



This document is uncontrolled  
when printed.



# FLOOD DESIGN REPORT

## A2I | Albury to Illabo

Package: A2I – Junee Drivers Platforms

CONTRACT NUMBER: 0052

PROJECT DOCUMENT NUMBER:

5-0052-210-IHY-JA-RP-0001

## Document Control

<b>DOCUMENT TITLE:</b>	Flood Design Report – Junee Drivers Platforms (JE11 and JE70)		
<b>DOCUMENT OWNER:</b>	Engineering Manager		
<b>PREPARED BY:</b>	Thinesh Thirumurugan	<b>TITLE:</b>	Engineer
	Yucen Lu	<b>TITLE:</b>	Engineer
<b>REVIEWED BY:</b>	Jasmine Lee	<b>TITLE:</b>	Associate Engineer
<b>VERIFIED BY:</b>	Eric Lam	<b>TITLE:</b>	Technical Director

## Approved by

NAME	TITLE	SIGNATURE	DATE
Zoë Cruice	Engineering Manager		23/10/2025

## Revision History

REVISION	REVISION DATE	AMENDMENT	DATE TO CLIENT
A	21/08/2025	DDR issue For Review	21/08/2025
0	23/10/2025	Issued for Use	23/10/2025

**Disclaimer:** This document has been prepared by Martinus. Use of this document shall be subject to the terms of the relevant contract with Martinus. The electronic file of this current revision is the controlled copy. This file is stored on Martinus' server located at Head Office, Unit 1, 23-27 Waratah St, Kirrawee, NSW.

This document is the property of and contains proprietary information owned by Martinus. No permission is granted to publish, reproduce, transmit or disclose to another party, any information contained in this document, in whole or in part, without prior written permission from the issuing authority.

For the purpose of this document, Martinus refers to the Martinus Group of companies.

**This document is uncontrolled when printed.**

# TABLE OF CONTENTS

<b>GLOSSARY</b> .....	<b>5</b>
<b>1 A2P PROJECT INTRODUCTION</b> .....	<b>7</b>
1.1 Albury to Parkes (A2P).....	7
1.2 Project Scope.....	7
1.3 Site Description.....	8
1.4 Objectives.....	9
1.5 Scopes.....	9
1.6 Previous Studies.....	10
Flood Studies.....	10
Reference Design.....	10
Environmental Impact Statement.....	10
1.7 Purpose and Requirements.....	11
1.8 Information Documents.....	11
1.9 Inputs.....	12
1.10 IFC Design Rev 1.....	13
1.11 Outputs.....	18
1.12 Limitations and Assumptions.....	18
<b>2 COMPLIANCE WITH REQUIREMENTS</b> .....	<b>19</b>
2.1 Project Scope and Requirements.....	19
2.2 Conditions of Approval – Flooding.....	20
2.3 Updated Mitigation Measures - Flooding.....	23
<b>3 CHANGE MANAGEMENT</b> .....	<b>24</b>
3.1 Concept Design to SDR.....	24
3.2 SDR to PDR.....	24
3.3 PDR to DDR.....	24
3.4 DDR to IFC.....	24
<b>4 MODELLING METHODOLOGY</b> .....	<b>25</b>
4.1 Hydrologic Modelling.....	25
RORB Modelling.....	25
RFFE Flow Comparison.....	27
RORB Kc Sensitivity Assessment.....	27
Climate Change.....	27
4.2 Hydraulic Modelling.....	28
Existing Model.....	28
Design Model.....	31
Design Events.....	32
Rainfall-On-Grid Assessment.....	32
Comparison to the Previous Study.....	32
<b>5 FLOOD ASSESSMENT</b> .....	<b>34</b>
5.1 Existing Conditions.....	34
5.2 Design Conditions.....	36
5.3 Flood Immunity and Scour Protection.....	37
5.4 Flood Impact Assessment.....	38
Changes in Peak Flood Level.....	38
Changes in Peak Flood Velocity.....	39
Changes in Peak Flood Hazard.....	39
Changes in Duration of Inundation.....	40
Cumulative impact.....	42
5.5 Sensitivity Test.....	43
Climate Change Risk Assessment.....	43
Blockage Assessment.....	43
<b>6 MITIGATION MEASURES</b> .....	<b>44</b>
<b>7 RECOMMENDATIONS</b> .....	<b>45</b>
<b>APPENDIX A</b> .....	<b>46</b>
Flood Maps.....	46

<b>APPENDIX B</b> .....	<b>49</b>
ARR Data Hub Data .....	49
<b>APPENDIX C</b> .....	<b>50</b>
ARTC Review .....	50
No comment sheet received. Rev A endorsed by IRPL without comment .....	50
<b>APPENDIX D</b> .....	<b>51</b>
Independent Flood Consultant Certificate .....	51

## LIST OF TABLES

Table 0-1: Definitions.....	5
Table 1-1: A Summary of the Previous Flood Studies .....	10
Table 1-2: Available Information .....	12
Table 1-3: Design Changes and Flood Impact Analysis .....	13
Table 2-1: Flooding Criteria within PSR Annexure B Technical Requirements.....	19
Table 2-2: Conditions of Approval Compliance Table – Flooding .....	21
Table 2-3: Updated Mitigation Measures Compliance Table – Flooding.....	23
Table 3-1: Design Differences between PDR and DDR.....	24
Table 3-2: Design Differences between DDR and IFC .....	24
Table 4-1: RORB Parameters.....	25
Table 4-2: Critical Storms and Peak Flows from RORB (for TUFLOW Inputs) .....	27
Table 4-3: Flow Comparison - RORB vs RFFE .....	27
Table 4-4: Flow Comparison - RORB vs RFFE Based on Different Kc Methods.....	27
Table 4-5: Model Parameters in the TUFLOW Model.....	28
Table 4-6: Major Existing Drainage Network in TUFLOW near JE70 Platform .....	31
Table 4-7: Comparison of Peak Flood Levels in Existing condition TUFLOW model and HEC-RAS Models .....	33
Table 5-1: Reporting Location Descriptions .....	34
Table 5-2: Peak Flood Levels (mAHD) at Reporting Locations under Existing Conditions .....	35
Table 5-3: Peak Flood Velocity (m/s) at Reporting Locations under Existing Conditions.....	35
Table 5-4: Peak Flood Hazards at Reporting Locations under Existing Conditions .....	36
Table 5-5: Peak Flood Levels (mAHD) at Reporting Locations under Design Conditions .....	37
Table 5-6: Peak Flood Velocity (m/s) at Reporting Locations under Design Conditions .....	37
Table 5-7: Peak Flood Hazards at Reporting Locations under Design Conditions .....	37
Table 5-8: Rail Immunity – Existing Conditions and Design Conditions.....	38
Table 5-9 Flood Immunity of the Platforms – Design Conditions .....	38
Table 5-10: Summary of Impacts on Peak Flood Level .....	38
Table 5-11: Changes in Peak Flood Level (mm) at Reporting Locations (Design minus Existing) .....	39
Table 5-12: Changes in Peak Flood Velocity (m/s) at Reporting Locations (Design minus Existing).....	39
Table 5-13: Changes in Flood Hazard at Reporting Locations (Design minus Existing).....	40
Table 5-14: Blockage Assessment for the Structures within the Project Boundary.....	43

## LIST OF FIGURES

Figure 1-1: Site Location.....	8
Figure 1-2: Site Location (Larger Scale) .....	9
Figure 1-3: 1% and 5% AEP Flood Extent at Juneе Yard (Image source: Albury to Illabo EIS Technical Paper 11, Figure 4.45 (July 2022)) .....	10
Figure 1-4: 1% AEP and 5% AEP Flood Extents at Juneе Yard Clearances (Source: Albury to Illabo Environmental Impact Statement (EIS) Technical Paper 11 – Hydrology, flooding and water quality (July 2022), Figure 4.49).....	11
Figure 1-5: JE70 design (left panel: IFC; right panel IFC Rev 1) .....	14
Figure 1-6: Changes in Flood Level for 1% AEP – IFC Rev1 vs. Existing (JE70).....	15
Figure 1-7: Changes in Flood Velocity for 1% AEP – IFC Rev1 vs. Existing (JE70).....	16
Figure 1-8: Changes in Flood Hazard for 1% AEP – IFC Rev1 vs. Existing (JE70).....	17
Figure 4-1: RORB Model Layout.....	26
Figure 4-2: TUFLOW Model Extent and Inflow Locations .....	29
Figure 4-3: Base Topography with Quadtree Extent and Survey Extent in TUFLOW .....	30
Figure 4-4: Zoning and Manning’s n Values in TUFLOW .....	30
Figure 4-5: Existing Drainage Network in TUFLOW .....	31
Figure 5-1: Reporting Locations and 1% AEP Overland Flow Paths (Existing Condition) .....	34
Figure 5-2: General Flood Hazard Vulnerability Curves and Categories .....	35
Figure 5-3: 1% AEP Overland Flow Path and Reporting Locations (Design Condition) .....	36
Figure 5-4: Reporting Locations for the Changes in Duration of Inundation .....	40
Figure 5-5 Comparison for Changes in Duration of Inundation at Location 1 .....	41
Figure 5-6 Comparison for Changes in Duration of Inundation at Location 2 .....	41
Figure 5-7 Comparison for Changes in Duration of Inundation at Location 3 .....	42
Figure 5-8 Comparison for Changes in Duration of Inundation at Location 4 .....	42
Figure 5-9: Changes in Peak Flood Levels for the 1% AEP Design Conditions (Blockage vs No Blockage).....	43

## GLOSSARY

Specific terms and acronyms used throughout this plan and sub-plans are listed and described in Table 0-1 below.

**Table 0-1: Definitions**

Term	Definition
A2I	Albury to Illabo
A2P	Albury to Parkes Enhancement Project
AEP	Annual Exceedance Probability
ADC	Assumptions, Dependencies and Constraints
AHD	Australian Height Datum
ALCAM	Australian Level Crossing Assessment Model
ARF	Areal Reduction Factor
ARI	Average Recurrence Interval
ARR	Australian Rainfall and Runoff
ARTC	Australian Railway Track Corporation
BoD	Basis of Design
BoM	Bureau of Meteorology
CIZ	Construction Impact Zone
CO	Construct Only
CRS	Coordination Reference System
CSSI	Critical State Significant Infrastructure
D&C	Design and Construct
DCN	Design Change Notice
DDR	Detailed Design Review
EMC	Electromagnetic compatibility
EDPM	Engineering, Design and Project Management
ECMP	Electromagnetic compatibility management plan
EIS	Environmental Impact Statement
FDR	Feasibility Design Review
FS	Finish-Start constraint type
FSL	Finished Surface Level
GDA	Geocentric Datum of Australia
GIR	Geotechnical Interpretative Report
HF	Human Factors

Term	Definition
I2S	Illabo to Stockinbingal
IFC	Issued for Construction
IR	Inland Rail
ITC	Incentivised Target Cost
IV	Independent Verifier
Km	Kilometres
LPA	Licensed Project Area
MIRDA	Master Inland Rail Development Agreement
NCR	Non-Conformance Report
NLPA	Non-Licensed Project Area
NtP	Notice to Proceed
PDR	Preliminary Design Review
PSR	Project Scope and Requirements
QDL	Quantitative Design Limits
REF	Review of Environmental Factors
RFFE	Regional Flood Frequency Estimation
RORB	Runoff Routing
RFI	Request for Information
S2P	Stockinbingal to Parkes
SAQP	Sampling, Analysis and Quality Plan
SDR	Systems Definition Review
SDRP	State Design Review Panel
SEMP	System Engineering Management Plan
TfNSW	Transport for New South Wales
TWL	Tail Water Level
UMM	Update Mitigation Measures
V & V	Verification and Validation
WAD	Works Authorisation Deed
WAE	Work-as-Executed

# 1 A2P PROJECT INTRODUCTION

## 1.1 Albury to Parkes (A2P)

As part of the Inland Rail program of projects, the Australian Rail Track Corporation (ARTC) has appointed Martinus as the delivery contractor for the Albury to Parkes (A2P) project, which comprises the brownfield sections between Albury and Illabo (A2I) and Stockinbingal to Parkes (S2P). The greenfield portion between Illabo to Stockinbingal (I2S) is not a part of the A2P project scope.

## 1.2 Project Scope

The S2P section will be delivered under a REF, and as such, construction works associated with the two (2) Construct Only packages can commence at Contract Award. The Design and Construct for the other seven (7) projects sites will also commence at Contract Award.

The A2I section will be delivered under an EIS and requires a Notice to Proceed from ARTC before works can commence on site. Design for A2I will however commence at Contract Award. The project received State Planning approval on 8 October 2024, and Martinus received the Notice to Proceed from IRPL on 18 October 2024.

Within the EIS for A2I there are twenty (20) locations, within which there are thirty (30) Design and Construct (D&C) projects of varying degrees of design gate development. A further location and project for Juneer Drivers Platforms has been added through Inland Rail Direction. Design packages are listed below:

- Murray River bridge (Structure modifications)
- Albury Station Yard (Track slews, track reconfigurations)
- Albury Station Yard Track Slews (retained 3-track alignment)
- Albury Station Yard Footbridge (footbridge replacement), both pre- and post- SDRP-response
- Riverina Highway bridge (Track lowering)
- Billy Hughes bridge (Track lowering)
- Tabletop Yard (Structure modification)
- Culcairn Station Yard (Track slews and bridge removal)
- Henty Yard (Track slews)
- Yerong Creek Yard (Track slews)
- The Rock Yard (Structure modification)
- Uranquinty Yard (Track slews)
- Pearson Street bridge (Track lowering)
- Cassidy Parade footbridge (Bridge replacement), both pre- and post- SDRP-response
- Edmondson Street Bridge (stand-alone road bridge)
- Edmondson Street Footbridge (stand-alone road bridge)
- Edmondson Street bridge and footbridge (combined Bridge replacement), post- SDRP-response
- Wagga Wagga Station Yard (Track slews)
- Wagga Wagga Footbridge (footbridge replacement), both pre- and post- SDRP-response
- Bomen Yard (Track slews)
- Harefield Yard (Track slews)
- Kemp Street Bridge (stand-alone road bridge)
- Kemp Street Footbridge (stand-along footbridge)
- Kemp Street bridge and footbridge (combined Bridge replacement)
- Juneer Station Yard (Track slews and bridge removal)
- Juneer Driver Platforms – JE11 and JE70
- Olympic Highway Underbridge (Track reconfiguration and Structure modification)
- Juneer to I2S dual track section (Track slews)
- LX605 & LX1472 Activations
- LX605 relocation and LX1472 closure

Within the S2P section, there are two (2) Construct only projects:

- Daroobalgie New Loop

- Wyndham Avenue (Track lowering)

and seven (7) Design and Construct (D&C) projects:

- Milvale Yard (Structure modification)
- Bribbaree Yard (Track slews)
- Quandialla Yard (Structure modification)
- Caragabal Yard (Track slews)
- Wirrinya Yard (Track slews)
- Lachlan River Bridge (Structure modifications)
- Forbes Station (Track slews and awning modifications)

The D&C scope typically includes works associated with route clearance to accommodate the new F2M clearance envelope, necessary to accommodate the double-stacked freight container trains and this includes.

- Structure modifications
- Track reconfigurations
- Bridge replacements
- Track lowering
- Track slews and level crossing upgrades
- Bridge removal

The additional directed package for design of the Junee Driver’s Platforms is new scope, and is being implemented to mitigate closure times of the Level Crossing in Junee township, which may be more frequently impacted when the Kemp Street bridge is demolished, and the associated grade-separated crossing removed. The Driver Platforms enable train crew changes to occur away from the Junee Station platform. Refer to the Design Report 5-0052-210-PEN-JA-RP-0001 for additional information.

### 1.3 Site Description

This study conducts a flood assessment for the Junee Driver Platforms (JE11 and JE70), located North and South of the Junee station yard respectively, as shown in Figure 1-1.



Figure 1-1: Site Location



**Figure 1-2: Site Location (Larger Scale)**

The Junee clearance locations form part of the Albury to Illabo Section works between Chainage (CH) 484.840km to 485.100km (northern section) and 485.928km to 486.155km (southern section). The Junee Station Yard is located between the two clearance locations. The proposed Junee Driver Platforms are located near the track designed works as part of the Junee Station Yard package, which are JE11 at CH485.106km (northern section) and JE70 at CH486.393km (southern section), as shown in Figure 1-1 and Figure 1-2.

## 1.4 Objectives

This report has been prepared to support the delivery of the Junee Driver Platforms and comply with the CSSI Conditions of Approval (CoA) and Updated Mitigation Measures (UMM) for quantitative flood modelling demonstrating compliance with pre- and post- development criteria for projects within the A2I CSSI area of assessment. Refer to Section 2 for a summary of compliance.

This report provides a flood impact assessment for the Issued for Construction (IFC) stage. It should be noted that the Junee Driver Platforms IFC designs were incorporated for the DDR flood assessment (5-0052-210-IHY-JA-RP-0001\_A). This IFC flood assessment is for Junee Driver Platforms IFC design Rev 1 (refer to item 22 in Table 1-2). The flood assessment aims to estimate the flood behaviour within the study area and assess the potential flood impacts as a result of the design, especially outside of the project boundary.

This report should be read in conjunction with the Detailed Design Report – Junee Driver Platform (5-0052-210-PEN-JA-RP-0001\_0).

## 1.5 Scopes

The scope of this study includes:

- Carrying out the flood assessment for the design events of 5%, 2%, 1% AEPs, 1% AEP with Climate Change and PMF (Probable Maximum Flood).
- Checking flood assessment results with the criteria, including flood impacts and flood immunity.
- Proposing any mitigation measures (if required).

## 1.6 Previous Studies

### Flood Studies

Table 1-1 summarises all the flood studies associated with the site.

**Table 1-1: A Summary of the Previous Flood Studies**

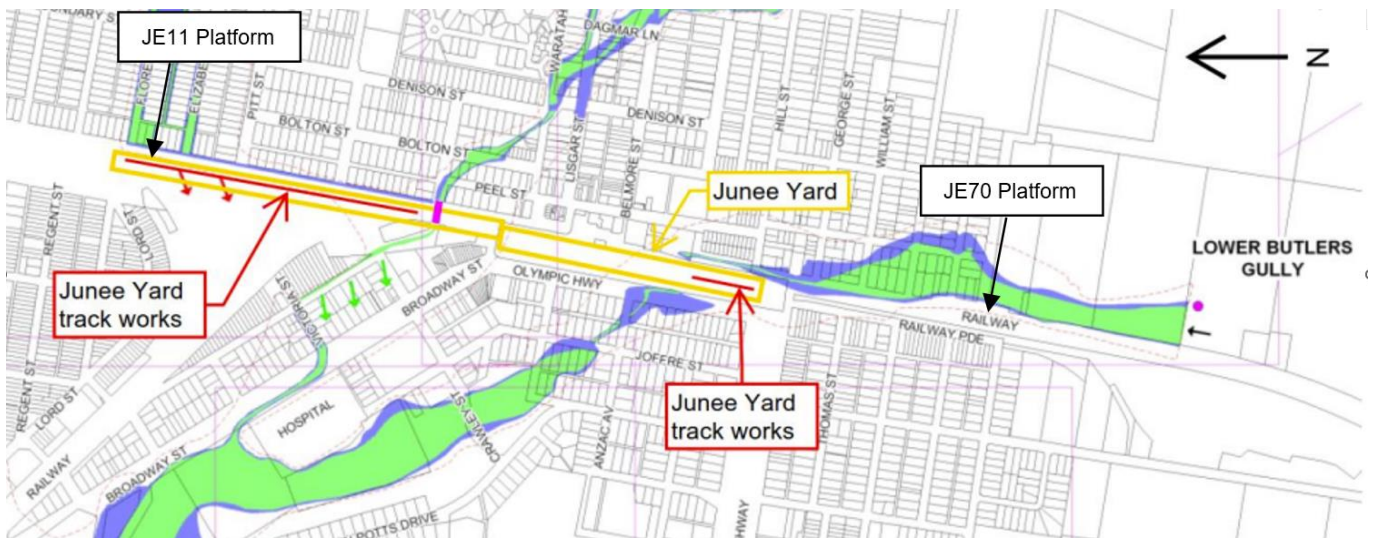
Item No.	Flood Study	Description
1	Lower Butlers Gully Flood Study (Lyll & Associates Consulting Engineers, 2009)	This flood study defined the flood behaviour in the Lower Butlers Gully catchment in Junee. The hydrologic and hydraulic modelling was undertaken in RORB and HEC-RAS (1D only) using the ARR1987 guidelines. There was no historical flood data to calibrate the study.
2	Lower Butlers Gully Floodplain Risk Management Study and Plan (Lyll & Associates Consulting Engineers, 2011)	The flood management study and plan used the findings from the Lower Butlers Gully Flood Study to assess the impacts of flooding, review Council policies and consider options for management of flood affected land.

### Reference Design

Reference Design Report:

- Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) Projects Reference Design Report – Junee Package (June 2022)

Regional flooding at the Platform was assessed against the Lower Butlers Gully Flood Study (Lyll and Associates, 2009), undertaken for the Junee Shire Council. The flood study indicates there is overland flooding within the rail corridor adjacent to Kemp Street bridge abutments during the 1% and 5% AEP flood events and the flows exit the rail corridor downstream to the Edgar Street Open Channel. To the north, there is an overland flow path on the road parallel to the rail. The Platforms were found not to be impacted by flooding. Refer to Figure 1-3 below extracted from the Reference Design Report.



**Figure 1-3: 1% and 5% AEP Flood Extent at Junee Yard (Image source: Albury to Illabo EIS Technical Paper 11, Figure 4.45 (July 2022))**

The driver platforms were not in the scope as part of the reference design. As such, it was not possible to establish the existing flood behaviour and potential impacts in relation to the proposed driver platforms based on the reference design report.

### Environmental Impact Statement

An EIS which has been approved, supports the application for approval of the Proposal under Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It addresses the environmental assessment requirements set by the Secretary of the NSW Department of Planning, Industry and Environment, which is commonly

referred to as the SEARs. The A2I CSSI Environmental Impact Statement contains the following relevant prior assessment documents:

- Albury to Illabo Environmental Impact Statement (EIS) Technical Paper 11 – Hydrology, flooding and water quality (July 2022)

Regional flooding at the Platforms was assessed against the Lower Butlers Gully Flood Study (Lyll and Associates, 2009), the flood study was undertaken for the Junee Shire Council. The findings of the Flood Study indicated that there is flood affected land associated with the Lower Butlers Gully surrounding the site, however the site itself is not located within flood prone land. An excerpt of the EIS is shown in Figure 1-4 where the Junee Yard and Junee Drivers platform works are referred to as the Enhancement Site.



**Figure 1-4: 1% AEP and 5% AEP Flood Extents at Junee Yard Clearances (Source: Albury to Illabo Environmental Impact Statement (EIS) Technical Paper 11 – Hydrology, flooding and water quality (July 2022), Figure 4.49)**

The driver platforms were not in the scope as part of the EIS. As such, it was not possible to accurately estimate the existing flood behaviour and potential impacts in relation to the proposed driver platforms based on the EIS report.

## 1.7 Purpose and Requirements

The primary purpose of this flood assessment report is to describe how the design development and the associated review process will be managed. The report assesses the change to the flood behaviour, and its impact on the rail immunity and on the neighbouring developments.

The secondary purpose of this report is to provide evidentiary documentation of consultation and review by external stakeholders, and the independent suitably qualified flood consultant, in demonstrating compliance with the CSSI conditions of approval. Refer to Appendix C for the ARTC review, Appendix D for the external consultation review, and Appendix E for the independent flood consultant review comments.

## 1.8 Information Documents

The following documents have been provided 'For Information' and have been referenced/reviewed as part of the design development:

- Lower Butlers Gully Floodplain Risk Management Study and Plan (Lyll & Associates Consulting Engineers, 2011). This flood study supersedes the other flood studies listed in Table 1-1 as it is the most recent flood study.
- Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) Projects Reference Design Report – Junee Package (June 2022)
- Albury to Illabo Environmental Impact Statement (EIS) Technical Paper 11 – Hydrology, flooding and water quality (July 2022) (currently under planning assessment)

- A2P Detail Design – Flood Reports
  - Flood Design Report 5-0052-210-IHY-J6-RP-0001 for Olympic Highway Underbridge package
  - Flood Design Report 5-0052-210-IHY-J4-RP-0001 for Junee Station Yard package
  - Flood Design Report 5-0052-210-IHY-J2-RP-0001 for Kemp Street Bridge and Footbridge package

## 1.9 Inputs

The inputs to this flood assessment report include:

- Australian Standards and Guidelines: AS 7637 Railway Infrastructure – Hydrology and Hydraulics
- Australian Rainfall and Runoff: A Guide to Flood Estimation 2019 V4.1
- Austroads Guide to Bridge Technology – Part 8: Hydraulic Design of Waterway Structures
- Inland Rail Climate Change Risk Assessment Framework

Table 1-2 outlines the available information relevant to the site, which is used for flood modelling.

**Table 1-2: Available Information**

Item	Information / Data Name	Type	Description / Comments
<b>Surveys / General</b>			
1	All Google Maps; NSW Imagery by SIXMAPS; ESRI World Street Map; Open Street Map	WMS	Basemaps linked in QGIS referenced for guidance through the assessment.
2	AAM2015_10cm_210_04_2_KempSt	ECW	Aerial imagery used in Reference Design, dated on 16/08/2023.
3	Urban Stormwater Mains 29 Nov 23 and Urban Stormwater Pits 29 Nov 23	GIS files	GIS files of the urban stormwater within Junee Shire Council, received from Junee Shire Council on 01/12/2023.
4	NSW Landuse 2017 v1.5	GIS files	GIS files of the NSW land zoning by NSW Department of Climate Change, Energy, the Environment and Water, dated on 21/09/2023 and accessed on 20/12/2023.
5	IS2301309 Ortho 35mm MGA2020z55 Junee	ECW	Aerial imagery provided by Martinus, dated on 15/03/2024.
6	Junee201502_Merged_5m_LiDAR	TIF	5m LiDAR captured in 2015 in GDA2020 projection: the data has an accuracy of 0.9m (95% Confidence Interval) vertical and 1.25m (95% Confidence Interval) horizontal, downloaded from Elvis - Elevation and Depth - Foundation Spatial Data ( <a href="https://elevation.fsdf.org.au/">https://elevation.fsdf.org.au/</a> ) on 15/07/2024. This LiDAR was used to delineate the hydrological catchments as it was received prior to the 1m LiDAR data.
7	A2P EXT JUN GDA20Z55 RAIL 240719	DXF	Existing rail strings in GDA2020 projection, received from Martinus on 19/07/2024.
8	Merge_1m_2015_GDA2020	TIF	1m LiDAR carried out in 2015 by ARTC (The data for the derived points have an accuracy of 0.15m (68% confidence level)), received from Martinus on 12/11/2024 for the rail corridor.
9	A2P JNK EXT GDA20Z55 COMBINED	TIN, DWG/DXF	Survey of the rail corridor including ground surveys, rails, and drainage infrastructure within the project boundary area, received from Martinus on 18/09/2024 and updated on 04/03/2025.
10	Southern End Driver Platform - Detail Survey.12da	12da dxf	Detailed survey for JE70 Platform location, received from Martinus on 04/06/2025.
<b>IFC Designs</b>			

Item	Information / Data Name	Type	Description / Comments
11	TRIA_210_DCW_J2_West_250317	DEM	DEM of the design civil works (to the west of the Kemp Street Bridge), received from the DJV team on 17/03/2025.
12	5-0052-210-SBD-J2-MD-2001-KEMP_STREET_BRIDGE_3D_STRUCTURAL_DESIGN_BRIDGE_MODEL_DWG	DWG	Kemp Street bridge design, received from the DJV design team on 14/05/2025.
13	5-0052-210-CAL-J4-MD-0001-JUNEE_YARD_3D_RAIL_DESIGN_STRINGS	DWG/XML	Design rail 3d strings in GDA2020 projection, received from the DJV team on 06/06/2025.
14	210 DCW J2 RW SKATE CHANNELS 20250613	DEM	DEM of the design civil works (to the east of the Kemp Street Bridge), received from the DJV team on 13/06/2025.
15	210 DCW J2 RW EDGAR 20250708	DEM	DEM of the design civil works (for channel upgrades near the proposed footbridge and for batters to the east of the Kemp Street Bridge), received from the DJV team on 08/07/2025.
16	IFC designs from the Olympic Park Underbridge package	TUFLOW files	Design layers in TUFLOW, received from the DJV team on 08/07/2025.
17	KEMP FOOTBRIDGE 3D	DXF	Kemp Street footbridge IFC design received from the DJV design team on 15/07/2025.
18	SKATE PARK ACCESS RD 20250717	DEM	DEM of the design civil works (for driveway updates near the proposed footbridge), received from the DJV team on 17/07/2025.
19	090725 KEMP STREET DRAINAGE DESIGN	12DAZ	Design drainage pits and pipes, received from the DJV design team on 09/07/2025 and updated on 17/07/2025.
20	2025 07 15 – JE11 Platform	DWG	JE11 Platform IFC design received from the DJV design team on 15/07/2025.
21	2025 07 15 – JE70 Platform	DWG	JE70 Platform IFC design received from the DJV design team on 15/07/2025.
22	2025.09.10_Junee Driver Platforms Model	DWG	JE70 Platform IFC design Rev 1 received from Martinus on 22/09/2025

### 1.10 IFC Design Rev 1

Minor design changes were made to the IFC design. The changes and associated flood impact analysis are summarised in Table 1-3 below:

**Table 1-3: Design Changes and Flood Impact Analysis**

Sites	Design changes between IFC Rev 1 and IFC	Changes in Flood Impact
JE11	No changes	N/A
JE70 (Figure 1-5)	<ol style="list-style-type: none"> <li>Reducing the floating walkway</li> <li>Removing car park bollards</li> <li>A new light to the east of the floating walkway</li> </ol>	<ol style="list-style-type: none"> <li>In the IFC design, the floating walkway did not cause any flood impact up to 1%AEP. In IFC Rev 1, the reduced floating walkway would not cause any flood impact (refer to Figure 1-6, Figure 1-7 and Figure 1-8), which will still comply with the criteria in Section 2.</li> <li>The car park is outside of the flood extent up to the 1% AEP. Therefore, removing bollards would not cause any change in flood impact.</li> <li>The flood velocity around the new light pier is up to 0.4m/s in the 1% AEP and the light pier size is 0.35m</li> </ol>

Sites	Design changes between IFC Rev 1 and IFC	Changes in Flood Impact
		in diameter. Therefore, the flood impact should be negligible.



**Figure 1-5: JE70 design (left panel: IFC; right panel IFC Rev 1)**

To support the analysis for the changes in flood impact in Table 1-3, a sensitivity test for 1% AEP 180min (critical duration for JE70 IFC Rev 1) has been undertaken and the results show that the changes in flood level (Figure 1-6), changes in flood velocity (Figure 1-7) and changes in flood hazard (Figure 1-8) are negligible.

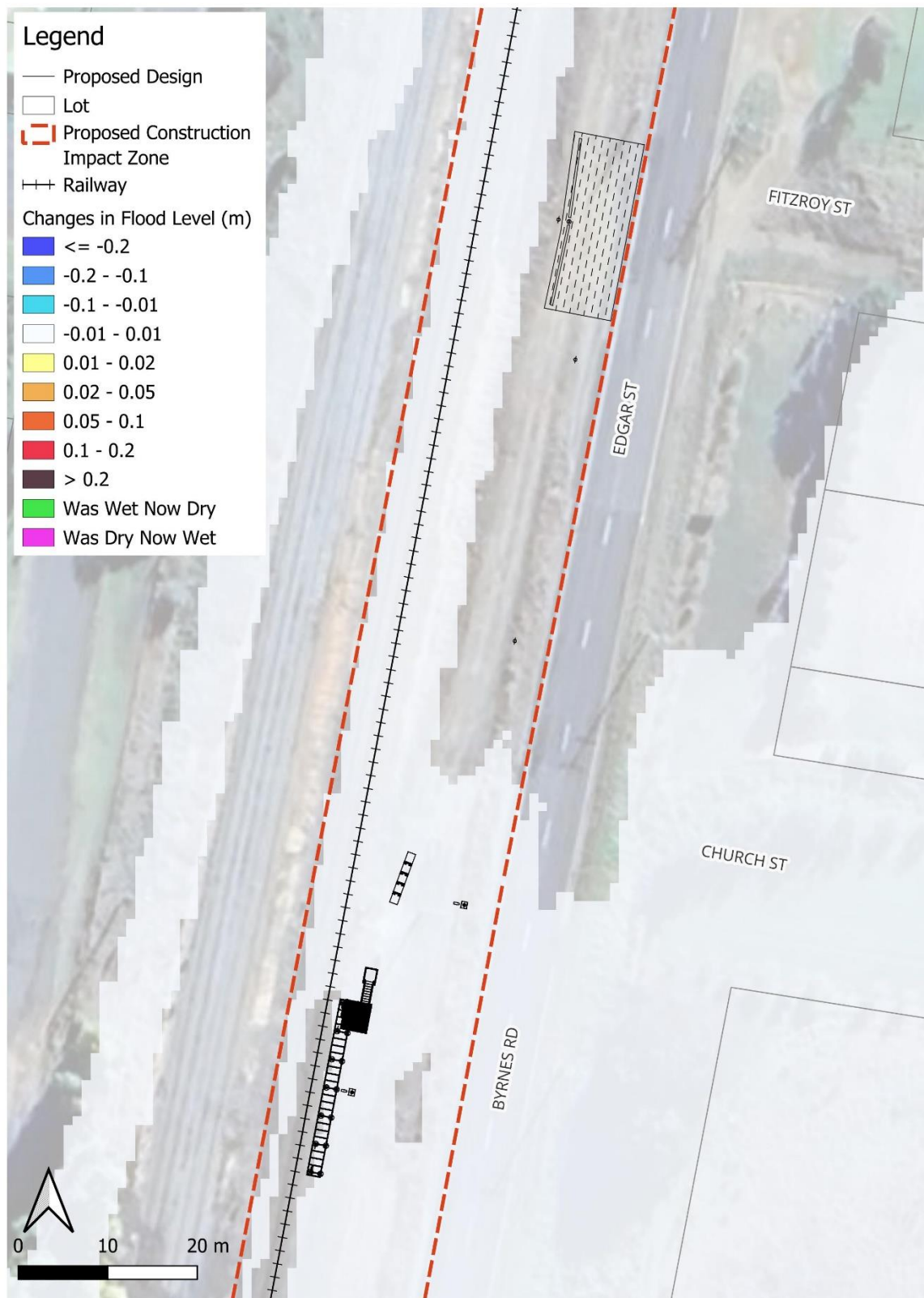


Figure 1-6: Changes in Flood Level for 1% AEP – IFC Rev1 vs. Existing (JE70)



Figure 1-7: Changes in Flood Velocity for 1% AEP – IFC Rev1 vs. Existing (JE70)

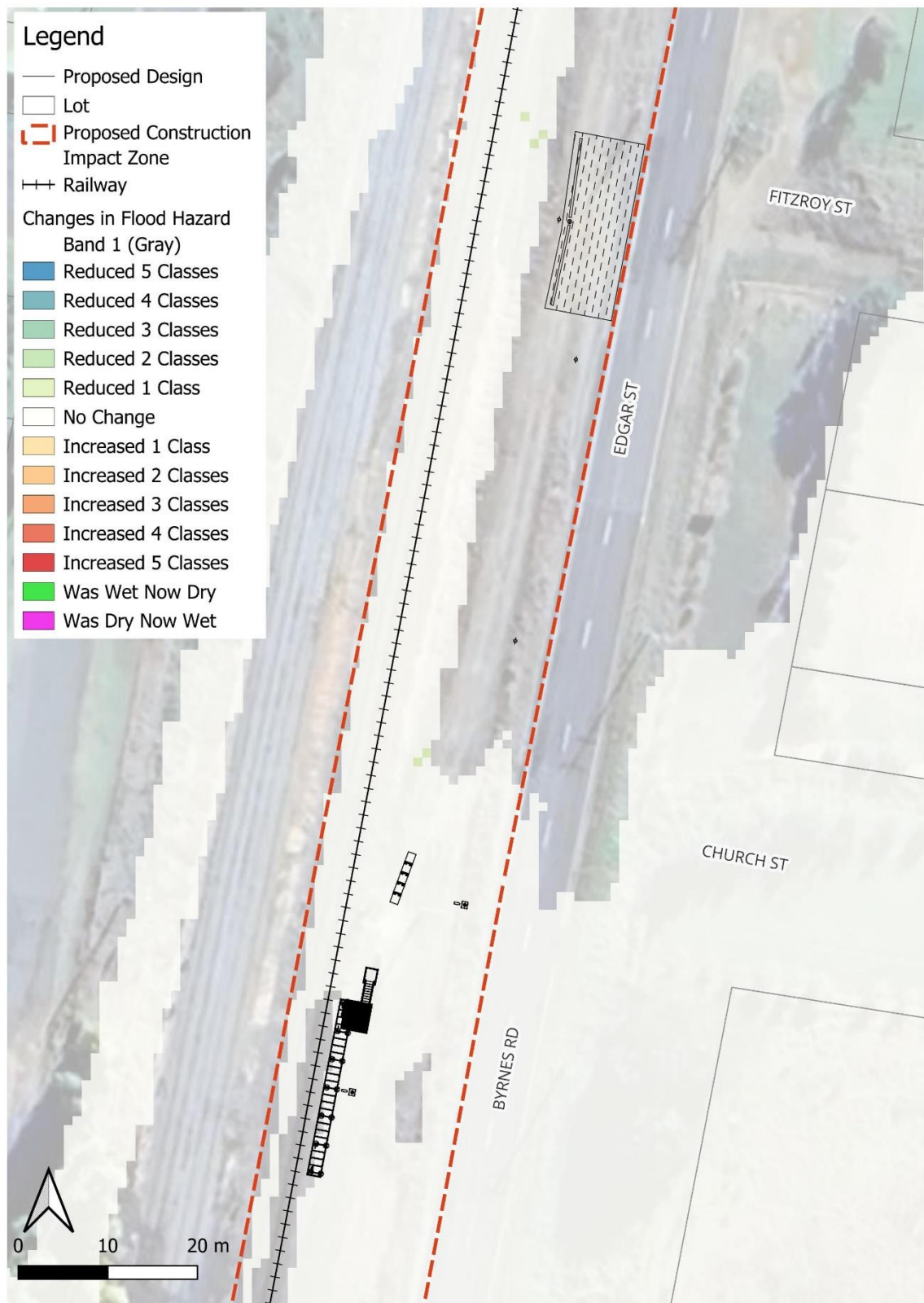


Figure 1-8: Changes in Flood Hazard for 1% AEP – IFC Rev1 vs. Existing (JE70)

Given that the changes in the IFC Rev 1 are minimal compared to the IFC, the flood assessment would not result in any non-compliance. Therefore, the DDR flood assessment (IFC design) is considered adequate to give the information of the flood impact and will be utilised to inform the IFC flood assessment (IFC Rev 1) from Section 2 onwards.

## 1.11 Outputs

The map list and the flood maps are included in Appendix A.

