoke movement joints. The deck will comprise Precast Concrete beams (in pseudo-slab configuration) to enable quick construction and avoid concrete spillage into the watercourse. Open metal parapets will be provided on the bridge and the approach walls.

4.3 The bridge will be designed and constructed to adoptable standards in accordance with the Design Manual for Roads and Bridges (DMRB). It will therefore be capable of supporting

40/44Tone lorries and in technical terms will be designed to Highway Loading of LM1, LM2 and LM3 – SV80.

4.4 At least the deck slab of the existing bridge will be removed following the realignment of the road

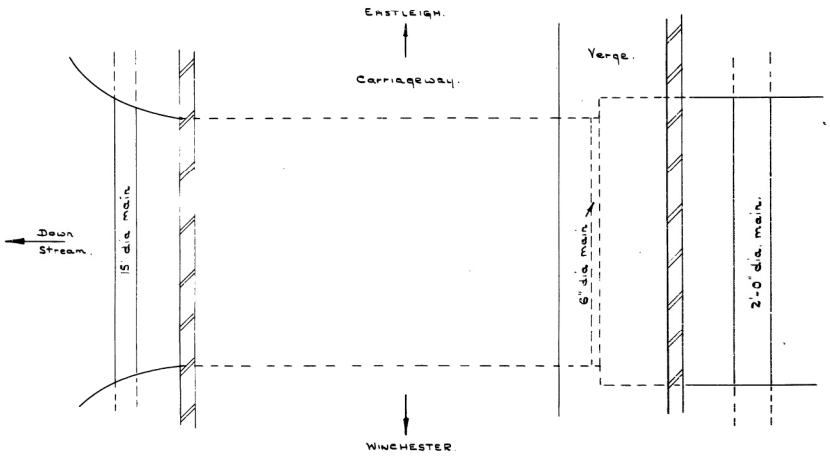
5.0 Future Actions

5.1 As the proposed bridge will be adopted by Hampshire County Council (HCC), they have confirmed the Technical Approval procedures required by the DMRB are to be used. Technical Standard BD2 (current version BD2/12) will be used for Technical Approval of the proposed Bridge. HCC have advised that the first stage of that procedure, an Approval in Principle (AIP), should commence at the earliest opportunity. It is the WYG experience that at least a year should be allowed between initial discussions regarding the AIP and the expected start of construction to allow adequate time for consideration of the AIP and the detailed design of the bridge, based on the approved AIP.

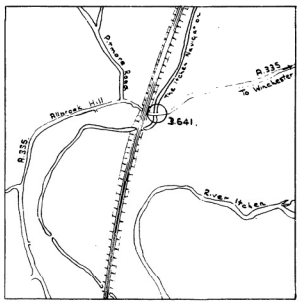
5.2 On a separate but related bridge structure, the PBA alignment will involve adjustments to the Highway under the Railway Bridge. It is recommended that when proposals for the alignment under the Railway Bridge are further developed post local plan adoption, a joint meeting is held with Network Rail and HCC to ensure both Highway and Rail technical approval procedures are coordinated, both seeking to protect public use of the bridge, over and under

Annexe A - EBC Record Drawings

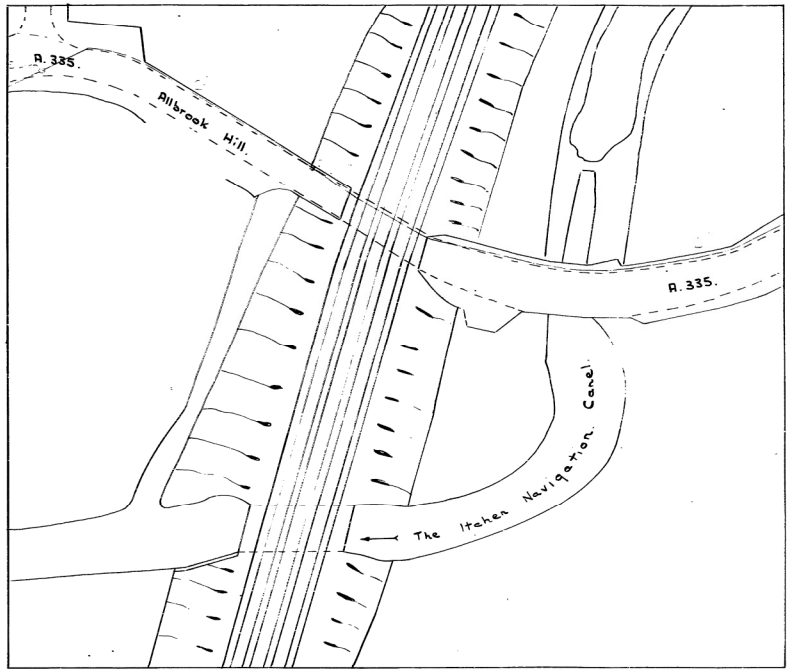
HAMPSHIRE



PLAN. SCALE:- 1/4 to 1'-0"



SITE PLAN.



NOTES

ALLBROOK BRIDGE.
OVER ITCHEN NAVIGATION CANEL.

