JJ RYAN CONSULTING PTY LTD

Our ref JJR-2210915F
Your ref Wybong Road Bridge over Rosebrook Creek

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MEMORANDUM

To:	Gajan Thamo, Project Manager – Roads and Drainage (Muswellbrook Shire Council)
From:	Kevin Sartipi, Senior Civil/Structural & Maritime Engineer (JJ Ryan Consulting)
Date:	19 January 2022
Subject:	Rosebrook Bridge Replacement Investigations and Proposed Options

Purpose

The purpose of this memorandum is to provide an account of a hydraulic assessment and preliminary bridge engineering carried out to inform design of a replacement bridge on Wybong Rd over Rosebrook Creek at Muswellbrook, NSW. The hydraulic assessment indicates that a two-span, transversely stressed pre-stressed concrete road bridge would achieve a hydraulic performance no more limiting than the existing two-span, composite timber-concrete road bridge.

Background

JJ Ryan Consulting (JJR) were engaged by Muswellbrook Shire Council to complete a bridge replacement concept design for a road bridge on Wybong Rd over Rosebrook Creek at Muswellbrook, NSW. The existing bridge comprises two composite timber-concrete spans, 18.8m long and 7.2m wide.

An overview of the structure is provided in Figure 1.

Figure 1: Locality Plan

Feature Survey

JJR has completed a Feature Survey of the site and the existing bridge. The existing bridge deck is approximately 600mm deep (top of wearing surface to bottom of timber stringers).

Bridge Concept Options

The concept design has been carried out in accordance with the following standards:

- AS5100-2 Bridge Design, Design Loads
- AS5100-5 Bridge Design, Concrete

Pre-Stressed Concrete (PSC) planks have been considered for both options' superstructures with a comparison in Table 1, assuming the same vertical alignment of wearing surface in all cases, and drawings in *Attachment 1*:

1. 1x 18.8m span precast prestressed concrete planks with reinforced concrete abutments; and
2. 2x 9.4m spans precast prestressed concrete planks with reinforced concrete pier of similar dimensions as the existing pier and abutments.

Table 1: Options Analysis

Parameter	Existing Bridge	Single-Span Option	Two-Span Option
Number of spans	2	1	2
Design vehicle per lane	T44 (1x 44t, 5x axle truck)	SM1600 (2x ~80t, 6x axle trucks)	
Superstructure depth	600mm	930mm (PSC planks + cast in-situ concrete wearing surface)	560mm (PSC planks + cast in-situ concrete wearing surface)
Superstructure weight	~80t	~300t	~195t
Advantages	N/A	-	• Hydraulic performance of waterway is mostly unaffected; • Shorter planks are easier to transport; • Smaller crane and less costly crane pad required for deck installation; and • At least parts of the existing substructure may be retained
Negative implications	N/A	• Waterway Hydraulic performance significantly reduced; and • Difficulties in precast planks transportation and installation.	-
Most economical	N/A	Likely no	Likely yes

If there are any questions or comments with regards to the information detailed in this memorandum, please do not hesitate to contact the undersigned either via phone (+61 410 156 249) or email (kevin.sartipi@jjryan.com.au).

Kevin Sartipi
For and on behalf of **JJ Ryan Consulting Pty Ltd**
Senior Engineer (Civil/Structural & Maritime)
BEng (Civil) BEng (Ocean) MIEAust CPEng NER RPEQ

Attachment(s)
Attachment 1 – Concept Design Drawings

ATTACHMENT 1 – CONCEPT DESIGN DRAWINGS

MUSWELLBROOK SHIRE COUNCIL

ROSEBROOK CREEK BRIDGE REPLACEMENT
CONCEPT DESIGN

DRAWING INDEX

DRAWING NUMBER	DRAWING DESCRIPTION
JJR-2210915F-ST001	LOCALITY PLAN & DRAWING INDEX
JJR-2210915F-ST002	OPTION 1: PLAN, ELEVATION & SECTIONS
JJR-2210915F-ST003	OPTION 2: PLAN, ELEVATION & SECTIONS

LOCALITY PLAN
N.T.S.

