



Australian Government



Queensland Government

Terms of Reference for an Independent International Panel of Experts for Flood Studies of Inland Rail in Queensland

Final

June 2020

Appointments and secretariat functions to the Independent Panel of Experts are managed by the Queensland Government Department of Transport and Main Roads working in partnership with the Australian Government Department of Infrastructure, Transport, Regional Development and Communications.

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Document control options

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INTRODUCTION

Consistent with the Council of Australian Governments' Transport and Infrastructure Council's priorities, the Commonwealth of Australia and the State of Queensland are committed to working towards improving the efficiency and productivity of Australia's infrastructure and transport systems. Ensuring these systems drive economic growth, increase employment opportunities, support social connectivity and enhance the quality of life for all Australians.

The Inland Rail Program is a further step in ensuring an efficient and seamless national rail system. Inland Rail will provide a new, productive, competitive interstate freight rail corridor to improve the resilience and capacity of the interstate freight network and strengthen inter-regional links across eastern Australia to meet future freight demand.

The Commonwealth has tasked the Australian Rail Track Corporation (ARTC) with the delivery and operation of Inland Rail. This requires the cooperation of the State of Queensland to facilitate the effective development and delivery of Inland Rail and its subsequent operation in the State of Queensland.

The Bilateral Agreement (BA) between the Queensland Government and the Australian Government to facilitate the delivery of Inland Rail was signed on 29 November 2019. The BA includes a provision intended to provide confidence to the Queensland and Commonwealth governments and related communities with regard to the impact of Inland Rail structures on local floodplains. The BA has a requirement to:

*Establish a panel of independent international experts to advise the Commonwealth, ARTC and the State as to the recommendations regarding the **extent, interpretation, assumptions and application of flood modelling**, and best **practice for structural design** in a floodplain environment, which panel will have members and will operate as agreed by the Commonwealth and State to provide assurance to the parties **based on existing flood modelling**.*

Accordingly, the independent panel of experts (the Panel) will provide professional expertise and advice on scientific and technical matters related to best practice flood modelling and design of waterway structures in relation to the Inland Rail in a floodplain environment in Queensland.

Members of the Panel shall have recognised expertise in flood modelling, hydraulics, hydrology or associated disciplines. Ideally, the panel should be comprised of approximately 5 members with no less than 2 members from international companies that have recognised expertise in flood modelling, hydraulics or hydrology.

As envisaged in the BA, the Commonwealth, represented by the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) and the State of Queensland, represented by the Department of Transport and Main Roads (TMR) will agree the membership of the Panel.

The establishment of the Panel will ensure that experts with appropriate skills are available to provide advice to the governments within the required timeframes and to manage the potential for conflicts of interest.

Membership of the Panel will be ongoing unless a member indicates they no longer wish to remain.

BACKGROUND

The Inland Rail alignment in Queensland crosses diverse terrain, including flood-prone areas like the Condamine floodplain and the Lockyer Valley and river catchments such as the Macintyre River.

Community safety and the potential impact of Inland Rail on flood behaviour is a key concern of many stakeholders along the Inland Rail alignment. ARTC is required to comply with state planning and environmental impact assessment processes, including a detailed assessment of hydrology impacts and design. This will ensure ARTC has appropriate environmental and safety protections in place, as well as adequate mitigation to minimise any potential impacts.

These planning and environmental impact assessments will be primarily conducted through four separate Environmental Impact Statements (EISs) for the Queensland Inland Rail projects subject to evaluation by the Queensland Coordinator-General (OCG). The terms of reference for each EIS include the requirement to describe the existing flood environment, assess the potential flood impact and recommend flood mitigation measures.

ARTC has taken various steps to ensure it has accurate and representative flood modelling. It has:

- engaged specialist flood modelling firm Aurecon to develop custom, place-based flood models
- engaged or funded individual specialists to work independently with community groups
- liaised with independent specialists engaged by other parties
- extensively upgraded its modelling to consider contemporary LiDAR topographical maps (which take into account approved and unapproved surface level structures that cause water flow changes)
- engaged with the community and individuals to calibrate and validate the hydrology and hydraulic modelling.

SCOPE AND ROLE OF THE INDEPENDENT INTERNATIONAL PANEL OF EXPERTS

The role of the Panel is to advise the Commonwealth and Queensland governments on matters in regard to the extent, interpretation, assumptions and application of existing flood modelling, and best practice for design of waterway structures in a floodplain environment.

The Panel will have access to both the hydrologic and hydraulic flood models and will review and validate these to the extent possible in the available time.

The Panel will focus on identifying whether, and to what extent, national and state guidelines and industry best practice has been applied to modelling techniques and outputs that created the existing flood models in four core areas: extent, assumptions, application and interpretation.