SHEET 1 OF

DRG.No. B. 641C

DRAWN BY

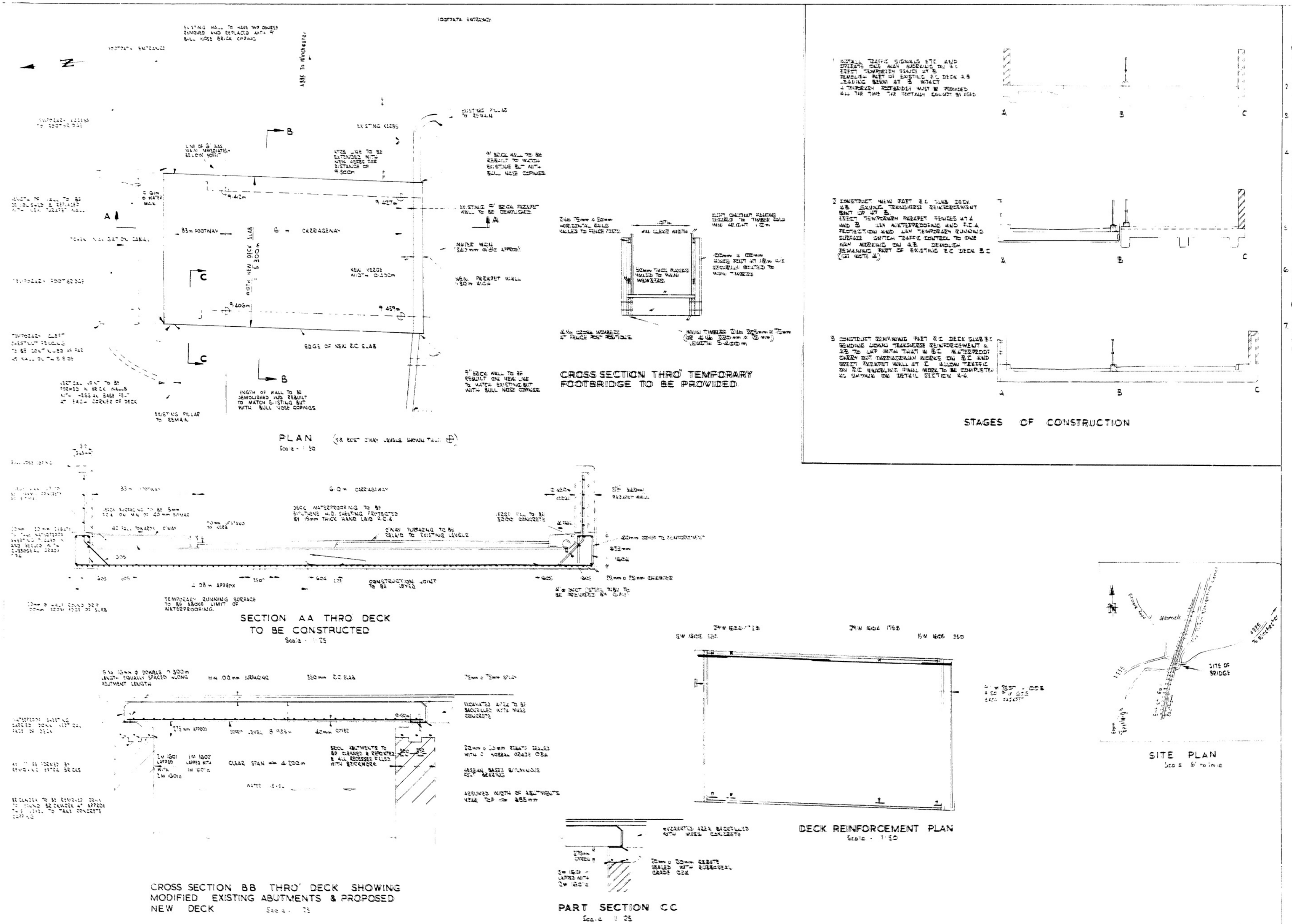
TRACED BY M.G.