DESIGN LOT CODE

PLOT DATE 16 January 2022 TIME 15:48:55

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

EXTERNAL REFERENCE FILES (UP TO 35 XREFS)	REV	DATE	AMENDMENT / REVISION DESCRIPTION	DVF No	APPROVAL
	0	16 JAN 2022	ISSUE FOR REVIEW	-	-

TITLE	NAME
DRAFTER	R.ABBASI
DRAFTING CHECK	R.HACOPIAN
DESIGNER	S.MINADI
DESIGN CHECK	R.HACOPIAN
DESIGN MANAGER	E.LAM
PROJECT MANAGER	E.LAM

PRINCIPAL: muswellbrook shire council

DESIGNER: JJ RYAN CONSULTING PTY LTD

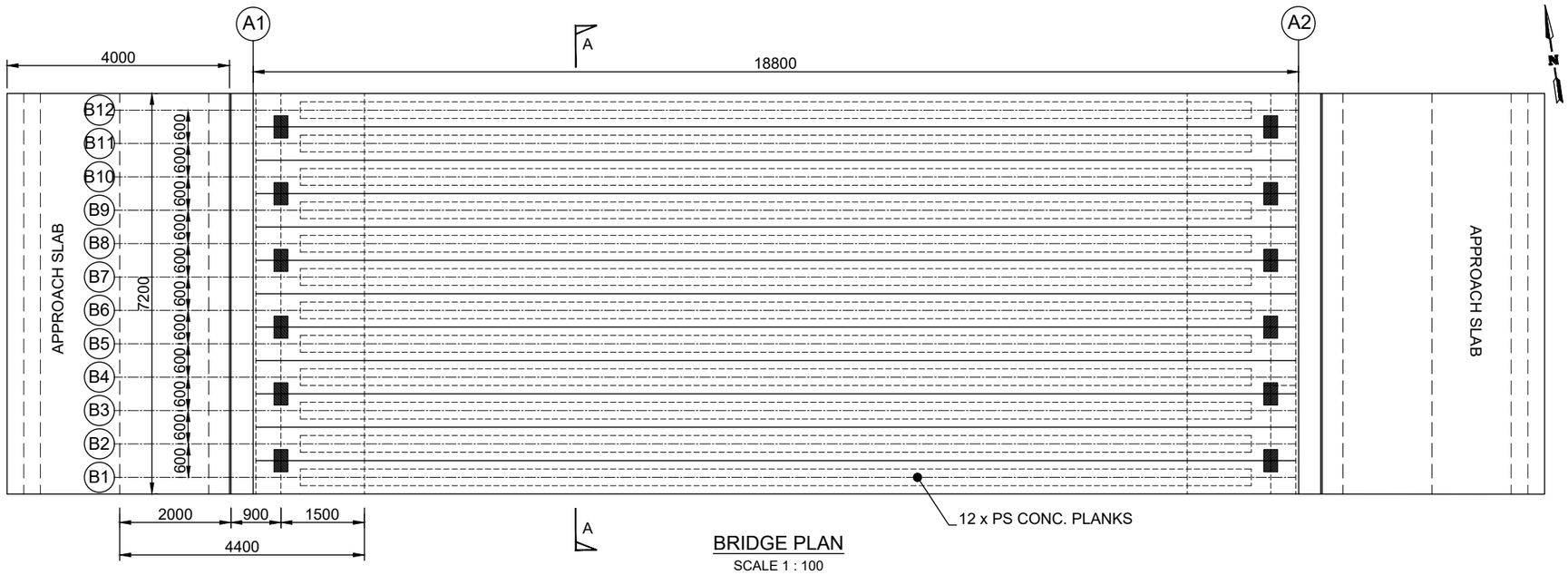
SCALES AT A3 SIZE DRAWING: AS SHOWN

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: A.H.D.