Extent

- Applicability and appropriateness for the relevant design stage (e.g. reference/detailed etc.)
- Appropriateness of tool/s selected for flood modelling
- Confirmation that key design criteria are considered reasonable and appropriate compared with typical similar linear infrastructure projects

Assumptions

- Appropriateness of model arrangements and input parameters
- Appropriateness of model calibration process
- Appropriate application of input data (including addressing data gaps)
- Assumptions around land-use (crops etc.)
- Appropriateness of blockage/debris assumptions
- Appropriateness of future events application, e.g. climate change
- Appropriateness of assumed soil conditions

Application

- Appropriate sensitivity analysis to various items e.g. flow inputs, coefficients
- Appropriateness of change indicators
- Appropriateness of structure and embankment representation (depending on the stage of the design)
- Flood frequency analysis

Interpretation

- Achievement of Design Criteria
- Appropriateness of relevant sensitivity analysis
- Confirm Inland Rail-related flood impacts, if any, are comprehensively quantified and interpreted to their local property context
- Appropriateness of the alignment, with regard the related flood impacts, within the current EIS Study Corridor
- Consider whether reasonable and practical steps have been taken to mitigate flood impacts, if any, outside of the project boundary
- Additional information that would be required to be addressed in the Detailed Design phase of the program.

The advice provided by the Panel will include views on the methodologies used for and outputs of the various Inland Rail flood studies commissioned by ARTC, the merits and further development of the approaches offered, the conduct of the studies and peer review of the outputs and recommendations from the studies.

The outputs expected from the Panel are advice and recommendations in respect of:

1. whether the development of the models and their application accords with the relevant requirements of national and state guidelines/manuals (guidelines) for flood estimation and design of structures in flood-prone environments (Attachment A),
2. whether the extent of the floodplain covered by the flood model is appropriate, and if not recommendations as to what additional extent would be appropriate;
3. whether the method, and extent, of calibration of the model accords with guidelines and industry standards for calibration;
4. whether the method for validation of the model accords with guidelines and industry standards and whether the assumptions used underpin the validation process, and the data points used in the validation are appropriate;
5. whether the model adequately:
 - a. accounts for the impacts of the reference design; and
 - b. whether those impacts are capable of appropriate local mitigation that either removes the impacts or reduces the impact to landholders in the area
6. whether the model is fit for purpose, taking into account the above and any public comments or comments from external stakeholders in relation to the flood model that arises from the public exhibition of the draft Environmental Impact Statement (EIS) for the relevant Inland Rail project; and
7. whether the reference design for the proposed structure meets industry standards for railway structures in a floodplain and if so, whether the reference design is in accordance with best practice.

The Panel may propose additional outputs for consideration of the two governments. In addition to these outputs the governments may seek advice from the Panel in regard to:

1. the development of the scope of works in briefs for tenders in relation to design for Inland Rail in a flood-prone environment;
2. the development of clear and concise translations of technical information and assumptions for communication to non-specialist audiences; and
3. other floodplain related matters in the context of Inland Rail as identified by the governments.

As an advisory body the Panel will not make decisions or recommendations in regard to approvals for the Inland Rail route and engineering design. The Panel will not have any statutory, nor regulatory powers under either Commonwealth or Queensland legislation.

The Panel will provide advice through the Joint Working Group to ARTC on relevant Reference Designs to inform the development of Detailed Designs.

The Panel will work independently of ARTC and the QCG in regard to the development, public consultation and approval processes for the Inland Rail EIS process.

The Panel will have regard for these processes in developing its work program so that where possible its work will be undertaken concurrently with the EIS processes so that its advice is available to help inform QCG's evaluation of the EISs.

The timing and nature of the Panel's reporting on ARTC's flood modelling and reference designs to the governments, including the QCG will be agreed as part of its work program.

Advice provided by the Panel will be used to support assurance related to Inland Rail impacts.

DELIVERABLES AND IMPLEMENTATION

The Panel will provide reports that, when final, will be made publicly available documents. The main purpose of the reports is to provide community assurance about Inland Rail design of waterway structures in flood-prone areas and likely structure interactions with floodwater as modelled by ARTC.

The reports may also be used to inform the QCG review and assessment of comments received in relation to a draft EIS presented by ARTC.

Following the establishment of the Panel it will:

- agree the scope, timeframe and milestones for its work program
- undertake activities according to the scope and timeframe agreed
- consider submissions from community, as relevant to the evaluation of flood models and reference designs against guidelines and industry best practice
- prepare and present draft views, advice and reports to the governments
- seek comments on draft reports as directed
- consider comments in preparing final draft reports for consideration by the governments
- prepare reports to a standard that is suitable for electronic publication by the governments.

GOVERNANCE

The Panel will be managed by a Joint Working Group (JWG) established by the TMR and DITRDC. The departments will have equal decision-making authority over the work of the Panel.

The day to day activities of the Panel will be managed by TMR, including administrative support for coordination of travel, meetings, the provision of information and general administration related to the role of the Panel.

REQUIRED SKILLS AND KNOWLEDGE OF THE MEMBERS OF THE PANEL

Technical expertise and independence

To be considered for the Panel an individual must have demonstrated technical expertise in one or more skill areas such as climatology, geomorphology, hydrology modelling, river hydraulics, floodplain management, flood risk assessment, and design of waterway structures in a flood-prone area.