CHECKED BY

DATE

H. N. JENNER, M.B.E., M.I.C.E., M.I.Mun.E.,
COUNTY SURVEYOR,
THE CASTLE,
WINCHESTER.

HAMPSHIRE

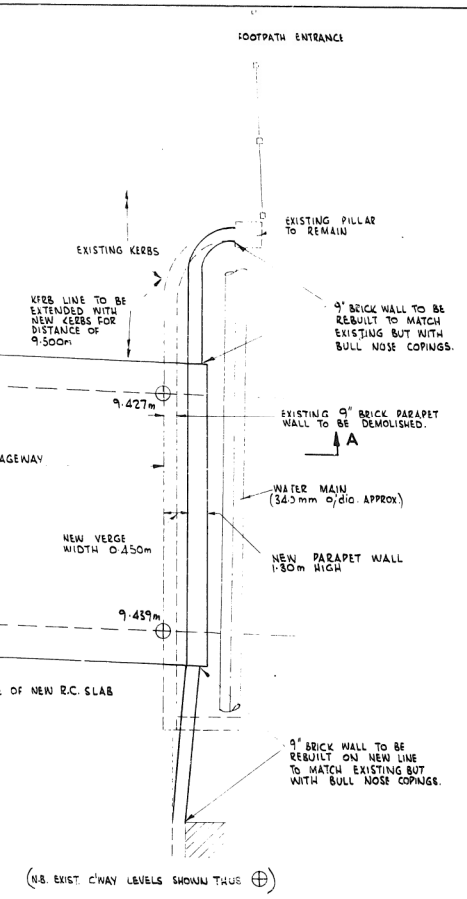


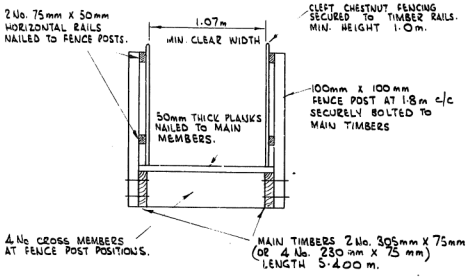
NOTES

1. CONCRETE IN DECK TO BE CLASS 4500 /¾ (4500 lbf/in² - 31 N/mm²)
   CONCRETE IN ABUTMENT TO BE CLASS 3000 /¾ (3000 lbf/in² - 20.7 N/mm²)
2. ALL REINFORCEMENT MILD STEEL MIN LAP TO BE 30 DIAMETERS
3. BRICKWORK TO BE CLASS 2 ENGINEERING BRICKS TO MATCH EXISTING IN COLOUR & TEXTURE
4. WHEN BC IS CAST AND AB IS CARRYING TRAFFIC, SLAB AB MUST BE EFFECTIVELY PROPPED AT B FOR 7 DAYS
   IF ADJUSTABLE FLOOR CENTRES ARE USED TO SUPPORT THE DECK THESE MAY BE DOUBLED UP FOR 1m EITHER SIDE OF THE JOINT
5. LEVELS ARE REFERRED TO T.B.M. ON TOP OF ANCHOR STRAP ON E END OF WATER MAIN ON S SIDE OF BRIDGE VALUE 10.00 m (ARBITARY)
6. SOFFIT FORMWORK MAY BE STRUCK AT 7 DAYS AND TRAFFIC ALLOWED OVER DECK AFTER THIS PERIOD PROVIDED 7 DAY CUBE STRENGTHS HAVE ATTAINED 4000 lbf/in² (27.6 N/mm²)
7. FORMWORK TO SIDES OF PARAPETS - CLASS F3
   FORMWORK TO DECK SOFFIT - CLASS F2

SHEET 1 OF 1		DRG. No. 641/
ALLBROOK BRIDGE No. 641	A335	RECONSTRUCTION OF BRIDGE DECK

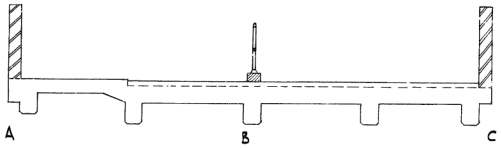
HAMPSHIRE



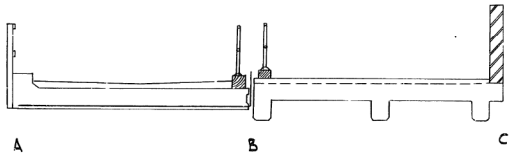


CROSS SECTION THRO' TEMPORARY FOOTBRIDGE TO BE PROVIDED.

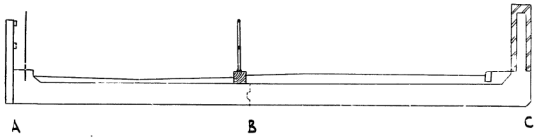
1. INSTALL TRAFFIC SIGNALS ETC. AND OPERATE ONE WAY WORKING ON B.C. ERECT TEMPORARY FENCE AT B. DEMOLISH PART OF EXISTING R.C. DECK A.B LEAVING BEAM AT B INTACT. A TEMPORARY FOOTBRIDGE MUST BE PROVIDED ALL THE TIME THE FOOTWAY CANNOT BE USED.



2. CONSTRUCT NEW PART R.C. SLAB DECK A.B. LEAVING TRANSVERSE REINFORCEMENT BENT UP AT B. ERECT TEMPORARY PARAPET FENCES AT A AND B. LAY WATERPROOFING AND F.C.A. PROTECTION AND LAY TEMPORARY RUNNING SURFACE. SWITCH TRAFFIC CONTROL TO ONE WAY WORKING ON A.B. DEMOLISH REMAINING PART OF EXISTING R.C. DECK B.C. (SEE NOTE 4)



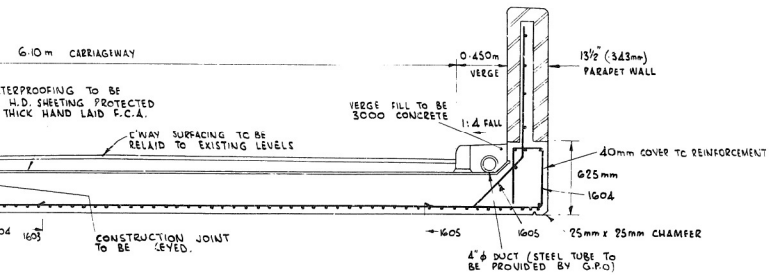
3. CONSTRUCT REMAINING PART R.C. DECK SLAB B.C BENDING DOWN TRANSVERSE REINFORCEMENT IN A.B TO LAP WITH THAT IN B.C. WATERPROOF. CARRY OUT CARRIAGEWAY WORKS ON B.C AND ERECT PARAPET WALL AT C. ALLOW TRAFFIC ON B.C ENABLING FINAL WORK TO BE COMPLETED AS SHOWN ON DETAIL SECTION 4-4