MUSWELLBROOK SHIRE COUNCIL

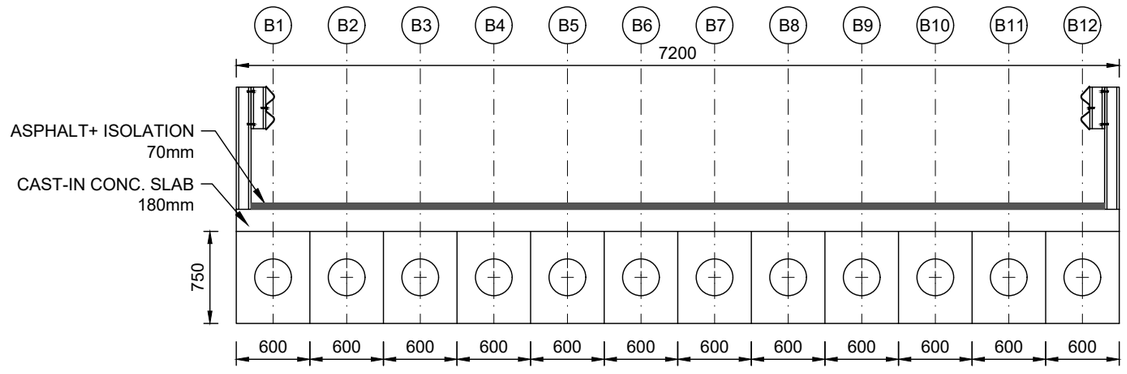
ROSEBROOK BRIDGE REPLACEMENT
CONCEPT DESIGN
LOCALITY PLAN & DRAWING INDEX

CLIENT PROJECT / DRAWING No	ISSUE STATUS	JJR PROJECT / DRAWING No	ISSUE
	FOR REVIEW	JJR-2210915F-ST001	0



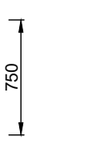
BRIDGE PLAN

SCALE 1 : 100



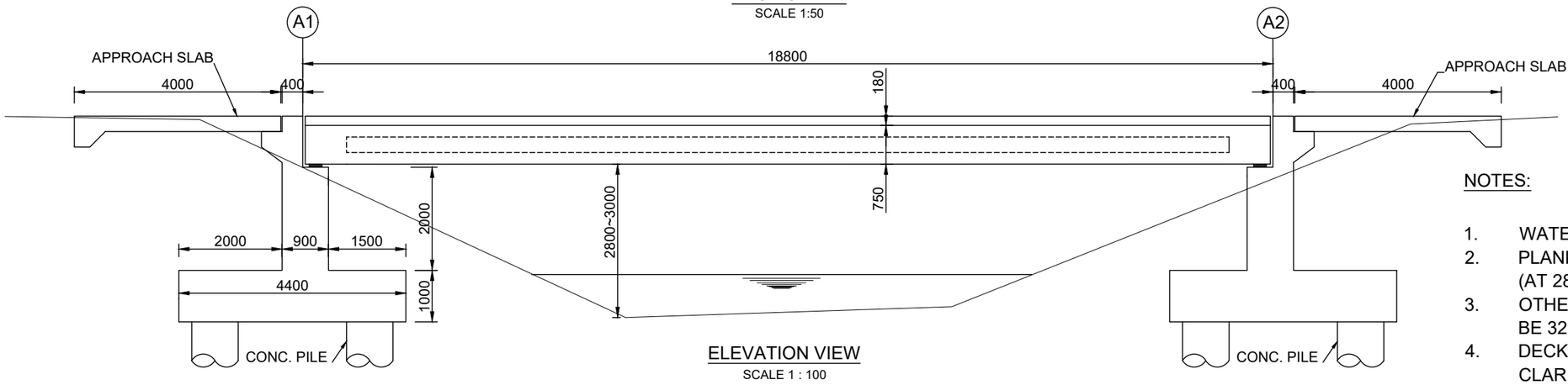
SECTION A-A

SCALE 1:50



PRECAST PS CONCRETE PLANK

SCALE 1:40



ELEVATION VIEW

SCALE 1 : 100

NOTES:

1. WATER LEVEL LINE IS INDICATIVE.
2. PLANKS CONCRETE SHALL BE 50 MPa (AT 28 DAYS).
3. OTHER COMPONENT CONCRETE SHALL BE 32 MPa (AT 28 DAYS).
4. DECK BARRIERS NOT SHOWN FOR CLARITY.