## 1.12 Limitations and Assumptions

The following limitations and assumptions are applied to the current study for the IFC stage:

- Existing drainage data for the greater area within Junee Shire Council was adopted based on the supplied GIS files from Junee Shire Council, as well as available survey data from Martinus.
- A blockage assessment was carried out for the 1% AEP design scenario. The estimated blockage as per the ARR2019 guidelines was adopted for the culverts and bridges within the project boundary, and a 20% blockage was adopted for the other culverts, pits and pipes outside the project boundary. The details and results are presented in Section 0.
- An assessment of temporary works and staging has not been undertaken as it is out of the flooding scope.

## 2 COMPLIANCE WITH REQUIREMENTS

### 2.1 Project Scope and Requirements

The detailed design has been assessed to check if it meets the Project Scope and Requirements (PSRs). This is demonstrated throughout the flood assessment with Table 2-1 below summarising the Junee Drivers Platforms Design’s Compliance with the PSRs.

**Table 2-1: Flooding Criteria within PSR Annexure B Technical Requirements**

Requirement	Identifier	A2P Technical Requirements Description	Compliance Evidence Reference
Project Wide	5.4.10	Without limiting the environmental management requirements in Annexure F, section 6.1.1, all D&C Works in watercourses shall comply with the NSW Department of Primary Industries Standards: Policy and Guidelines for Fish Friendly Waterway Crossings; Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings; and Policy and Guidelines for Fish Habitat Conservation and Management Update.	N/A (structure modifications do not affect any watercourses environmentally)
Project Wide	5.4.2	Where existing flood immunity is lower than ARTC SMS minimum requirements, the functional requirements for flood immunity take precedence over the ARTC SMS.	Compliant The existing immunity of the rails (lower than 5% AEP) is lower than the ARTC SMS minimum requirement (1% AEP), which would be maintained under design conditions as per the functional requirements. Refer to Section 5.3.
Project Wide	5.4.3	Where existing flood immunity is higher than ARTC SMS minimum requirements, the ARTC SMS requirements for flood immunity take precedence over the functional requirements.	Compliant The existing immunity of the rails (lower than 5% AEP) is lower than the ARTC SMS minimum requirement (1% AEP), which would be maintained under design conditions as per the functional requirements. Refer to Section 5.3.
Project Wide	5.4.5	Bridge and culvert hydraulics shall comply with Austroads Guide to Bridge Technology Part 8: Hydraulic Design of Waterway Structures.	N/A (there is no waterway bridge in this package)
A2I Technical Requirements	IR-SR-A2I-116	The System shall comply with 0-0000-900-ESS-00-ST-0001 Inland Rail Climate Change Risk Assessment Framework.	Compliant Climate change assessment was carried out by running the 1% AEP + 2090 RCP 8.5 and identifying that the bridge has low hazards. Refer to Section 0.
A2I Technical Requirements	IR-SR-A2I-349	The Corridor System for Enhancement Corridors shall have a flood immunity of no worse than existing.	Compliant The existing immunity is maintained under design conditions. Refer to Section 5.3.
A2I Technical Requirements	IR-SR-A2I-350	The Corridor System, where the existing track is lowered, shall maintain the existing flood immunity.	Compliant The existing immunity is maintained under design conditions.

Requirement	Identifier	A2P Technical Requirements Description	Compliance Evidence Reference
			Refer to Section 5.3.
A2I Technical Requirements	IR-SR-A2I-352	The Corridor System shall prevent damage of the formation due to ponding of water.	Compliant The Works maintain existing formation drainage and ensure positive drainage is provided within the works to existing tie-in locations. The existing immunity and ponding conditions in the rail corridor are maintained. Refer to Sections 5.2 & 5.3.
A2I Technical Requirements	IR-SR-A2I-458	The Corridor System shall prevent ponding in longitudinal open channels.	N/A There is no change to open channels within the corridor system, and the existing conditions are maintained. Refer to Section 5.4.
A2I Technical Requirements	IR-SR-A2I-459	The Corridor System for Enhancement Corridors shall provide mitigation for flood impacts no worse than existing condition.	Compliant The existing conditions are maintained. Refer to Section 5.2 & 5.4.
A2I Technical Requirements	IR-SR-A2I-464	The Corridor System shall cause no adverse impacts either inside or outside the rail corridor when diverting water away from the track.	Compliant The existing conditions are maintained. No diversion of water is proposed. Refer to Section 5.4.
A2I Technical Requirements	IR-SR-A2I-465	The Corridor System shall minimise changes to the existing or natural flow patterns.	There are no changes to the existing or natural flow patterns. refer to Section 5.2 & 5.4.
A2I Technical Requirements	IR-SR-A2I-541	The Structures System new underbridges shall withstand the 0.05% annual exceedance probability design flood event.	N/A (there is no bridge design in this package)
A2I Technical Requirements	IR-SR-A2I-735	The Third-Party System private roads shall have flood immunity no worse than existing.	No third-party private roads are impacted. Refer to Section 5.2.
A2I (Annexure F)	6.1.1	Without limiting clauses 8 and 14 of the Deed, the Contractor shall ensure that the Contractor's Activities and the Works comply with the following for A2I, the Conditions of Approval and the environmental assessment reports available on <a href="https://www.planningportal.nsw.gov.au/major-projects/projects/inland-rail-albury-illabo">https://www.planningportal.nsw.gov.au/major-projects/projects/inland-rail-albury-illabo</a>	Refer to Table 2-2.

## 2.2 Conditions of Approval – Flooding

The Conditions of Approval (CoA) have been provided as part of the CSSI approval and Inland Rail Deed of Variation. The detailed design has been assessed to check if it meets the CoA and the compliance is presented in Table 2-2 below.

Table 2-2: Conditions of Approval Compliance Table – Flooding

Condition	Condition or Criteria	Compliance Evidence Reference
E38	All practicable measures must be implemented to ensure the design, construction and operation of the CSSI will not adversely affect flood behaviour, or adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	Compliant. Refer to Section 5.
E39	The CSSI must be designed with the objective to meet or improve upon the flood performance identified in the documents listed in <b>Condition A1</b> . Variation consistent with the requirements of this approval at the rail corridor is permitted to effect minor changes to the design with the intent of improving the flood performance of the CSSI.	Compliant. Refer to Section 5.
E40	Updated flood modelling of the project’s detailed design must be undertaken for the full range of flood events, including blockage of culverts and flowpaths, considered in the documents listed in <b>Condition A1</b> . This modelling must include:	Compliant. Refer to Section 5.
E40	a) Hydrologic and hydraulic assessments consistent with <i>Australian Rainfall and Runoff – A Guide to Flood Estimation</i> (Geoscience Australia, 2019);	Compliant. Refer to Section 4.
E40	b) Use of modelling software appropriate to the relevant modelling task;	Compliant. Appropriate software (RORB and TUFLOW) was used. Refer to Section 4.
E40	c) Field survey of the existing rail formation and rail levels, should be included within the models; and	Compliant. The existing rail data was included in the hydraulic models. Refer to Section 1.9 and Section 4.
E40	d) Confirmation of predicted afflux at industrial properties adjacent to Railway Street, Wagga Wagga based on field survey.	N/A - This report relates to the Junee Drivers Platform site, which is not related to Wagga Wagga.
E40	Updated flood modelling must be made publicly available in accordance with <b>Condition B18</b> .	Flood design report and independent review of the flood design report have been provided to IR, through this submission, for IR to upload on the IR website, as per CoA B18 responsibility allocation.
E41	The Proponent’s response to the requirements of <b>Conditions E38</b> and <b>E40</b> must be reviewed and endorsed by a suitably qualified flood consultant, who is independent of the project’s design and construction and approved in accordance with <b>Condition A16</b> , in consultation with directly affected landowners, DCCEEW Water Group, TfNSW, DPI Fisheries, BCS, NSW State Emergency Service (SES) and relevant Councils.	Independent review of the flood modelling, model and Flood Design Report have been undertaken by the Proof Engineer’s specialist contractor, to satisfy and comply with the requirements of A16. Consultation with the Council and other stakeholders will be undertaken through formal review of this Flood Design Report.
E42	The CSSI must be designed and constructed to limit impacts on flooding characteristics in areas <i>outside the project boundary</i> during any flood event up to and including the 1% AEP flood event, to the following:	

Condition	Condition or Criteria	Compliance Evidence Reference
E42	(a) a maximum increase in inundation time of one hour, or 10%, whichever is greater;	Compliant. Refer to Section 0.
E42	(b) a maximum increase of 10 mm in above-floor inundation to habitable rooms where floor levels are currently exceeded;	Compliant. Refer to Section 0 for discussion of changes in peak flood level.
E42	(c) no above-floor inundation of habitable rooms which are currently not inundated;	
E42	(d) a maximum increase of 50 mm in inundation of land zoned as residential, industrial or commercial;	
E42	(e) a maximum increase of 100 mm in inundation of land zoned as environment zone or public recreation;	
E42	(f) a maximum increase of 200 mm in inundation of land zoned as rural or primary production, environment zone or public recreation;	
E42	(g) no increase in the flood hazard category or risk to life; and	Compliant. Refer to Section 0.
E42	(h) maximum relative increase in velocity of 10%, or to 0.5m/s, whichever is greater, unless adequate scour protection measures are implemented and/or the velocity increases do not exacerbate erosion as demonstrated through site-specific risk of scour or geomorphological assessments	Compliant. Refer to Section 0.
E42	Where the requirements set out in clauses (d) to (f) inclusive cannot be met alternative flood levels or mitigation measures must be agreed to with the affected landowner.	Clause (d) to (f) are compliant.
E43	A <b>Flood Design Report</b> confirming the:	
E43	a) final design of the CSSI meets the requirements of <b>Condition E42</b> ; and	Compliant Refer to Section 5.4.
E43	b) the results of consultation with the relevant council in accordance with <b>Condition E46</b>	Refer to E46.
E43	must be submitted to and approved by the Planning Secretary prior to the commencement of permanent works that would impact on flooding.	This report will be submitted to the Planning Secretary for approval prior to the commencement of permanent works that would impact on flooding.
E44	The <b>Flood Design Report</b> required by <b>Condition E43</b> must be approved by the Planning Secretary prior to works that may impact on flooding or the relevant council's stormwater network.	This report will be submitted to the Planning Secretary for approval prior to the commencement of permanent works that would impact on flooding.
E45	Flood information including flood reports, models and geographic information system outputs, and work as executed information from a registered surveyor certifying finished ground levels and the dimensions and finished levels of all structures within the flood prone land, must be provided to the relevant Council, BCS and	Flood information will be provided to the relevant Council, BCS and the SES to assist in preparing relevant documents and to reflect changes in flood behaviour as a result of the CSSI in accordance with the requirements of CoA E45.

Condition	Condition or Criteria	Compliance Evidence Reference
	the SES in order to assist in preparing relevant documents and to reflect changes in flood behaviour as a result of the CSSI. The Council, BCS and the SES must be notified in writing that the information is available no later than one (1) month following the completion of construction. Information requested by the relevant Council, BCS or the SES must be provided no later than six (6) months following the completion of construction or within another timeframe agreed with the relevant Council, BCS or the SES.	
E46	The design, operation and maintenance of pumping stations and storage tanks and discharges to council's stormwater network must be developed in consultation with the relevant council. The results of the consultation are to be included in the report required in <b>Condition E43</b> .	Local drainage flow regime, catchment area and imperviousness remain the same as per the existing condition, there is no additional flow towards the existing Council's stormwater network. The design has not worsened the existing condition.

### 2.3 Updated Mitigation Measures - Flooding

The Updated Mitigation Measures (UMM) have been provided, and the detailed design has been assessed to meet the UMM and the compliance is presented in Table 2-3 below.

**Table 2-3: Updated Mitigation Measures Compliance Table – Flooding**

Condition	Condition or Criteria	Compliance Evidence Reference
HFQ3	Further consultation will be undertaken with local councils and other relevant authorities to identify opportunities to coordinate the proposal with flood mitigation works committed to as part of the council's flood management plans, or other strategies.	Consultation with the Council and other relevant authorities will be undertaken through a formal review of this Flood Design Report.
HFQ4	At Wagga Wagga Yard enhancement site, flood modelling would be carried out during detailed design to confirm predicted afflux at industrial properties located at Railway Street and compliance with the Quantitative Design Limits for Inland Rail.  This would be informed by topographic and building floor surveys and a review of localised drainage structures (as required).  Quantitative assessment of the sites of low and moderate hydraulic complexity will be carried out during detailed design and will consider the impact of the Possible Maximum Flood event at built-up areas (where information is available) and the tenure of the upstream areas that are impacted by drainage and/or flooding. The outcomes of the assessment are to be provided to DCCEW– BCS.	This report relates to the Junee Driver Platform site, which is not related to Wagga Wagga Yard.  Compliant. A quantitative assessment has been undertaken.  Refer to Section 5.
HFQ5	At Riverina Highway bridge enhancement site, flood and drainage network modelling (including capacity and operation of the stormwater storage and pump system) will be carried out during detailed design to confirm predicted compliance with the Quantitative Design Limits (QDLs)* for Inland Rail. The modelling would be undertaken in consultation with Albury City Council.	This report relates to the Junee Driver Platform site, which is not related to the Riverina Highway track lowering site.

\* QDL is superseded by CoA E42.

### 3 CHANGE MANAGEMENT

This section summarises the changes made to this design package due to changes in the project scope and/or evolution of the design.

#### 3.1 Concept Design to SDR

Flood modelling is not applicable to this stage.

#### 3.2 SDR to PDR

Flood modelling is not applicable to this stage.

#### 3.3 PDR to DDR

Key changes between the PDR and the DDR flood modelling are listed in Table 3-1

**Table 3-1: Design Differences between PDR and DDR**

Item	Difference	Reason for Change
1	DJV updated the hydraulic and hydrologic models for both the existing conditions and the design conditions for the Junee Drivers Platform area.	Adopted the Master model containing Junee Yard IFC design, the Kemp Street Bridge and Footbridge package IFC design, and the Olympic Highway Under bridge IFC package design to assess the flooding condition in the area of interest.

#### 3.4 DDR to IFC

Key changes between the DDR and the IFC flood modelling are listed in Table 3-2. Table 3-1

**Table 3-2: Design Differences between DDR and IFC**

Item	Difference	Reason for Change
1	Updating report sections and text throughout the report	To analyse the design changes between IFC and IFC Rev 1  To carry out the IFC Rev 1 sensitivity test and list the details.

## 4 MODELLING METHODOLOGY

The overall approaches for flood modelling are listed below:

- A 'RORB' runoff routing hydrologic model was developed to calculate flood hydrographs from rainfall and catchment characteristics.
- Based on ARR2019, utilise the hydrological model and generate flow hydrographs for input to the hydraulic model for all events (5% AEP, 2% AEP, 1% AEP, 1% AEP with Climate Change and PMF) to perform critical duration analysis.
- The flood hydrographs generated in the RORB runoff routing model were compared against the Regional Flood Frequency Estimation (RFFE) Model to validate the runoff routing model. There is no stream level gauge within the catchment to calibrate the hydrologic model.
- A hydraulic model was created using the software TUFLOW, which is a 1D/2D hydraulic modelling software for flood assessments. The TUFLOW model was created using the latest available LiDAR and survey, as well as drainage infrastructure information supplied by the Junee Shire Council. This formed the existing model for this study.
- A rainfall-on-grid simulation was undertaken in the created TUFLOW model to assess if local overland flooding or mainstream flooding from Lower Butlers Gully and Rocky Creek was dominant at the site.
- The TUFLOW model was updated from the existing conditions to the design conditions by incorporating the IFC Junee Yard track works, as well as the IFC design works from the Olympic Highway Underbridge package and the Kemp Street Bridge and Footbridge package.
- The TUFLOW model was extended south to incorporate the JE70 site, as the original model extent was not covering the site area. The Inflows of the extended area were adopted based on the updated hydrology model (Refer to Section 0)
- The cumulative flood impact was assessed for events up to and including the 1% AEP as per the CoA and the flood results are shown within this report.
- A sensitivity assessment by climate change was conducted for the 1% AEP existing and design conditions to inform the potential impacts on the flood immunity of the railway tracks.
- A sensitivity assessment for blockage as per ARR2019 procedures was undertaken for the 1% AEP design conditions to inform the potential impacts of blockage. The methodology used in assessing blockage is described in a separate Technical Memo. Refer to 5-0052-210-IHY-99-ME-0001.

### 4.1 Hydrologic Modelling

#### RORB Modelling

A RORB model was developed to generate the flow hydrographs for input to the hydraulic as part of the Junee Station Yard package (Refer to the Flood Design Report 5-0052-210-IHY-J4-RP-0001). The hydrology model covers the Lower Butlers Gully catchment, Rocky Creek catchment, the town of Junee, including the Junee Driver Platforms. For this package, the RORB output configurations are slightly updated for inputs into the extended TUFLOW extent around the JE70 platform area. A figure of the catchment layout of the hydrology model can be seen in Figure 4-1. The RORB model was developed with catchment characteristics derived from LiDAR and aerial imagery, following ARR2019 guidelines. Table 4-1 lists the parameters used within the model.

**Table 4-1: RORB Parameters**

Parameters	Descriptions
Hydrology model and version	RORBwin (Version 6.31) using Storm injector HL (V 1.4.0.0).
Events	PMP, 1% AEP + Climate Change, 1% AEP, 2% AEP, 5% AEP
Total catchment area to upstream model boundary for TUFLOW	There are 3 different stream paths that integrate with each other to the Junee Yard site locations. Refer to Figure 4-1 for the location of these stream paths. Lower Butlers Gully (Catchment XX) – 15.87 km <sup>2</sup> Rocky Creek (Catchment YY) – 7.64 km <sup>2</sup> Tributary to the northern site (Catchment ZZ) – 1.52 km <sup>2</sup>
Design Rainfall	The Bureau of Meteorology (BOM) 2016 Intensity-Frequency-Duration (IFDs) were used for the design rainfall with the rainfall extracted at the centroid of the catchment. This is included in this report in Appendix B.

Parameters	Descriptions
	PMP rainfalls were generated using the Generalised Short-Duration Method (GSDM).
Temporal Patterns	ARR2019 ensemble point temporal patterns for the Murray Basin region were used for the durations ranging from 30 minutes to 72 hours for the 5%, 2%, 1%, 1% Climate Change events. The ARR data used for this assessment is included in Appendix B of this report. The 10 Jordan and 1 BoM (total 11) temporal patterns from 15 minutes to 180 minutes were used for the PMF.
Spatial Varying Rainfall and Areal Reduction Factor (ARF)	Due to the small to medium size of the catchment, spatially varying rainfall was not adopted in this assessment. The ARF for the corresponding catchment area was adopted.
Climate Change Factors	A Climate Change factor of 20.2% was applied from the representative concentration pathway (RCP) 8.5, the Year 2090.
Rainfall Losses	Impervious areas: initial loss 1 mm, continuing loss 0 mm/hr Pervious areas: initial loss - probability neutral burst initial loss, continuing loss 1.84 mm/hr
% Pervious / Impervious	The % pervious / impervious for each catchment was derived using aerial imagery of the catchments. Impervious areas were taken as roads, carparks and rooftops. Inter-connecting-areas (ICA's) were not used as the rooftops of buildings were classified as fully impervious.
Sub-catchments	Sub-catchments were derived from the 2015 LiDAR sourced from Geosciences Australia. Sub-catchments were created so that no sub-catchment was greater than 25% of the total catchment area, and at least 5 sub-catchments were upstream of any reporting locations.
Reach Slopes	The equal area slope was derived for each reach length from the available LiDAR.
Kc Value	Kc values of 4.25, 3.01 and 1.43 were used for tributary catchments, which were derived from the recommended Kc equation for NSW catchments as per ARR2019 Book 7 (Keleemola Equation 7.6.13: $Kc=1.18 * A^{0.46}$ ).
Coefficient m	0.8, recommended as per ARR2019

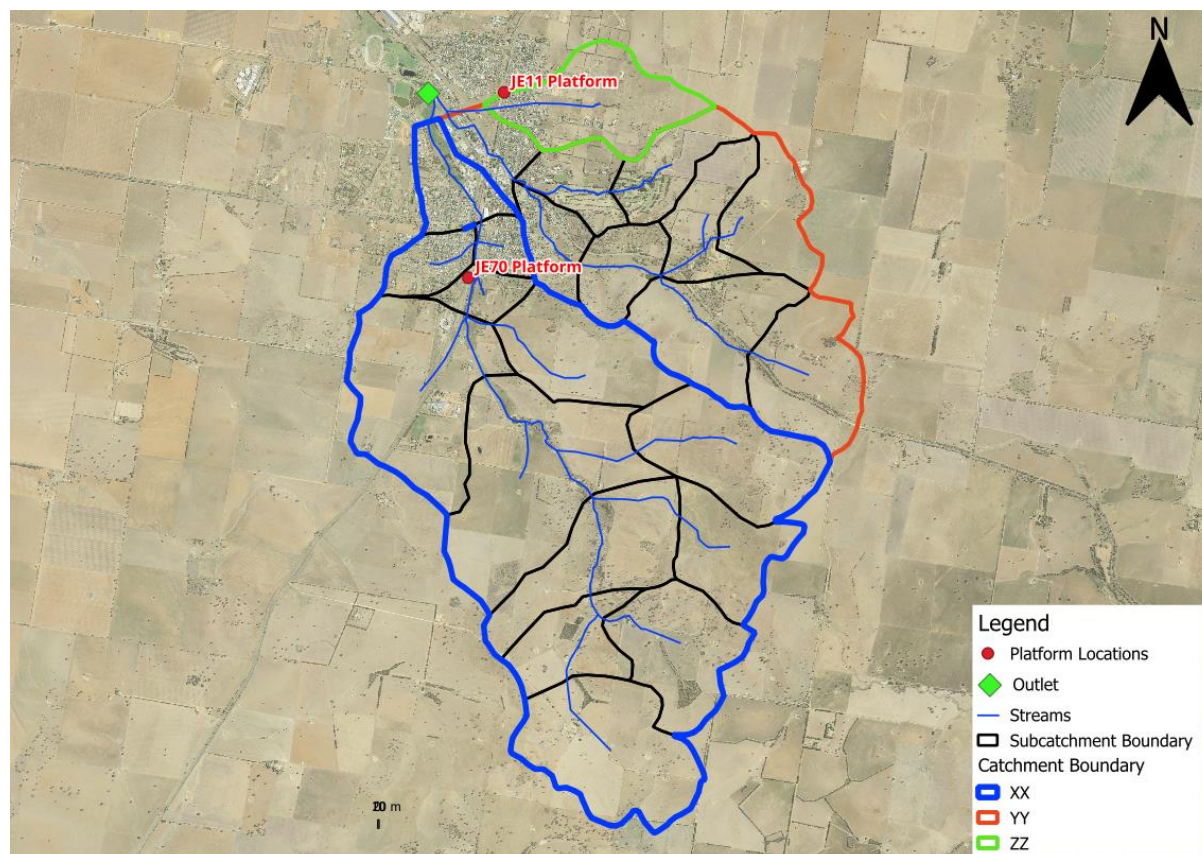


Figure 4-1: RORB Model Layout

Storm Injector was used alongside the RORB model to produce the inflow hydrographs for critical duration analysis. Flow hydrographs were generated for input to the hydraulic model for the 5% AEP, 2% AEP, 1% AEP, 1% AEP Climate Change and PMF (Probable Maximum Flood) events. The critical durations and peak flows from the Lower Butlers Gully catchment, from the Rocky Creek catchment, and from the local tributary catchment (towards the northern site) are summarised in Table 4-2 respectively. Refer to Figure 4-2 for the inflow locations into TUFLOW.

**Table 4-2: Critical Storms and Peak Flows from RORB (for TUFLOW Inputs)**

Event	Critical Durations (minutes) *	Peak Flows (m <sup>3</sup> /s) *
5% AEP	180, 120, 60	43.2, 35.7, 15.0
2% AEP	180, 120, 45	59.9, 41.7, 17.0
1% AEP	180, 90, 45	72.7, 51.0, 22.4
1% AEP Climate Change	180, 90, 45	92.3, 65.8, 27.9
PMF	90, 60, 45	824.1, 577.3, 189.1

\*Each critical duration and peak flow value provided is for each catchments XX, YY, ZZ, where “XX” is for Lower Butlers Gully catchment, “YY” is for Rocky Creek catchment, and “ZZ” is for the local tributary catchment, respectively (as illustrated in Figure 4-1)

## RFFE Flow Comparison

The comparison of peak flows was undertaken between RFFE and RORB, for the Lower Butlers Gully catchment and the Rocky Creek catchment, respectively, for validation purposes. The RFFE model 2021 version 2 was used for the regional flow estimation. As shown in Table 4-3, the RORB flows sit within the RFFE confidence limits, and are slightly higher than the expected values. As the events become less frequent, the RORB flows match with the RFFE expected flows better in general. This likely occurs because the larger storms are expected to be big enough to saturate the catchment, so most rain turns into runoff and both RORB and RFFE tend to give similar flows. This comparison indicates that the peak flows estimated by RORB are consistent with those by RFFE with some levels of conservativeness.

**Table 4-3: Flow Comparison - RORB vs RFFE**

Event	RORB Flow (m <sup>3</sup> /s) *	RFFE Expected Value (m <sup>3</sup> /s) *	RFFE Lower Confidence Limit (5%) (m <sup>3</sup> /s) *	RFFE Upper Confidence Limit (95%) (m <sup>3</sup> /s) *
5% AEP	43.2, 35.7	29.8, 19.9	6.1, 4.1	123.8, 82.7
2% AEP	59.9, 41.7	49.4, 32.6	8.7, 5.8	227.7, 148.8
1% AEP	72.7, 51.0	67.3, 43.9	10.5, 6.9	349.8, 225.9

\* XX, YY, where “XX” is for Lower Butlers Gully catchment and “YY” is for Rocky Creek catchment, respectively (as illustrated in Figure 4-1)

## RORB Kc Sensitivity Assessment

A comparison of the RORB Kc value used in the computation was undertaken to assess if the Kc adopted from ARR2019 Book 7 equation 7.6.13 is appropriate. This method was compared against the Australia wide method Yu (1989), Pearse et. Al. 2002, the Australia wide method Dyer (1994, Pearse et. Al. 2002), and the RORB Manual Equation 2.5. The comparison is shown in Table 4-4. Overall, the ARR2019 Book 7 equation 7.6.13 was chosen as it is suitable for the purpose of this assessment.

**Table 4-4: Flow Comparison - RORB vs RFFE Based on Different Kc Methods**

AEP (%)	RFFE Expected Value (m <sup>3</sup> /s) *	ARR2019 Equation 7.6.13 (m <sup>3</sup> /s) *	RORB manual, equation 2.5 (m <sup>3</sup> /s) *	Dyer (1994, Pearse et. al. 2002) (m <sup>3</sup> /s) *	Yu (1989, Pearse et. al. 2002) (m <sup>3</sup> /s) *
5%	29.8, 19.9	43.2, 35.7	22.9, 17.6	32.5, 24.7	37.1, 29.0
2%	49.4, 32.6	59.9, 41.7	31.8, 24.2	45.4, 31.7	52.3, 36.5
1%	67.3, 43.9	72.7, 51.0	41.7, 29.6	57.7, 37.9	61.4, 44.0

\* XX, YY, where “XX” is for Lower Butlers Gully catchment and “YY” is for Rocky Creek catchment, respectively (as illustrated in Figure 4-1)

## Climate Change

An assessment was conducted to evaluate the influence of climate change on flooding to anticipate any future climate change flood risk(s). The existing RORB model was employed to generate hydrographs for the TUFLOW model for the 1% AEP with climate change. As per the EIS report (Section 3.3.5 of Albury to Illabo Environmental Impact Statement Technical Paper 11) and the agreement between the Contractor and ARTC for the continued use of the prior version of ARR2019 climate change method (refer to IR2140-RTRFI-000773), the Year 2090 RCP8.5 interim climate change factor sourced from the ARR Data Hub (<https://data-legacy.arr-software.org/>) was adopted – a 20.2% increase in rainfall.

## 4.2 Hydraulic Modelling

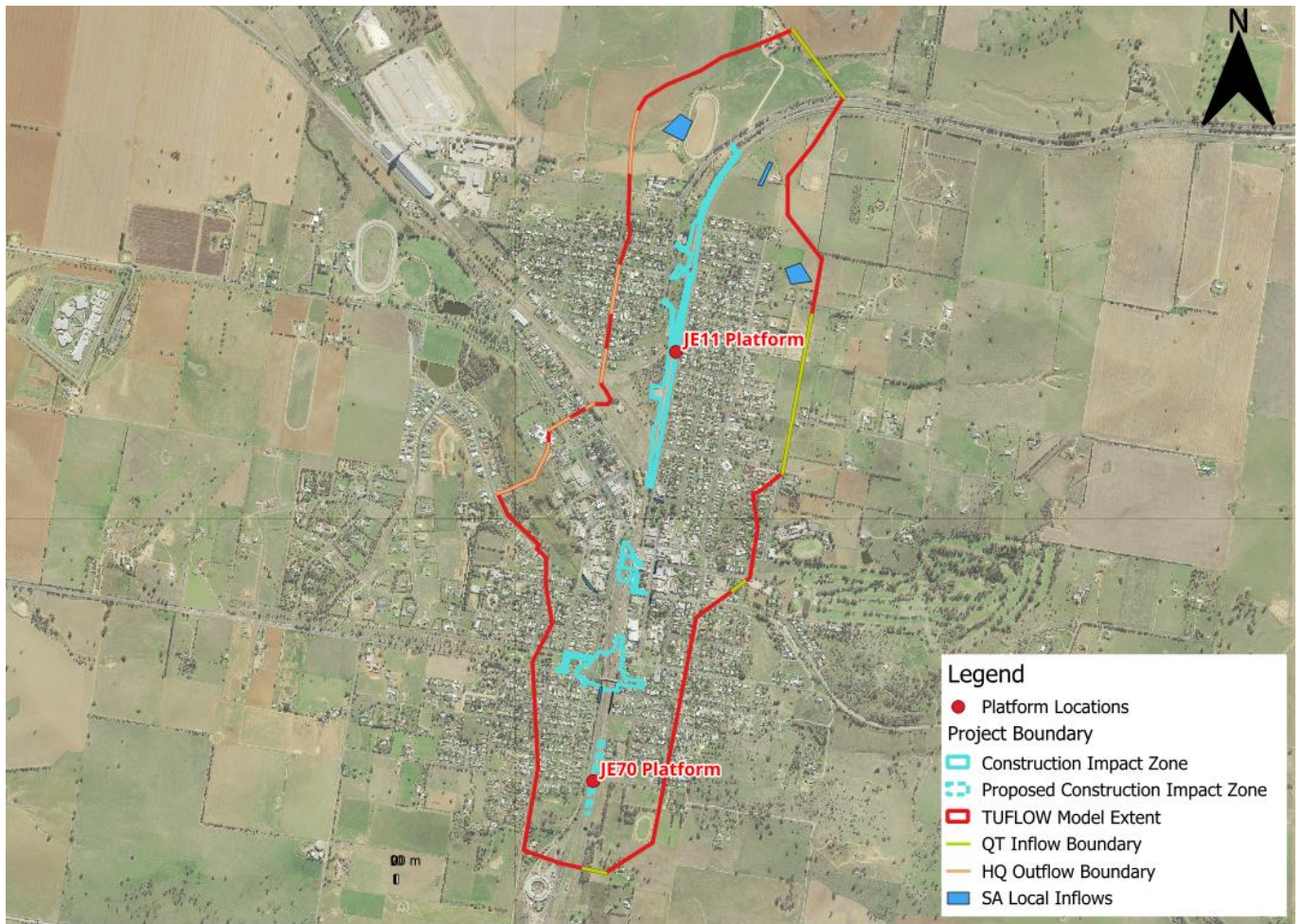
### Existing Model

No existing model was available for the baseline of the assessment, therefore a TUFLOW model for Junee Yard, including the Kemp Street area, Olympic Hwy Underbridge and Junee Drivers Platform, was created. For the IFC stage, the model was extended to include the model area from the Olympic Highway Underbridge Package (refer to the Flood Design Report 5-0052-210-IHY-J6-RP-0001 for details). The model was further extended for inclusion of the Junee Driver Platform (JE 70), as shown in Figure 4-2. A summary of the model parameters is included in Table 4-5.

**Table 4-5: Model Parameters in the TUFLOW Model**

Parameters	Descriptions
Build	TUFLOW 2023-03-AE HPC
Coordination Reference System (CRS)	GDA2020 MGA 55
Grid Size (see Quadtree extent in Figure 4-3)	1m within the Quadtree area (for main flow paths within the project boundaries) and 2m outside of the Quadtree area
Hydrology	RORB derived inflows as per ARR2019 guidelines
Inflow type (Figure 4-2)	2D Flow versus Time (QT) boundaries for mainstream inflows from Lower Butlers Gully, Rocky Creek and the northern tributary. 2D Source over Area (SA) layers for local catchment inflows applied within the major flow paths.
Extent (Figure 4-2)	Central Junee, covering the Kemp Street site, Junee Yard site and Junee Drivers Platform (south), as well as the Olympic Hwy Underbridge site in the north.
Downstream Boundary (Figure 4-2)	Water level (head) versus flow taken from the slope of the terrain (HQ type)
Timestep	Adaptive timesteps by TUFLOW
Building Representation (Figure 4-3)	Buildings were modelled as null polygons based on the latest aerial images as listed in Section 1.9. The buildings are the nulled-out areas as shown in Figure 4-3.
Topography (Figure 4-3)	1m resolution 2015 LiDAR and site survey/ verified cloud point data, as listed in Section 1.9
Roughness (Figure 4-4)	Roads: 0.022 Railway: 0.06 Residential and Open Pervious Areas: 0.05
Drainage Network (Figure 4-5)	As shown in Section 1.9, the drainage data were sourced from the supplied surveys and/or from the supplied drainage GIS layer from Junee Shire Council. Culvert inverts were unavailable from the Council data and were estimated based on the 1m LiDAR data. The drainage network was modelled in 1d domain of TUFLOW. Refer to Section 0 for details.

Design Events (Table 4-2)	Full ensemble simulations of each duration for the PMF, 1% AEP + Climate Change, 1% AEP, 2% AEP, and 5% AEP events
---------------------------	--



**Figure 4-2: TUFLOW Model Extent and Inflow Locations**

**Topography**

As described in Section 1.9, the model base topography was represented by incorporating the 1m LiDAR data and additional survey data on top of it. The digital elevation model (DEM) of the model terrain under the existing conditions is shown in Figure 4-3. The model sits at approximately 290–340 mAHD. The terrain within the town is largely flat to gently sloping, especially towards the western and southern portions of the model. Surrounding the town to the north and east are low ridges and rolling slopes, rising gradually but with no steep escarpments. The railway corridor runs across a relatively flat bench cut into the local terrain.

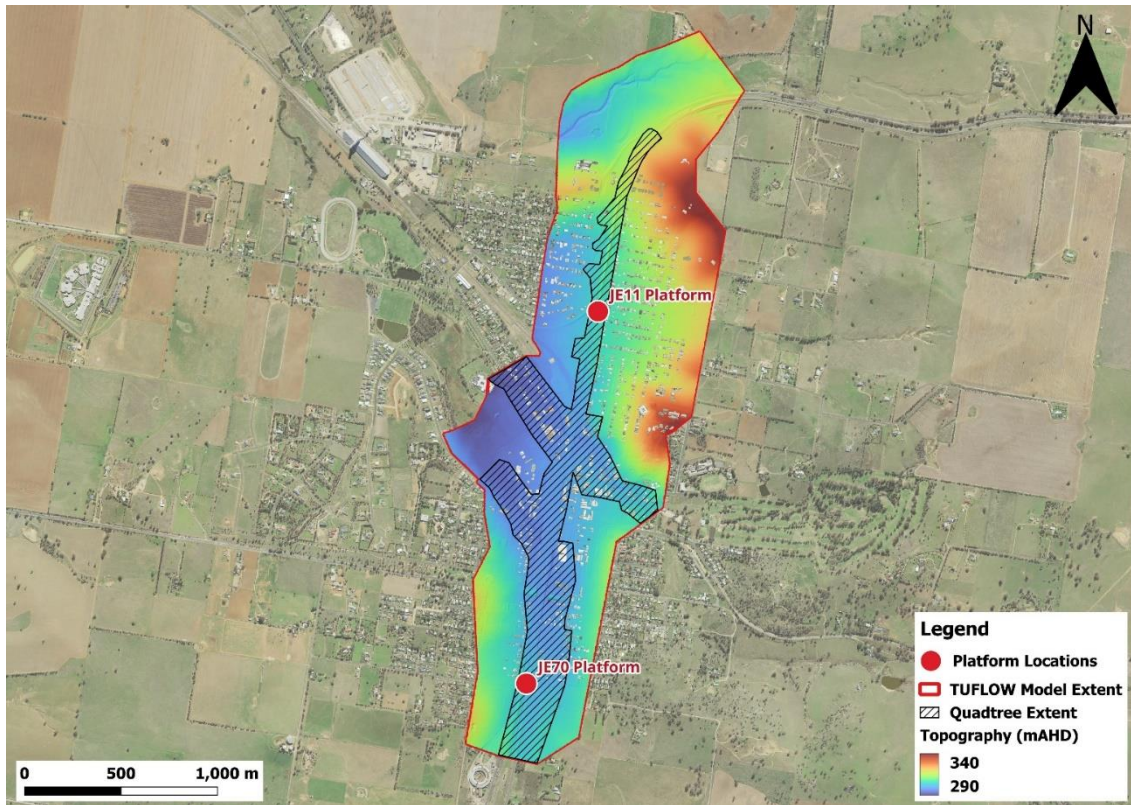


Figure 4-3: Base Topography with Quadtree Extent and Survey Extent in TUFLOW

**Hydraulic Roughness**

In general, the land zones in TUFLOW were assigned based on the available land zoning data and aerial images as described in Section 1.9. The corresponding hydraulic roughness (Manning’s n values) were determined in line with the ARR19 guidelines. The layout of the zones and the hydraulic roughness is shown in Figure 4-4.