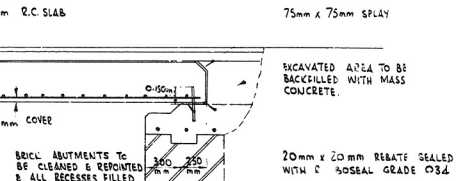
STAGES OF CONSTRUCTION

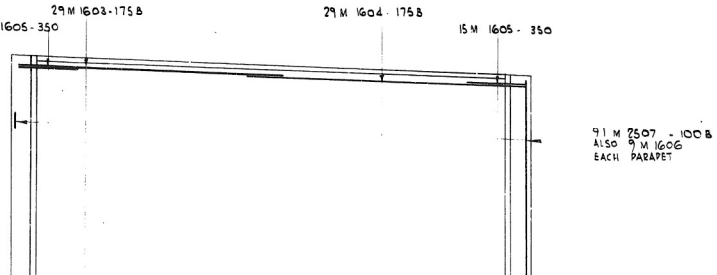
NOTES

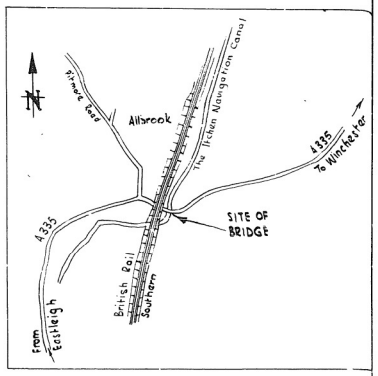
1. CONCRETE IN DECK TO BE CLASS 4500/¾ (4500 lbf/in² = 31 N/mm²) CONCRETE IN ABUTMENT TO BE CLASS 3000/¾ (3000 lbf/in² = 20.7 N/mm²)
2. ALL REINFORCEMENT MILD STEEL MIN. LAP TO BE 30 DIAMETERS.
3. BRICKWORK TO BE CLASS B ENGINEERING BRICKS TO MATCH EXISTING IN COLOUR & TEXTURE
4. WHEN B.C IS CAST AND A.B IS CARRYING TRAFFIC, SLAB A.B MUST BE EFFECTIVELY PROPPED AT B FOR 7 DAYS. IF ADJUSTABLE FLOOR CENTRES ARE USED TO SUPPORT THE DECK THESE MAY BE DOUBLED UP FOR 1m EITHER SIDE OF THE JOINT.
5. LEVELS ARE REFERRED TO T.B.M. ON TOP OF ANCHOR STRAP ON E. END OF WATER MAIN ON S. SIDE OF BRIDGE VALUE :- 10.00 m (ARBITARY)
6. SOFFIT FORMWORK MAY BE STRUCK AT 7 DAYS AND TRAFFIC ALLOWED OVER DECK AFTER THIS PERIOD PROVIDED 7 DAY CUBE STRENGTHS HAVE ATTAINED 4000 lbf/in² (27.6 N/mm²)
7. FORMWORK TO SIDES OF PARAPETS :- CLASS F3 FORMWORK TO DECK SOFFIT :- CLASS F2