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DESIGN CHECK	R.HACOPIAN
DESIGN MANAGER	E.LAM
PROJECT MANAGER	E.LAM

PRINCIPAL: muswellbrook shire council

DESIGNER: JJ RYAN CONSULTING PTY LTD

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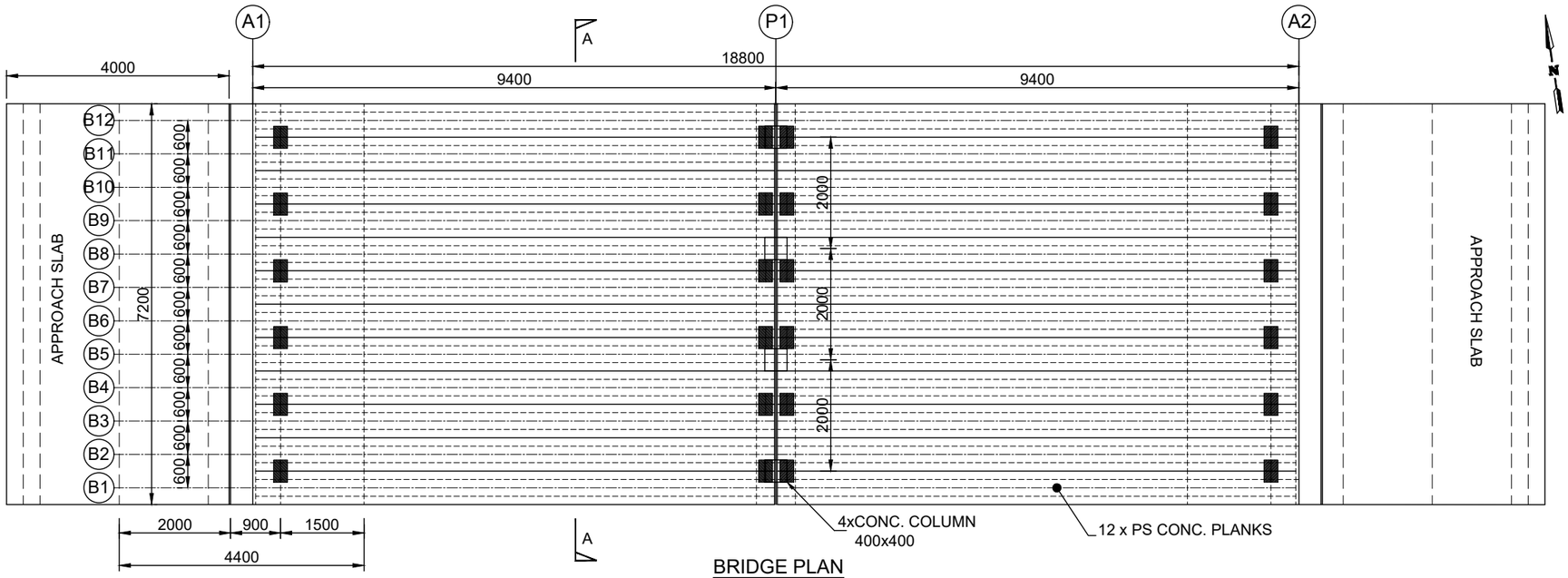
MUSWELLBROOK SHIRE COUNCIL