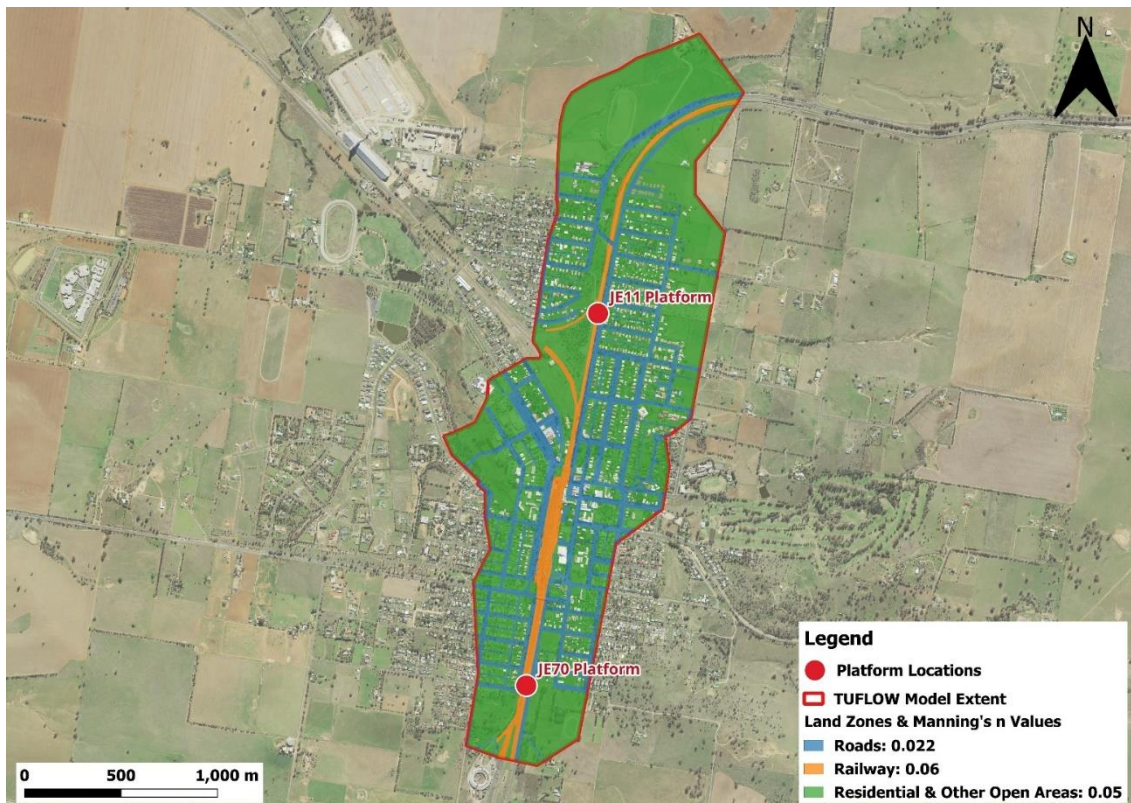


Figure 4-4: Zoning and Manning’s n Values in TUFLOW

**Drainage Network**

As shown in Section 1.9, the drainage data were sourced from the supplied detailed surveys and/or from the supplied drainage GIS layer from Juneе Shire Council. Where culvert inverts were unavailable from the Council data or surveys, they were estimated based on the 1m LiDAR data. The drainage network was modelled in 1d domain of TUFLOW, as shown in Figure 4-5. The key drainage data along major flow paths in TUFLOW are summarised in Table 4-6.

**Table 4-6: Major Existing Drainage Network in TUFLOW near JE70 Platform**

ID	Type	Dimension (width x height or diameter in mm)	Number of Barrels
Road_Culvert	Box Culvert	2100 x 450	1
600DIA	Circular Pipe	600	1
Rail_Culvert	Box Culvert	2100 x 300	2



**Figure 4-5: Existing Drainage Network in TUFLOW**

**Design Model**

The design model was updated from the Existing Model by incorporating all relevant Inland Rail Project Works, as listed in Section 1.9, including:

For the master design model:

- IFC track works (from Olympic Highway Underbridge package):  
 The design rail tracks were represented as 3d breaklines to reinforce the top of rail levels.
- IFC track works (from Juneе Station Yard package):  
 The design rail tracks were represented as 3d breaklines to reinforce the top of rail levels.
- IFC civil works (from Kemp Street Bridge and Footbridge package):

The proposed civil works at Kemp Street (MC10), Olympic Highway (MC20), Pretoria Avenue (MC30), Ducker Street (MC40) and for the proposed footbridge were incorporated into the model as DEM TINs.

- IFC structural works (from Kemp Street Bridge and Footbridge package):

The proposed Kemp Street Bridge (overbridge) and footbridge, including the approaches, were incorporated into the model. The approach slabs, bridge decks, piers and handrails were modelled in 2d\_zsh and 2d\_lfch layers in TUFLOW.

- IFC drainage works (from Kemp Street Bridge and Footbridge package):

The proposed pit and pipe drainage at Edgar Street and Kemp Street was modelled in the 1D domain of TUFLOW. The proposed open drains were included in the DEM TINs provided by the civil works to the west and the east of the design overbridge. The ARTC culverts under the existing railway line will be retained.

Further details for design disciplines are discussed in the Detailed Design Reports of each interfacing package:

- 5-0052-210-PEN-J6-RP-0001 for Olympic Highway Underbridge package
- 5-0052-210-PEN-J4-RP-0001 for Junee Station Yard package
- 5-0052-210-PEN-J2-RP-0001 for Kemp Street Bridge and Footbridge package

For Junee Drivers Platforms:

- The JE70 and JE11 platforms are elevated on piers. The piers were modelled as a Layered Flow Constrictions (2d\_lfch). The data was adopted from the Platform CAD design (Items 8, 9 of IFC design from Table 1-2).
- The carpark (Figure 5-3) on the northern side of the JE70 were represented as 2d\_zsh in the model.

## Design Events

The TUFLOW hydraulic model was run for the 5%, 2%, 1%, 1% AEP + Climate Change and PMF design events to determine the peak flood levels, depths, velocities and hazards under the design conditions. The critical storm durations identified by the RORB modelling, as summarised in Table 4-2, were adopted in the TUFLOW model simulations. The full ensemble of 11 temporal patterns for PMF and 10 temporal patterns for the other events was run for each critical duration as recommended in ARR2019. The enveloped median results were adopted for all design events except for PMF, while the enveloped maximum results were adopted for the PMF events.

## Rainfall-On-Grid Assessment

An assessment of the critical form of flooding was undertaken by assessing the peak flood levels generated from overland flows at the Junee Drivers Platform site locations via a rainfall-on-grid assessment. This utilised the IFD rainfall depths and temporal patterns used in the RORB assessment applied via a 2d\_rf file, and the same initial and continuing losses were applied directly to the model terrain via a material layer. This assessment was undertaken to ensure the critical forms of flooding at the site locations were from Rocky Creek, Lower Butlers Gully and the local tributary rather than rainfall runoffs from the local catchment. It was found that the mainstream flow paths were the critical form of flooding dominating peak flood levels for the project works.

## Comparison to the Previous Study

The hydraulic model from the Lower Butlers Gully Flood Study (Lyll & Associates Consulting Engineers, 2009) (report only) was not made available for this assessment. The Lower Butlers Gully Flood Study was undertaken in 2009 using ARR1987 principles, it used a HEC-RAS 1d model for the hydraulic modelling. HEC-RAS is a hydraulic modelling package developed by the Hydrologic Engineering Centre of the US Army Corps of Engineers. It does not consider areas of floodplain storage within the modelling as it is used when the flow paths are confined to a relatively narrow strip, close to the proximity of the channels and drainage infrastructure.

Results at two locations were compared for the Lower Butlers Gully, upstream of the railway at the entrance to the railway culvert, and within the Edgar Street channel downstream of William Street. Due to the differences in methods between the two studies the results of each assessment are not expected to be directly comparable. The comparison has been undertaken to ensure the estimated flow and flood behaviour in the catchment is appropriate.

Results at two locations under existing conditions were compared for the Lower Butlers Gully Catchment, upstream of the railway at the entrance to the railway culvert KS\_04, and within the Edgar Street channel downstream of culvert KS\_05 (see culvert locations in Figure 4-5). Due to the differences in methods between the two studies the results are not expected to be directly comparable. The comparison has been undertaken to ensure the modelled flood behaviour in TUFLOW is reasonably consistent with the HEC-RAS results, which is demonstrated in Table 4-7.

Table 4-7: Comparison of Peak Flood Levels in Existing condition TUFLOW model and HEC-RAS Models

AEP Event	Flood Level at Upstream of KS_04 (mAHD)		Flood Level in the Edgar Street Channel Downstream of KS_05 (mAHD)	
	Lower Butlers Gully Flood Study	DDR Existing TUFLOW	Lower Butlers Gully Flood Study	DDR Existing TUFLOW
1% AEP	298.4	299.0	300.2	300.5
5% AEP	297.5	298.3	299.2	300.3

The peak flood levels from this assessment are reasonably higher than those in the Lower Butlers Gully Flood Study, which is likely due to differences such as:

- The HEC-RAS model conveys flow more efficiently in the 1D system generated by a series of cross sections.
- In TUFLOW drainage networks were modelled in the 1D domain and transferred through 1D/2D connections.
- There were finer definitions in the TUFLOW model, such as for buildings and for hydraulic roughness (Manning’s n).
- The TUFLOW model used 2d terrain data with more recent surveys of the area.
- Different hydrological inflows were applied due to the change in design IFDs from ARR1987 to ARR2019.

## 5 FLOOD ASSESSMENT

### 5.1 Existing Conditions

The flood maps under the existing conditions, including peak flood depths, peak velocities, and peak hazards for all flood events, are provided in Appendix A.

For JE11 project works under the existing conditions, the floodwaters flow west from the local tributary catchment towards the Olympic Highway/ Main Street and travel south along the existing rail tracks until they overtop the rails near the intersection of Olympic Highway and Elizabeth Street. The overtopping flows travel both to the western open space and to the south within the rail corridor. The corridor is in cut and acts like an open channel. The southward flows eventually join the Rocky Creek. For the JE70 project works, mainstream floodwaters flow north from Lower Butlers Gully through the Edgar Street channel between Edgar Street and the railway tracks.

Figure 5-1 shows the 1% AEP peak flood levels under the existing conditions at the reporting locations for further discussion below. A description of the reporting locations is listed in Table 5-1.

**Table 5-1: Reporting Location Descriptions**

Reporting Location	Description
Point 1	Upstream of JE11 platform location inside the project boundary
Point 2	Downstream of JE11 platform location inside the project boundary east of the track
Point 3	Downstream of JE11 platform location inside the project boundary west of the track
Point 4	Upstream of JE70 platform location inside the project boundary
Point 5	Downstream of JE70 platform location inside the project boundary, Adjacent to Edgar Street, east of track
Point 6	Downstream of JE70 platform location inside the project boundary, east of track



**Figure 5-1: Reporting Locations and 1% AEP Overland Flow Paths (Existing Condition)**

Table 5-2 below shows the peak flood depths at the reporting locations in the existing conditions.

**Table 5-2: Peak Flood Levels (mAHD) at Reporting Locations under Existing Conditions**

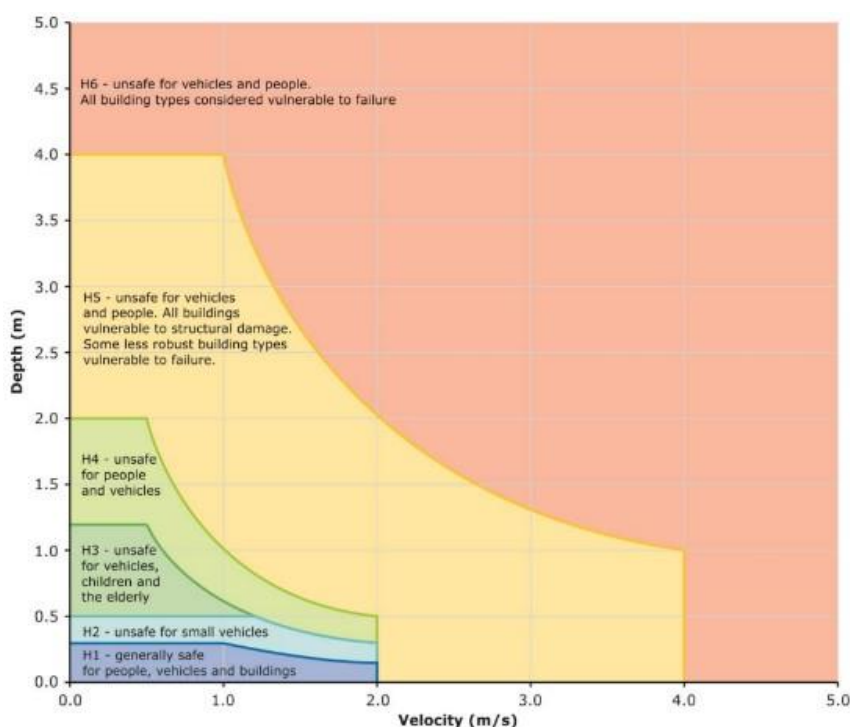
Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	306.39	306.43	306.51	306.58	307.75
Point 2	306.18	306.21	306.29	306.35	307.37
Point 3	304.72	304.73	304.76	304.78	305.07
Point 4	302.54	302.57	302.63	302.67	304.08
Point 5	302.91	302.94	303.00	303.05	304.49
Point 6	302.94	302.98	303.03	303.11	304.63

Table 5-3 shows the peak flood velocities at the reporting locations in the existing conditions.

**Table 5-3: Peak Flood Velocity (m/s) at Reporting Locations under Existing Conditions**

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	1.8	1.9	2.0	2.1	3.1
Point 2	0.9	1.0	1.0	1.1	1.9
Point 3	0.2	0.3	0.4	0.4	1.3
Point 4	1.0	1.0	1.0	1.0	2.0
Point 5	0.4	0.4	0.4	0.6	2.3
Point 6	0.8	0.8	0.8	0.9	2.3

The flood hazard assessment was based on the general flood hazard classification set by the Australian Institute for Disaster Resilience in the Australian Disaster Resilience Handbook Collection - Flood Hazard, 2017. Figure 5-2 below shows the general flood hazard vulnerability curves and categories.



**Figure 5-2: General Flood Hazard Vulnerability Curves and Categories**

Table 5-4 shows the peak flood hazards at the reporting locations in the existing conditions.

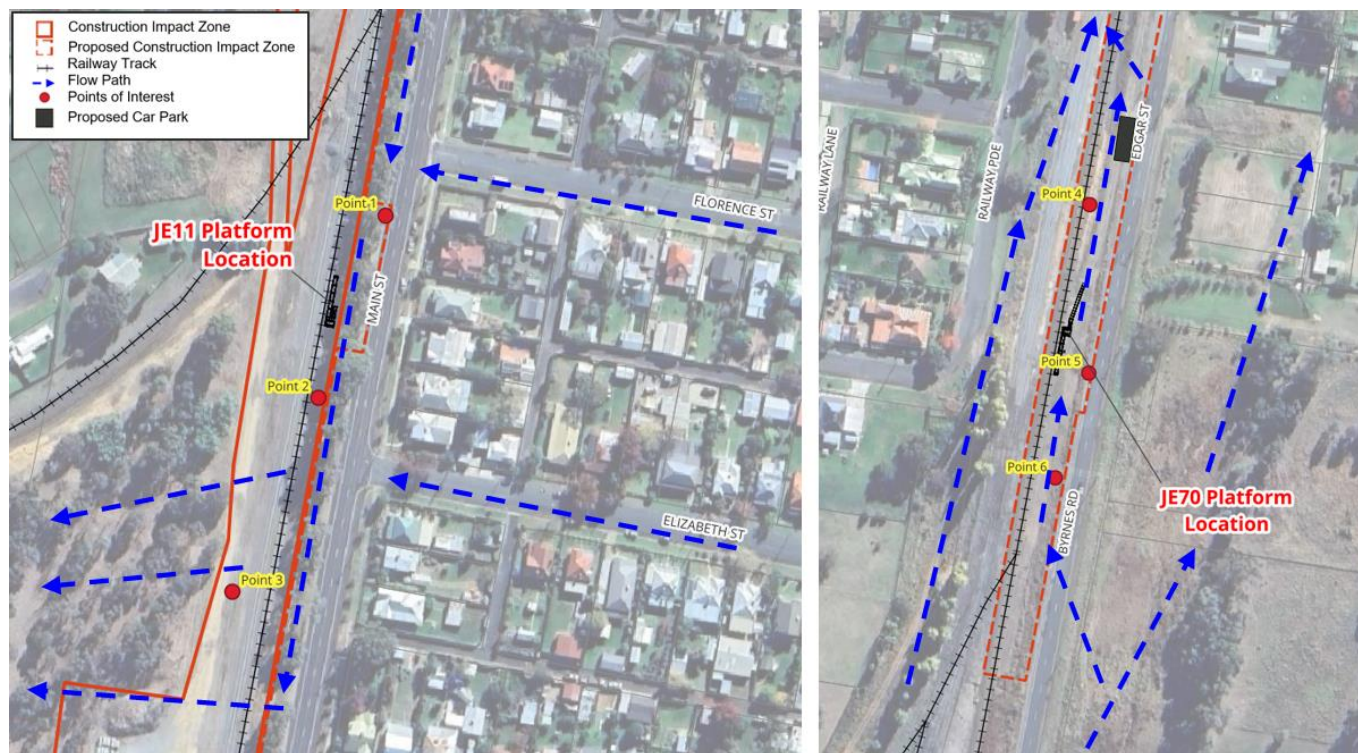
**Table 5-4: Peak Flood Hazards at Reporting Locations under Existing Conditions**

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate change	PMF
Point 1	H4	H4	H5	H5	H6
Point 2	H3	H3	H4	H4	H5
Point 3	H1	H1	H1	H1	H2
Point 4	H2	H2	H3	H4	H5
Point 5	H1	H2	H2	H2	H6
Point 6	H3	H3	H3	H4	H6

## 5.2 Design Conditions

During the design conditions, the flood behaviour is similar to the existing condition near the platform areas. For the northern section of the project works near Platform JE1, in the design condition, track lifts by up to 66mm have been proposed as part of the Junee Yard track designs (refer to 5-0052-210-IHY-J4-RP-0001). It generally causes only localised changes in flood behaviour as the rail corridor is in cut and acts like a channel for the floodwaters spilling over from the Olympic Highway to travel west and south.

Figure 5-3 shows the 1% AEP peak flood depths under the design conditions with the reporting locations for further discussion below. A description of the reporting locations was listed in Table 5-1.



**Figure 5-3: 1% AEP Overland Flow Path and Reporting Locations (Design Condition)**

Table 5-5 below shows the peak flood depths at the reporting locations in the design conditions. The peak flood depths in the design conditions have minimal changes from those in the existing conditions. For a detailed discussion on changes, refer to Section 5.4. The peak flood depth maps are included in Appendix A.

**Table 5-5: Peak Flood Levels (mAHD) at Reporting Locations under Design Conditions**

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	306.39	306.43	306.51	306.58	307.77
Point 2	306.18	306.21	306.29	306.36	307.39
Point 3	304.71	304.73	304.76	304.78	305.05
Point 4	302.54	302.57	302.62	302.67	304.08
Point 5	302.91	302.94	303.00	303.05	304.50
Point 6	302.95	302.98	303.03	303.11	304.63

Table 5-6 shows the peak flood velocities at the reporting locations in the design conditions. The velocities remain consistent with the existing conditions. For a detailed discussion on changes, refer to Section 5.4. The peak flood velocity maps are included in Appendix A.

**Table 5-6: Peak Flood Velocity (m/s) at Reporting Locations under Design Conditions**

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	1.8	1.9	2.0	2.1	3.1
Point 2	0.9	1.0	1.0	1.1	1.9
Point 3	0.2	0.3	0.4	0.4	1.3
Point 4	1.0	1.0	1.0	1.0	2.0
Point 5	0.4	0.4	0.4	0.6	2.2
Point 6	0.8	0.8	0.8	0.9	2.3

Table 5-7 shows the peak flood hazards at the reporting locations in the design conditions. The flood hazards remain consistent with the existing conditions. The peak flood hazard maps are included in Appendix A.

**Table 5-7: Peak Flood Hazards at Reporting Locations under Design Conditions**

Locations	5% AEP	2% AEP	1% AEP	1% AEP + Climate Change	PMF
Point 1	H4	H4	H5	H5	H6
Point 2	H3	H3	H4	H4	H5
Point 3	H1	H1	H1	H1	H2
Point 4	H2	H2	H3	H4	H5
Point 5	H1	H2	H2	H2	H6
Point 6	H3	H3	H3	H4	H6

### 5.3 Flood Immunity and Scour Protection

The flood immunity of the rail tracks in the existing and design conditions remained unchanged and is discussed in Table 5-8. Refer to Table 5-2 and Table 5-5 for peak flood depths at the reporting locations in the existing and design conditions. The peak flood depth maps are included in Appendix A for illustration of inundation extents.

**Table 5-8: Rail Immunity – Existing Conditions and Design Conditions**

Design Events	Overtopping Descriptions
5% AEP	<ul style="list-style-type: none"> <li>Floodwaters overtop the existing rail tracks South of JE11 Platform generally by 0.5m and North of JE70 Platform by 0.1m.</li> <li>Overtopping extents are maintained for both sections of the track works under the design conditions.</li> </ul>
2% AEP	<ul style="list-style-type: none"> <li>Floodwaters overtop the existing rail tracks South of JE11 Platform generally by 0.55m and North of JE70 Platform by 0.2m.</li> <li>Overtopping extents are maintained for both sections of the track works under the design conditions.</li> </ul>
1% AEP	<ul style="list-style-type: none"> <li>Floodwaters overtop the existing rail tracks South of JE11 Platform generally by 0.6m and North of JE70 Platform by 0.15m.</li> <li>Overtopping extents are maintained for both sections of the track works under the design conditions.</li> </ul>

The flood immunity of the platform JE11 and JE70 are above 1% AEP and are summarised in Table 5-9. The car park (Figure 5-3) on the northern side of JE70 is outside of the 1% AEP flood extent.

**Table 5-9 Flood Immunity of the Platforms – Design Conditions**

Platform	Platform Level (mAHD)	5% AEP Flood Level(mAHD)	2% AEP Flood Level(mAHD)	1% AEP Flood Level(mAHD)
JE70	304.40	302.88	302.91	302.96
JE11	307.85	306.29	306.33	306.40

Furthermore, in the design conditions, the flood velocities outside the project boundary comply with the CoA Scour/ Erosion potential criteria (less than 10% increase or less than 0.5m/s change in velocity) (refer to CoA E42 (h) in Table 2-2) up to and including the 1% AEP storm event. Hence, there is no need for scour protection measures outside the project boundary. Refer to Section 0 for more details on changes in flood velocity by the designs.

## 5.4 Flood Impact Assessment

As per CoA E42, the flood impact assessment was conducted. The results are summarised for events up to and including the 1% AEP event. The discussion focuses on the flood impacts outside the project boundary (and the proposed construction impact zone) for compliance. The outcome shows that the flood impact outside of the project boundary complies with all the criteria in PSR and CoA and there is no adverse impact to the existing drainage system. The flood impact maps are included in Appendix A for illustration of the project areas, which are recommended to be read with the discussion below.

### Changes in Peak Flood Level

The changes in peak flood level are summarised and discussed in Table 5-10.

**Table 5-10: Summary of Impacts on Peak Flood Level**

Design Events	Changes in Peak Flood Level
5% AEP	<ul style="list-style-type: none"> <li>For the JE11 Platform Works, the changes are generally within <math>\pm 10</math>mm outside the project boundary. No properties are adversely affected by the project works. To the west of the design tracks within the downstream open space, the peak levels have minimal changes of <math>\pm 25</math>mm due to the Junee Yard track lifts. These are compliant within the 100mm limit as per the CoA E42(e) for the public recreation zone.</li> <li>For the JE70 Platform Works, the changes are generally within <math>\pm 10</math>mm outside the project boundary. No properties are adversely affected by the project works</li> <li>The ‘newly wet’ grids outside the project boundary are varied between 0 and 50 mm in the road/ rail corridors, and below 100mm in the public recreation zones. There is no inundation of habitable properties which are currently not inundated. These are within the limits as per CoA E42. Refer to the maps showing the peak flood depths under the design conditions in Appendix A for details.</li> </ul>
2% AEP	
1% AEP	

The change in flood levels at the reporting locations in Figure 5-1 are shown below in Table 5-11.

**Table 5-11: Changes in Peak Flood Level (mm) at Reporting Locations (Design minus Existing)**

Location	5% AEP	2% AEP	1% AEP
Point 1	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 2	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 3	-0.01m	-0.01m	Negligible impacts*
Point 4	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 5	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 6	Negligible impacts*	Negligible impacts*	Negligible impacts*

\*Impact less than 0.01m is considered a negligible impact

As discussed, the changes in peak flood level outside the project boundary comply with the PSR and CoA requirements.

### Changes in Peak Flood Velocity

For the events up to and including the 1% AEP, the changes in peak flood velocity outside the project boundary are less than 0.5m/s. The newly wet grids outside the project boundary have velocities less than 0.5m/s. Refer to the peak flood velocity maps and flood impact maps in Appendix A for demonstration.

The changes in flood velocity at the reporting locations in Figure 5-1 are shown below in Table 5-12, which are insignificant in general.

**Table 5-12: Changes in Peak Flood Velocity (m/s) at Reporting Locations (Design minus Existing)**

Locations	5% AEP	2% AEP	1% AEP
Point 1	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 2	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 3	-0.01	-0.01	0.00
Point 4	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 5	Negligible impacts*	Negligible impacts*	Negligible impacts*
Point 6	Negligible impacts*	Negligible impacts*	Negligible impacts*

\*Impact less than 0.01m/s is considered a negligible impact

As discussed, the changes in peak flood velocity outside the project boundary comply with the PSR and CoA requirements.

### Changes in Peak Flood Hazard

For the events up to and including the 1% AEP, there is no increase in flood hazard or risk to life outside the project boundary. Where there are scattered individual cells showing an increase by 1 category, velocities, depths and  $V \times D$  were inspected and reviewed at these locations. The changes in  $V \times D$  at the scattered cells are within  $\pm 0.01 \text{ m}^2/\text{s}$ , showing no real change in hazard category or risk to life, according to the combined hazard curves thresholds in Figure 5-2. The inaccuracies are likely due to the output configurations in TUFLOW assigning values for the peak flood hazards. According to the TUFLOW Classic/HPC User Manual (2025.0), Section 11.2.3.1, grid map output hazard categories are output as integer grids (i.e. values are rounded to the nearest integer when a grid output cell centre is located at a change in category).

The changes in peak flood hazard at the reporting locations in Figure 5-1 are shown in the table below. There is generally no change at these locations.

Table 5-13: Changes in Flood Hazard at Reporting Locations (Design minus Existing)

Location	5% AEP	2% AEP	1% AEP
Point 1	No change	No change	No change
Point 2	No change	No change	No change
Point 3	No change	No change	No change
Point 4	No change	No change	No change
Point 5	No change	No change	No change
Point 6	No change	No change	No change

As discussed, the changes in peak flood hazard outside the project boundary comply with the PSR and CoA requirements.

### Changes in Duration of Inundation

The analysis around the changes in the duration of inundation was undertaken by comparing the time series of flood level between the existing and design conditions at selected locations. The typical locations were selected in the vicinity of the project works outside the project boundary, which are the key locations for concern in terms of the flood impacts, as shown in Figure 5-4. The diagrams are shown in Figure 5-5 to Figure 5-8 . The comparison of the flood level vs time for the 1%, 2% and 5% AEP events indicates that there are minimal changes to the duration of inundation, thereby complying with the maximum increase in inundation time of one hour, or 10%, whichever is greater as per the CoA E42(a).

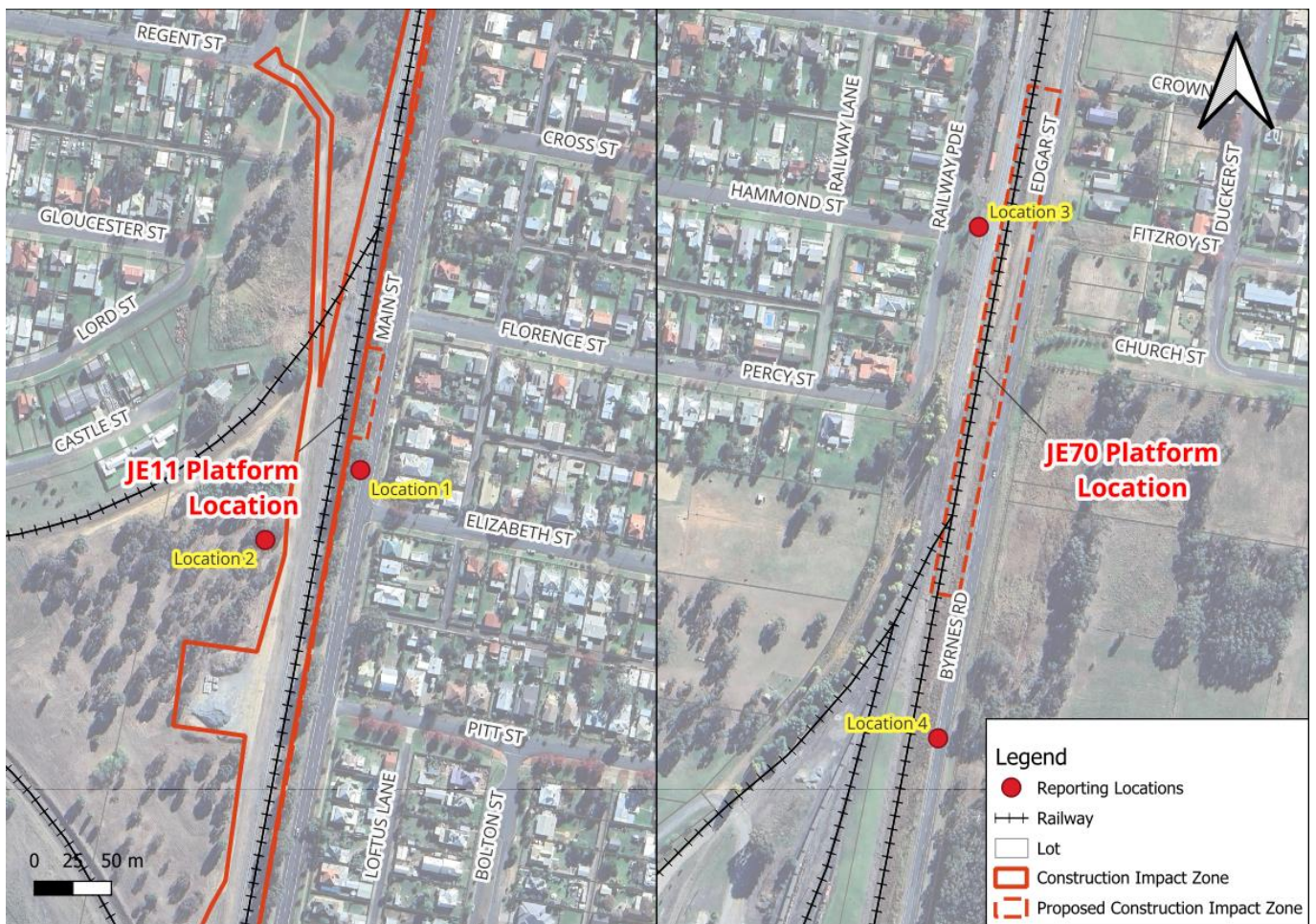
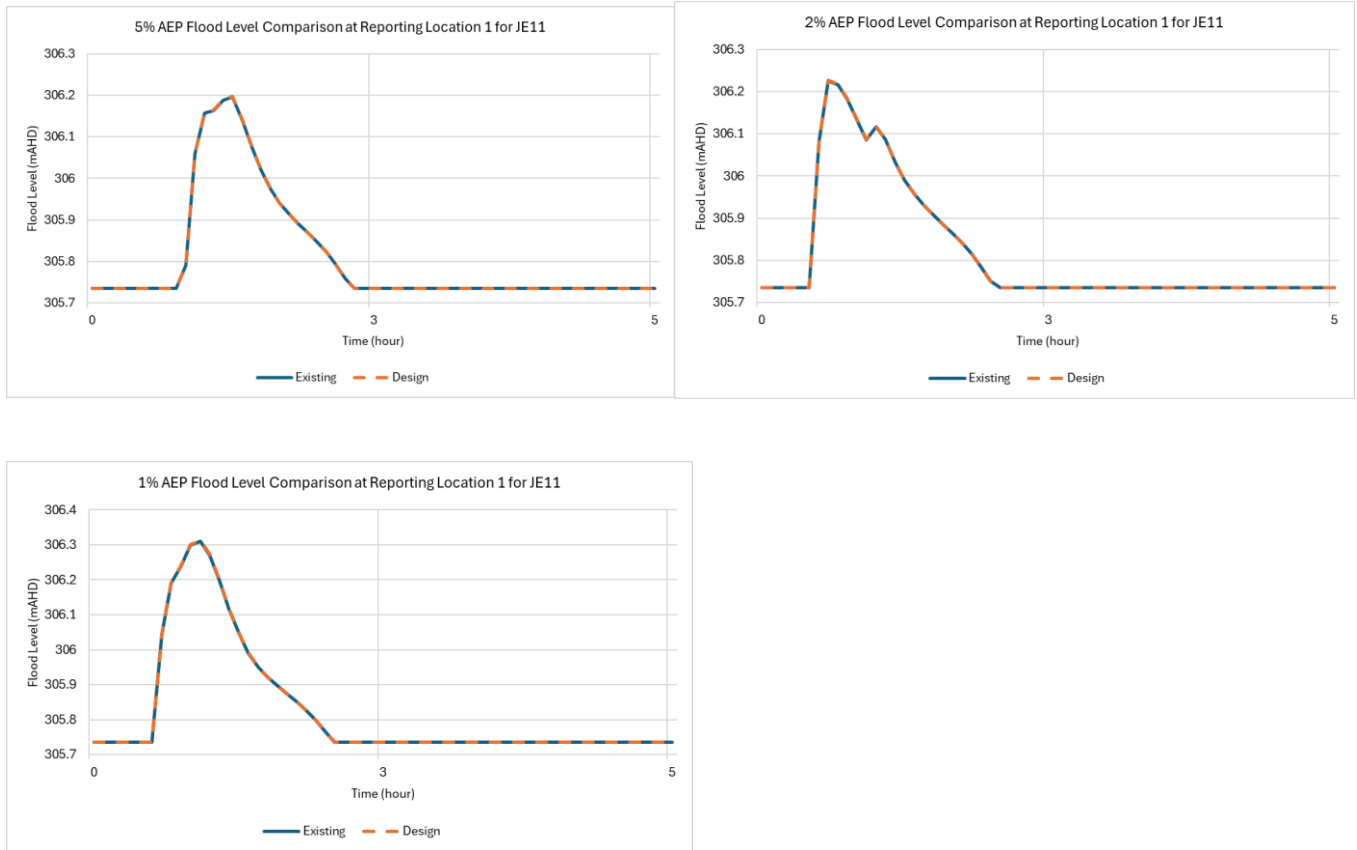
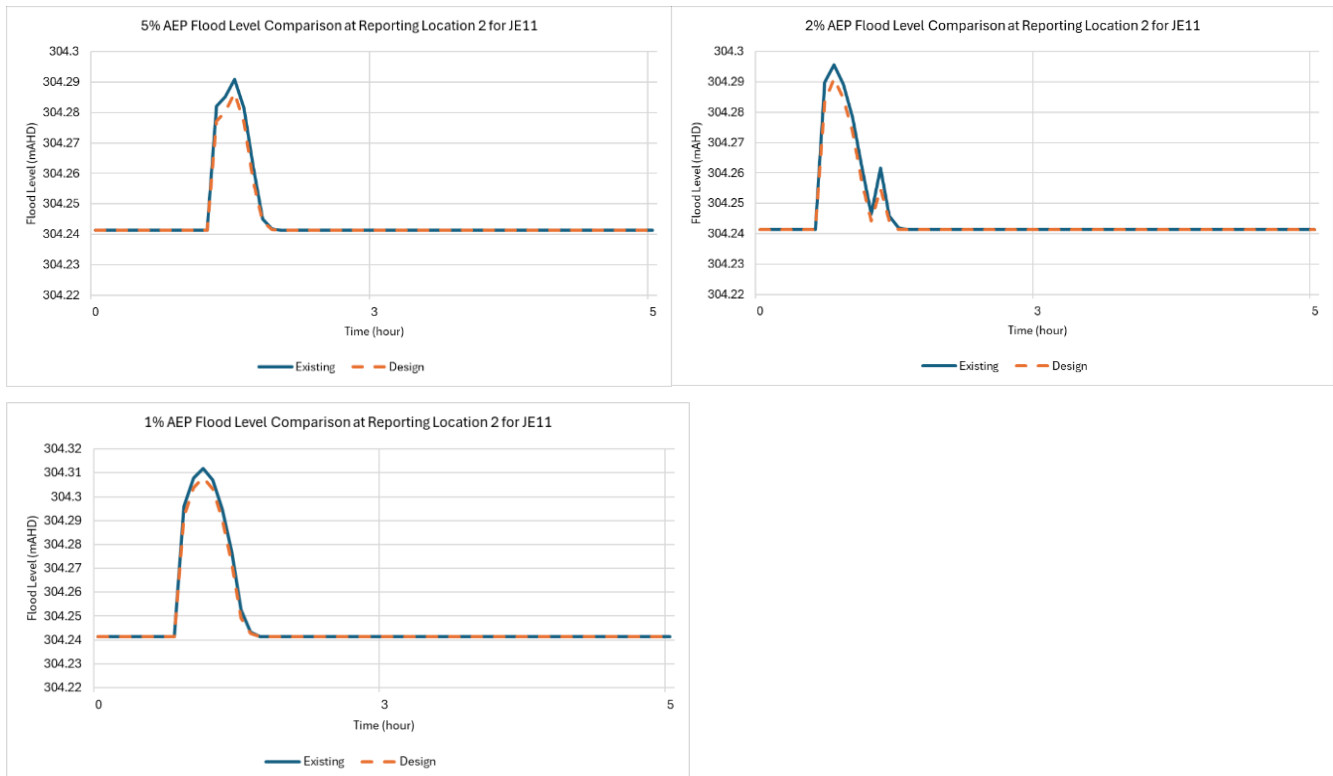


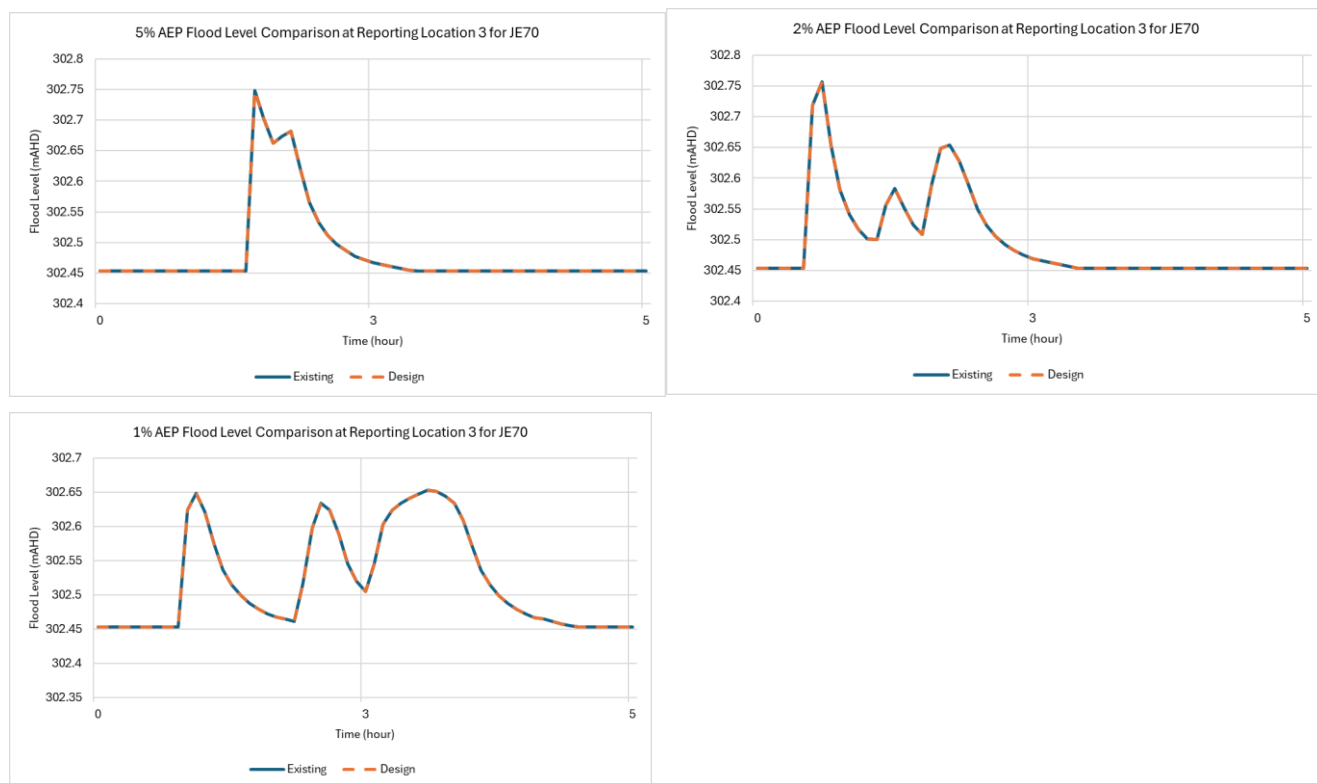
Figure 5-4: Reporting Locations for the Changes in Duration of Inundation



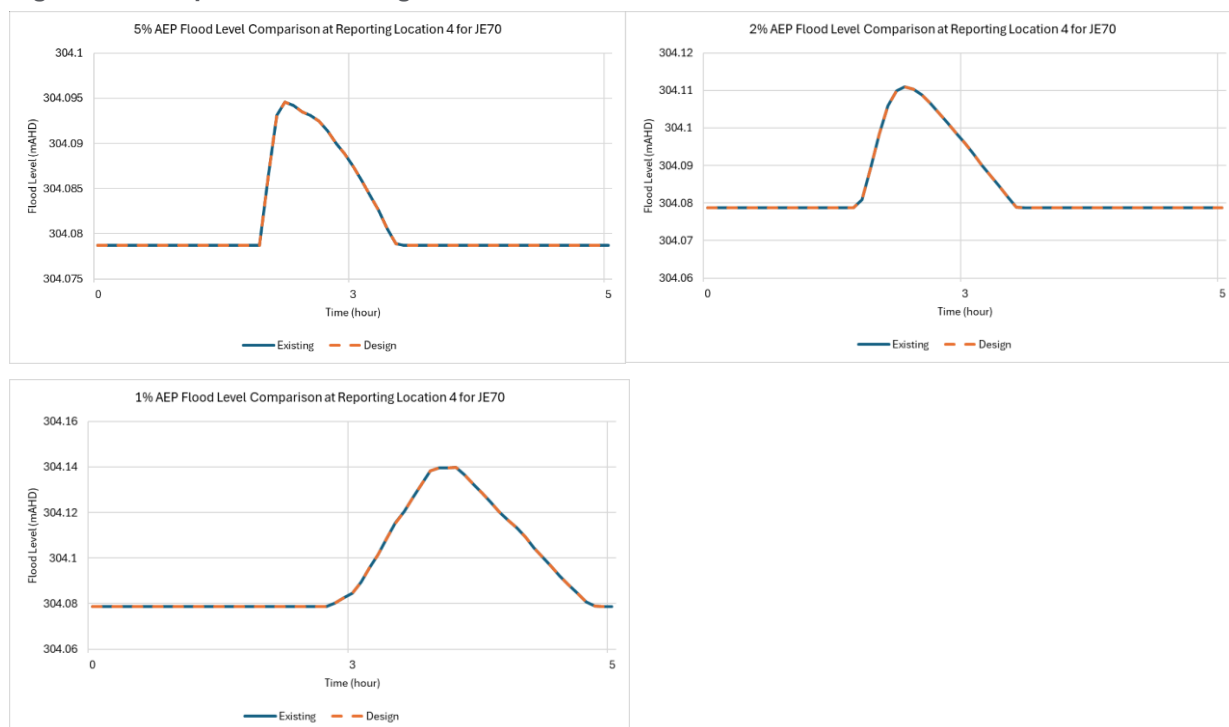
**Figure 5-5 Comparison for Changes in Duration of Inundation at Location 1**



**Figure 5-6 Comparison for Changes in Duration of Inundation at Location 2**



**Figure 5-7 Comparison for Changes in Duration of Inundation at Location 3**



**Figure 5-8 Comparison for Changes in Duration of Inundation at Location 4**

## Cumulative impact

As stated in Section 4 under “Modelling Methodology”, the design condition incorporated the permanent design works located within the Olympic Highway Underbridge design (5-0052-210-PEN-J6-RP-0001), Junee Yard Design (5-0052-210-PEN-J4-RP-0001) and Kemp Street Bridge and Footbridge design (5-0052-210-PEN-J2-RP-0001) to understand an overall cumulative impact on the site. Those cumulative impacts have been reflected in Section 0 to Section 0, indicating that there are no non-compliances on Junee Drivers Platform caused by the Olympic Highway Underbridge design, Junee Yard design and Kemp Street Bridge and Footbridge design for all events up to the 1% AEP, or these on the Junee Driver Platform sites.