THRO' DECK
STRUCTED
25

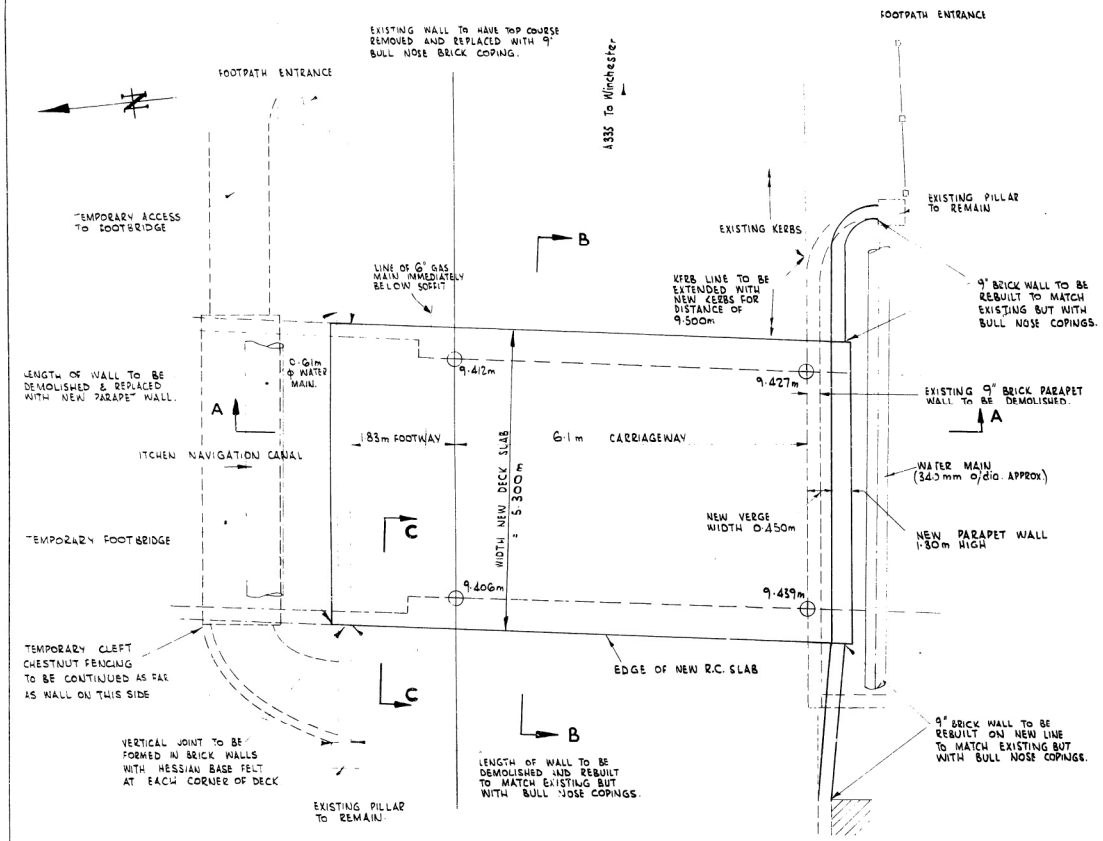




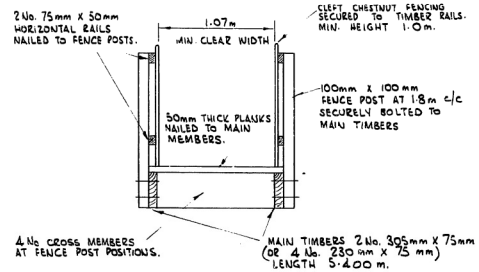


SITE PLAN

HAMPSHIRE

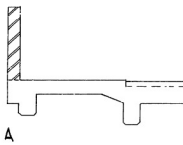


PLAN (N.B. EXIST. C'WAY LEVELS SHOWN THUS ⊕)
Scale:- 1:50



CROSS SECTION THRO' TEMPORARY FOOTBRIDGE TO BE PROVIDED.

1. INSTALL TRAFFIC SIGNALS ETC. AND OPERATE ONE WAY WORKING ON B.C. ERECT TEMPORARY FENCE AT B. DEMOLISH PART OF EXISTING R.C. DECK A.B LEAVING BEAM AT B INTACT. A TEMPORARY FOOTBRIDGE MUST BE PROVIDED ALL THE TIME THE FOOTWAY CANNOT BE USED.



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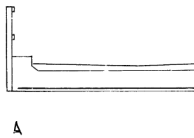
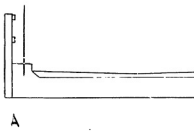
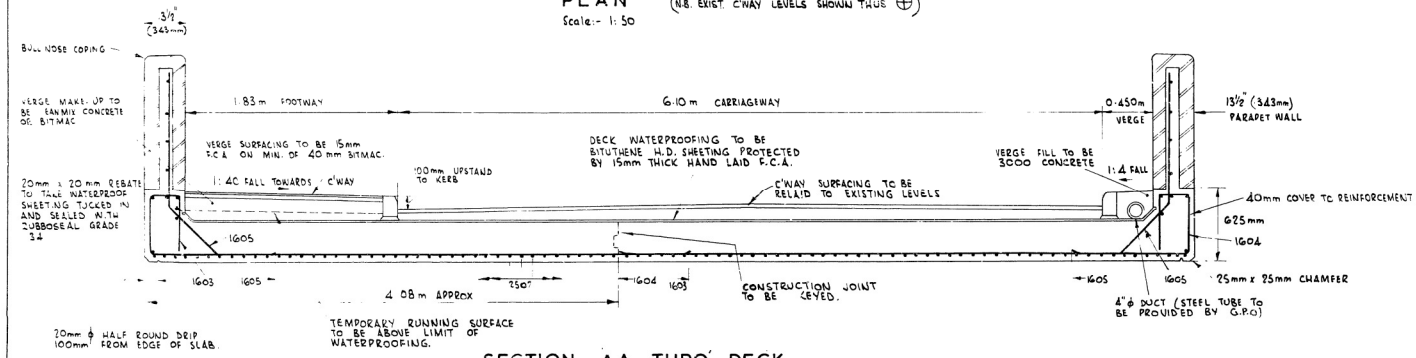


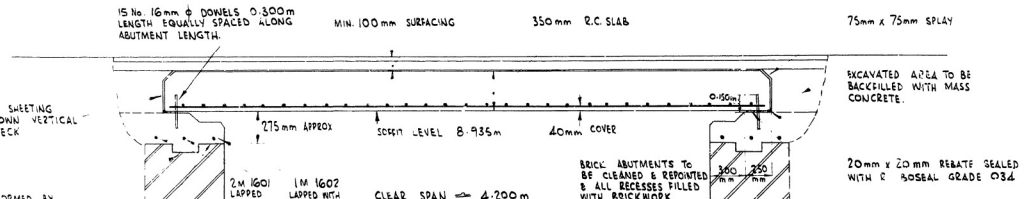
3 CONSTRUCT REMAINING PART R.C. DECK SLAB B.C. BENDING DOWN TRANSVERSE REINFORCEMENT IN A.B. TO LAP WITH THAT IN B.C. WATERPROOF AND CARRY OUT CARRIAGEWAY WORKS ON B.C. AND ERECT PARAPET WALL AT C. ALLOW TRAFFIC ON B.C. ENABLING FINAL WORK TO BE COMPLETED AS SHOWN ON DETAIL SECTION A-A