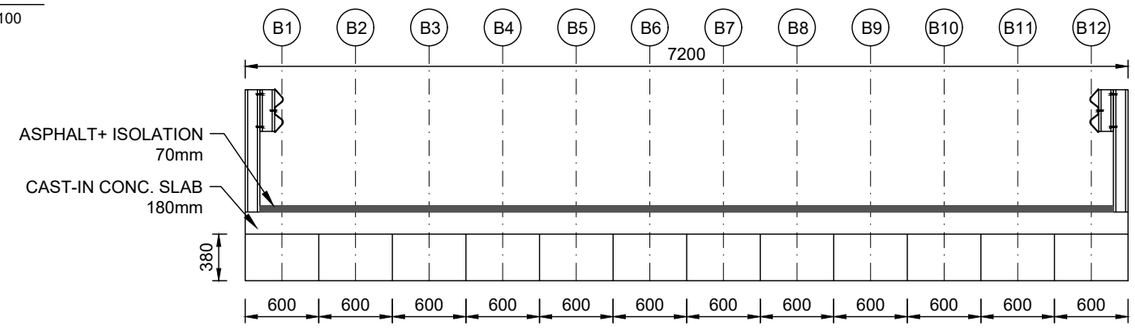
ROSEBROOK BRIDGE REPLACEMENT
CONCEPT DESIGN
OPTION 1 (18.8m SINGLE SPAN - PSC PLANKS)

CLIENT PROJECT / DRAWING No	ISSUE STATUS	JJR PROJECT / DRAWING No	ISSUE
	FOR REVIEW	JJR-2210915F-ST001	0

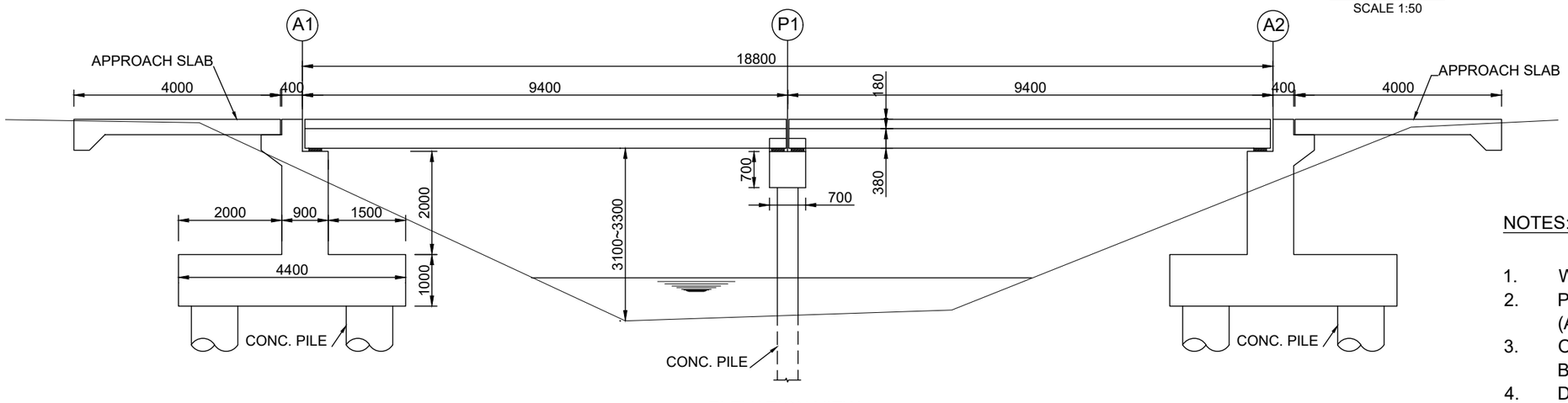


BRIDGE PLAN
SCALE 1 : 100

PRECAST PS CONCRETE PLANK
SCALE 1:40



SECTION A-A
SCALE 1:50



ELEVATION VIEW
SCALE 1 : 100

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MUSWELLBROOK SHIRE COUNCIL

ROSEBROOK BRIDGE REPLACEMENT
CONCEPT DESIGN
OPTION 2 (2x9.4m SPANS - PSC PLANKS)

CLIENT PROJECT / DRAWING No | ISSUE STATUS: FOR REVIEW | JJR PROJECT / DRAWING No: JJR-2210915F-ST003 | ISSUE: 0