## 5.5 Sensitivity Test

### Climate Change Risk Assessment

Climate change risk assessment was carried out by running the 1% AEP with 2090 RCP8.5 interim climate change factor (refer to Section 0 for details of methodology). The results of peak flood depths, flood velocities and flood hazards are shown in Section 5.1 and Section 5.2. The corresponding flood maps are included in Appendix A.

As discussed in Section 5.3 for flood immunity, the railway tracks would be overtopped in both the existing and design conditions in the 1% AEP event + Climate Change event. The depth of overtopping is slightly higher due to the increased rainfall.

### Blockage Assessment

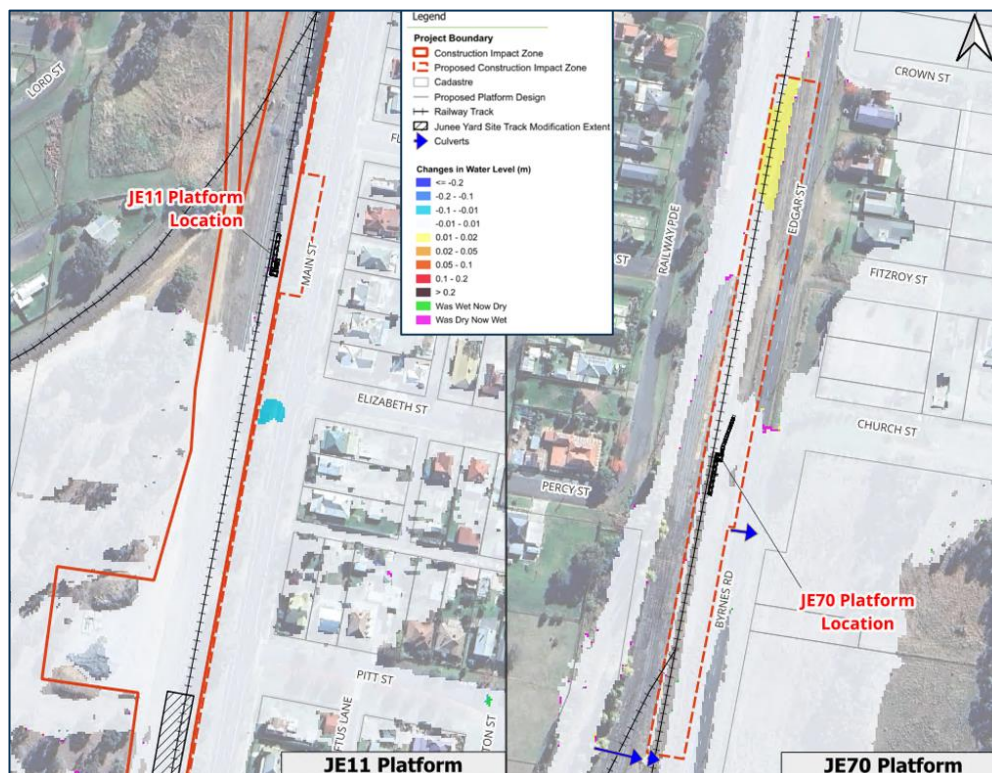
A hydraulic blockage assessment was carried out for the 1% AEP design scenario. A 20% blockage was adopted for all the other culverts, pits and pipes outside the project boundary. Within the project boundary, blockage of culverts and bridges was assessed based on the ARR2019 guidelines. The assessment involved assessing the site area for debris availability, mobility and transportability. The adopted blockage factors are shown in Table 5-14.

**Table 5-14: Blockage Assessment for the Structures within the Project Boundary**

Structures	Debris Availability	Debris Mobility	Debris Transportability	AEP Adjusted Debris Potential	Blockage
Culverts	Low	Low	Medium	Low	25%
Kemp Street overbridge	Medium	Medium	Medium	Medium	10%
Kemp Street footbridge	Medium	High	High	High	20%

Note: It is estimated that the L10 values are 1.5m for the culverts, 8m for the Kemp Street Overbridge and 5m for the Kemp Street Footbridge.

Generally, there are minimal changes with the blockage applied as there is a minor drainage network in this area and the floodwaters are relatively shallow overland flows. The change in peak flood levels for the 1% AEP design conditions is shown in the figure below.



**Figure 5-9: Changes in Peak Flood Levels for the 1% AEP Design Conditions (Blockage vs No Blockage)**

## 6 MITIGATION MEASURES

No instances of non-compliance in terms of flood impact were documented. Therefore, no additional mitigation measures are necessary, unless the design changes.

## 7 RECOMMENDATIONS

This is the final IFC stage of the report, and the following are finalised:

- No instances of non-compliance have been identified through the assessment.
- All comments raised by relevant parties have been resolved (refer to Appendices C, D and E)

Consequently, there are no further recommendations.

## APPENDIX A

---

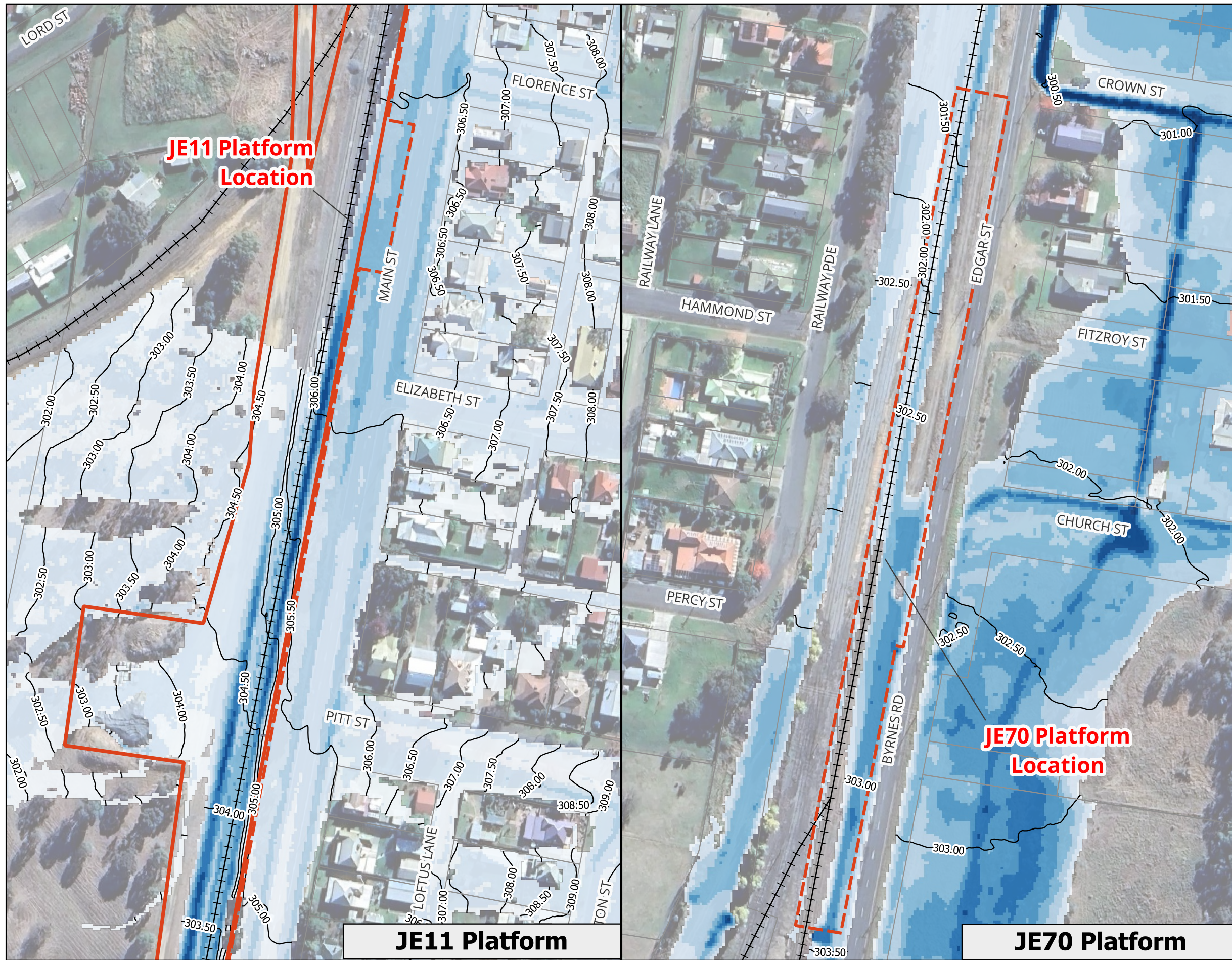
# Flood Maps



Table A- 1 List of Figures

Figure Number	Figure Name
Figure A01	5% AEP Peak Flood Depth and Levels - Existing Condition
Figure A02	2% AEP Peak Flood Depth and Levels - Existing Condition
Figure A03	1% AEP Peak Flood Depth and Levels - Existing Condition
Figure A04	1% AEP Climate Change Peak Flood Depth and Levels - Existing Condition
Figure A05	PMF Peak Flood Depth and Levels - Existing Condition
Figure A06	5% AEP Peak Flood Velocity - Existing Condition
Figure A07	2% AEP Peak Flood Velocity - Existing Condition
Figure A08	1% AEP Peak Flood Velocity - Existing Condition
Figure A09	1% AEP Climate Change Peak Flood Velocity - Existing Condition
Figure A10	PMF Peak Flood Velocity - Existing Condition
Figure A11	5% AEP Peak Flood Hazard - Existing Condition
Figure A12	2% AEP Peak Flood Hazard - Existing Condition
Figure A13	1% AEP Peak Flood Hazard - Existing Condition
Figure A14	1% AEP Climate Change Peak Flood Hazard - Existing Condition
Figure A15	PMF Peak Flood Hazard - Existing Condition
Figure A16	5% AEP Peak Flood Depth and Levels - Design Condition
Figure A17	2% AEP Peak Flood Depth and Levels - Design Condition
Figure A18	1% AEP Peak Flood Depth and Levels - Design Condition
Figure A19	1% AEP Peak Flood Depth and Levels - Design Blockage Condition
Figure A20	1% AEP Climate Change Peak Flood Depth and Levels - Design Condition
Figure A21	PMF Peak Flood Depth and Levels - Design Condition
Figure A22	5% AEP Peak Flood Velocity - Design Condition
Figure A23	2% AEP Peak Flood Velocity - Design Condition
Figure A24	1% AEP Peak Flood Velocity - Design Condition
Figure A25	1% AEP Peak Flood Velocity - Design Blockage Condition
Figure A26	1% AEP Climate Change Peak Flood Velocity - Design Condition
Figure A27	PMF Peak Flood Velocity - Design Condition
Figure A28	5% AEP Peak Flood Hazard - Design Condition
Figure A29	2% AEP Peak Flood Hazard - Design Condition
Figure A30	1% AEP Peak Flood Hazard - Design Condition
Figure A31	1% AEP Peak Flood Hazard - Design Blockage Condition
Figure A32	1% AEP Climate Change Peak Flood Hazard - Design Condition
Figure A33	PMF Peak Flood Hazard - Design Condition
Figure A34	Changes in Peak Flood Levels for 5% AEP - Design Condition vs Existing Condition
Figure A35	Changes in Peak Flood Levels for 2% AEP - Design Condition vs Existing Condition

Figure Number	Figure Name
Figure A36	Changes in Peak Flood Levels for 1% AEP - Design Condition vs Existing Condition
Figure A37	Changes in Peak Flood Levels for 1% AEP Climate Change - Design Condition vs Existing Condition
Figure A38	Changes in Peak Flood Velocity for 5% AEP - Design Condition vs Existing Condition
Figure A39	Changes in Peak Flood Velocity for 2% AEP - Design Condition vs Existing Condition
Figure A40	Changes in Peak Flood Velocity for 1% AEP - Design Condition vs Existing Condition
Figure A41	Changes in Peak Flood Velocity for 1% AEP Climate Change - Design Condition vs Existing Condition
Figure A42	Changes in Peak Flood Hazard for 5% AEP - Design Condition vs Existing Condition
Figure A43	Changes in Peak Flood Hazard for 2% AEP - Design Condition vs Existing Condition
Figure A44	Changes in Peak Flood Hazard for 1% AEP - Design Condition vs Existing Condition
Figure A45	Changes in Peak Flood Hazard for 1% AEP Climate Change - Design Condition vs Existing Condition



- Legend
- Project Boundary**
  - Construction Impact Zone
  - Proposed Construction Impact Zone
  - Cadastre
  - Railway Track

- Peak Flood Level Contours (mAH)
- Peak Flood Depth (m)**
- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Notes:



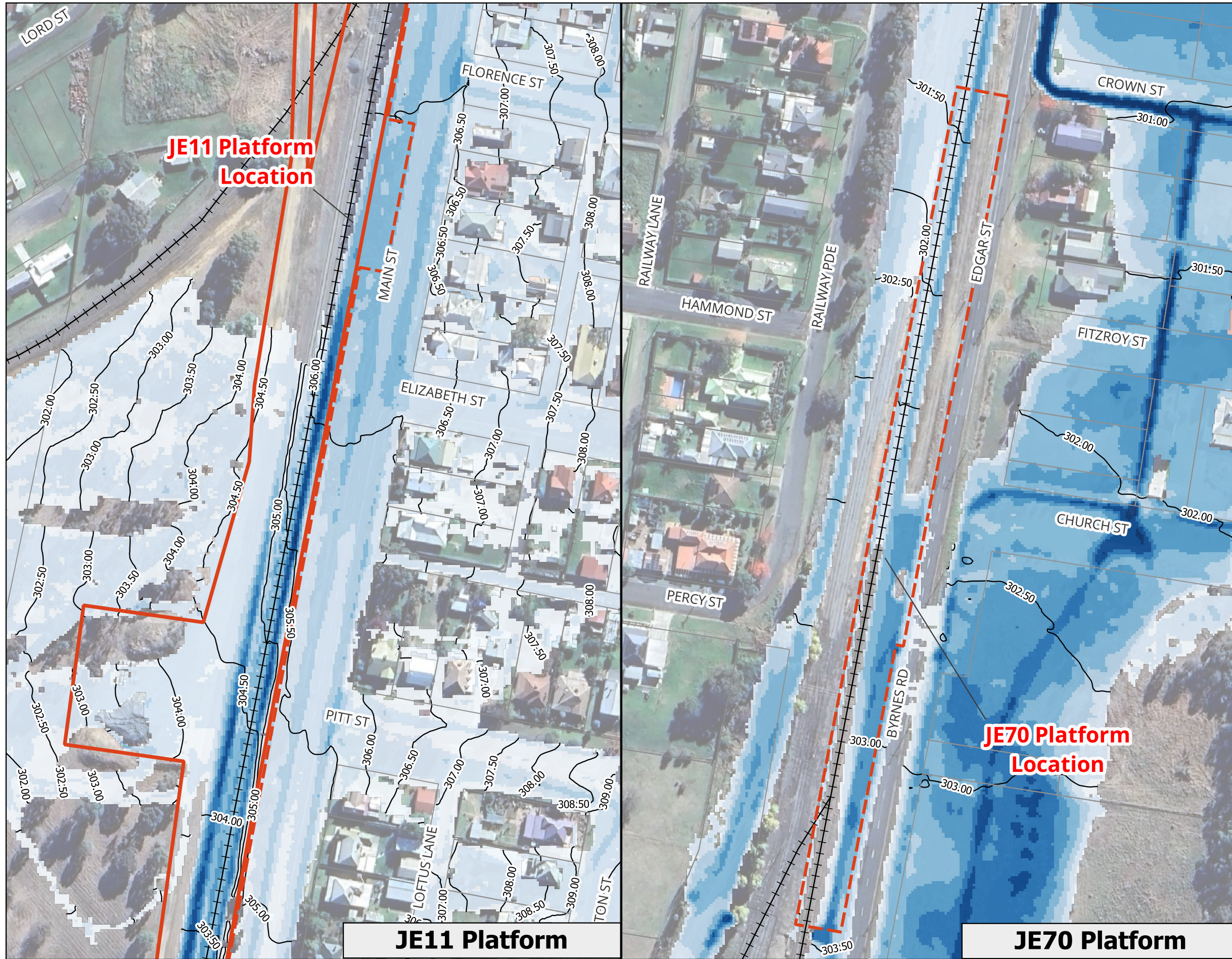
0 60 120 m

A3  
Scale: 1:1,500

24/9/2025 GDA2020 / MGA zone 55

June Drivers Platforms - IFC Stage

Figure A01: 5% AEP Peak Flood Depth and Levels - Existing Condition



Legend

- Project Boundary**
- Construction Impact Zone
  - Proposed Construction Impact Zone
  - Cadastre
  - Railway Track

- Peak Flood Level Contours (mAHD)
- Peak Flood Depth (m)**
- <= 0.03
  - 0.03 - 0.2
  - 0.2 - 0.4
  - 0.4 - 0.6
  - 0.6 - 0.8
  - 0.8 - 1.0
  - 1.0 - 1.2
  - > 1.2

Notes:

Notes:



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

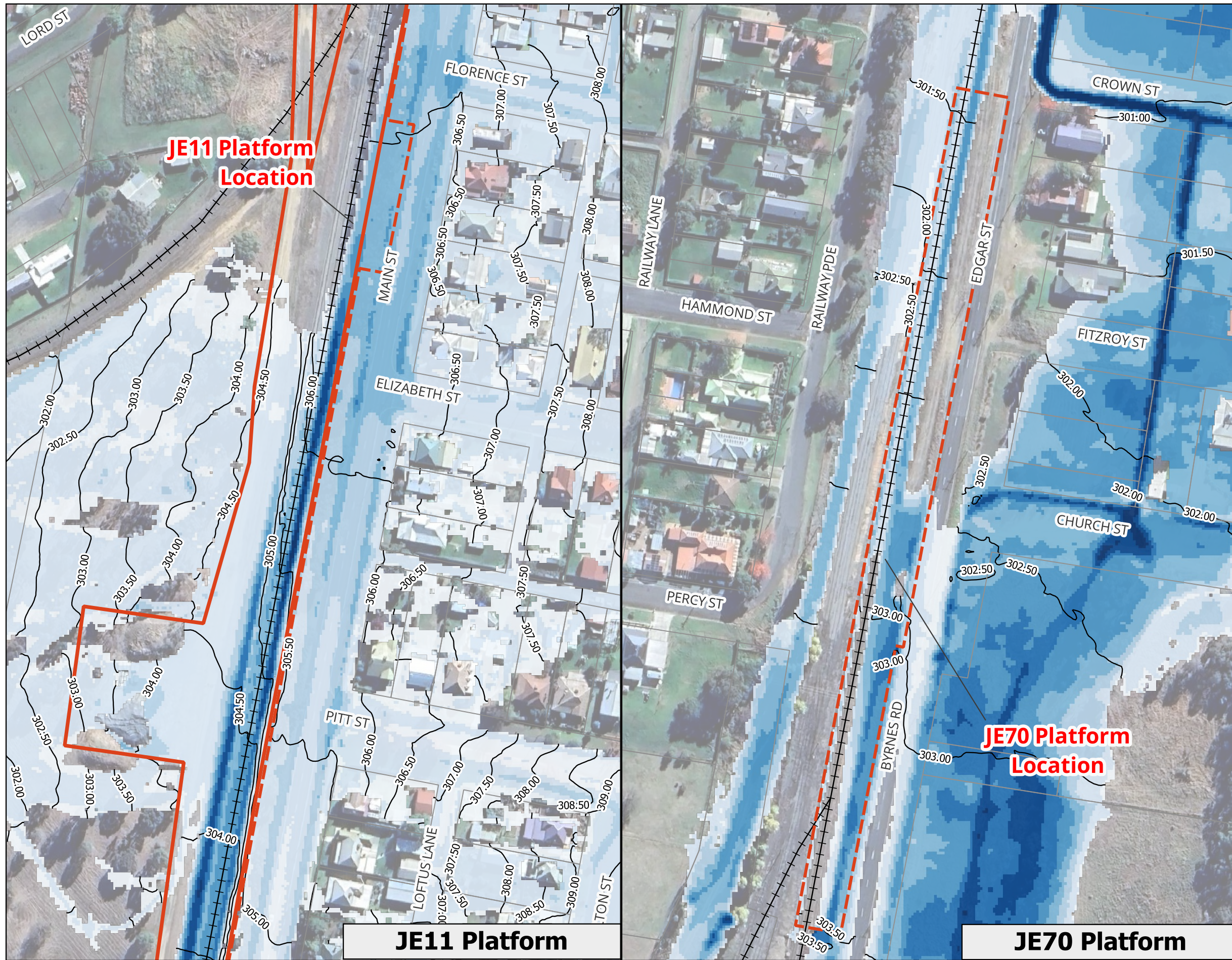
June Drivers Platforms - IFC Stage

Figure A02: 2% AEP Peak Flood Depth and Levels - Existing Condition

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend





- Project Boundary**
- Construction Impact Zone
  - Proposed Construction Impact Zone
  - Cadastre
  - Railway Track


- Peak Flood Level Contours (mAHD)
- Peak Flood Depth (m)**
- <= 0.03
  - 0.03 - 0.2
  - 0.2 - 0.4
  - 0.4 - 0.6
  - 0.6 - 0.8
  - 0.8 - 1.0
  - 1.0 - 1.2
  - > 1.2

Notes:









Legend

Project Boundary

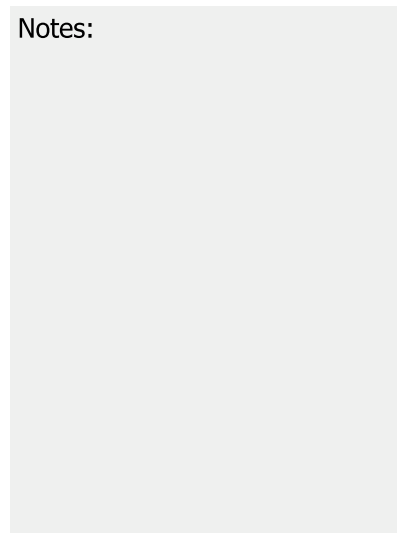
-  Construction Impact Zone
-  Proposed Construction Impact Zone
-  Cadastre
-  Railway Track

 Peak Flood Level Contours (mAHD)

Peak Flood Depth (m)

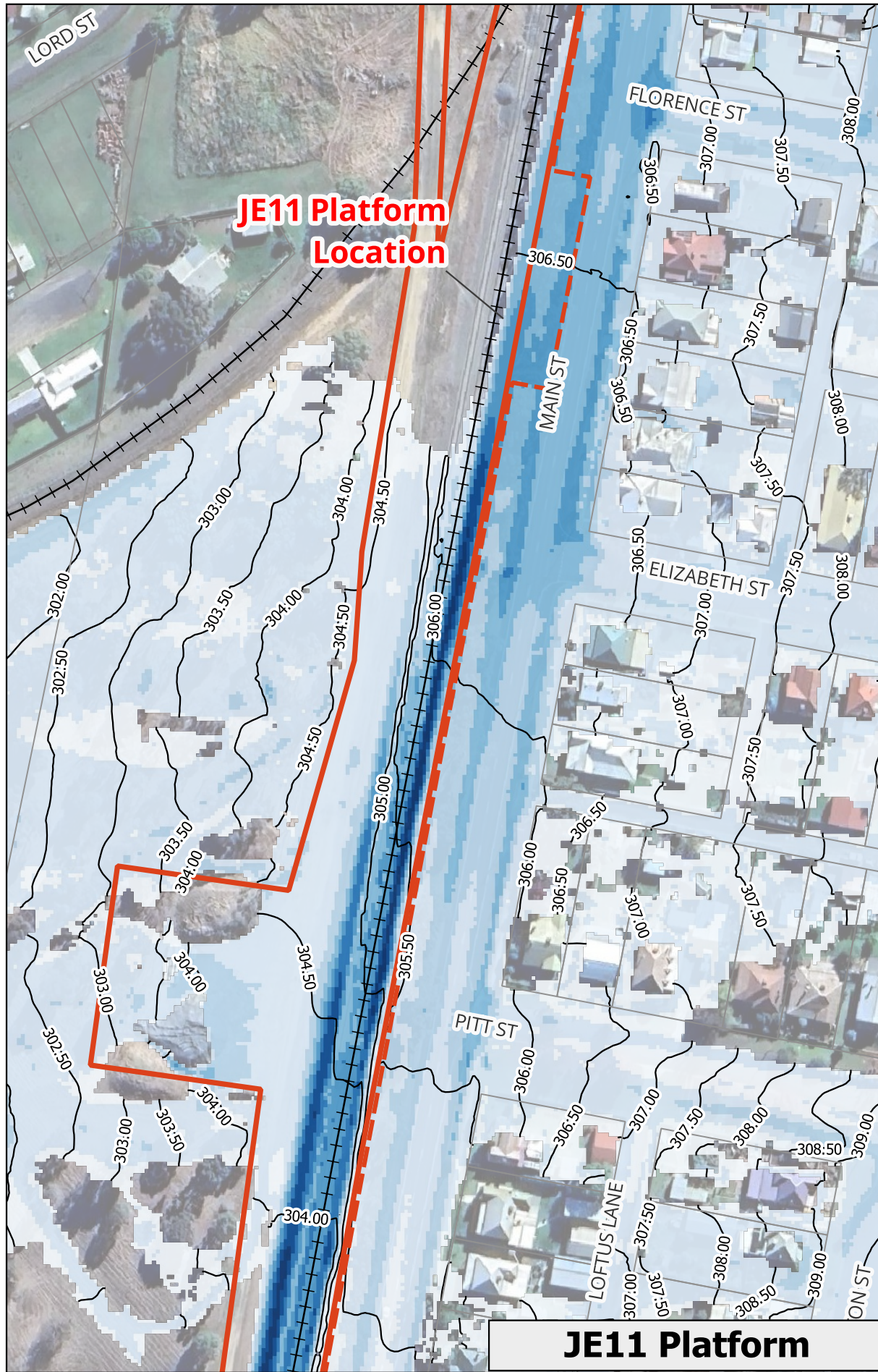
-  <= 0.03
-  0.03 - 0.2
-  0.2 - 0.4
-  0.4 - 0.6
-  0.6 - 0.8
-  0.8 - 1.0
-  1.0 - 1.2
-  > 1.2

Notes:

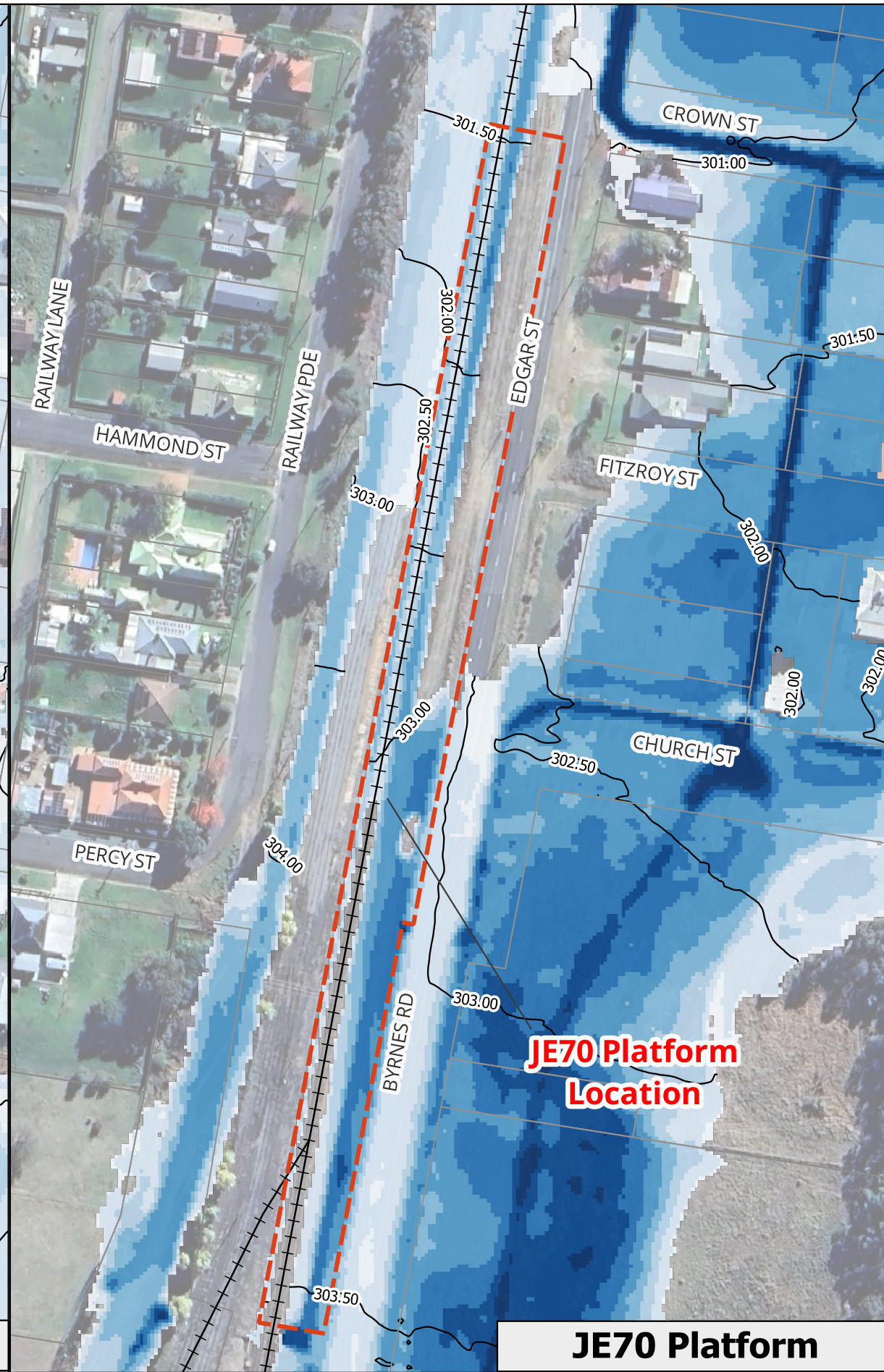


R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_Mapping\IFC.qgz

Map by: TT



**JE11 Platform**



**JE70 Platform**



0 60 120 m

A3  
Scale: 1:1,500

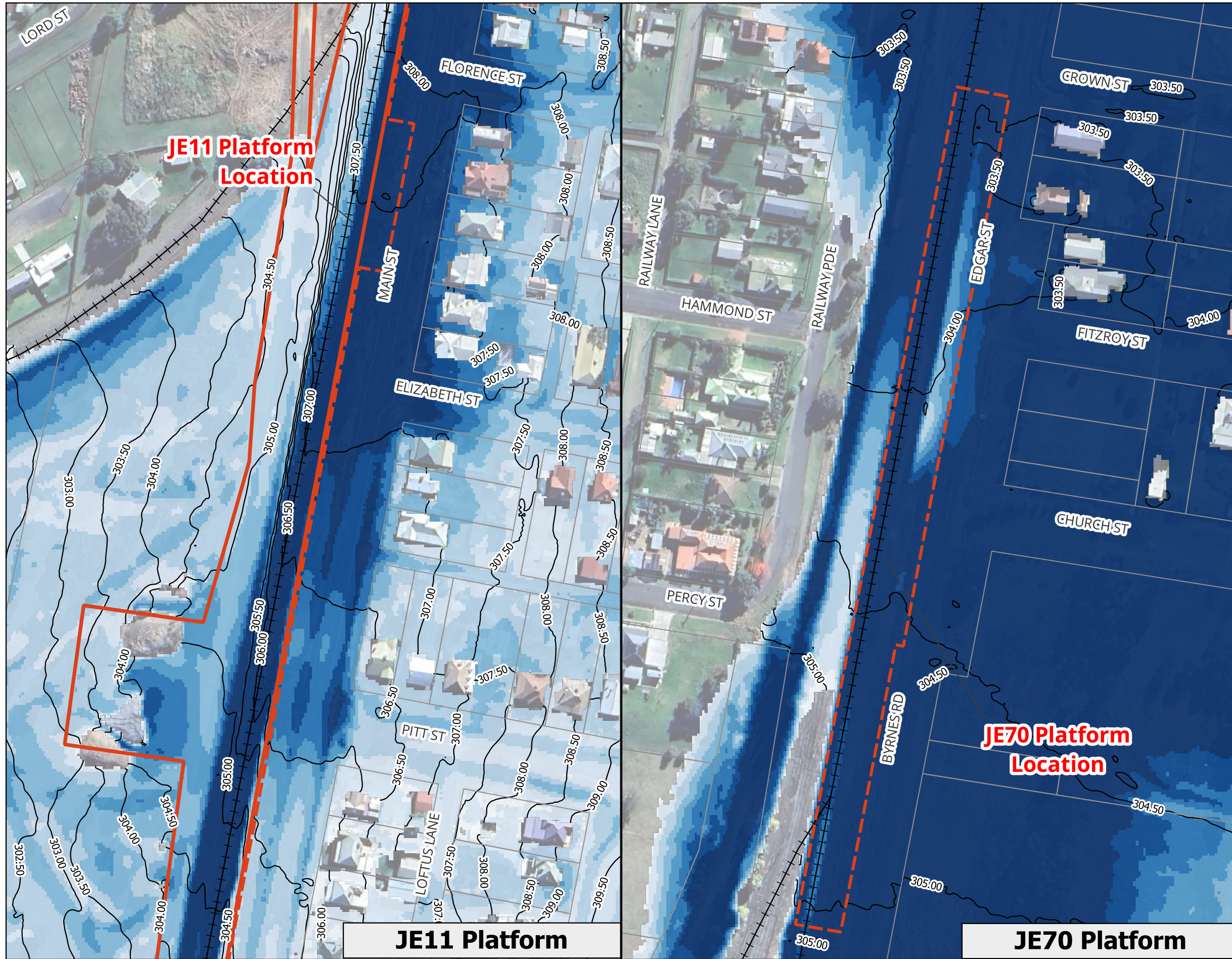
24/9/2025 GDA2020 / MGA zone 55

**June Drivers Platforms - IFC Stage**

**Figure A04: 1% AEP Climate Change Peak Flood Depth and Levels - Existing Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