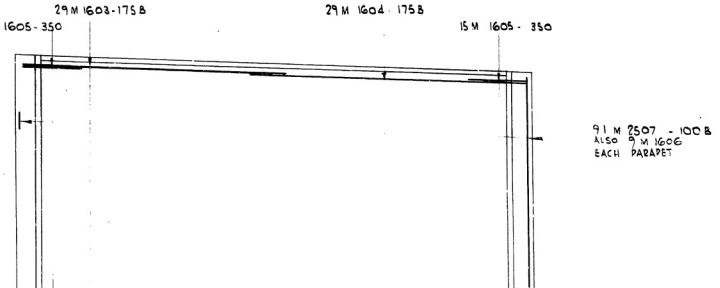


STAGES OF CONSTRU



SECTION AA THRO' DECK TO BE CONSTRUCTED
Scale:- 1:25

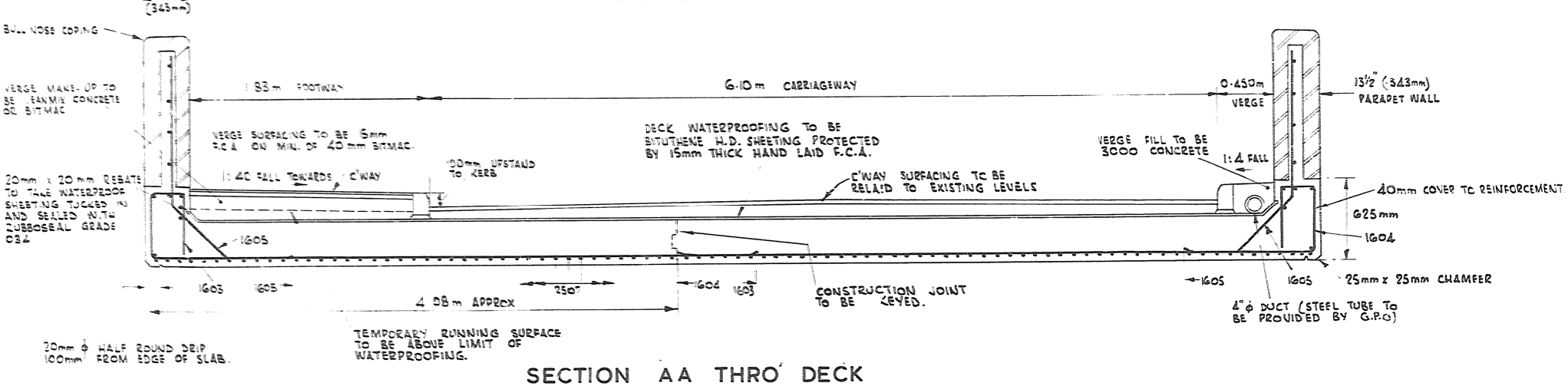




PLAN

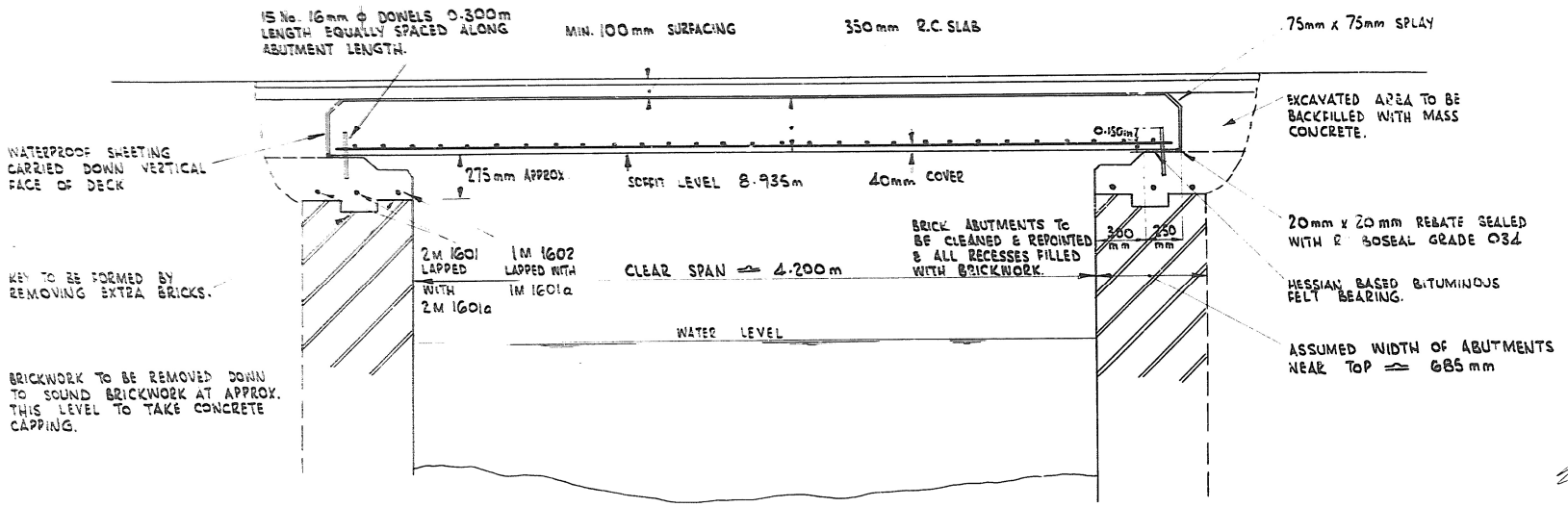
Scale:- 1: 50

(N.B. EXIST. C'WAY LEVELS SHOWN THUS ⊕)