To be considered for the Panel, individuals should also have:

- memberships and registrations necessary within the nominated areas of technical expertise (i.e. RPEQ, MIEAust, CPEng or international equivalent), or the capacity to achieve such;
- acceptance of a recognised Code of Ethical behaviour (e.g. Engineers Australia); and
- not undertaken paid or unpaid work or activities in relation to either the design, assessment and/or examination of the flood modelling for Inland Rail projects in Queensland.

Ideally, the panel should be comprised of approximately 5 members with no less than 2 members from International companies that have recognised expertise in flood modelling, hydraulics or hydrology.

RESPONSIBILITIES OF THE PANEL

The Panel members will be required to:

- maintain strict confidentiality;
- adhere to the milestones and timelines for the work program as agreed;
- interact and report regularly and communicate fully with JWG and nominated TMR staff;

- engage professionally with stakeholders, including in handling submissions ;
- request and manage information and documentation in a consultative manner; and
- develop high quality analysis and advice as the basis for reports to the governments.

MEDIA

All media and public communications are to be jointly agreed with the Joint Working Group. Panel members must not provide personal opinions or other comments on behalf of the Panel unless previously agreed to by the Joint Working Group.

CONFIDENTIALITY

The Panel will recognise its exposure to confidential information. Improper use or disclosure of confidential information could jeopardise the ability of the Panel to fulfil its role. All information provided to members as part of their role on the Panel should be considered in the first instance “commercial-in-confidence” and must not be divulged to any person without prior written consent of the information provider and the JWG.

Each member of the Panel is to provide a written undertaking (that they will keep information and documents received by them in their role as a member of the Panel, the contents of any meetings, committees or other deliberations of the Panel, confidential unless they are permitted to disclose such information:

- in the course of performing their role as a member of the Panel;
- by the Joint Working Group; or
- by law.

Information will not be considered confidential if it is already publicly available.

All activities of the Panel will be subject to the *Queensland Right to Information Act 2009*.

JOINT WORKING GROUP

The Joint Working Group will comprise the following officers or their proxy or successor:

Joint Working Group Director	TMR Program Director (Rail Planning)
Joint Working Group Director	Director Inland Rail Regional Delivery
Project Manager	TMR Inland Rail
Technical Secretariat	TMR Director (Hydraulics)

ATTACHMENTS

Attachment A – National and state guidelines for flood modelling and design of structures

Attachment B – Flood Models for Inland Rail in Queensland (as at May 2020)

Attachment A – National and State Guidelines for Flood Modelling and the Design of Structures

Publication	Author / Publisher and Date	Access Location
Australian Rainfall and Runoff – national flood estimation guideline	Ball et. al (2019)	http://www.arr-software.org/pdfs/ARR_190514.pdf
Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia	Australian Institute for Disaster Resilience (2017)	https://knowledge.aidr.org.au/resources/handbook-7-managing-the-floodplain/
State Planning Policy – State Interest Guidance Material – Natural hazards, risks and resilience - Flood	Department of Infrastructure, Local Government and Planning (2017)	https://dilgpprd.blob.core.windows.net/general/spp-guidance-natural-hazards-risk-resilience-flood.pdf
Technical Guideline for hydrological and hydraulic modelling	Department of Transport and Main Roads Queensland	https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Hydrologic-and-Hydraulic-Modelling
Guide to Bridge Technology Part 8: Hydraulic Design of Waterway Structures	AUSTROADS, 2019	https://austroads.com.au/publications/bridges/agbt08
Bridge Scour Manual	Department of Transport and Main Roads Queensland (2018)	https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Bridge-scour-manual
Road Drainage Manual	Department of Transport and Main Roads Queensland (2019)	https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Road-drainage-manual

Attachment B – Flood Models for Inland Rail in Queensland (as at May 2020)

Border to Gowrie (B2G) – Hydraulic models
1. Condamine River, large
2. Macintyre River, large (used in B2G and NS2B)
3. Macintyre Brook (Yelarbon to Inglewood), large
4. Westbrook Creek and Dry Creek, medium
5. Gowrie Creek, medium (used in G2H and B2G)
6. Back Creek, small
7. Bringalily Creek, small
8. Macintyre Brook at Bybera Road, small
9. Macintyre Brook at Cremascos Road, small
10. Native Dog Creek, small
11. Pariagara Creek, small
12. Cattle Creek, small
13. Nicol Creek, small
Gowrie to Helidon (G2H)
14. Gowrie Creek, medium (used in G2H and B2G)
15. Intermediate Tunnel Shaft, small
16. Oaky Creek, small
17. Six Mile Creek, small
18. Lockyer Creek, large (used in both G2H and H2C)
Helidon to Calvert (H2C)
19. Lockyer Creek, large (used in both G2H and H2C)
20. Western Creek/Bremer River, medium (used in H2C and C2K)
Calvert to Kagaru (C2K)
21. Western Creek/Bremer River, medium (used in H2C and C2K)
22. Warrill Creek, medium
23. Purga Creek, medium
24. Teviot brook, medium