



OUT20/15373

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Dear Mr Fallon

**Inland Rail - Narromine to Narrabri (SSI 9487)  
EIS**

I refer to your email of 7 December 2020 to the Department of Planning, Industry and Environment (DPIE) Water and the Natural Resources Access Regulator (NRAR) about the above matter.

We have identified a number of issues including:

- There is insufficient information provided to confirm that the proponent has ensured a secure water supply is available
- The proponent must address compensation or alternative water-supply arrangements for the decommissioning of any bores as a result of the proposal.
- The proponent should assess whether the flood related impacts of the project comply with the assessment criteria of the Floodplain Management Plan for the Lower Namoi Valley Floodplain 2020 and the Draft Floodplain Management Plan for the Macquarie Valley Floodplain 2018.

Detailed explanation and recommendations can be found in **Attachment A**.

Any further referrals to DPIE Water and NRAR can be sent by email to:  
[landuse.enquiries@dpi.nsw.gov.au](mailto:landuse.enquiries@dpi.nsw.gov.au).

Yours sincerely

Liz Rogers  
Manager, Assessments  
**Water – Knowledge Office**  
5 February 2021

## ATTACHMENT A

### Detailed advice to DPIE - Planning & Assessment regarding the Inland Rail - Narromine to Narrabri (SSI 9487) EIS

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#### 1. Water Take and Licensing

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##### 1.1 Explanation

The proponent requires groundwater throughout the construction phase of the proposal, but none for the operational phase. Estimates have been made of potable water for temporary workforce accommodation and of non-potable water for earthworks, dust suppression, concrete, and washdown. Estimates of the volumetric non-potable groundwater requirement for construction are inconsistent, being either:

- 1,041 megalitres per year (Chapter B2)
- 1,400 megalitres per year (Tech Report 4).

Insufficient information has been provided to ensure a secure water supply is available and this represents a commercial risk for the project. A number of bore fields are proposed along the rail alignment. However, no confirmation has been provided of an agreement with relevant landholders, if sufficient volumes are available or if sufficient entitlement exists where required. Security of supply also needs to be addressed due to the potential for drought conditions. Where new extraction points are proposed or where the proposed volume to be extracted is greater than currently approved, new approvals and/or impact assessments may be required. It is recommended this be confirmed and additional assessments carried out for new works and extractions as part of the SSI assessment to enable exclusion of approval requirements under the *Water Management Act 2000* where applicable.

Groundwater and geotechnical investigations have indicated that groundwater levels are generally below the excavation depth for construction of the proposed rail and road infrastructure. There may be potential to encounter shallow groundwater during piling of bridges if bored piles are used, however groundwater inflows are expected to be minimal.

The proponent has concluded that only one proposed excavation, borrow pit A, would likely intersect the groundwater table and result in an estimated maximum groundwater inflow of 0.3 ML/year. As the groundwater take that may occur at Borrow Pit A is expected to be less than 1 ML per year. Where there is the potential for total water take associated with an aquifer interference activity to exceed 3ML, sufficient entitlement must be obtained in the relevant water source prior to any extraction or interception. The impact calculations as presented for borrow pit A, however, are incorrect, are not traceable or repeatable, and were validated with an unrepresented sensitivity analysis.

It is noted that borrow pit A will not impact any third-party bore or high priority groundwater dependent ecosystem. The depth of bore BH-2-093, representing the aquifer at borrow pit A, is inconsistently presented as either 9.55 m below ground (Tech Report 4, Table 7.1) or with a maximum screen depth below ground being 10.1 m (Tables 4.2, 4.4, 5.10, 5.11). The surface elevations of all borrow pits are also inconsistent between Tables 4.2 and 7.1.

Potential exists for unidentified geological structures to enable the incidental take from connected water sources. This is not considered in the proposed monitoring program.

The feasibility to extract the maximum estimated construction-water and potable groundwater requirements has not been demonstrated. The volumes needed for the proposal may thus be inaccessible and no alternative source of construction water has been identified.