- Project Boundary**
- Construction Impact Zone
  - Proposed Construction Impact Zone
  - Cadastre
  - Railway Track

- Peak Flood Level Contours (mAHD)
- Peak Flood Depth (m)**
- <= 0.03
  - 0.03 - 0.2
  - 0.2 - 0.4
  - 0.4 - 0.6
  - 0.6 - 0.8
  - 0.8 - 1.0
  - 1.0 - 1.2
  - > 1.2

Notes:



0 60 120 m

A3  
Scale: 1:1,500





24/9/2025 GDA2020 / MGA zone 55

June Drivers Platforms - IFC Stage








Figure A05: PMF Peak Flood Depth and Levels - Existing Condition

Legend

Project Boundary

-  Construction Impact Zone
-  Proposed Construction Impact Zone
-  Cadastre
-  Railway Track

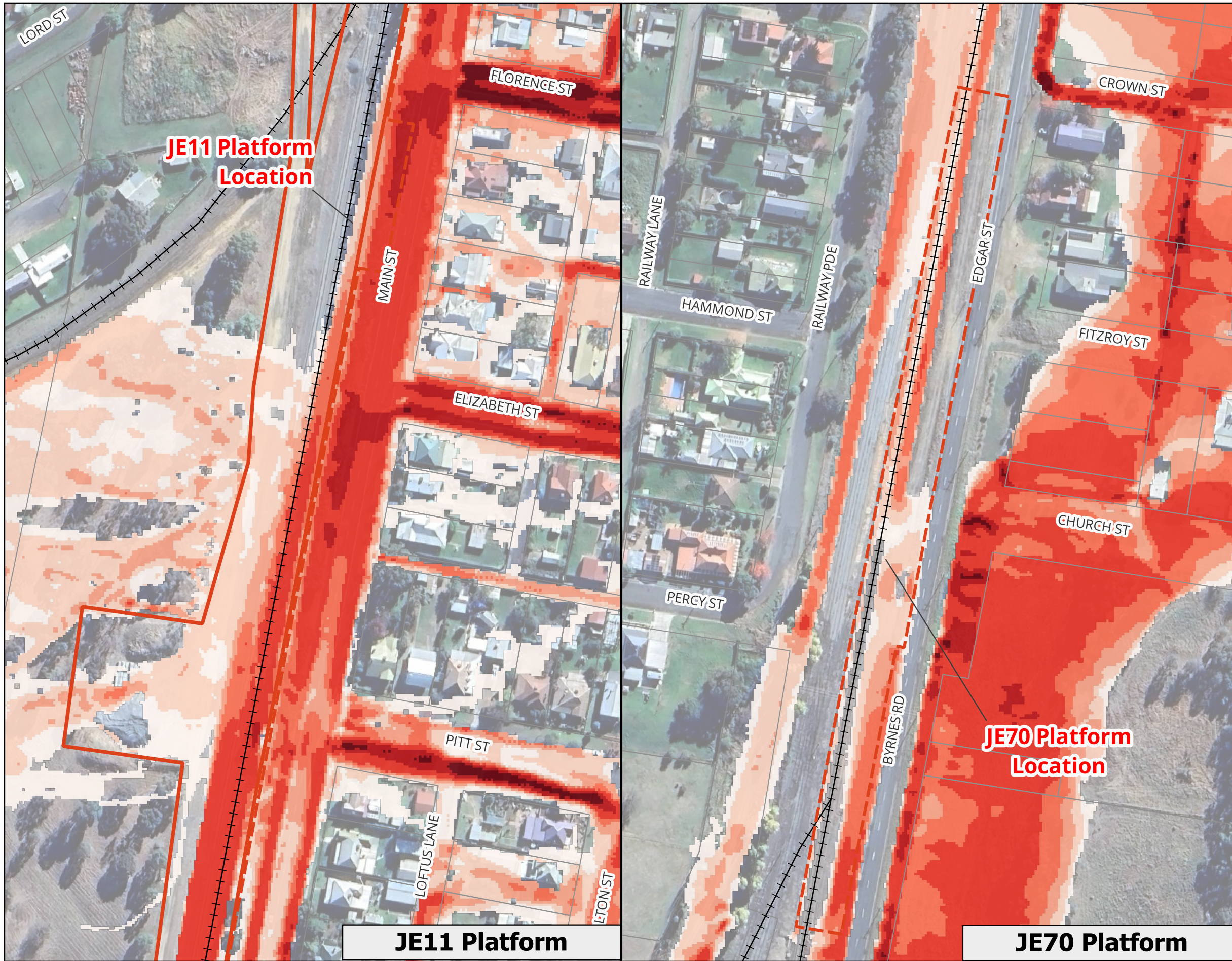
Peak Flood Velocity (m/s)

-  <= 0.25
-  0.25 - 0.5
-  0.5 - 0.75
-  0.75 - 1
-  1 - 1.5
-  1.5 - 2
-  > 2

Notes:

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



0 60 120 m

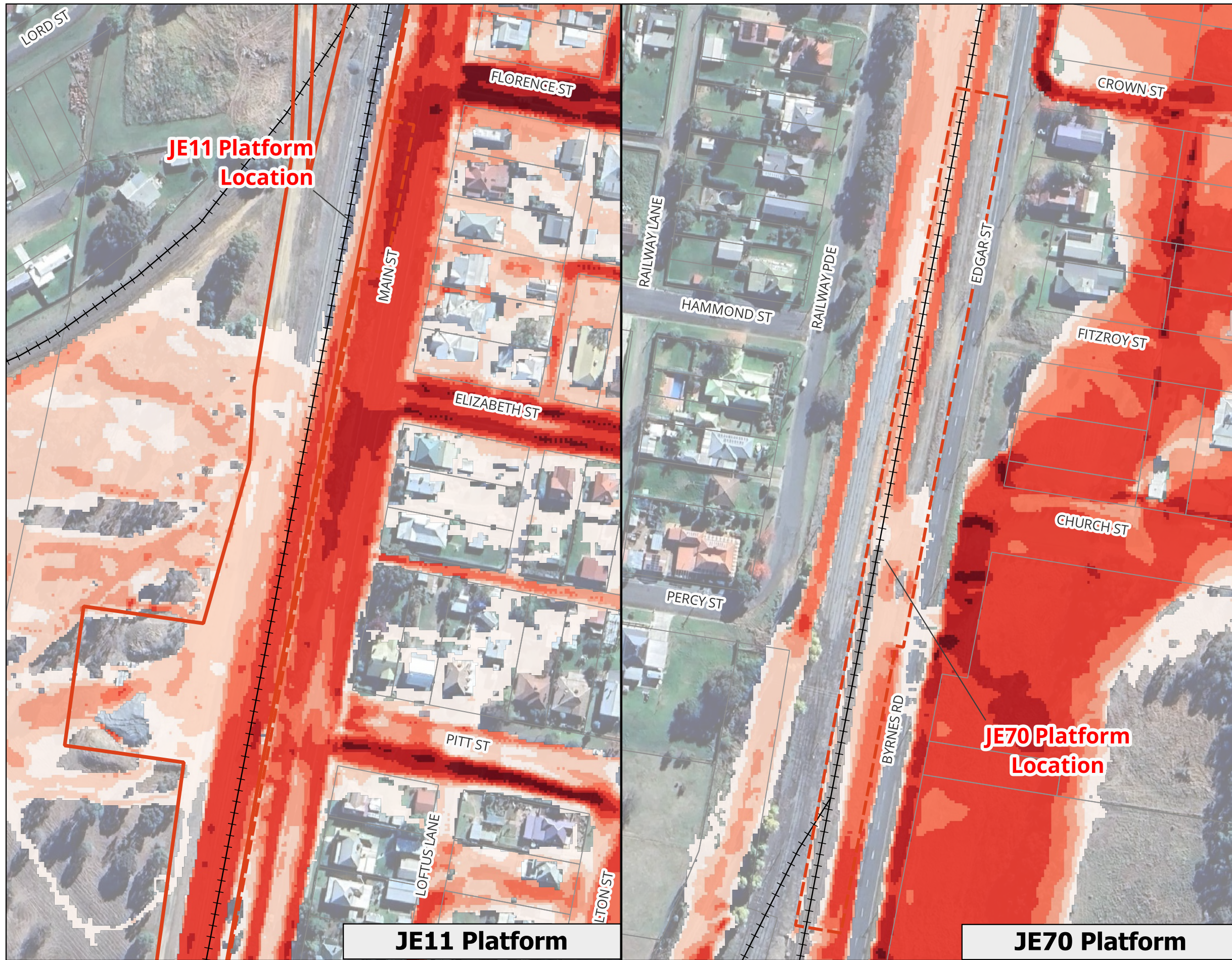
A3  
Scale: 1:1,500

24/9/2025 GDA2020 / MGA zone 55

**June Drivers Platforms - IFC Stage**  
**Figure A06: 5% AEP Peak Flood Velocity - Existing Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Railway Track

Peak Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Notes:



0 60 120 m

A3  
Scale: 1:1,500





24/9/2025 GDA2020 / MGA zone 55

June Drivers Platforms - IFC Stage








Figure A07: 2% AEP Peak Flood Velocity - Existing Condition

Legend

Project Boundary

-  Construction Impact Zone
-  Proposed Construction Impact Zone
-  Cadastre
-  Railway Track

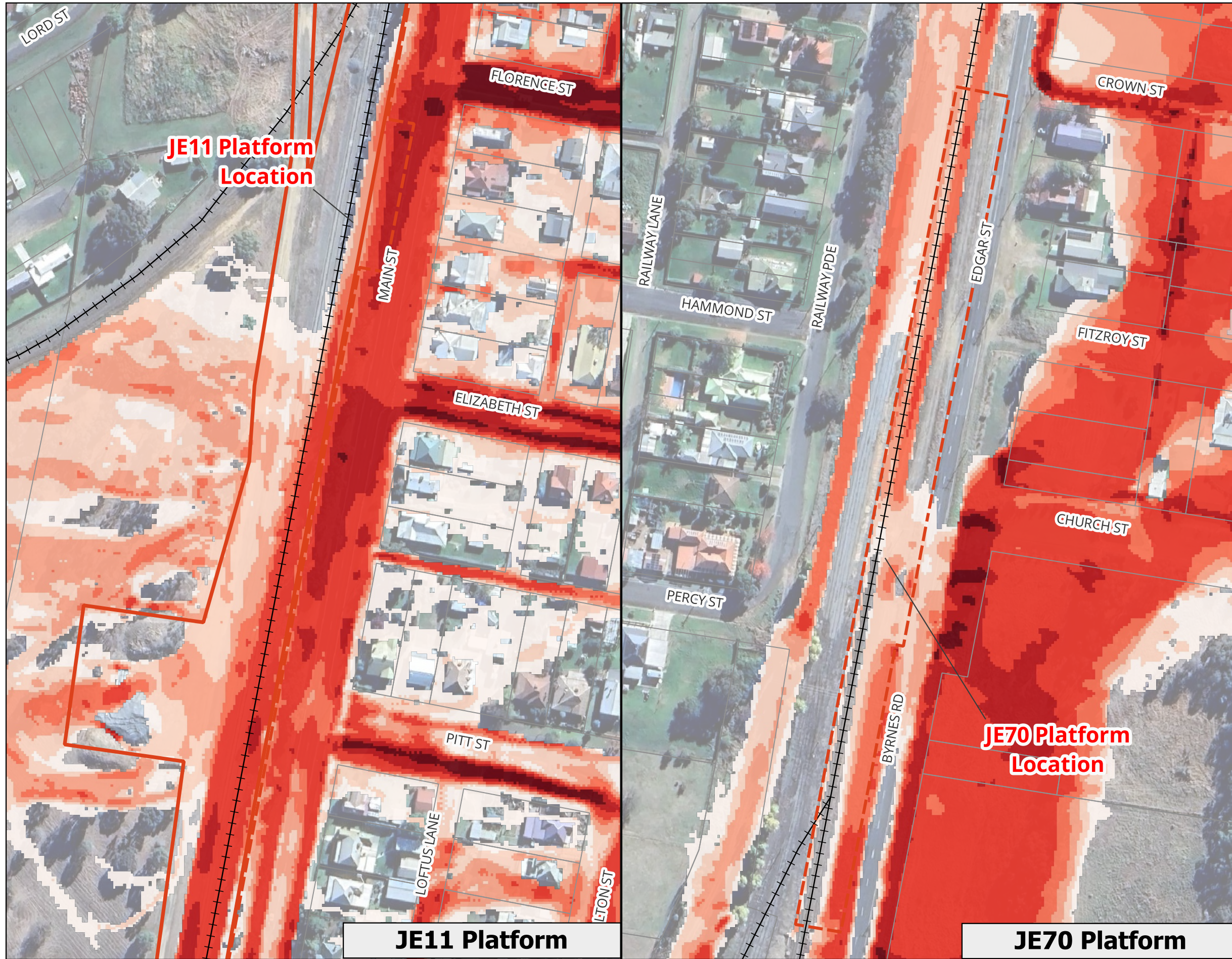
Peak Flood Velocity (m/s)

-  ≤ 0.25
-  0.25 - 0.5
-  0.5 - 0.75
-  0.75 - 1
-  1 - 1.5
-  1.5 - 2
-  > 2

Notes:

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



0 60 120 m

A3  
Scale: 1:1,500





24/9/2025 GDA2020 / MGA zone 55

June Drivers Platforms - IFC Stage








Figure A08: 1% AEP Peak Flood Velocity - Existing Condition

Legend

Project Boundary

-  Construction Impact Zone
-  Proposed Construction Impact Zone
-  Cadastre
-  Railway Track

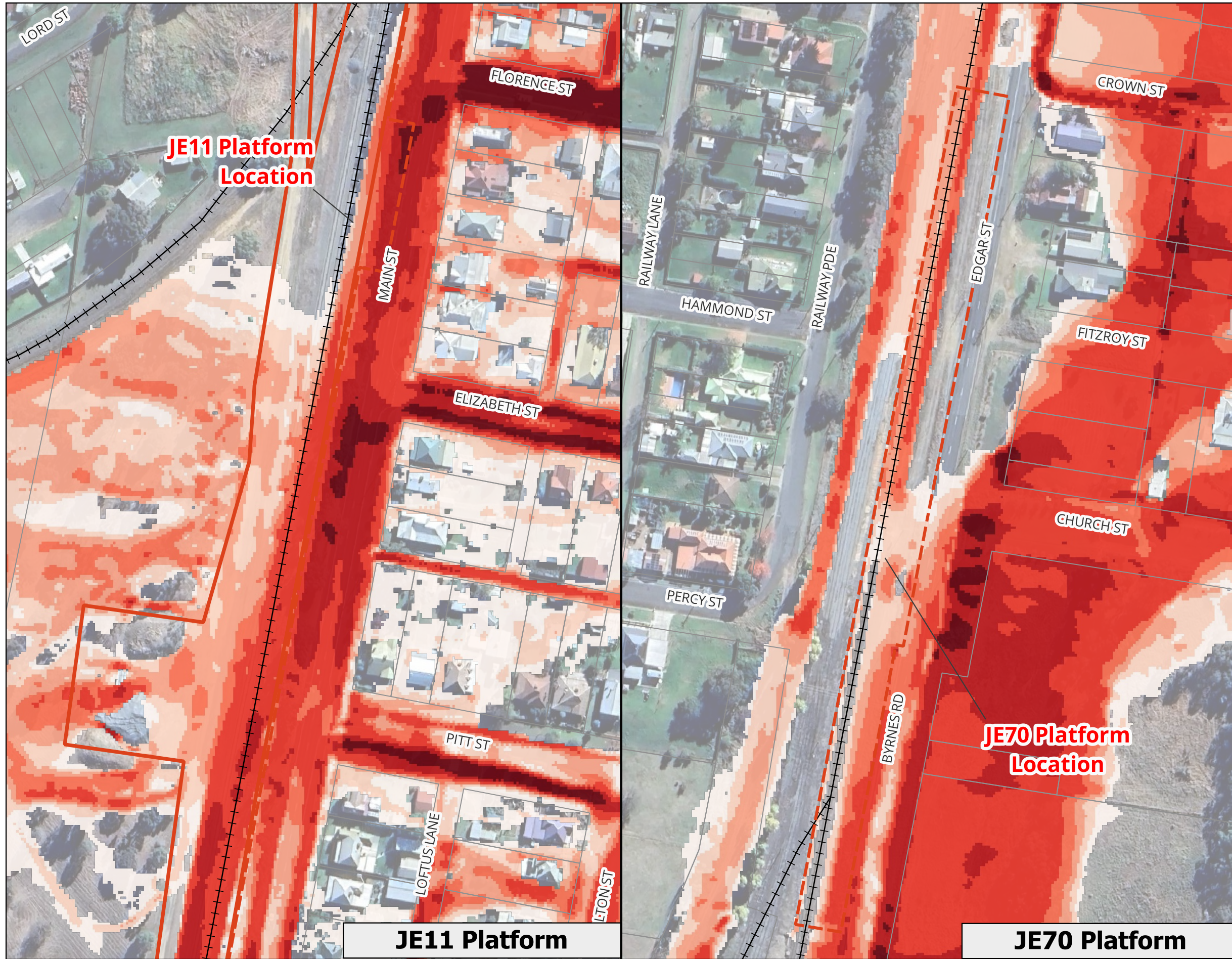
Peak Flood Velocity (m/s)

-  <= 0.25
-  0.25 - 0.5
-  0.5 - 0.75
-  0.75 - 1
-  1 - 1.5
-  1.5 - 2
-  > 2

Notes:

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



JE11 Platform

JE70 Platform



0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

June Drivers Platforms - IFC Stage

Figure A09: 1% AEP Climate Change Peak Flood Velocity - Existing Condition

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Railway Track

Peak Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Notes:







0 60 120 m 24/9/2025 GDA2020 / MGA zone 55







A3  
Scale: 1:1,500

Legend

Project Boundary

-  Construction Impact Zone
-  Proposed Construction Impact Zone
-  Cadastre
-  Railway Track

Peak Flood Hazard

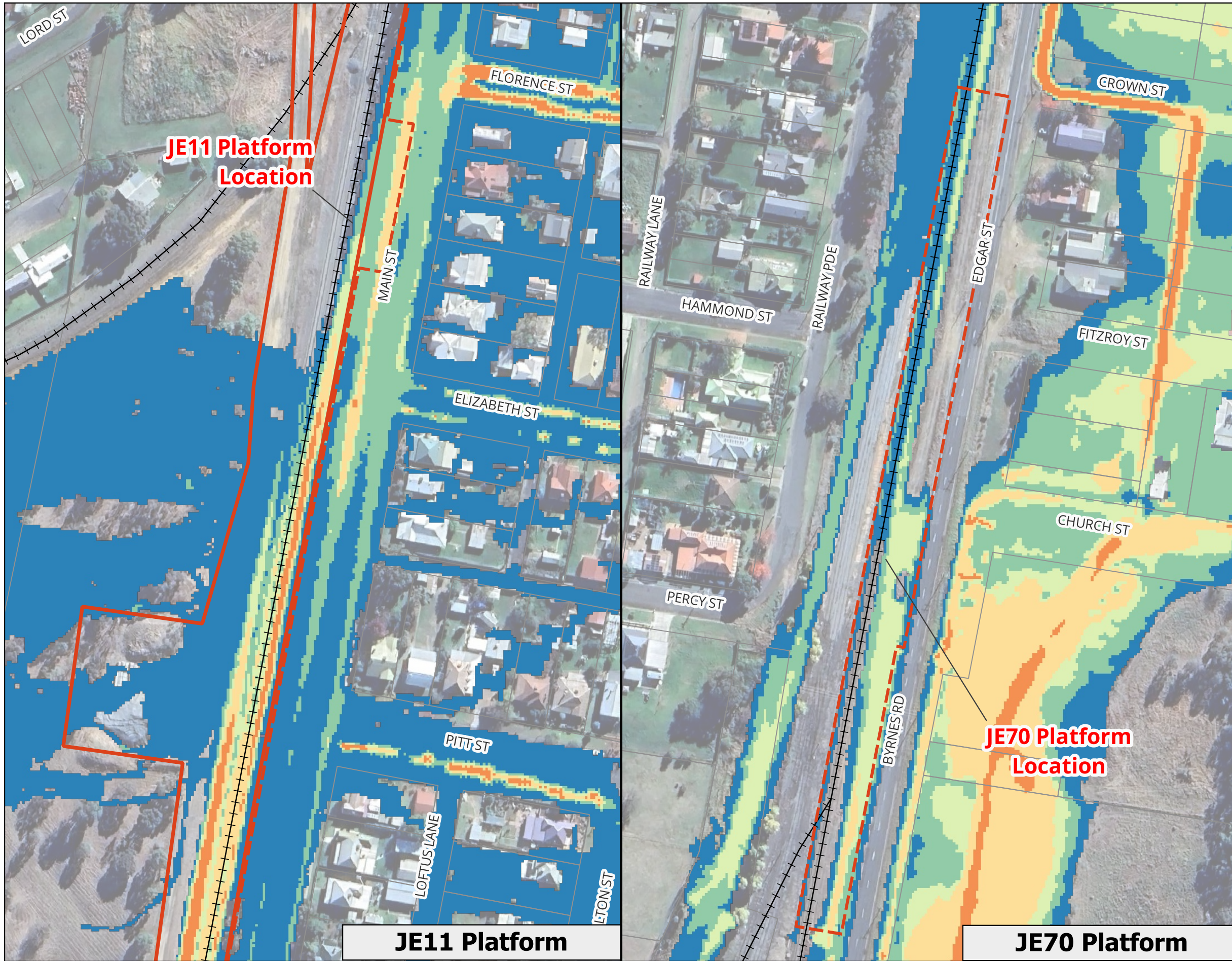
-  H1
-  H2
-  H3
-  H4
-  H5
-  H6

Notes:

Notes:

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



**JE11 Platform**

**JE70 Platform**



0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

**June Drivers Platforms - IFC Stage**  
**Figure A11: 5% AEP Peak Flood Hazard - Existing Condition**

Legend

- Project Boundary**
- Construction Impact Zone
  - Proposed Construction Impact Zone
  - Cadastre
  - + Railway Track

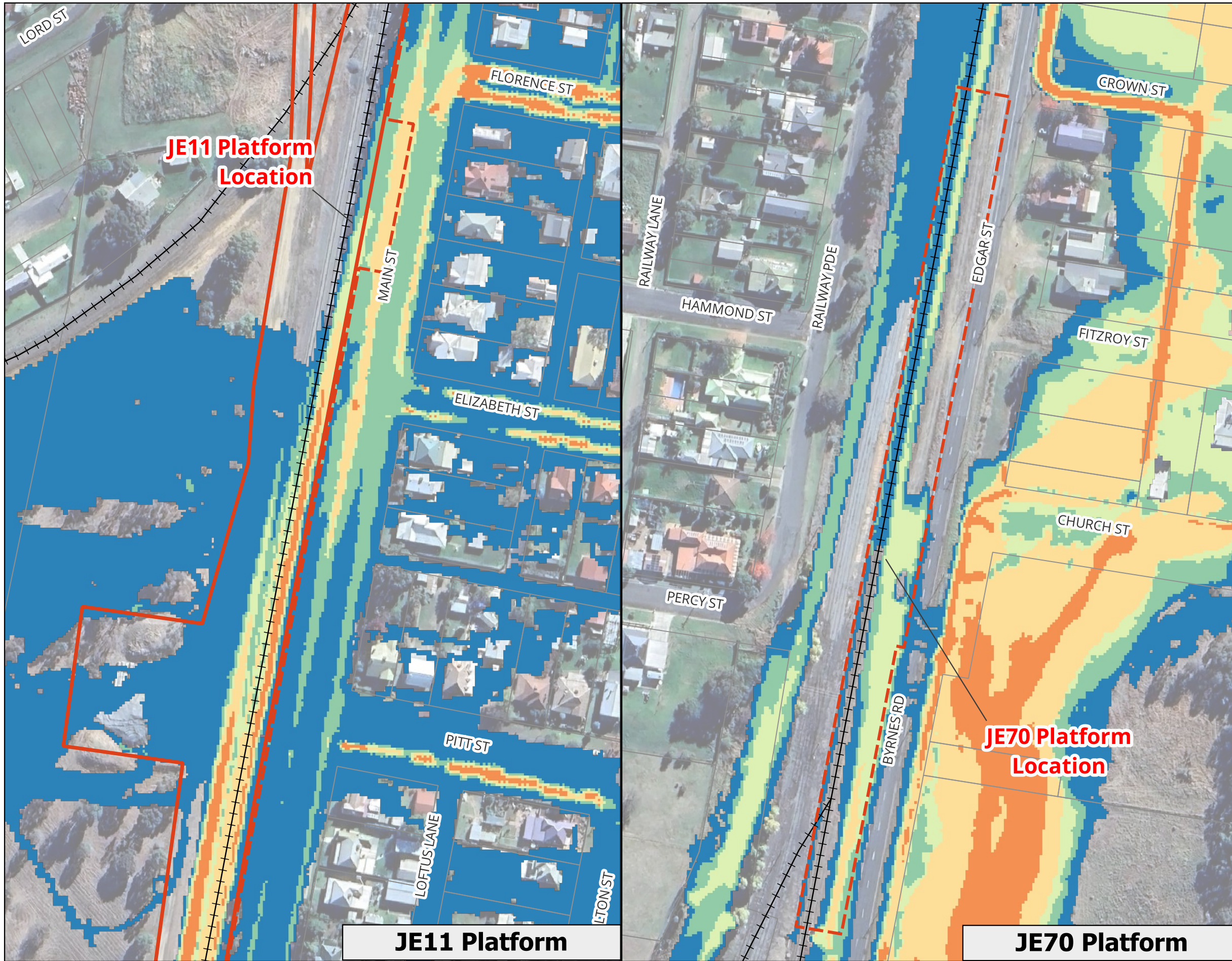
**Peak Flood Hazard**

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



**JE11 Platform**

**JE70 Platform**







0 60 120 m 24/9/2025 GDA2020 / MGA zone 55







A3  
Scale: 1:1,500

**June Drivers Platforms - IFC Stage**  
**Figure A12: 2% AEP Peak Flood Hazard - Existing Condition**

Legend

- Project Boundary**
-  Construction Impact Zone
  -  Proposed Construction Impact Zone
  -  Cadastre
  -  Railway Track

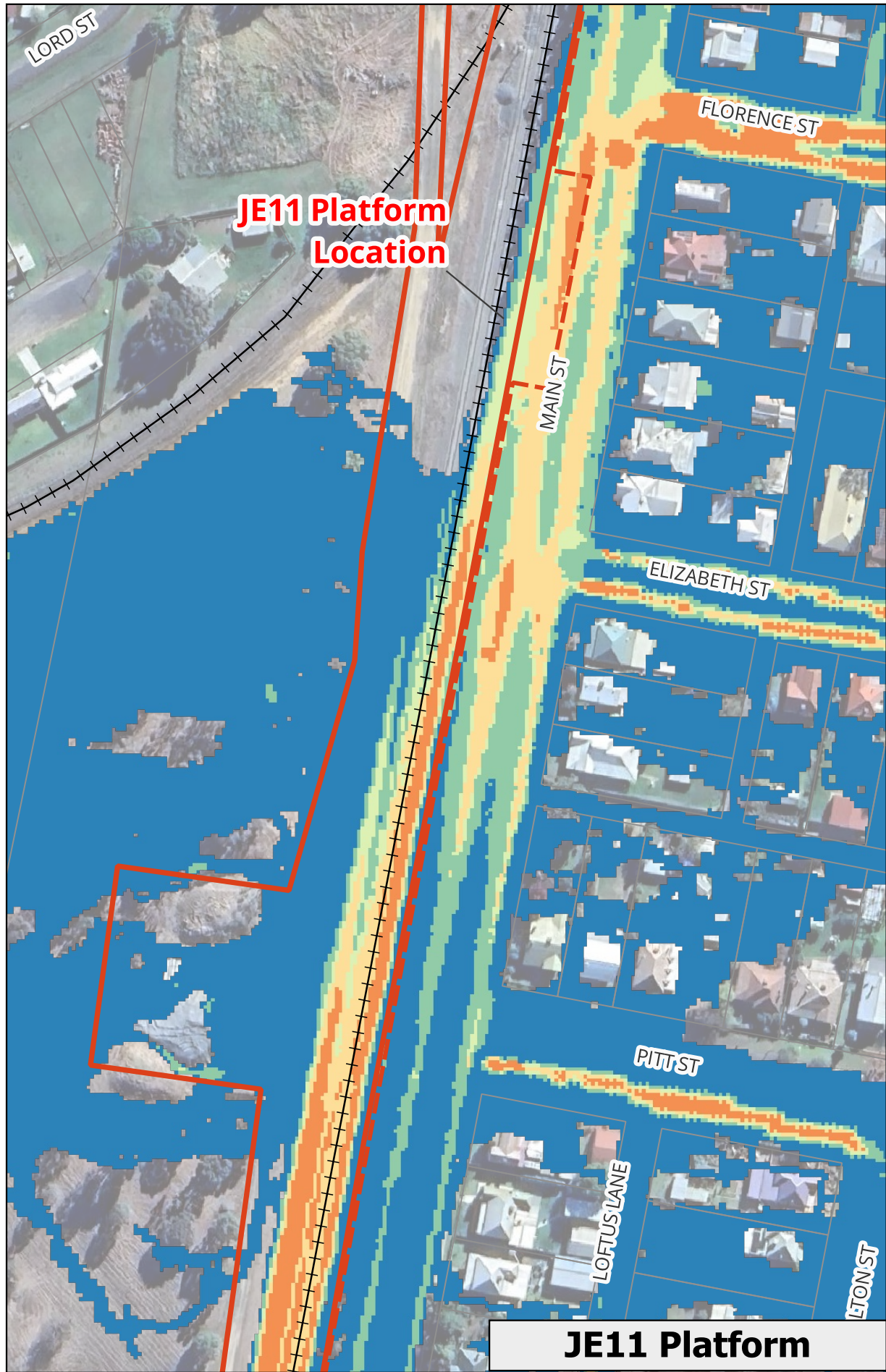
**Peak Flood Hazard**

-  H1
-  H2
-  H3
-  H4
-  H5
-  H6

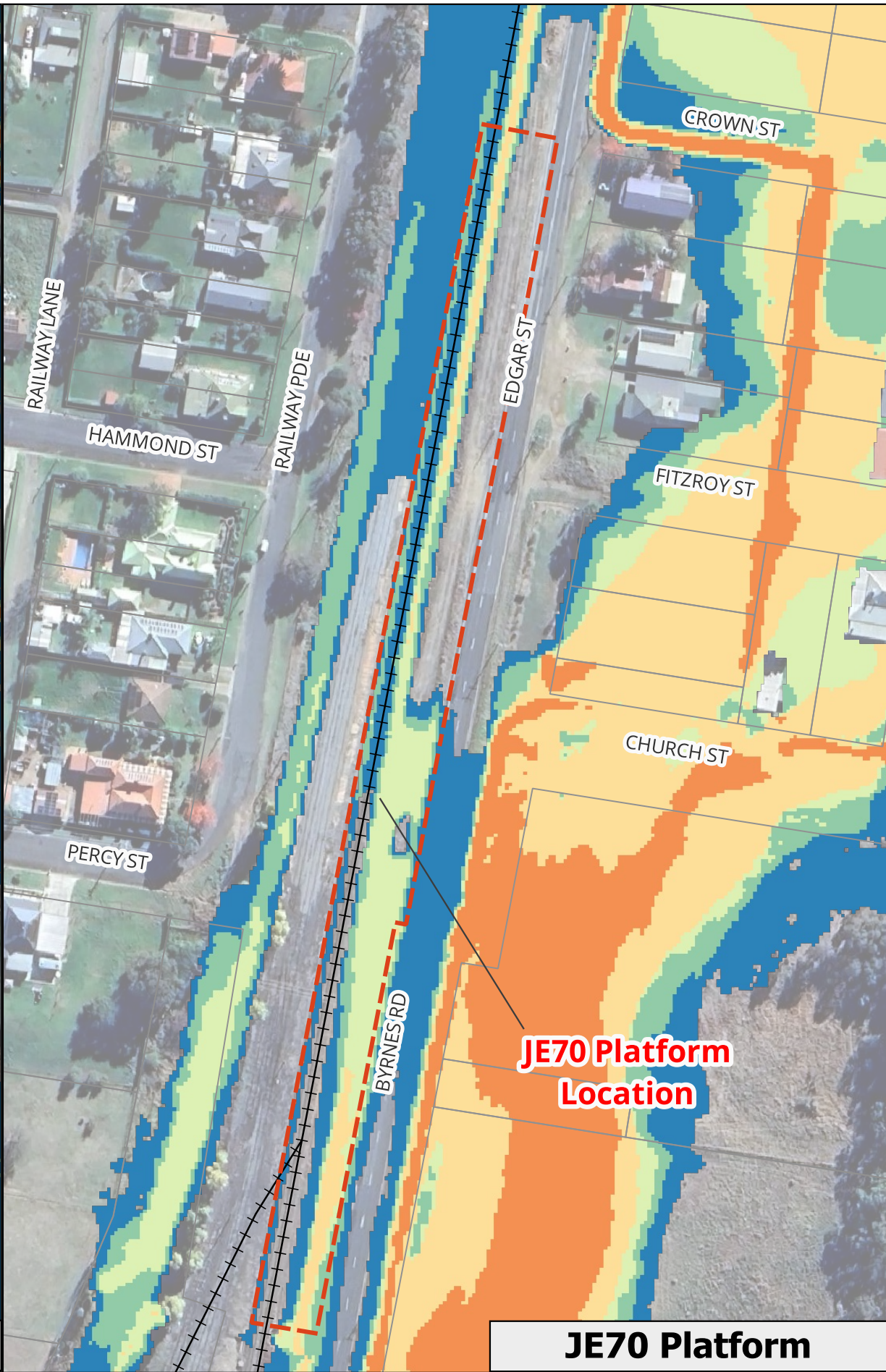
Notes:

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



**JE11 Platform**



**JE70 Platform**







0 60 120 m 24/9/2025 GDA2020 / MGA zone 55







A3  
Scale: 1:1,500

**June Drivers Platforms - IFC Stage**  
**Figure A13: 1% AEP Peak Flood Hazard - Existing Condition**

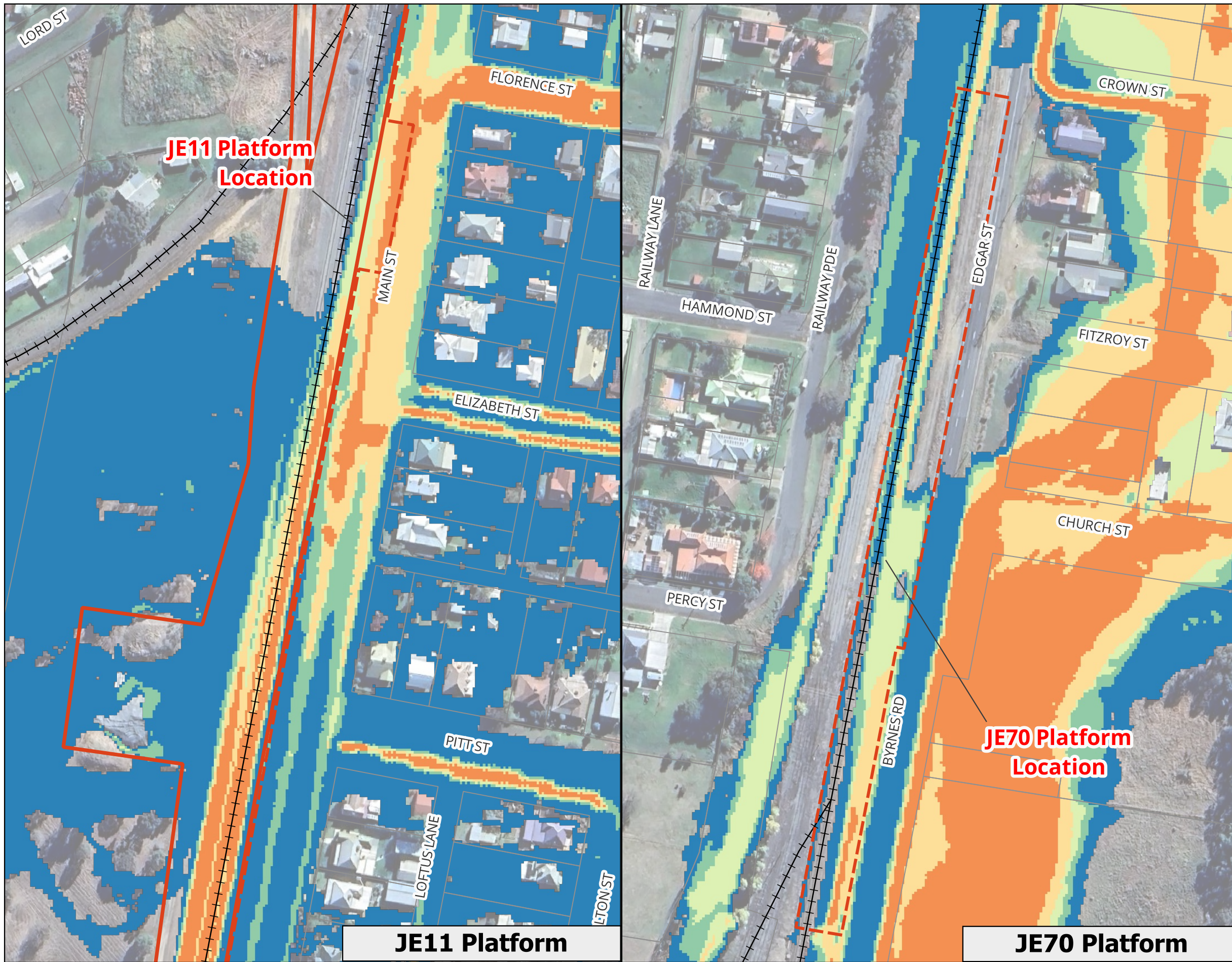
Legend

- Project Boundary**
-  Construction Impact Zone
  -  Proposed Construction Impact Zone
  -  Cadastre
  -  Railway Track

**Peak Flood Hazard**

-  H1
-  H2
-  H3
-  H4
-  H5
-  H6

Notes:



R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT

**JE11 Platform**

**JE70 Platform**



0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

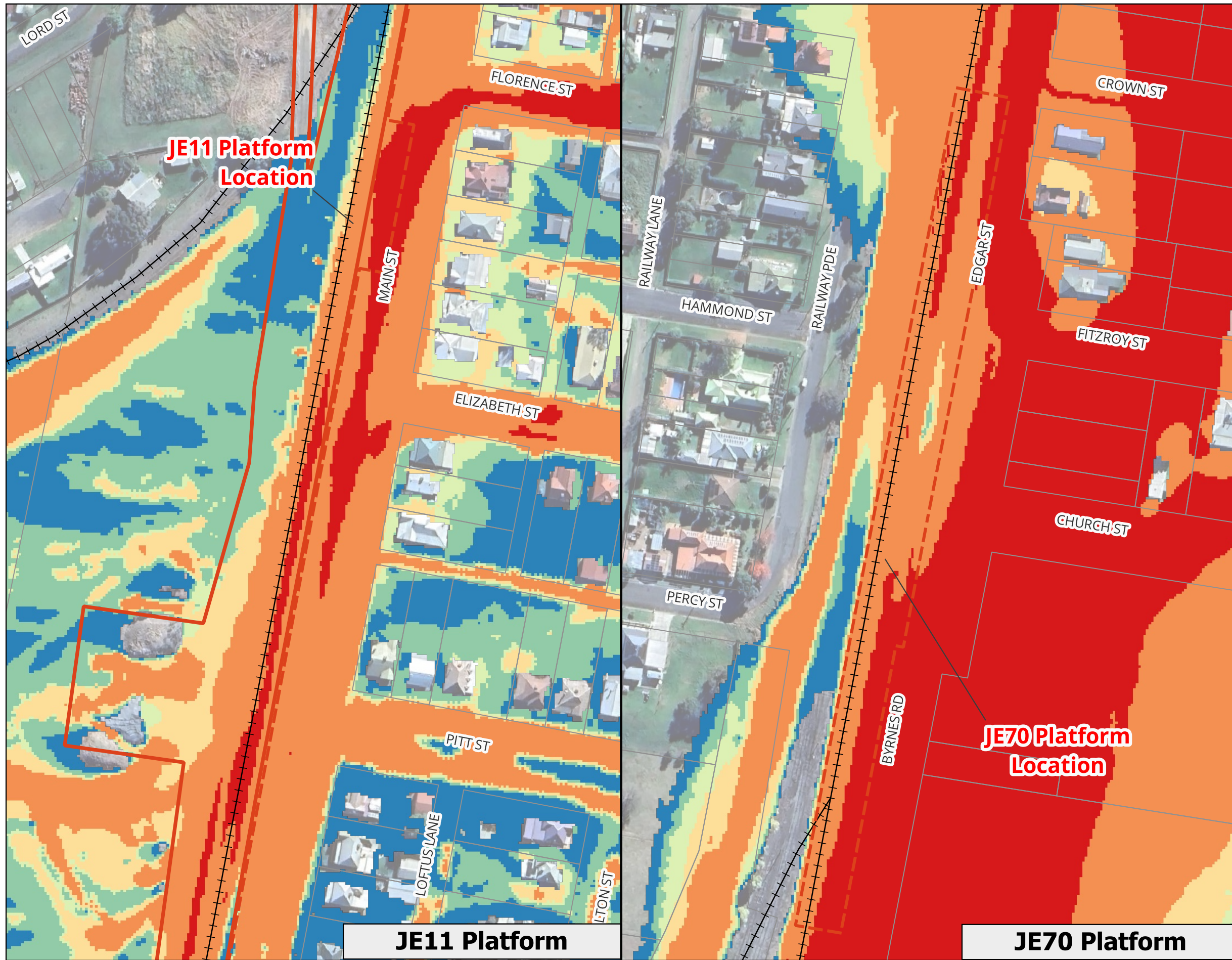
A3  
Scale: 1:1,500

**June Drivers Platforms - IFC Stage**

**Figure A14: 1% AEP Climate Change Peak Flood Hazard - Existing Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Railway Track

Peak Flood Hazard

- H1
- H2
- H3
- H4
- H5
- H6

Notes:



0 60 120 m

A3  
Scale: 1:1,500

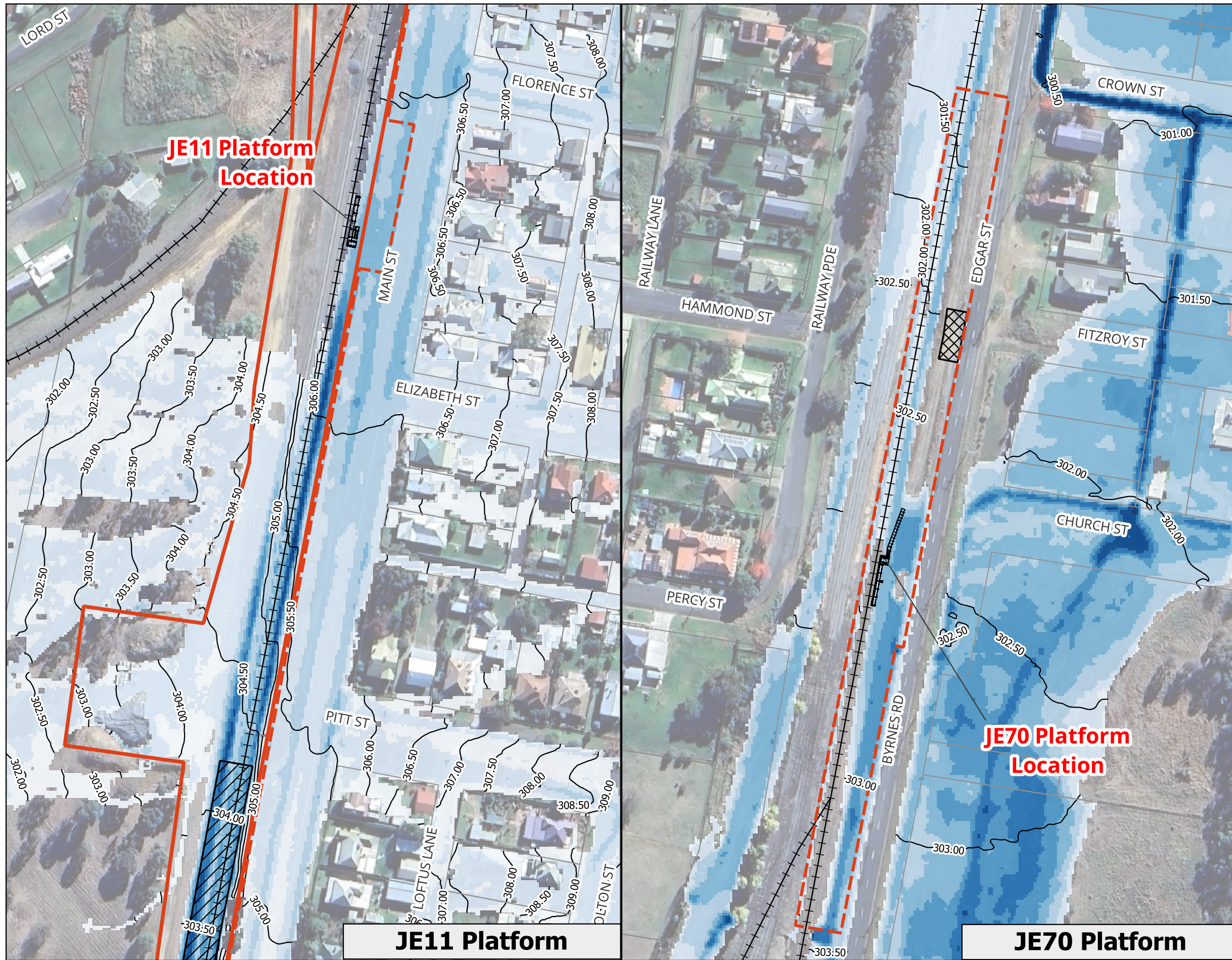
24/9/2025 GDA2020 / MGA zone 55

June Drivers Platforms - IFC Stage

Figure A15: PMF Peak Flood Hazard - Existing Condition

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_Mapping\IFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Level Contours (mAHD)

Peak Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Notes:



0 60 120 m

A3  
Scale: 1:1,500

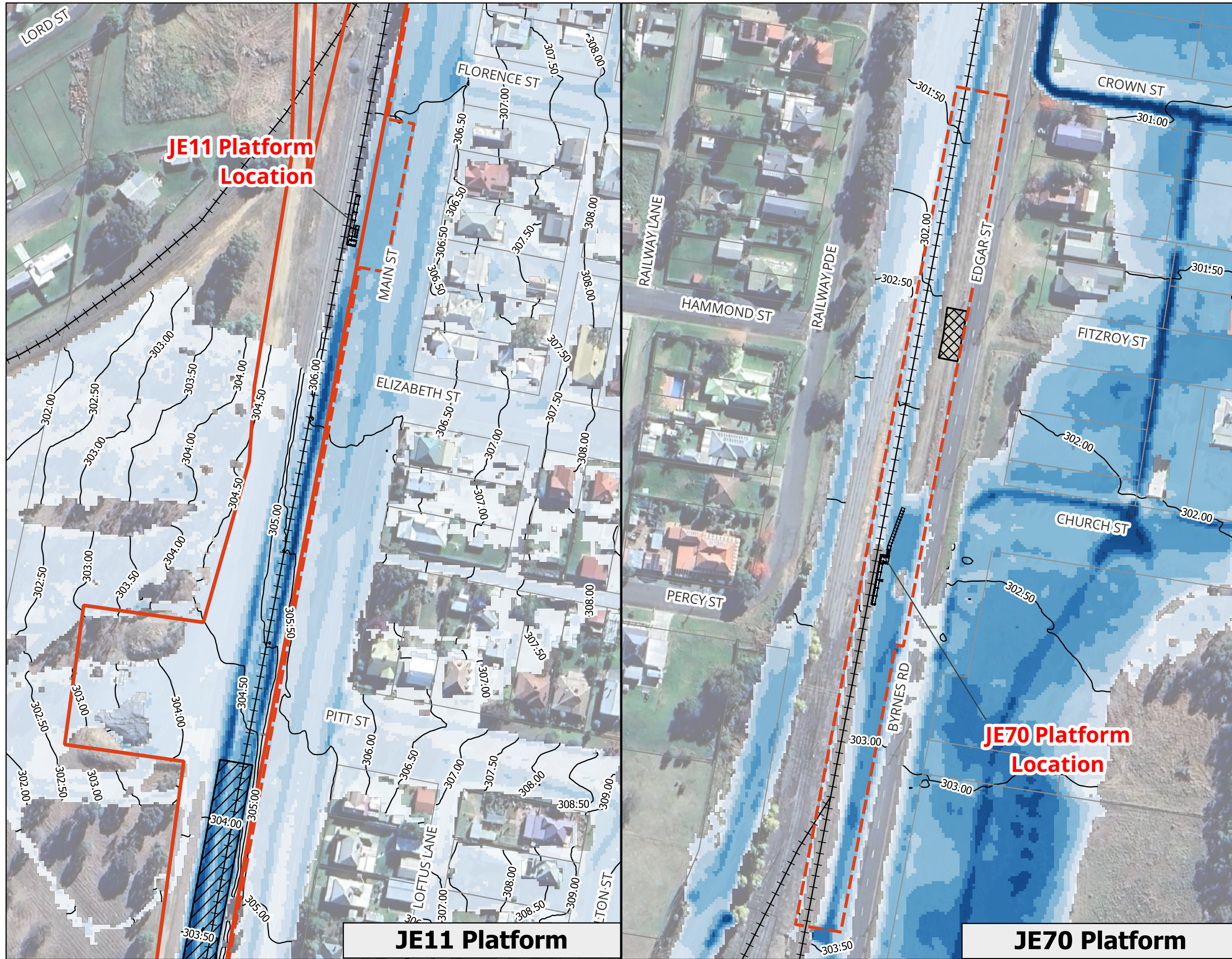
24/9/2025 GDA2020 / MGA zone 55

Junee Drivers Platforms - IFC Stage

Figure A16: 5% AEP Peak Flood Depth and Levels - Design Condition

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_Mapping\FC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Level Contours (mAHD)

Peak Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Notes:



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

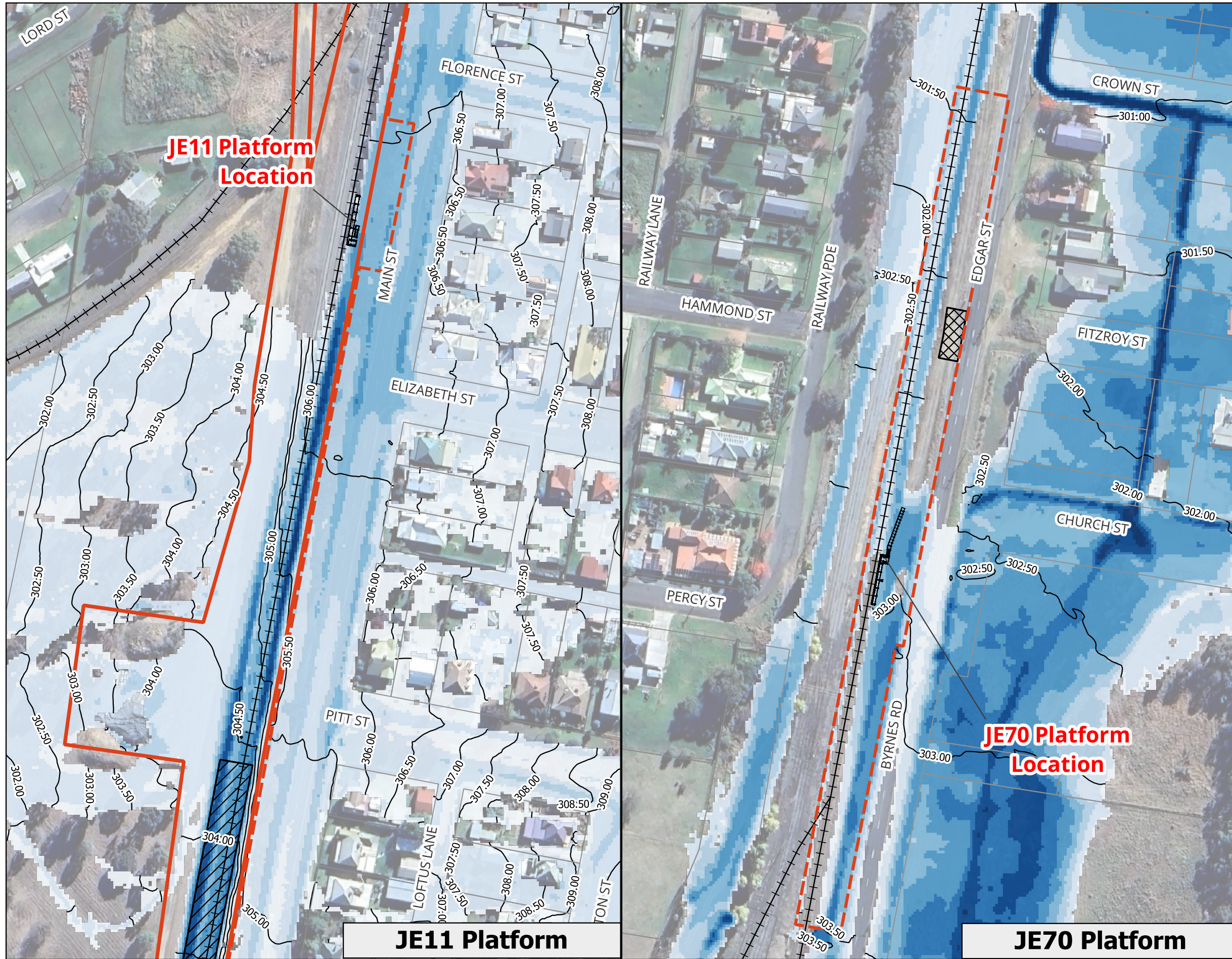
Junee Drivers Platforms - IFC Stage

Figure A17: 2% AEP Peak Flood Depth and Levels - Design Condition

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_Mapping\IFC.qgz

Map by: TT



- Legend**
- Construction Impact Zone
  - Proposed Construction Impact Zone
  - Cadastre
  - Proposed Platform Design
  - Railway Track
  - Junee Yard Site Track Modification Extent
  - Proposed Carpark

- Peak Flood Level Contours (mAHD)
- Peak Flood Depth (m)**
- <= 0.03
  - 0.03 - 0.2
  - 0.2 - 0.4
  - 0.4 - 0.6
  - 0.6 - 0.8
  - 0.8 - 1.0
  - 1.0 - 1.2
  - > 1.2

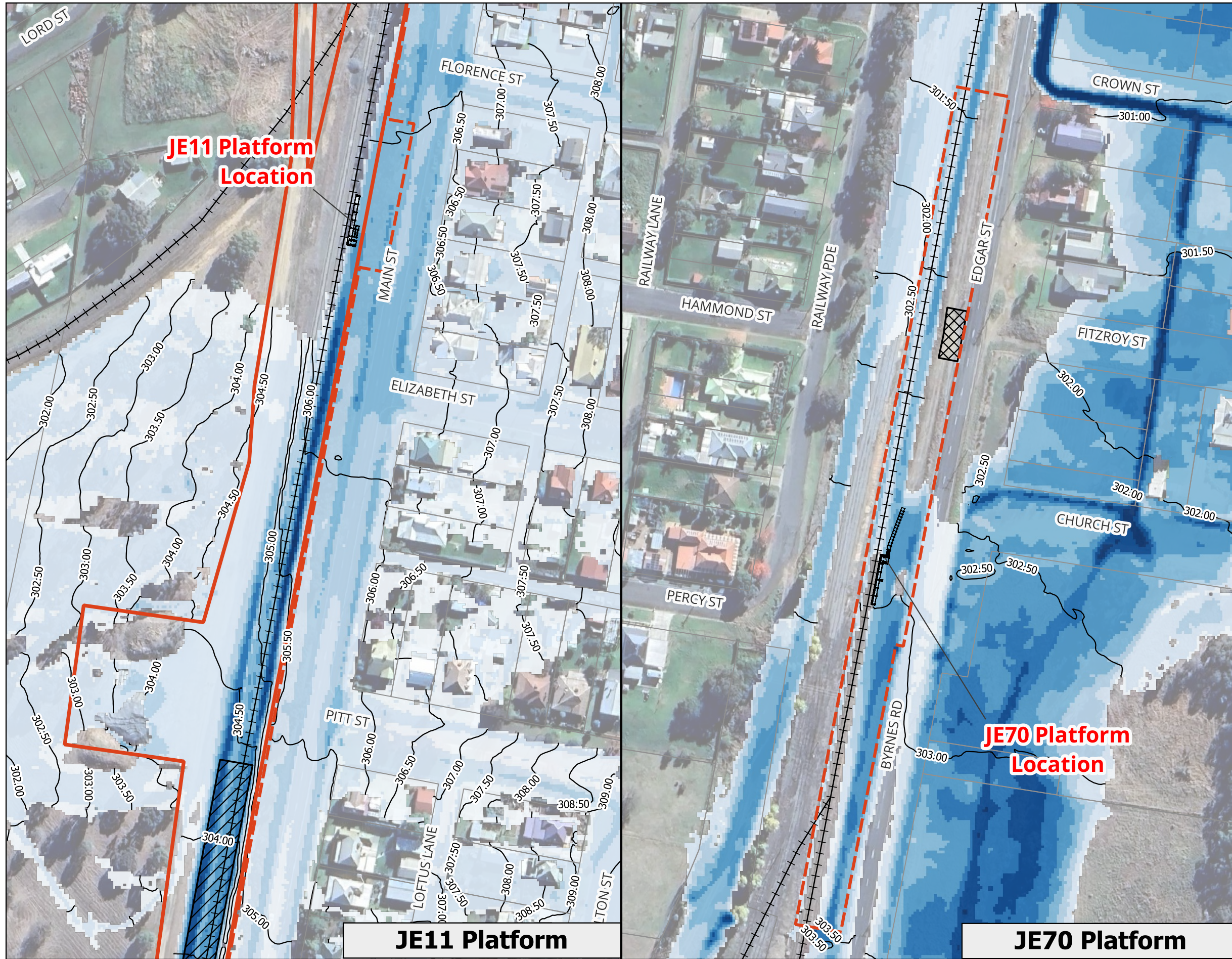
Notes:

**JE11 Platform** **JE70 Platform**

**June Drivers Platforms - IFC Stage**  
**Figure A18: 1% AEP Peak Flood Depth and Levels - Design Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_Mapping\IFC.qgz

Map by: TT



Legend

- Project Boundary**
- Construction Impact Zone
  - Proposed Construction Impact Zone
  - Cadastre
  - Proposed Platform Design
  - Railway Track
  - Junee Yard Site Track Modification Extent
  - Proposed Carpark

Peak Flood Level Contours (mAHD)

**Peak Flood Depth (m)**

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Notes:

**JE11 Platform**

**JE70 Platform**



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

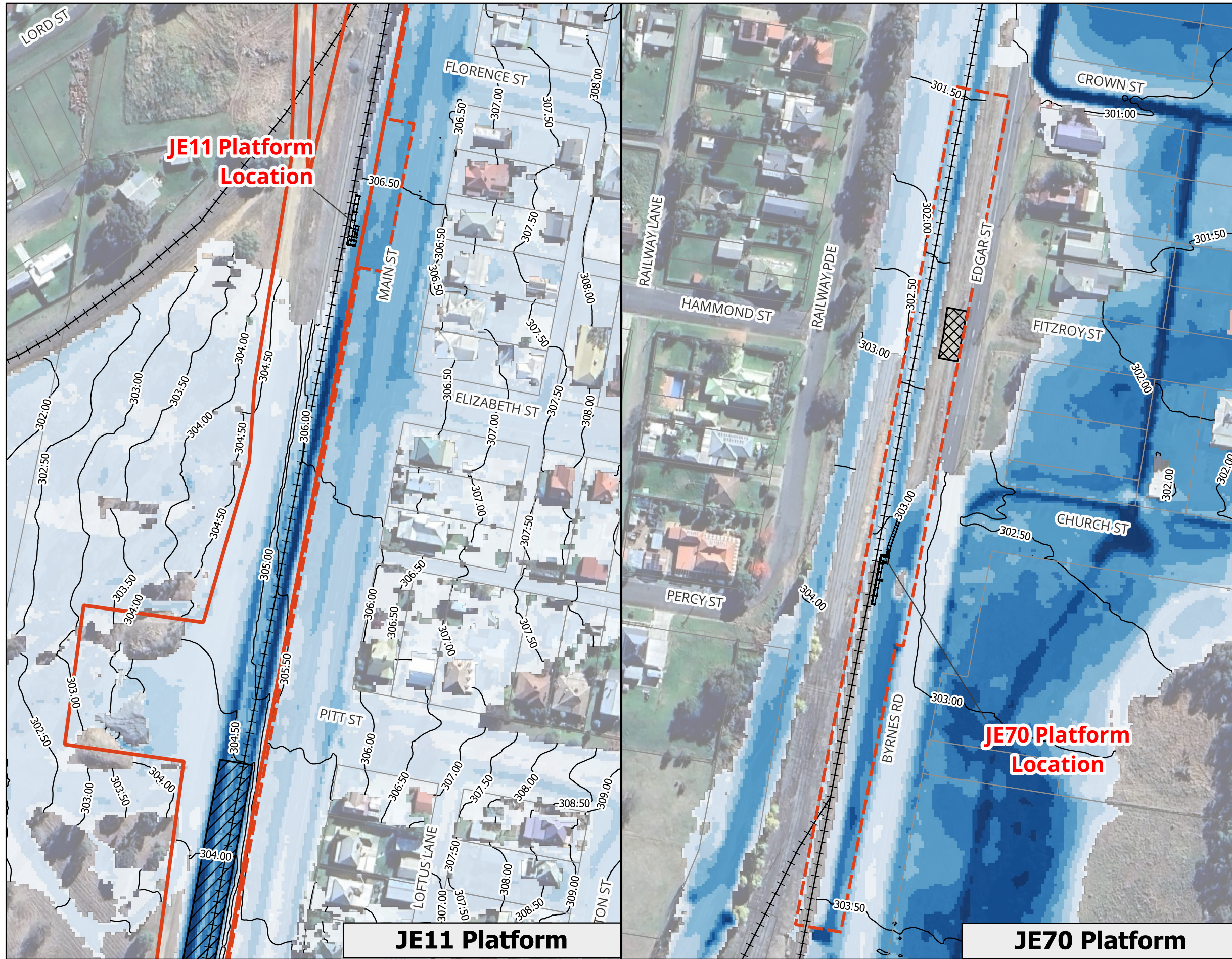
**June Drivers Platforms - IFC Stage**

**Figure A19: 1% AEP Peak Flood Depth and Levels - Design Blockage Condition**

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_Mapping\FC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

— Peak Flood Level Contours (mAHD)

Peak Flood Depth (m)

- <= 0.03
- 0.03 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

Notes:



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

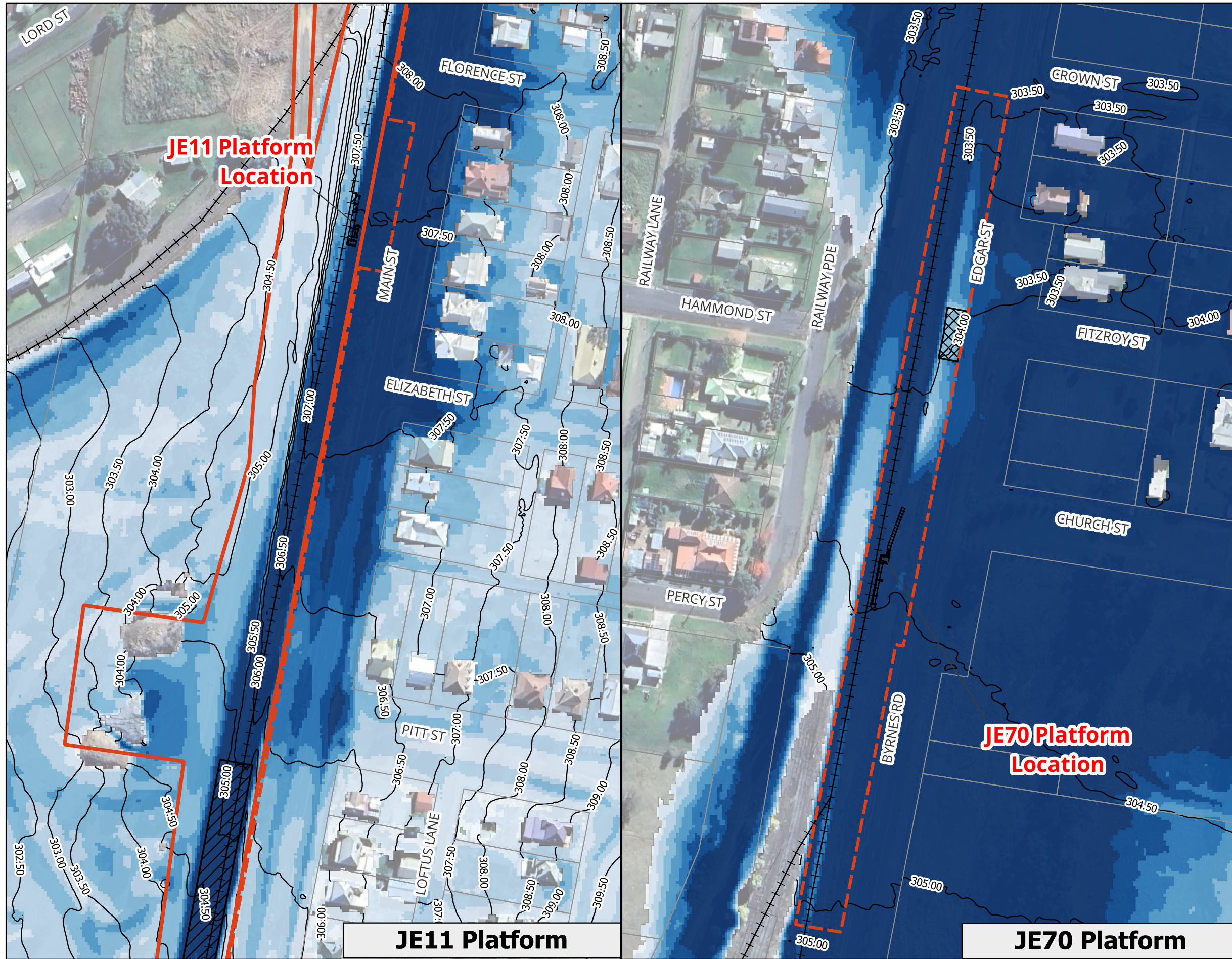
Junee Drivers Platforms - IFC Stage

Figure A20: 1% AEP Climate Change Peak Flood Depth and Levels - Design Condition

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



- Legend**
- Project Boundary
  - Construction Impact Zone
  - Proposed Construction Impact Zone
  - Cadastre
  - Proposed Platform Design
  - Railway Track
  - Junee Yard Site Track Modification Extent
  - Proposed Carpark

- Peak Flood Level Contours (mAHD)
- Peak Flood Depth (m)**
- <= 0.03
  - 0.03 - 0.2
  - 0.2 - 0.4
  - 0.4 - 0.6
  - 0.6 - 0.8
  - 0.8 - 1.0
  - 1.0 - 1.2
  - > 1.2

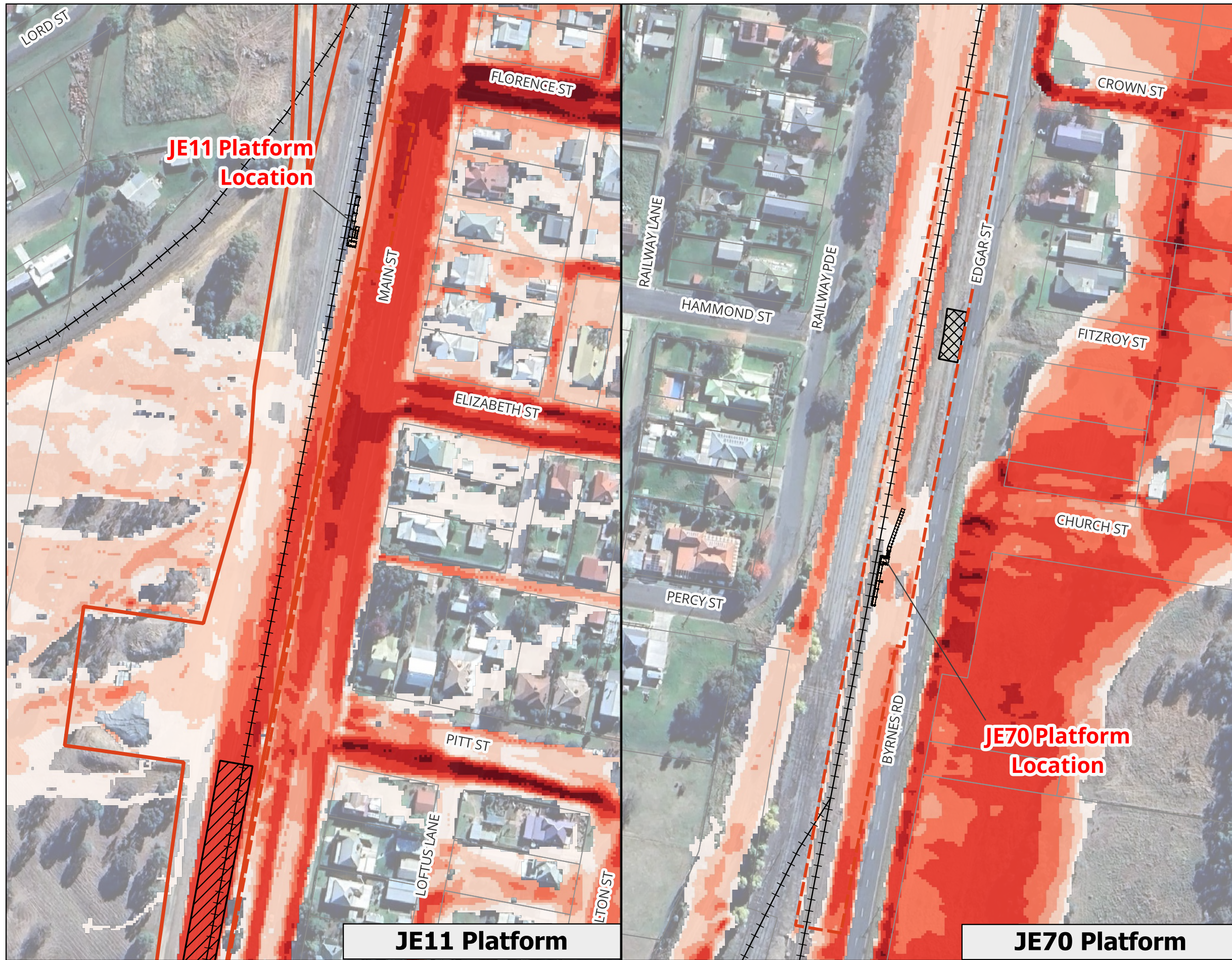
Notes:



**June Drivers Platforms - IFC Stage**  
**Figure A21: PMF Peak Flood Depth and Levels - Design Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Notes:

**JE11 Platform**

**JE70 Platform**



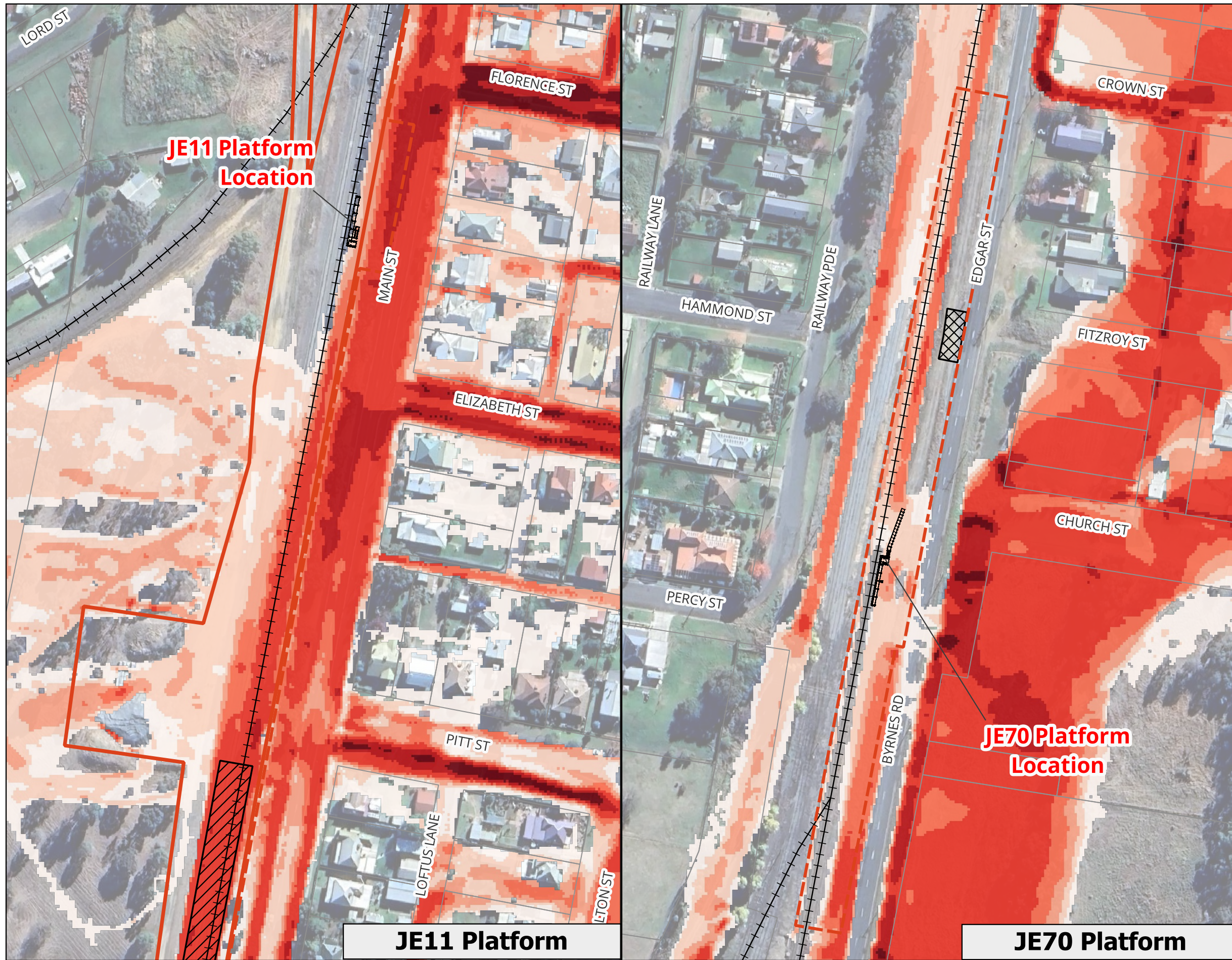
0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

**June Drivers Platforms - IFC Stage**  
**Figure A22: 5% AEP Peak Flood Velocity - Design Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

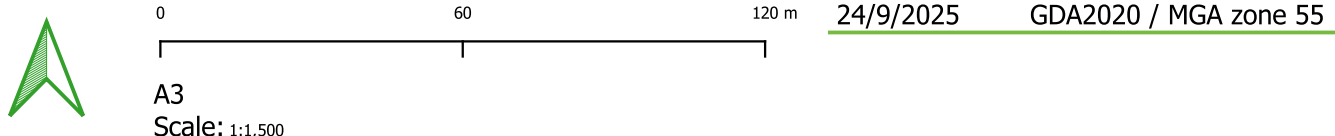
Peak Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Notes:

**JE11 Platform**

**JE70 Platform**

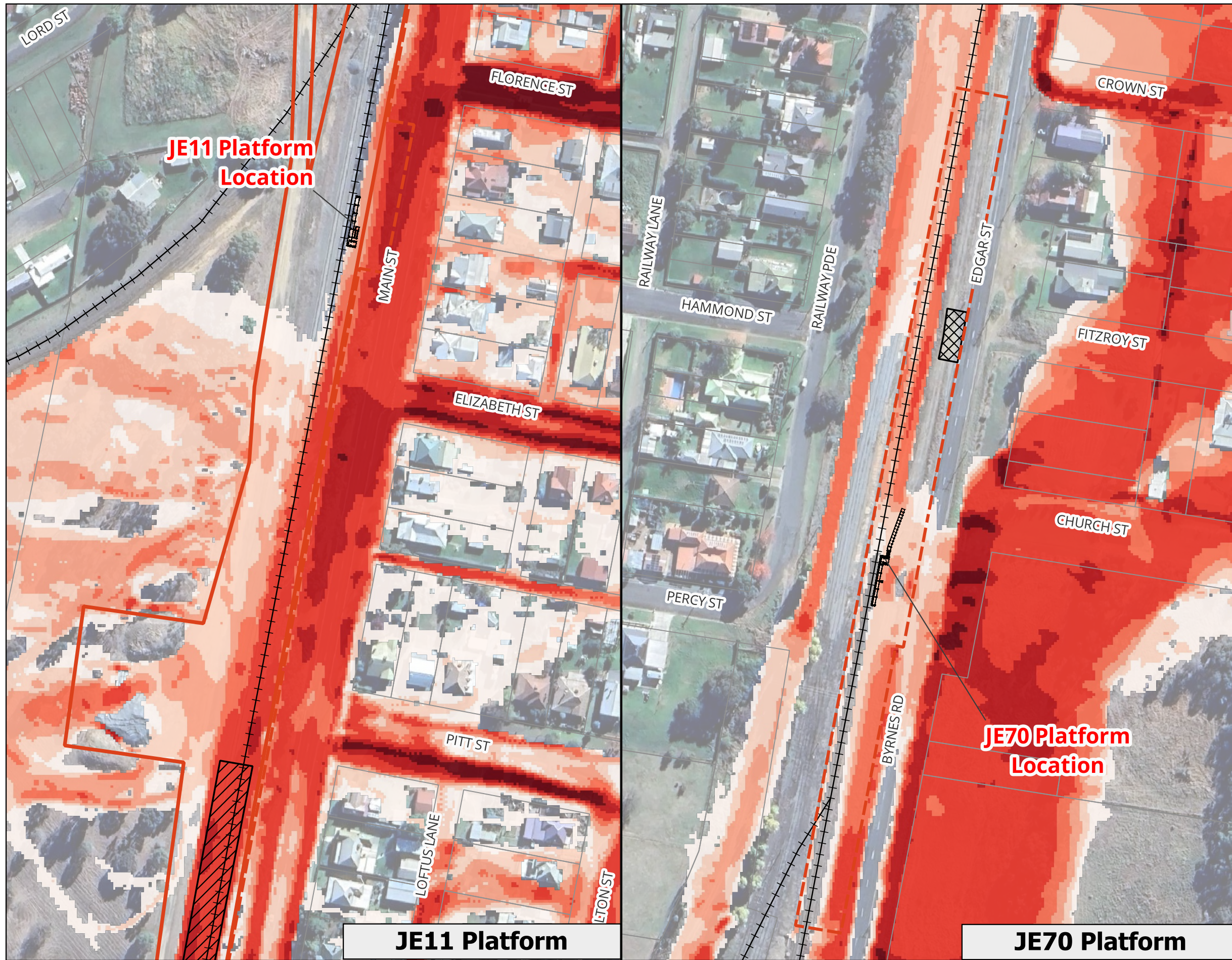


**Junee Drivers Platforms - IFC Stage**

**Figure A23: 2% AEP Peak Flood Velocity - Design Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Notes:

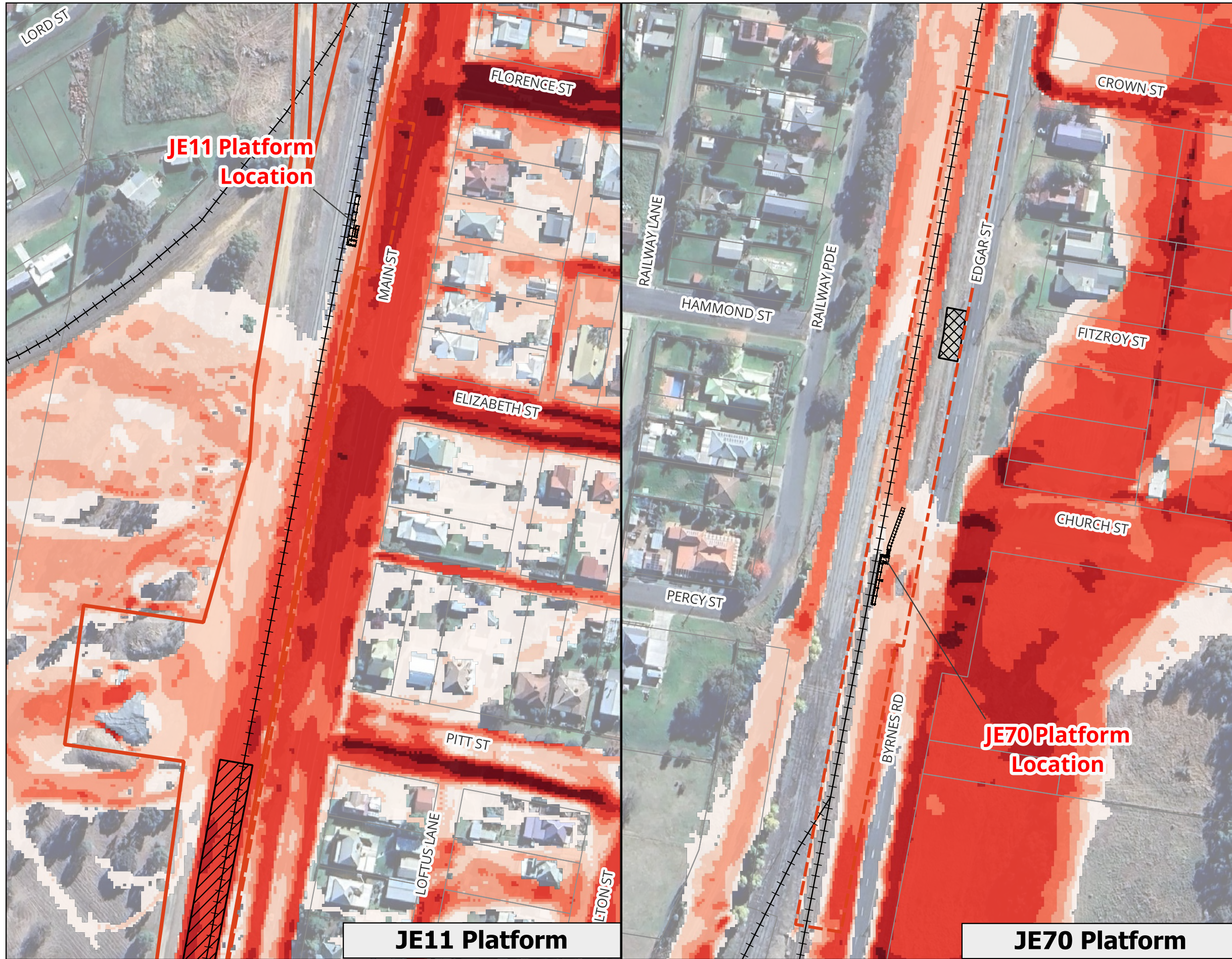


0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Notes:

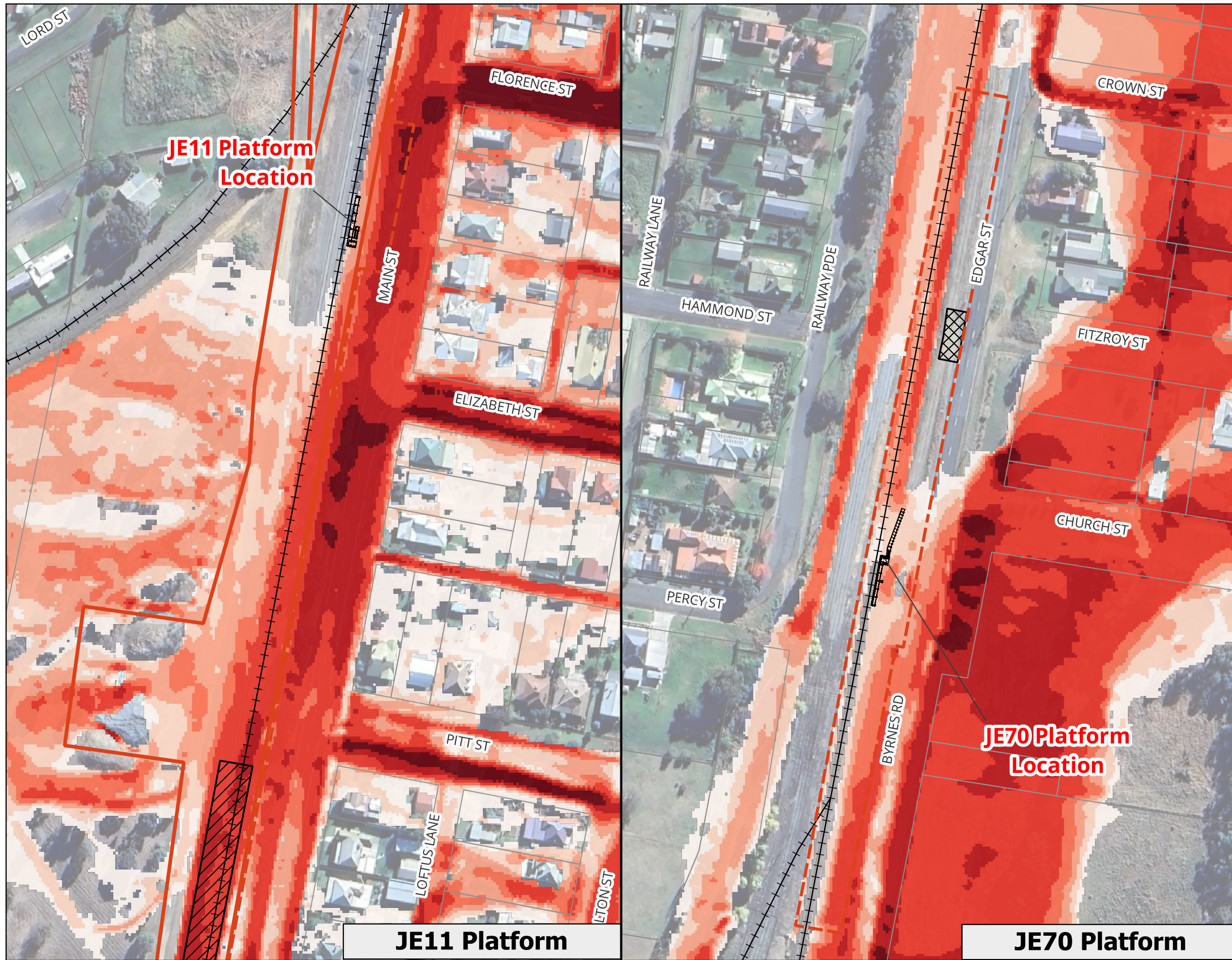


0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Notes:

Notes:

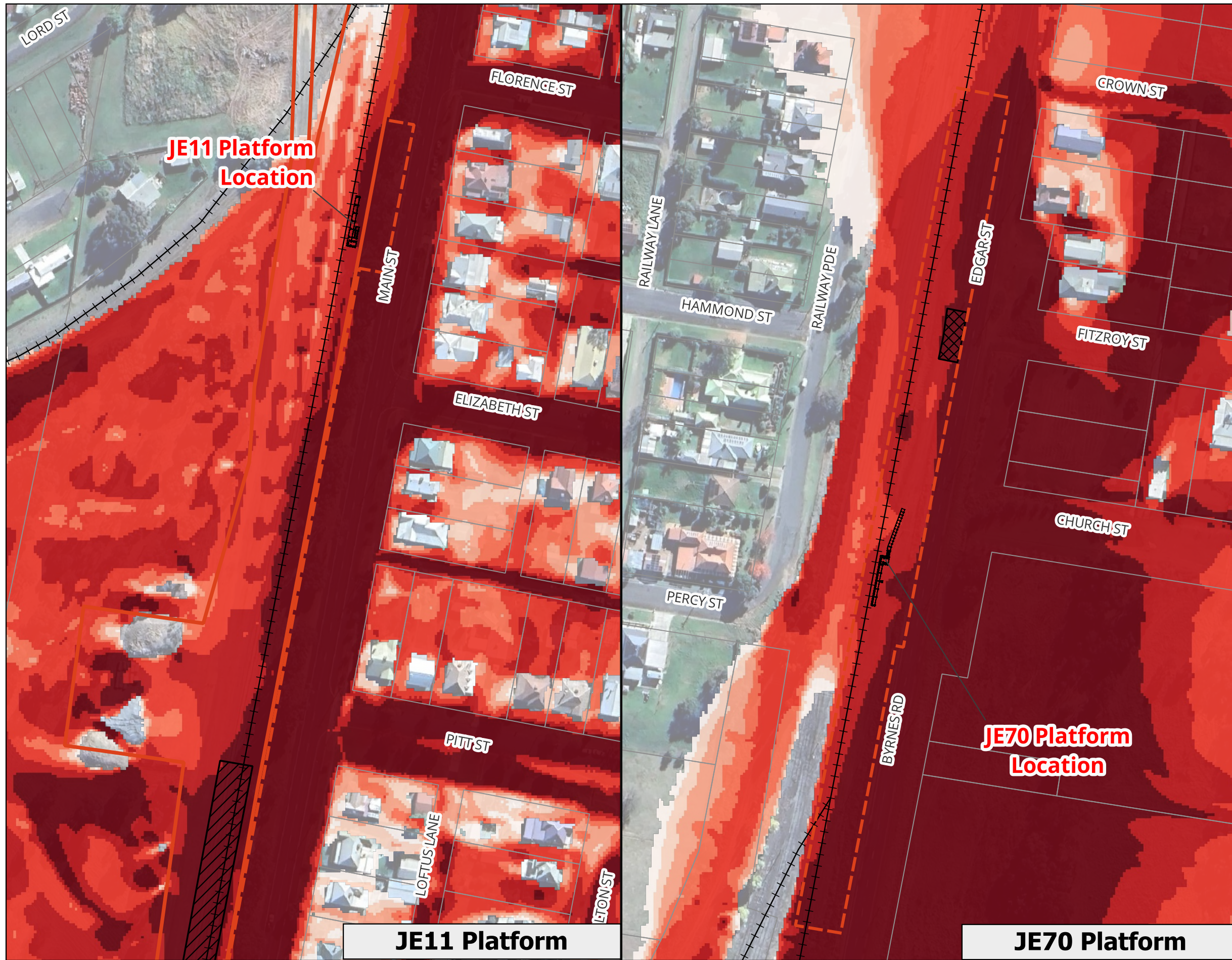


0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Notes:

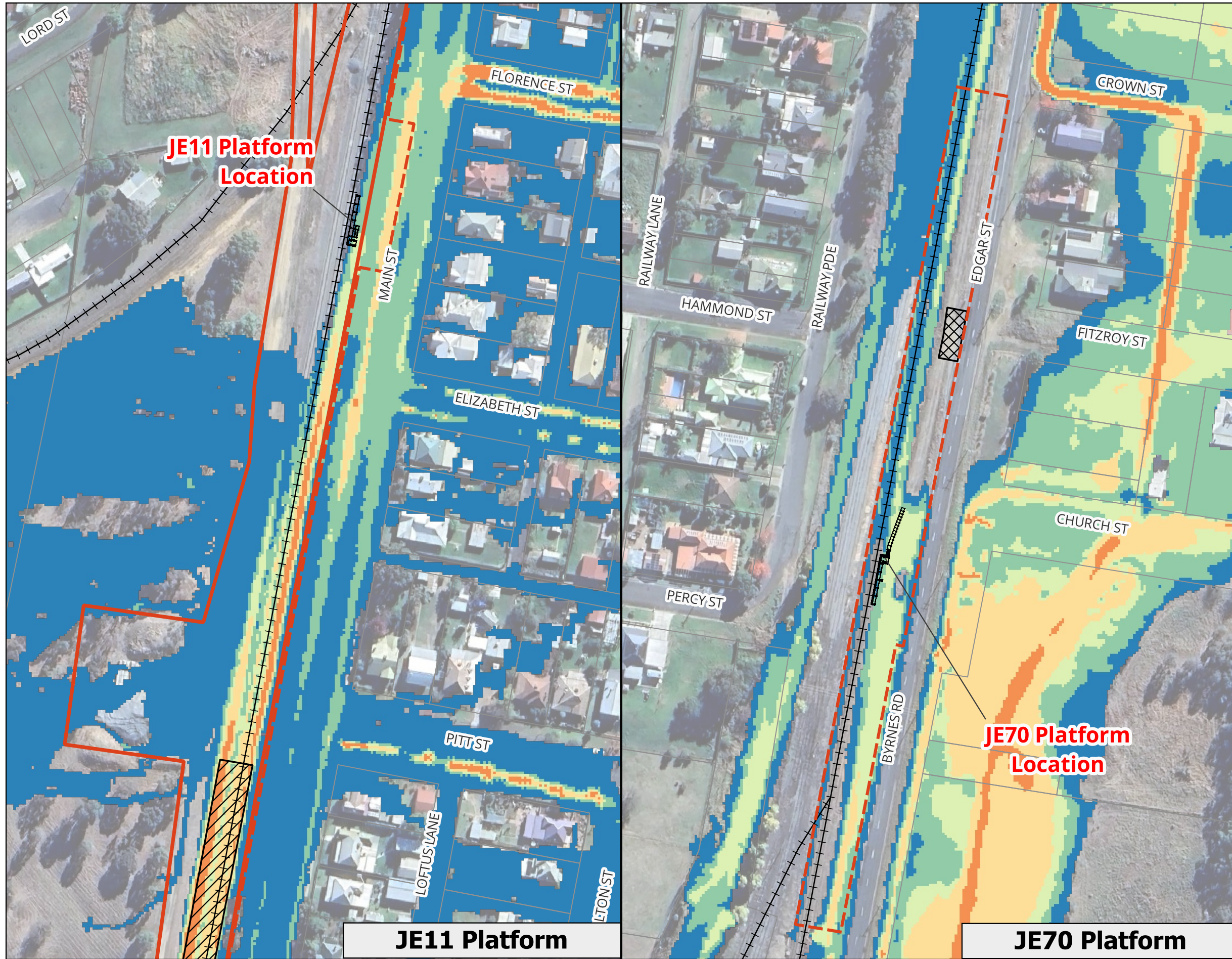


0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Hazard

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

**JE11 Platform**

**JE70 Platform**



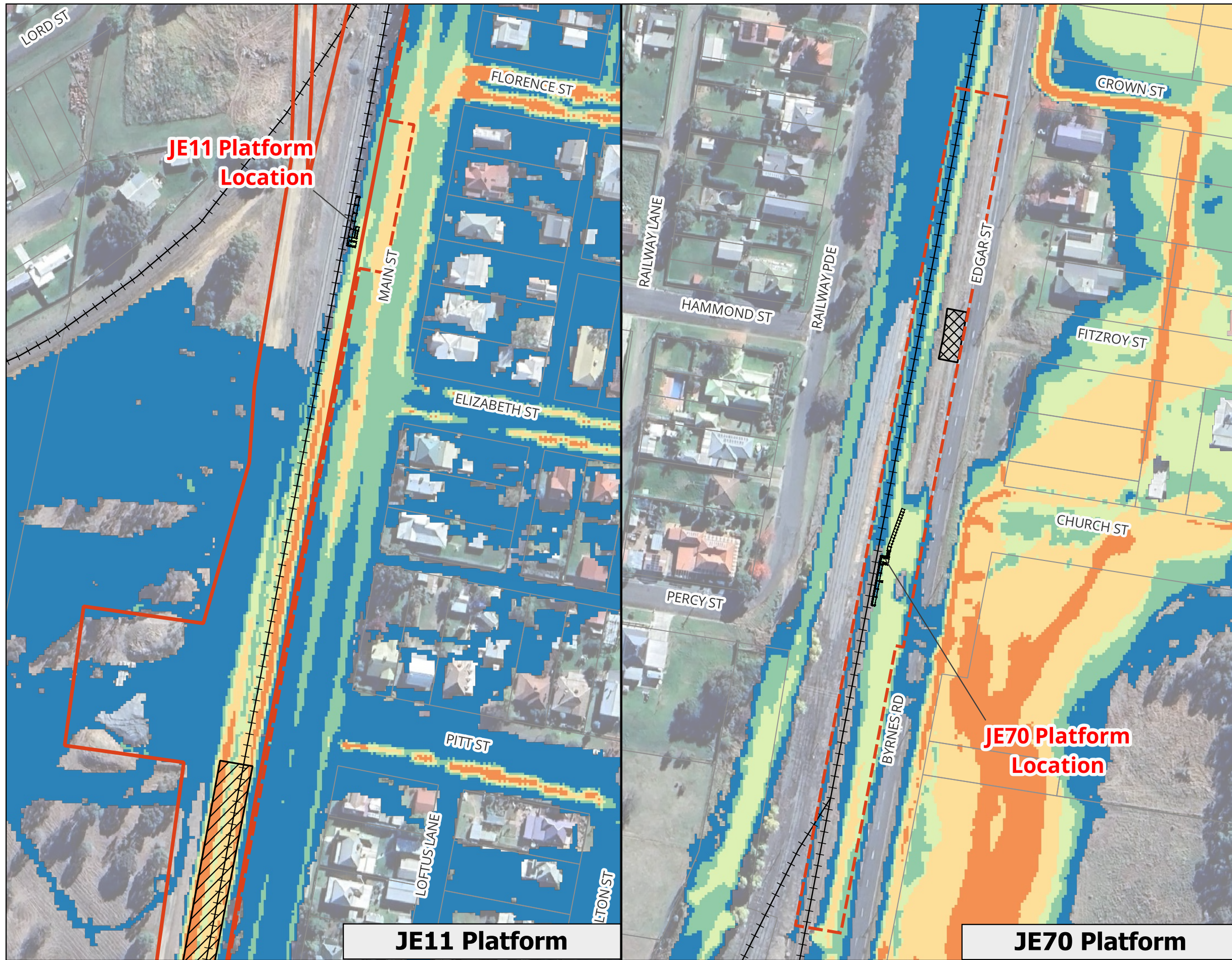
0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

**June Drivers Platforms - IFC Stage**  
**Figure A28: 5% AEP Peak Flood Hazard - Design Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Hazard

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

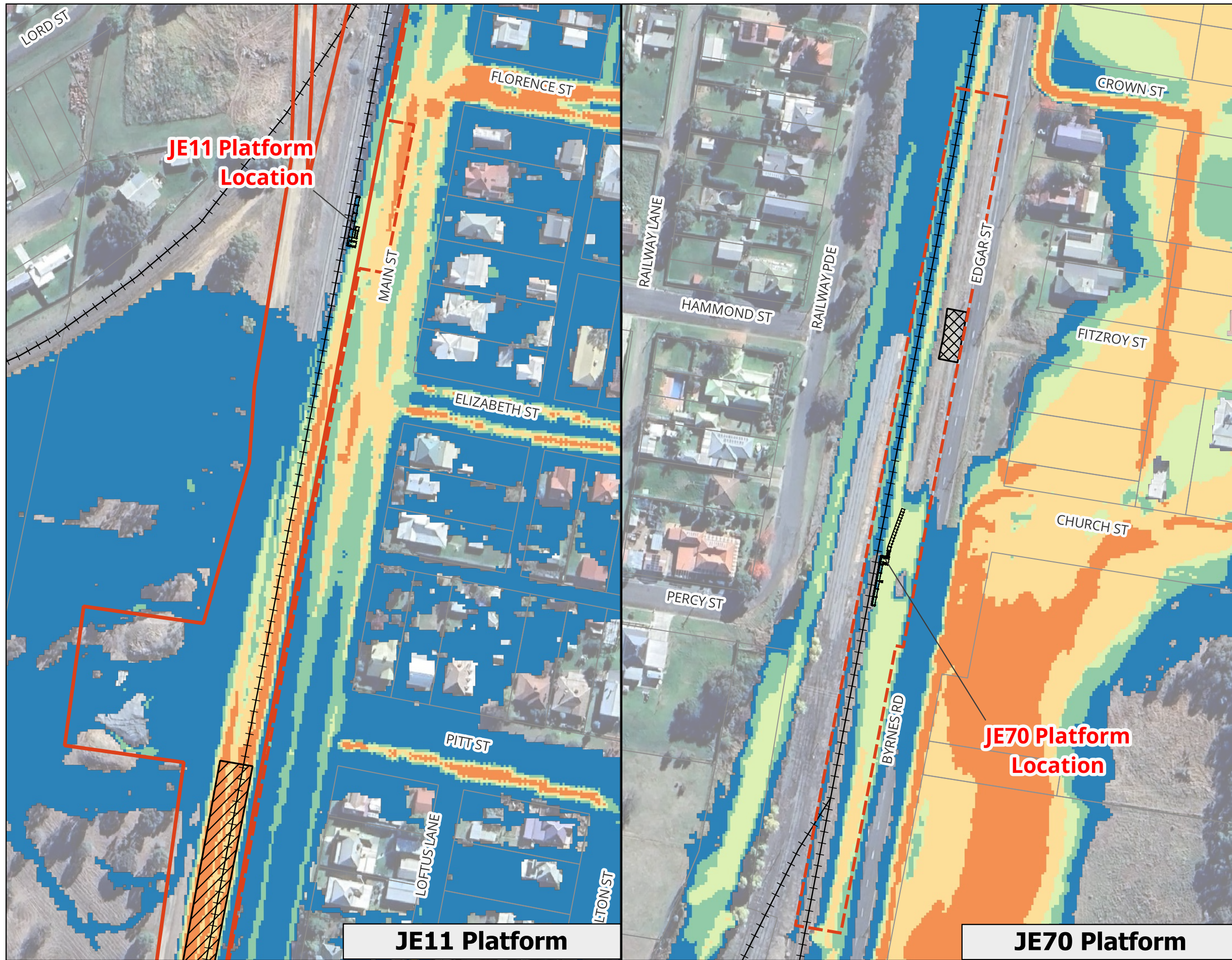


0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Hazard

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

**JE11 Platform**

**JE70 Platform**



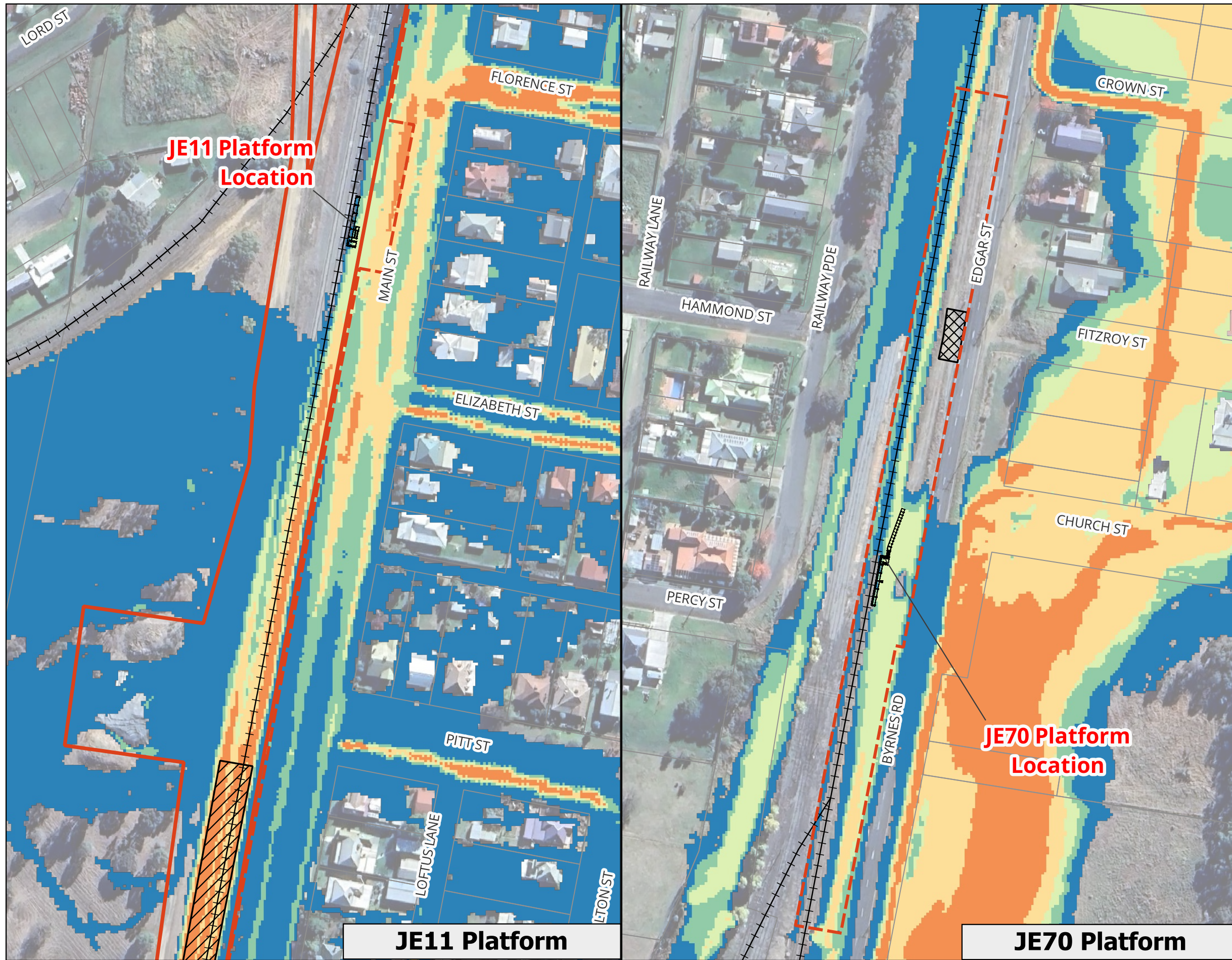
0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

**June Drivers Platforms - IFC Stage**  
**Figure A30: 1% AEP Peak Flood Hazard - Design Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Hazard

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

**JE11 Platform**

**JE70 Platform**



0 60 120 m

A3  
Scale: 1:1,500

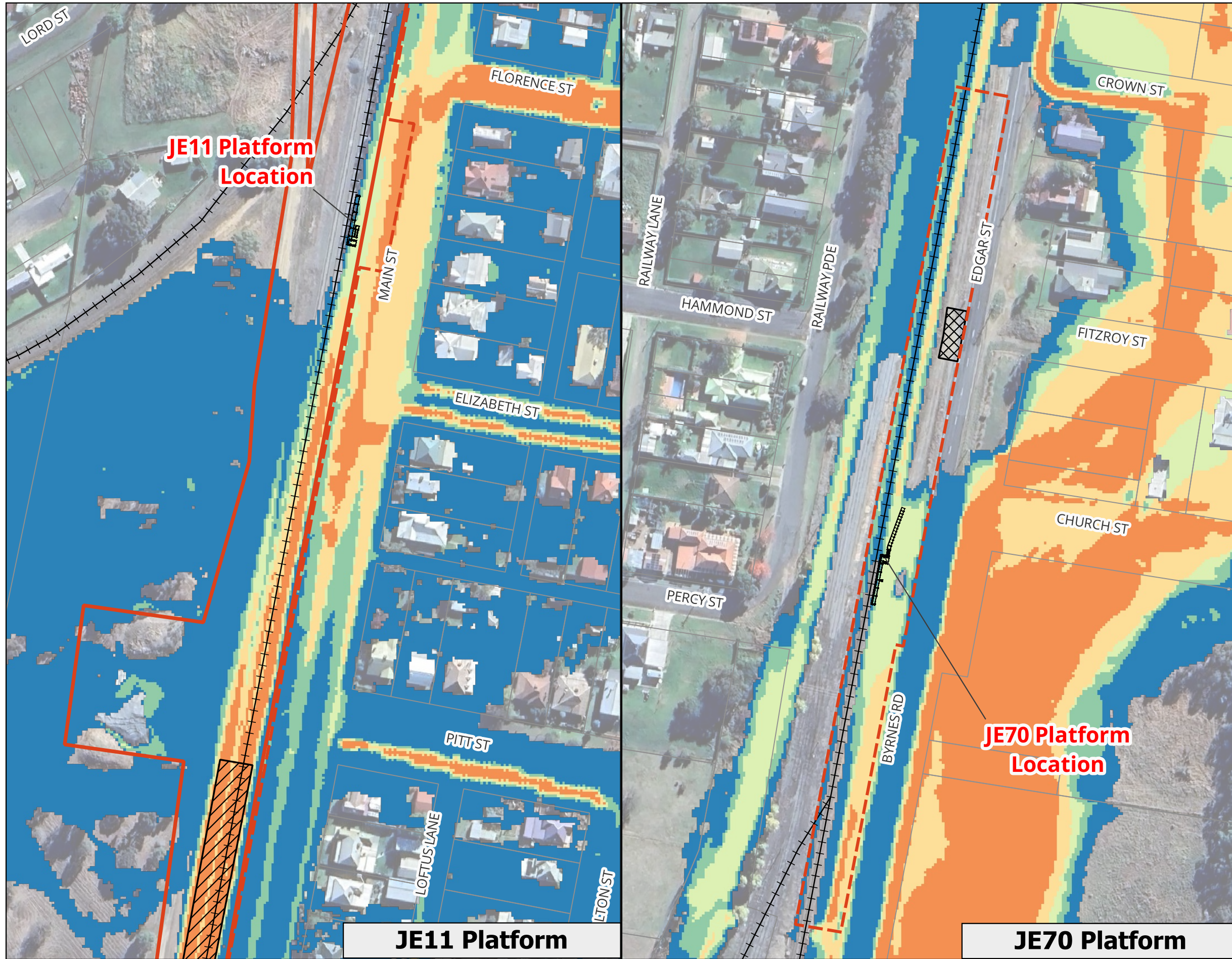
24/9/2025 GDA2020 / MGA zone 55

**June Drivers Platforms - IFC Stage**

**Figure A31: 1% AEP Peak Flood Hazard - Design Blockage Condition**

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Hazard

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

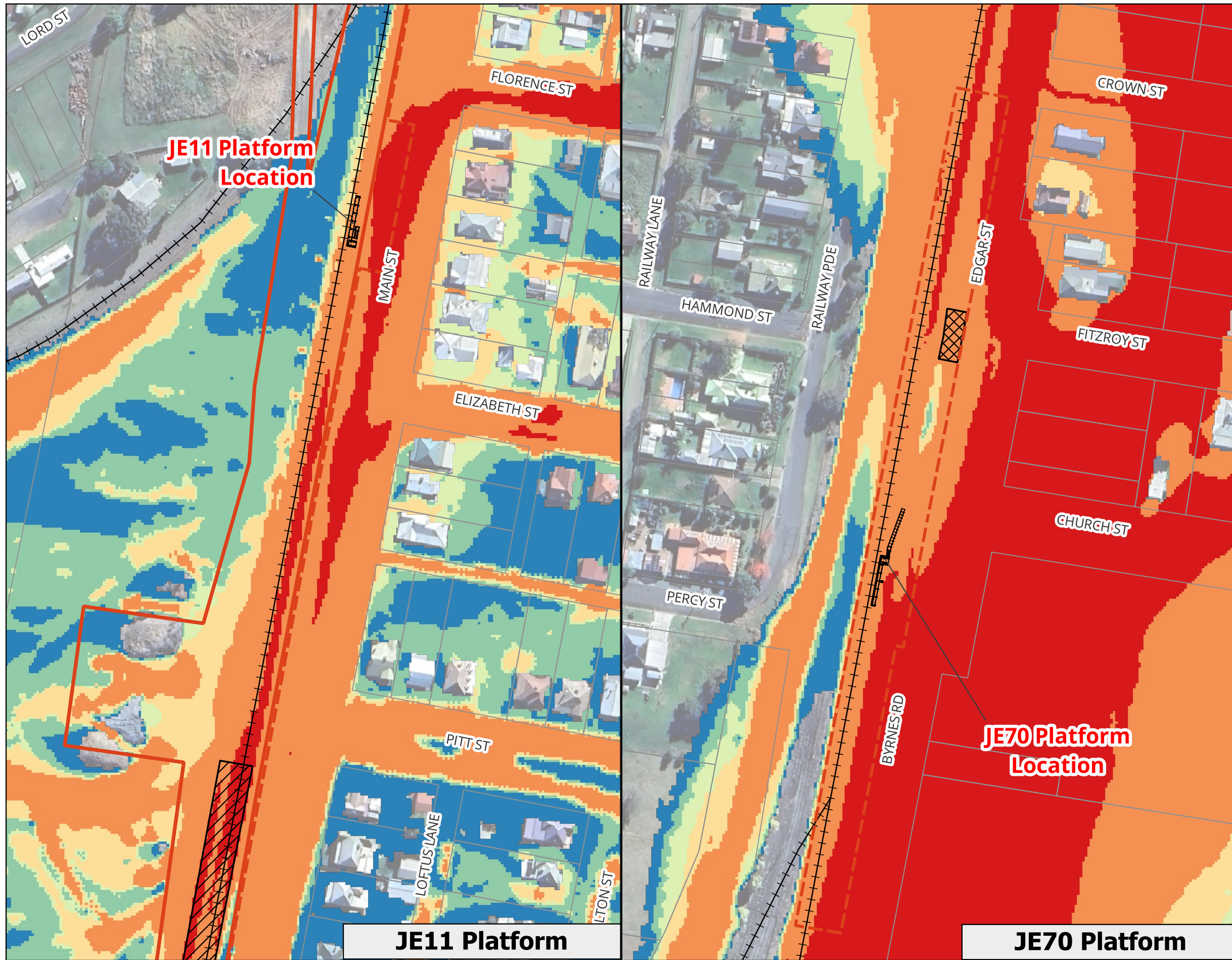


0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_Mapping\IFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Peak Flood Hazard

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

Notes:



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

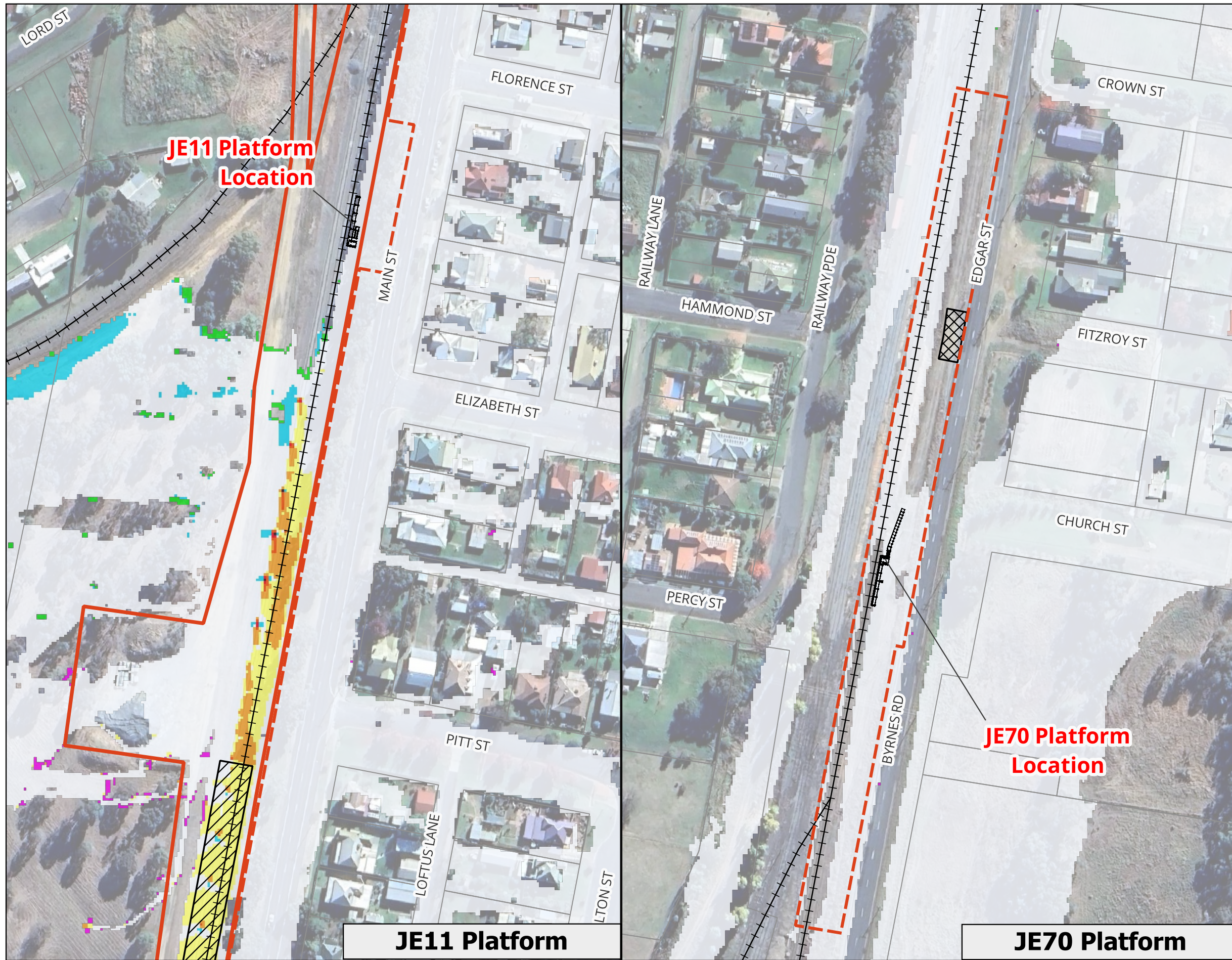
A3  
Scale: 1:1,500

Junee Drivers Platforms - IFC Stage

Figure A33: PMF Peak Flood Hazard - Design Condition

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

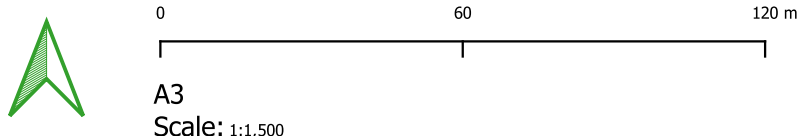
Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Changes in Water Level (m)