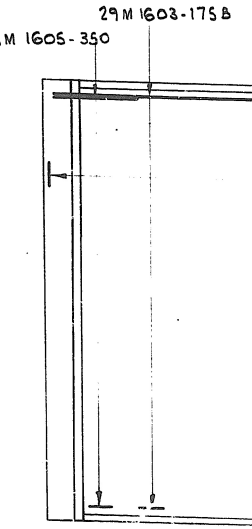
SECTION AA THRO' DECK TO BE CONSTRUCTED

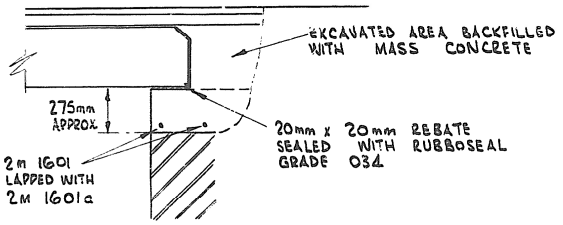
Scale:- 1: 25



CROSS SECTION BB THRO' DECK SHOWING MODIFIED EXISTING ABUTMENTS & PROPOSED NEW DECK

Scale:- 1: 25



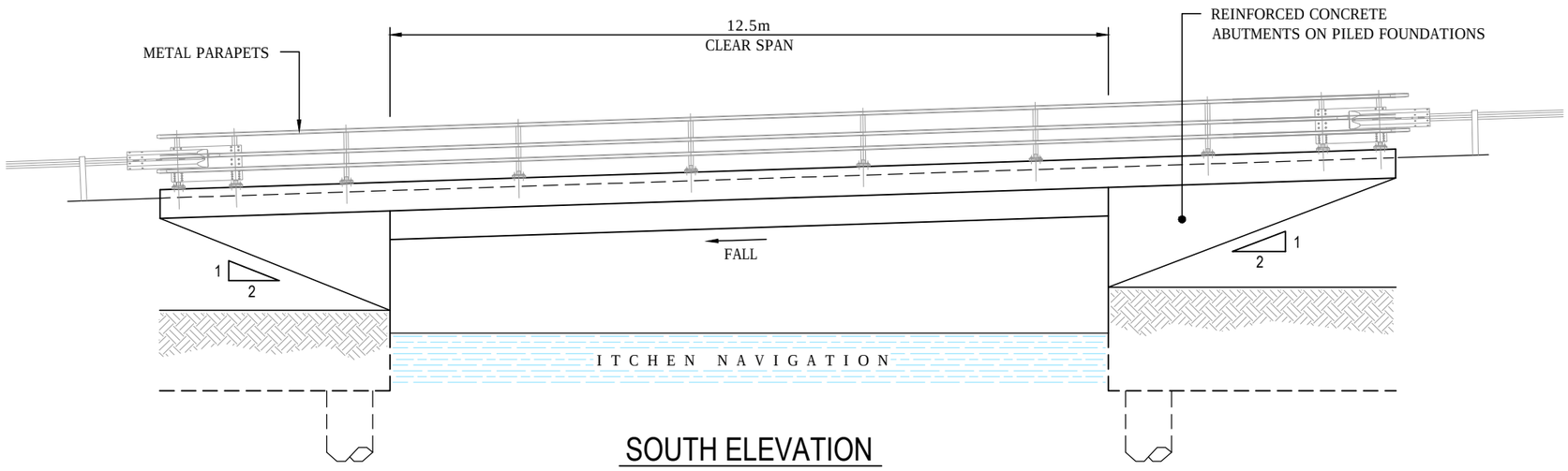


PART SECTION CC

Scale: 1: 25

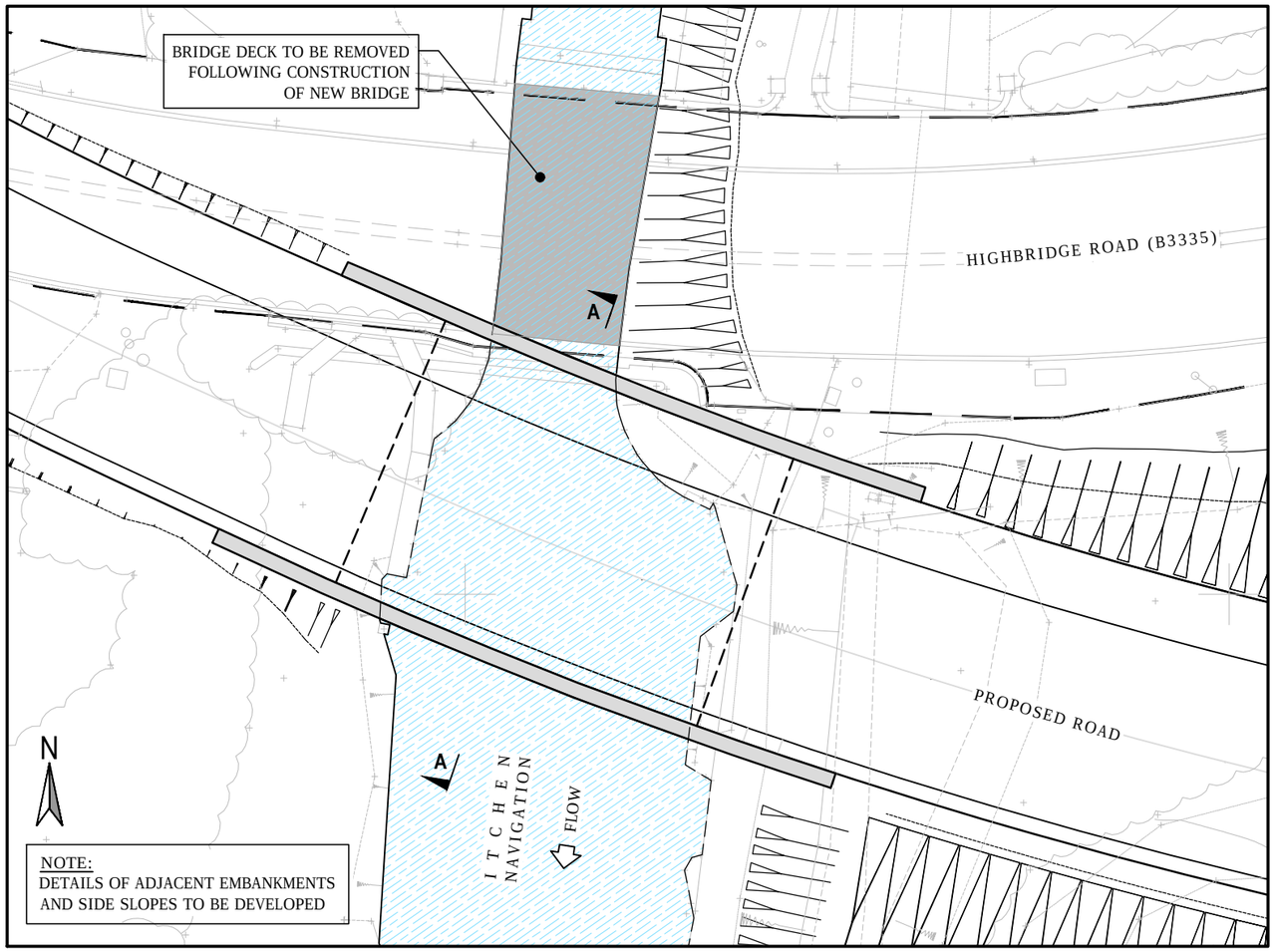
Annexe B – Bridge General Arrangement

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



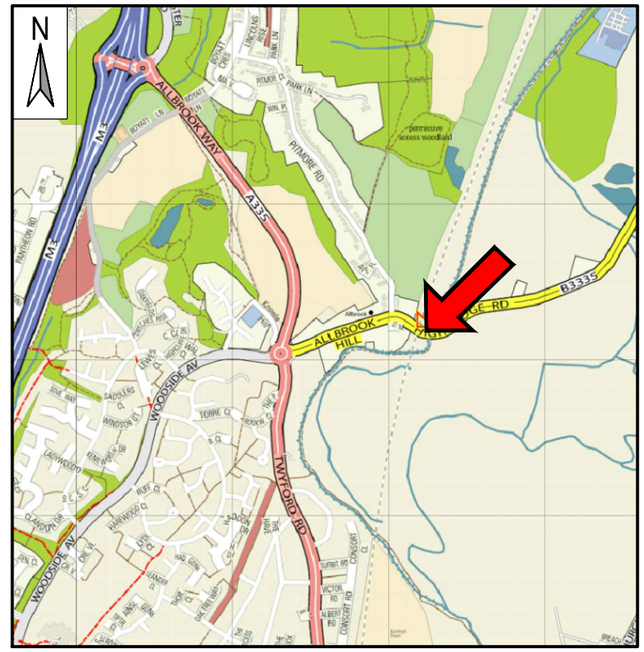
SOUTH ELEVATION

SCALE 1:100



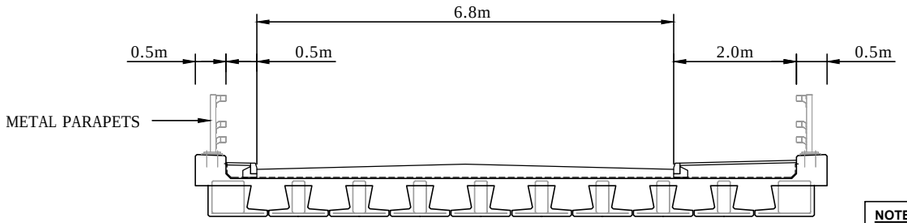
PLAN

SCALE 1:200



LOCATION PLAN

NTS



BRIDGE BEAMS AND CONCRETE INFILL DECK

NOTE:
CONCRETE INFILL BETWEEN BEAMS NOT SHOWN FOR CLARITY

SECTION A-A

SCALE 1:100

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METRES (m). UNLESS NOTED OTHERWISE.
2. DO NOT SCALE FROM THIS DRAWING.

0 1000 2000 3000 4000 5000 mm

SCALE 1:100

0 2 4 6 8 10 m

SCALE 1:200

PRELIMINARY ISSUE

REV	DESCRIPTION	BY	CHK	APP	DATE

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:
ALLBROOK BRIDGE

Drawing Title:
PROPOSED ALLBROOK BRIDGE OVER ITCHEN NAVIGATION

GENERAL ARRANGEMENT

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
AS STATED	PJC	21.06.19	PMV	21.06.19	PMV	21.06.19

Project No.	Office	Type	Drawing No.	Revision
A093272	35	12	SK 1600	-