- <= -0.2
- 0.2 - -0.1
- 0.1 - -0.01
- 0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m 24/9/2025 GDA2020 / MGA zone 55

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

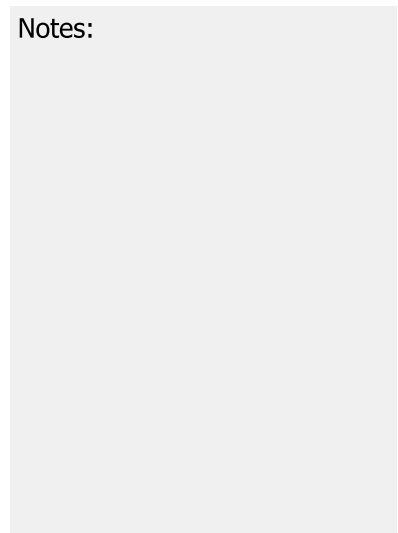
Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Changes in Water Level (m)

- <= -0.2
- 0.2 - -0.1
- 0.1 - -0.01
- 0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

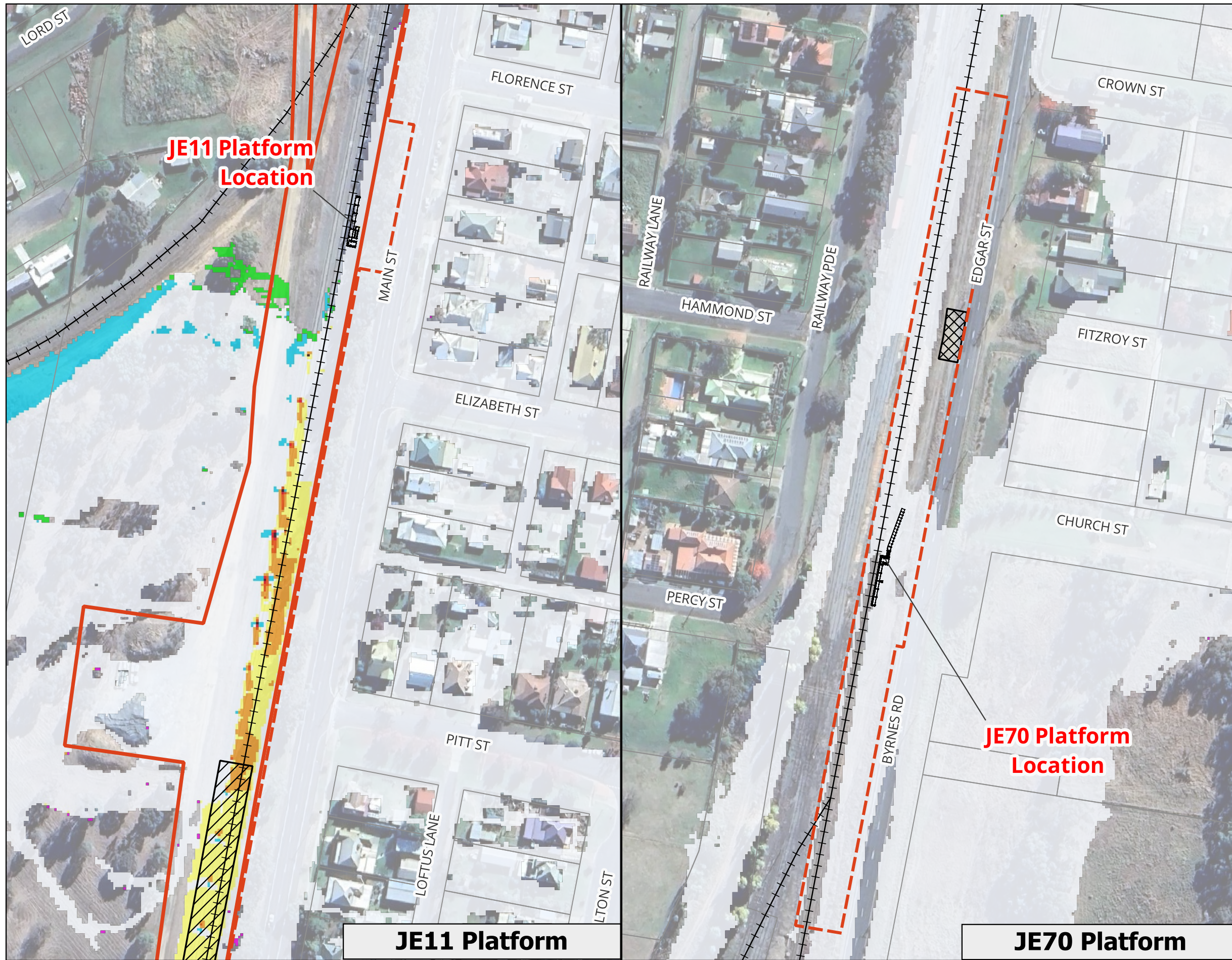
Junee Drivers Platforms - IFC Stage

Figure A35: Changes in Peak Flood Levels for 2% AEP - Design Condition vs Existing Condition

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

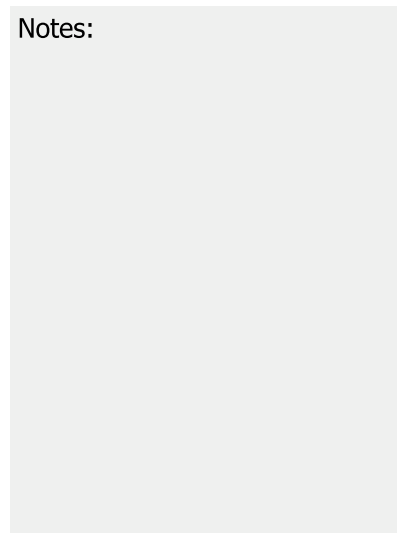
Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Changes in Water Level (m)

- <= -0.2
- 0.2 - -0.1
- 0.1 - -0.01
- 0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

A3  
Scale: 1:1,500

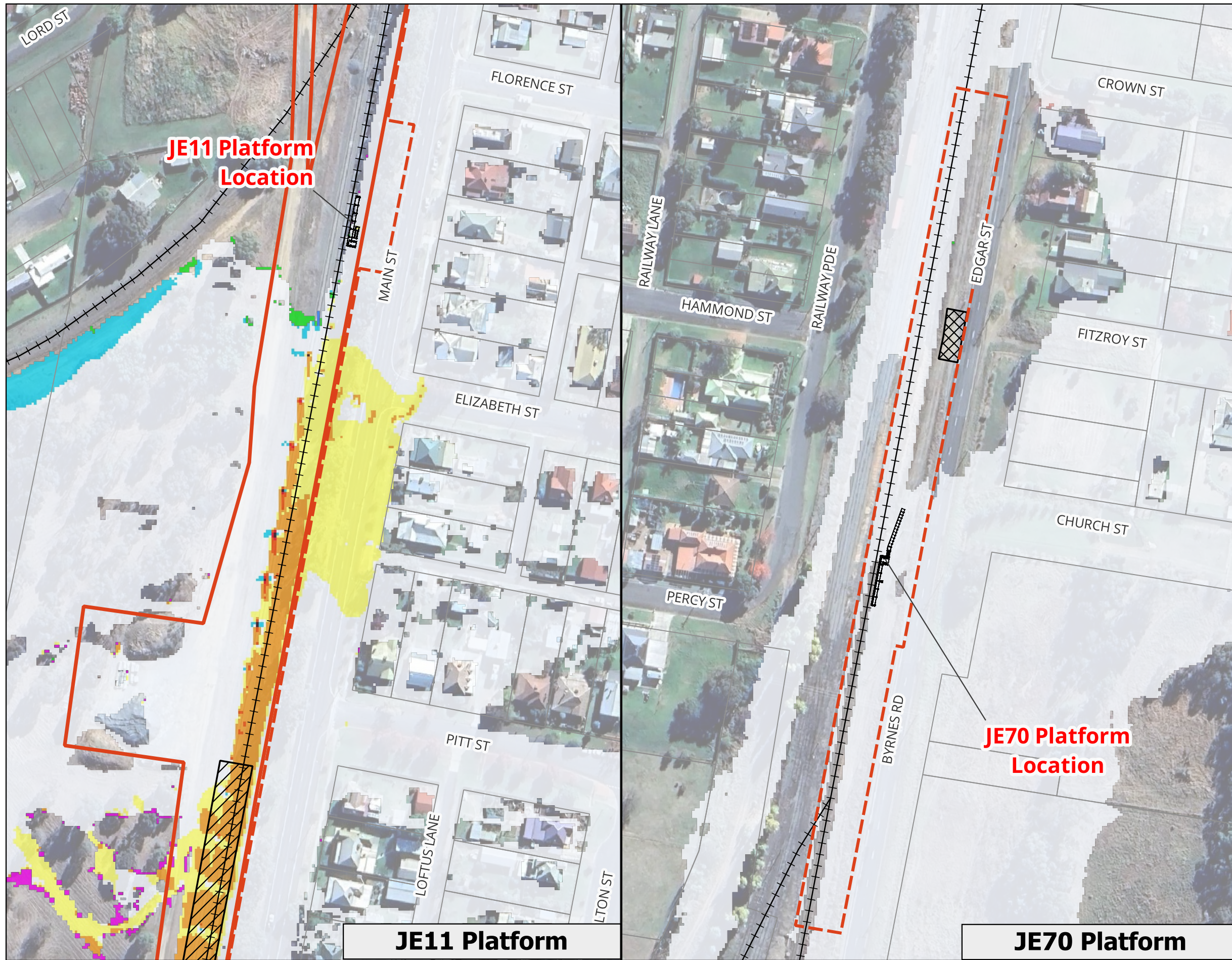
24/9/2025 GDA2020 / MGA zone 55

Junee Drivers Platforms - IFC Stage

Figure A36: Changes in Peak Flood Levels for 1% AEP - Design Condition vs Existing Condition

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_Mapping\IFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Changes in Water Level (m)

- <= -0.2
- 0.2 - -0.1
- 0.1 - -0.01
- 0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- > 0.2
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

Junee Drivers Platforms - IFC Stage

Figure A37: Changes in Peak Flood Levels for 1% AEP Climate Change - Design Condition vs Existing Condition

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Changes in Velocity (m/s)

<= 0.5

Change in Velocity (%)

- <= 10%
- 10% - 20%
- > 20%
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

A3  
Scale: 1:1,500

24/9/2025 GDA2020 / MGA zone 55

Junee Drivers Platforms - IFC Stage

Figure A38: Changes in Peak Flood Velocity for 5% AEP - Design Condition vs Existing Condition

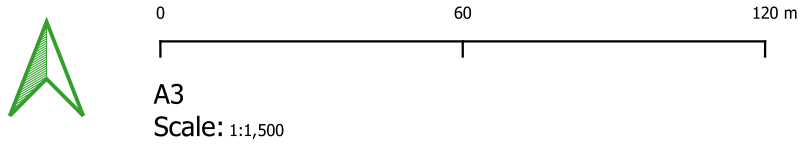
R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



- Legend**
- Project Boundary**
    - Construction Impact Zone
    - Proposed Construction Impact Zone
    - Cadastre
    - Proposed Platform Design
    - Railway Track
    - Junee Yard Site Track Modification Extent
    - Proposed Carpark
  - Changes in Velocity (m/s)**
    - <= 0.5
  - Change in Velocity (%)**
    - <= 10%
    - 10% - 20%
    - > 20%
    - Was Wet Now Dry
    - Was Dry Now Wet

Notes:



24/9/2025 GDA2020 / MGA zone 55

**Junee Drivers Platforms - IFC Stage**

**Figure A39: Changes in Peak Flood Velocity for 2% AEP - Design Condition vs Existing Condition**

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Changes in Velocity (m/s)

<= 0.5

Change in Velocity (%)

- <= 10%
- 10% - 20%
- > 20%
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

A3  
Scale: 1:1,500

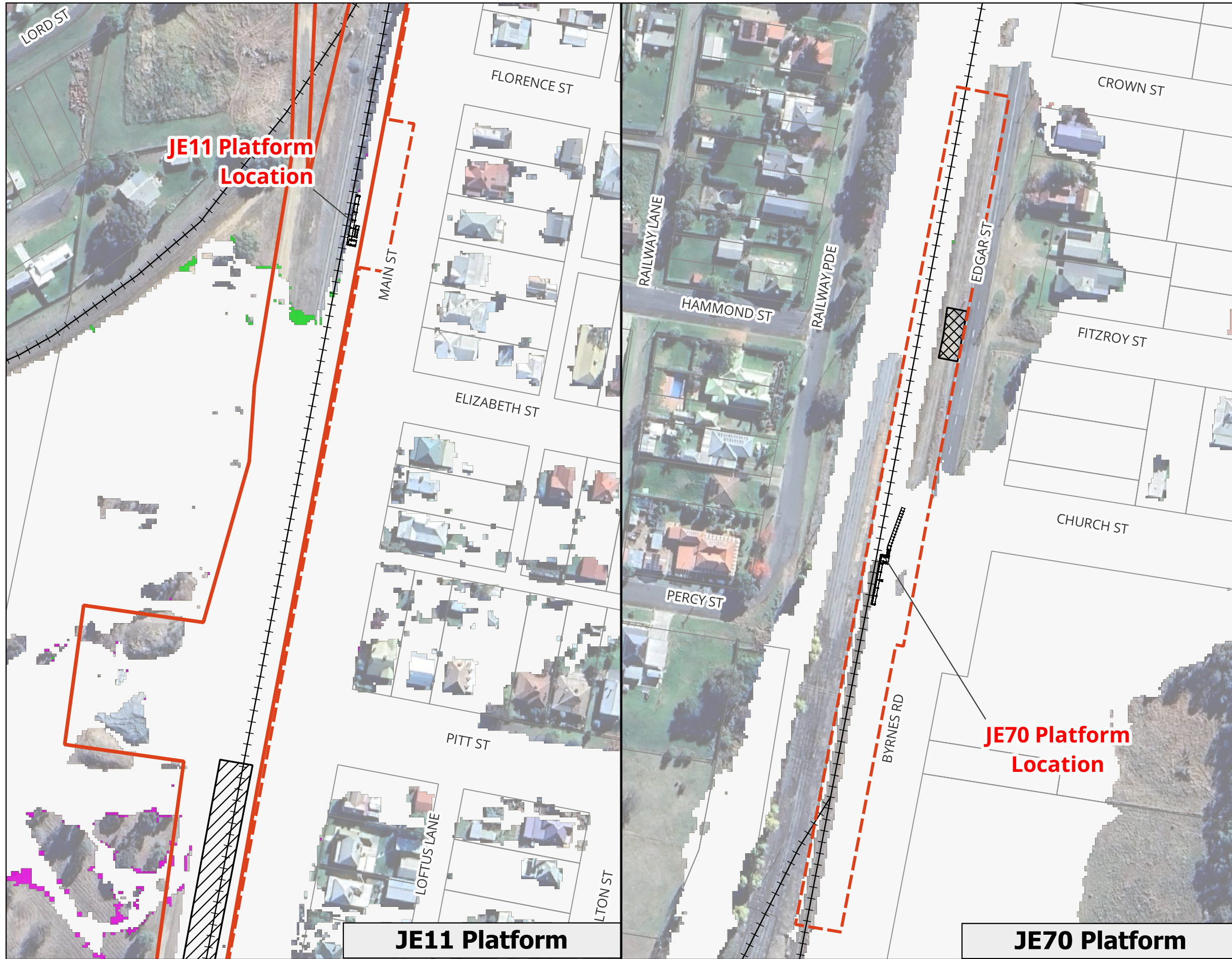
24/9/2025 GDA2020 / MGA zone 55

Junee Drivers Platforms - IFC Stage

Figure A40: Changes in Peak Flood Velocity for 1% AEP - Design Condition vs Existing Condition

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Changes in Velocity (m/s)

<= 0.5

Change in Velocity (%)

- <= 10%
- 10% - 20%
- > 20%
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55






Junee Drivers Platforms - IFC Stage

Figure A41: Changes in Peak Flood Velocity for 1% AEP Climate Change - Design Condition vs Existing Condition



A3  
Scale: 1:1,500

Legend

Project Boundary

-  Construction Impact Zone
-  Proposed Construction Impact Zone
-  Cadastre
-  Proposed Platform Design
-  Railway Track
-  Junee Yard Site Track Modification Extent
-  Proposed Carpark

Change in Hazard

-  Reduced 5 Classes
-  Reduced 4 Classes
-  Reduced 3 Classes
-  Reduced 2 Classes
-  Reduced 1 Class
-  No Change
-  Increased 1 Class
-  Increased 2 Classes
-  Increased 3 Classes
-  Increased 4 Classes
-  Increased 5 Classes
-  Was Wet Now Dry
-  Was Dry Now Wet

Notes:

R:\Projects\524067\_A2P\3\_Hydraulics\Junee Driver Platform\Mapping\250812a\_DDR\JuneeDrivers\_MappingIFC.qgz

Map by: TT



**JE11 Platform**

**JE70 Platform**



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

**Junee Drivers Platforms - IFC Stage**

**Figure A42: Changes in Peak Flood Hazard for 5% AEP - Design Condition vs Existing Condition**

A3  
Scale: 1:1,500

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Change in Hazard

- Reduced 5 Classes
- Reduced 4 Classes
- Reduced 3 Classes
- Reduced 2 Classes
- Reduced 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

A3  
Scale: 1:1,500

24/9/2025 GDA2020 / MGA zone 55

Junee Drivers Platforms - IFC Stage

Figure A43: Changes in Peak Flood Hazard for 2% AEP - Design Condition vs Existing Condition

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Change in Hazard

- Reduced 5 Classes
- Reduced 4 Classes
- Reduced 3 Classes
- Reduced 2 Classes
- Reduced 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

A3  
Scale: 1:1,500

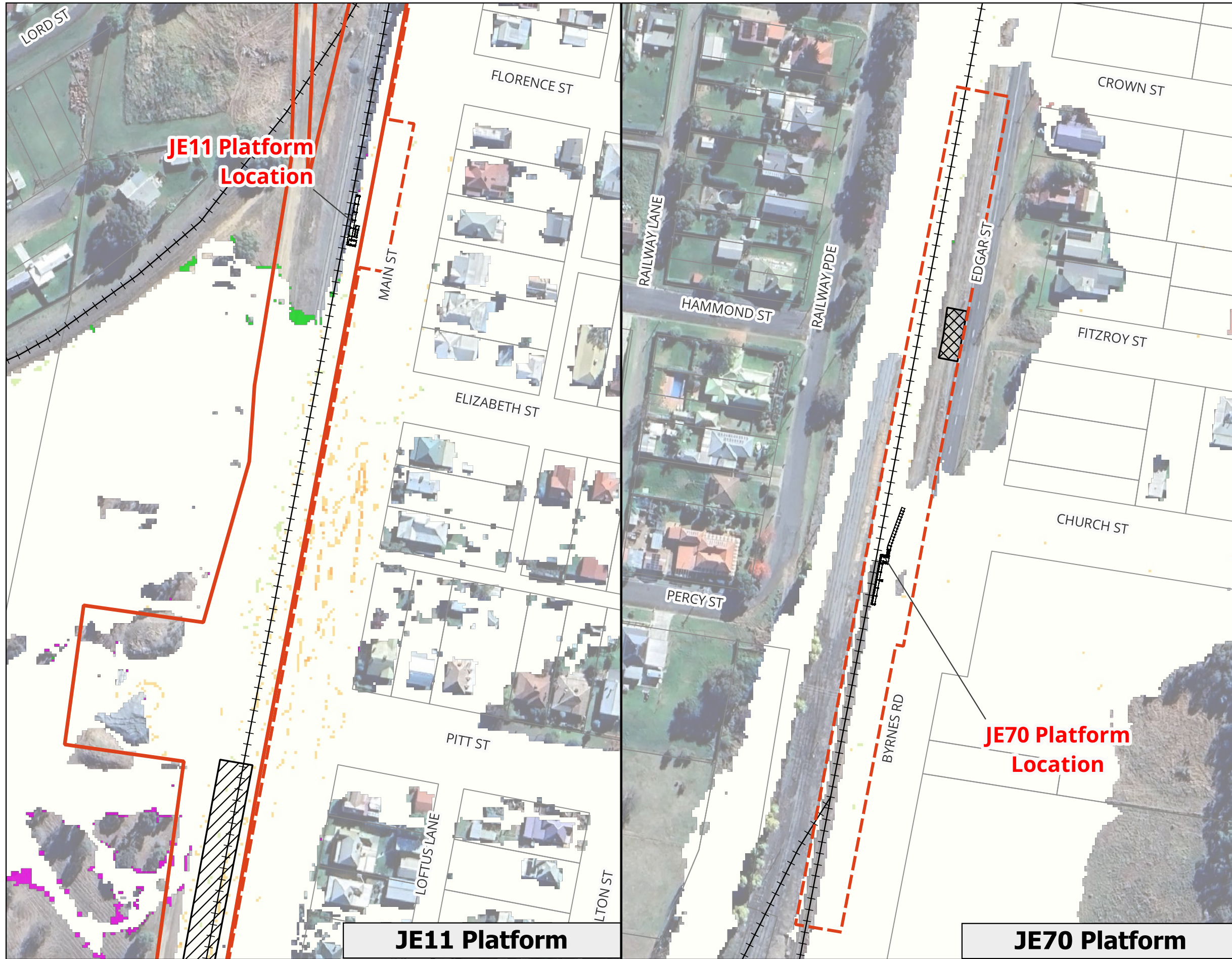
24/9/2025 GDA2020 / MGA zone 55

Junee Drivers Platforms - IFC Stage

Figure A44: Changes in Peak Flood Hazard for 1% AEP - Design Condition vs Existing Condition

R:\Projects\524067\_A2P\3\_Hydraulics\June Driver Platform\Mapping\250812a\_DDR\JuneDrivers\_MappingIFC.qgz

Map by: TT



Legend

Project Boundary

- Construction Impact Zone
- Proposed Construction Impact Zone
- Cadastre
- Proposed Platform Design
- Railway Track
- Junee Yard Site Track Modification Extent
- Proposed Carpark

Change in Hazard

- Reduced 5 Classes
- Reduced 4 Classes
- Reduced 3 Classes
- Reduced 2 Classes
- Reduced 1 Class
- No Change
- Increased 1 Class
- Increased 2 Classes
- Increased 3 Classes
- Increased 4 Classes
- Increased 5 Classes
- Was Wet Now Dry
- Was Dry Now Wet

Notes:



0 60 120 m

24/9/2025 GDA2020 / MGA zone 55

Junee Drivers Platforms - IFC Stage

Figure A45: Changes in Peak Flood Hazard for 1% AEP Climate Change - Design Condition vs Existing Condition

A3  
Scale: 1:1,500

## APPENDIX B

---

# ARR Data Hub Data



**BOM IFD**

Duration	Duration in min	63.20%	50%	20%	10%	5%	2%	1%
1 min	1	1.6	1.82	2.52	3.03	3.53	4.23	4.79
2 min	2	2.72	3.1	4.3	5.14	5.98	7.13	8.05
3 min	3	3.72	4.23	5.87	7.02	8.17	9.76	11
4 min	4	4.58	5.21	7.23	8.65	10.1	12.1	13.6
5 min	5	5.34	6.07	8.42	10.1	11.8	14.1	15.9
10 min	10	8.09	9.2	12.8	15.3	17.9	21.5	24.3
15 min	15	9.91	11.3	15.7	18.8	22	26.3	29.8
20 min	20	11.3	12.8	17.8	21.4	25	29.9	33.8
25 min	25	12.3	14	19.5	23.4	27.4	32.8	37
30 min	30	13.2	15.1	21	25.1	29.4	35.1	39.7
45 min	45	15.3	17.4	24.2	29	33.8	40.5	45.7
1 hour	60	16.8	19.1	26.6	31.9	37.2	44.4	50.2
1.5 hour	90	19.1	21.7	30.2	36.1	42.1	50.3	56.9
2 hour	120	20.9	23.7	32.9	39.3	45.8	54.9	62
3 hour	180	23.7	26.8	37	44.3	51.7	61.9	70
4.5 hour	270	26.9	30.3	41.7	49.9	58.2	69.8	79.1
6 hour	360	29.4	33.1	45.4	54.2	63.3	76	86.1
9 hour	540	33.3	37.4	51.1	61.1	71.3	85.5	97
12 hour	720	36.4	40.8	55.5	66.3	77.5	92.9	105
18 hour	1080	41	45.9	62.2	74.2	86.7	104	117
24 hour	1440	44.4	49.7	67.2	80.1	93.4	111	126
30 hour	1800	47.2	52.7	71.1	84.7	98.7	117	132
36 hour	2160	49.4	55.1	74.3	88.4	103	122	137
48 hour	2880	52.8	59	79.3	94.1	109	129	145
72 hour	4320	57.4	64.1	86.1	102	118	138	154
96 hour	5760	60.5	67.6	90.5	107	123	144	160
120 hour	7200	62.8	70.2	93.9	110	127	149	165
144 hour	8640	64.7	72.3	96.5	113	130	152	169
168 hour	10080	66.4	74.1	98.8	116	133	156	173

**ARR Data Hub**

Results - ARR Data Hub  
[STARTTXT]

Input Data Information  
[INPUTDATA]  
Latitude,-34.890813  
Longitude,147.598348  
[END\_INPUTDATA]

River Region  
[RIVREG]  
Division,Murray-Darling Basin  
River Number,12  
River Name,Murrumbidgee River  
[RIVREG\_META]  
Time Accessed,31 July 2024 03:17PM  
Version,2016\_v1  
[END\_RIVREG]

ARF Parameters  
[LONGARF]  
Zone,Southern Temperate  
a,0.158  
b,0.276  
c,0.372  
d,0.315  
e,0.000141  
f,0.41  
g,0.15  
h,0.01  
i,-0.0027  
[LONGARF\_META]  
Time Accessed,31 July 2024 03:17PM  
Version,2016\_v1  
[END\_LONGARF]

Storm Losses  
[LOSSES]  
ID,16277.0  
Storm Initial Losses (mm),26.0  
Storm Continuing Losses (mm/h),4.6  
[LOSSES\_META]  
Time Accessed,31 July 2024 03:17PM  
Version,2016\_v1  
[END\_LOSSES]

Temporal Patterns  
[TP]  
code,MB  
Label,Murray Basin  
[TP\_META]  
Time Accessed,31 July 2024 03:17PM  
Version,2016\_v2  
[END\_TP]

Areal Temporal Patterns  
[ATP]  
code,MB  
arealabel,Murray Basin  
[ATP\_META]  
Time Accessed,31 July 2024 03:17PM  
Version,2016\_v2  
[END\_ATP]

Median Preburst Depths and Ratios  
[PREBURST]  
min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),2.6 (0.134),2.0 (0.074),1.6 (0.049),1.2 (0.032),1.0 (0.022),0.8 (0.017)  
90 (1.5),1.9 (0.087),1.4 (0.046),1.1 (0.029),0.7 (0.017),0.6 (0.011),0.4 (0.008)  
120 (2.0),4.2 (0.176),3.3 (0.101),2.8 (0.070),2.2 (0.049),1.0 (0.018),0.1 (0.001)  
180 (3.0),3.5 (0.130),3.2 (0.087),3.1 (0.069),2.9 (0.056),1.4 (0.023),0.3 (0.004)  
360 (6.0),1.9 (0.059),1.1 (0.024),0.5 (0.010),0.0 (0.000),0.7 (0.009),1.3 (0.015)  
720 (12.0),0.2 (0.004),1.1 (0.020),1.7 (0.026),2.3 (0.030),6.2 (0.066),9.0 (0.086)  
1080 (18.0),0.0 (0.000),0.4 (0.007),0.7 (0.009),0.9 (0.011),4.0 (0.038),6.2 (0.053)  
1440 (24.0),0.0 (0.000),0.2 (0.003),0.3 (0.004),0.4 (0.004),0.5 (0.005),0.7 (0.005)  
2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

[PREBURST\_META]

Time Accessed,31 July 2024 03:17PM

Version,2018\_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END\_PREBURST]From preburst class

### 10% Preburst Depths

[PREBURST10]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
120 (2.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
360 (6.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
720 (12.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

[PREBURST10\_META]

Time Accessed,31 July 2024 03:17PM

Version,2018\_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END\_PREBURST10]From preburst class

### 25% Preburst Depths

[PREBURST25]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),0.1 (0.005),0.1 (0.002),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
120 (2.0),0.1 (0.002),0.0 (0.001),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
360 (6.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
720 (12.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)  
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

[PREBURST25\_META]

Time Accessed,31 July 2024 03:17PM

Version,2018\_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END\_PREBURST25]From preburst class

75% Preburst Depths

[PREBURST75]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),13.2 (0.691),12.5 (0.470),12.0 (0.378),11.6 (0.311),14.8 (0.334),17.3 (0.344)  
90 (1.5),15.1 (0.694),12.4 (0.411),10.6 (0.294),8.9 (0.212),9.1 (0.181),9.3 (0.163)  
120 (2.0),15.9 (0.668),16.3 (0.495),16.5 (0.421),16.8 (0.367),11.1 (0.203),6.9 (0.111)  
180 (3.0),12.7 (0.472),15.2 (0.410),16.9 (0.380),18.5 (0.357),18.6 (0.300),18.7 (0.267)  
360 (6.0),11.9 (0.358),11.3 (0.249),10.9 (0.201),10.6 (0.167),17.3 (0.228),22.3 (0.259)  
720 (12.0),4.1 (0.101),8.2 (0.148),10.9 (0.165),13.5 (0.175),22.0 (0.237),28.4 (0.270)  
1080 (18.0),3.5 (0.076),6.6 (0.106),8.7 (0.117),10.7 (0.123),15.5 (0.150),19.2 (0.163)  
1440 (24.0),0.2 (0.004),3.3 (0.049),5.3 (0.066),7.3 (0.078),8.9 (0.080),10.1 (0.081)  
2160 (36.0),0.0 (0.000),1.2 (0.016),2.0 (0.022),2.7 (0.026),3.7 (0.031),4.5 (0.033)  
2880 (48.0),0.0 (0.000),0.3 (0.004),0.5 (0.006),0.7 (0.007),1.6 (0.013),2.3 (0.016)  
4320 (72.0),0.0 (0.000),0.0 (0.000),0.1 (0.001),0.1 (0.001),0.2 (0.001),0.3 (0.002)

[PREBURST75\_META]

Time Accessed,31 July 2024 03:17PM

Version,2018\_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END\_PREBURST75]From preburst class

90% Preburst Depths

[PREBURST90]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),26.6 (1.391),22.8 (0.858),20.3 (0.638),17.9 (0.482),26.1 (0.588),32.3 (0.644)  
90 (1.5),33.8 (1.554),29.7 (0.984),27.0 (0.747),24.4 (0.579),26.6 (0.529),28.3 (0.497)  
120 (2.0),34.8 (1.465),33.1 (1.008),32.0 (0.815),31.0 (0.676),31.7 (0.578),32.2 (0.520)  
180 (3.0),24.9 (0.929),29.0 (0.782),31.7 (0.715),34.2 (0.663),36.2 (0.585),37.6 (0.537)  
360 (6.0),23.5 (0.710),27.1 (0.598),29.5 (0.545),31.9 (0.503),46.8 (0.616),58.0 (0.673)  
720 (12.0),17.3 (0.423),25.3 (0.456),30.7 (0.463),35.8 (0.462),47.1 (0.507),55.6 (0.528)  
1080 (18.0),16.1 (0.352),20.4 (0.327),23.2 (0.312),25.9 (0.299),42.8 (0.413),55.5 (0.473)  
1440 (24.0),11.0 (0.222),14.8 (0.221),17.4 (0.217),19.8 (0.212),20.5 (0.184),21.0 (0.167)  
2160 (36.0),3.5 (0.063),8.8 (0.118),12.3 (0.139),15.7 (0.152),16.6 (0.136),17.3 (0.126)  
2880 (48.0),0.7 (0.011),6.8 (0.085),10.8 (0.115),14.7 (0.134),19.5 (0.151),23.1 (0.160)  
4320 (72.0),0.2 (0.004),4.3 (0.050),7.0 (0.069),9.6 (0.081),13.3 (0.097),16.2 (0.105)

[PREBURST90\_META]

Time Accessed,31 July 2024 03:17PM

Version,2018\_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END\_PREBURST90]From preburst class

Interim Climate Change Factors

[CCF]

,RCP 4.5,RCP6,RCP 8.5

2030,0.816 (4.1%),0.726 (3.6%),0.934 (4.7%)  
2040,1.046 (5.2%),1.015 (5.1%),1.305 (6.6%)  
2050,1.260 (6.3%),1.277 (6.4%),1.737 (8.8%)  
2060,1.450 (7.3%),1.520 (7.7%),2.214 (11.4%)  
2070,1.609 (8.2%),1.753 (8.9%),2.722 (14.2%)  
2080,1.728 (8.8%),1.985 (10.2%),3.246 (17.2%)  
2090,1.798 (9.2%),2.226 (11.5%),3.772 (20.2%)

[CCF\_META]

Time Accessed,31 July 2024 03:17PM

Version,2019\_v1

Note,ARR recommends the use of RCP4.5 and RCP 8.5 values. These have been updated to the values that can be found on the climate change in Australia website.  
[END\_CCF]

Probability Neutral Burst Initial Loss  
[BURSTIL]

min (h)\AEP(%),50.0,20.0,10.0,5.0,2.0,1.0  
60 (1.0),19.2,11.2,10.8,11.7,11.0,8.6  
90 (1.5),18.6,11.2,11.3,12.4,12.2,10.8  
120 (2.0),17.6,11.1,10.5,11.3,11.5,10.6  
180 (3.0),18.5,12.7,11.2,12.1,11.0,8.0  
360 (6.0),19.3,14.4,13.9,14.9,13.2,8.2  
720 (12.0),22.0,16.3,15.2,15.9,12.6,6.9  
1080 (18.0),22.7,17.9,17.2,17.6,14.5,9.9  
1440 (24.0),24.2,19.5,19.8,20.8,19.1,12.9  
2160 (36.0),25.9,21.6,21.8,23.2,21.0,15.9  
2880 (48.0),27.0,22.3,22.5,23.9,21.7,15.0  
4320 (72.0),27.5,22.8,24.2,24.9,22.7,18.2

[BURSTIL\_META]

Time Accessed,31 July 2024 03:17PM

Version,2018\_v1

Note,As this point is in NSW the advice provided on losses and pre-burst on the [NSW Specific Tab of the ARR Data Hub](/nsw_specific) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. Probability neutral burst initial loss values for NSW are to be used in place of the standard initial loss and pre-burst as per the losses hierarchy.

[END\_BURSTIL]

Transformational Pre-burst Rainfall

[PREBURST\_TRANS]

min (h)\AEP(%),50.0,20.0,10.0,5.0,2.0,1.0  
60 (1.0),6.8,14.8,15.2,14.3,15.0,17.4  
90 (1.5),7.4,14.8,14.7,13.6,13.8,15.2  
120 (2.0),8.4,14.9,15.5,14.7,14.5,15.4  
180 (3.0),7.5,13.3,14.8,13.9,15.0,18.0  
360 (6.0),6.7,11.6,12.1,11.1,12.8,17.8  
720 (12.0),4.0,9.7,10.8,10.1,13.4,19.1  
1080 (18.0),3.3,8.1,8.8,8.4,11.5,16.1  
1440 (24.0),1.8,6.5,6.2,5.2,6.9,13.1  
2160 (36.0),0.1,4.4,4.2,2.8,5.0,10.1  
2880 (48.0),0.0,3.7,3.5,2.1,4.3,11.0  
4320 (72.0),0.0,3.2,1.8,1.1,3.3,7.8

[PREBURST\_TRANS\_META]

The transformational pre-burst is intended for software suppliers in the NSW area and is simply the Initial Loss - Burst Initial Loss. It is not appropriate to use these values if considering a calibrated initial loss.

[END\_PREBURST\_TRANS]

[ENDTXT]

## APPENDIX C

---

# ARTC Review

No comment sheet received. Rev A endorsed by IRPL without comment



## APPENDIX D

---

# Independent Flood Consultant Certificate



## Schedule 12 Consultant Certificate

### Part A – Consultant’s Statement of Conformance for Services

(clause 5.3 (b))

<b>Date:</b>	22 October 2025
<b>Project:</b>	Albury to Parkes Enhancement Project (A2P) (the Project) JA – Junee Drivers Platforms Flood (IFC)
<b>Consultant:</b>	Hatch Pty Ltd ABN 59 008 630 500
<b>In relation to:</b>	The contract between the Consultant and Martinus Rail Pty Ltd (MR) dated ... 18 March 2024.....with respect to the Project

1. This Statement of Conformance is given in relation to the Agreement.
2. The Consultant hereby certifies to MR that:
  - a. the design calculations and drawings are agreed with the Designer; and
  - b. it has provided a full and independent assessment of all factors influencing the final integrity of the specified components of the Works,
  - c. it has reviewed the design calculations, models and drawings, and undertaken separate calculations for critical aspects of the Works,
  - d. it has undertaken an independent detailed check of the Design Documentation,
  - e. it has provided all advice and comment, including calculations, in writing.

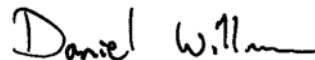
Statement 2 above applies to the extent clarified in Section 3 and 4 on the following page.



.....  
Signature of Authorised Person

Darren Lyons

.....  
Name of Authorised Person



.....  
Signature of Witness

Daniel Williams

.....  
Name of Witness

---

## Schedule 12 Consultant Certificate

### Part A – Consultant’s Statement of Conformance for Services

(clause 5.3 (b))

3. This statement of conformance applies to the following work packages only:
  - a. JA – Junee Drivers Platforms Flood (IFC)
4. Statement 2 is limited to the degree at which the design and review has progressed at the relevant phase (SDR, PDR, DDR & IFC) and the information provided by Martinus.

All proof engineering comments identified as part of our IFC review have been closed.



**MARTINUS** 

Head Office | 1/23-27 Waratah Street | KIRRAWEE NSW 2232