##### 1.2 Recommendations

Prior to approval

- Clarification be provided of the ability to obtain a secure water supply for the project. This is to include relevant agreements where required and to demonstrate sufficient water entitlements can be acquired where necessary. Where the water is to be sourced from a currently unauthorised source and/or where additional water take infrastructure is required eg. borefields, an impact assessment of this infrastructure development and water take will be required. The impact assessment and access to additional water entitlement will be required to meet the rules of the relevant Water Sharing Plan, the Access Licence Dealings Principles Order (2004) and DPIE Water's Factsheet – Assessing Groundwater Applications

### Post approval

- The proponent must obtain relevant approvals and licences under the *Water Management Act 2000* before commencing any works which intercept or extract groundwater or surface water.
- For the take of water within borrow pit A where take is presented to be less than 3 ML/yr, an exemption is available under cl. 7 of Schedule 4 of the *Water Management (General) Regulation*. To exercise this exemption certain requirements must be met to ensure that less than 3 ML of water is taken. To qualify for the exemption, refer to clause 21(6) of the *Water Management (General) Regulation 2018* which includes requirements to:
  - record the water take within 24 hours in the approved form and manner;
  - provide the water take records to the Minister by no later than 28 July for the year ending 1 July during which the water was taken (e.g. included in the annual report); and
  - keep the water take records for a period of five years.
- The Water Management Plan must include the requirement of an endorsed Bore Field Extraction Plan(s).
- The Bore Field Extraction Plan(s) must be submitted to DPIE Water/NRAR for consultation and endorsement. The Plan(s) must be submitted a minimum three months prior to bore construction. All bore (exempt or not) cannot be constructed or pumping commence until DPIE Water have endorsed this plan.
- The Bore Field Extraction Plan(s) must include at a minimum:
- Detailed information on bore location, water source, depth and proposed volumes of take per year per bore.
- DPIE Water will undertake impact assessment on each bore based on the provided information and the final endorsement of the Bore Field Extraction Plan(s) may include extraction limits on bores to limit impact in line with DPIE Water requirements. This may also include the requirement for make good provisions if assessed necessary.

## **2. Groundwater impacts**

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### **2.1 Explanation**

Impacts from the take of water associated with an aquifer interference activity, i.e. the indirect or consequential take of water from the interception of an aquifer are to be assessed against the 'minimal impact considerations' of the NSW Aquifer Interference Policy (2012). This applies to 'borrow pit A'. The proponent has not directly provided an assessment of the requirements against the Aquifer Interference Policy.

For the supply of groundwater for consumptive purposes to an aquifer interference activity, the water supply works must be assessed as per a water supply dealing and not under the NSW Aquifer Interference Policy. This applies to all bores to be constructed for the take/use of groundwater.

Indicative areas for borelines have been identified with these locations to be refined at a later detailed design stage subject to test drilling results. Potential groundwater impacts were simulated for five of the 12 representative bore fields via individual analytical element, multi-layer transient groundwater models constructed using the software AnAqSim following consultation with DPIE Water in early 2020.

This type of model, in accordance with the Australian Groundwater Modelling Guidelines, is considered appropriate for the qualitatively assessed low risk of groundwater impact, as well as the limited level of problem complexity and data availability. The model construction and applied parameters are mostly reasonable and conservative.

However, justification or further consideration is required regarding the structure of model PB1 and uniform hydrological parameter values applied in model PB2. A drawdown of 4 m, exceeding the aquifer interference policy's minimal impact criterion, was forecast for a neighbouring bore by groundwater model PB1 but waived by assuming extraction is mainly from geologic material represented by model layer 1. Conversely, that bore had been drilled beyond the model layer 1 boundary depth of 66 m through what the driller had described as a water supply zone to 73 m in depth and clay gravel to 76 m in depth. Thus, 10 m of productive basal alluvium is represented by model layer 2. The groundwater model PB2 was assigned identical hydrological parameter values for all three layers without providing justification (Tech Report 4, Table 4.6). These uniform model properties have resulted in a forecast drawdown at a neighbouring bore exceeding the aquifer interference policy's minimal impact criterion.

Accordingly, DPIE-Water supports the recommendation (Tech Report 4, Section 4.6.2) to measure site specific hydrogeological properties at the detailed design stage so that impact modelling can be refined.

Test-bore measurements of layer thickness and hydraulic conductivity are proposed to refine the final bore field design, but without specifying any methods. The methodology is particularly important for dual-porosity media and where data accuracy depends on the degree of aquifer stressing and test duration.

A sensitivity analysis was performed on some of the models by slightly reducing one or both directional hydraulic conductivity values for a selected model layer. The results were described as a drawdown in selected model layers at the centre of a bore field. The implications of the analysis for the potential extent of impacts from the proposal on other groundwater users, and the model's reliability in forecasting those impacts, were not presented.

The proponent has not committed to any specific make good provisions, and indicated their feasibility, for neighbouring groundwater users impacted by drawdown.

## **2.2 Recommendations**

### Prior to approval

- For the supply of groundwater for consumptive purposes to an aquifer interference activity, the water supply works must be assessed as per a water supply dealing and not under the NSW Aquifer Interference Policy.
- The proponent should provide an assessment of the take of water from borrow pit A against the requirements of the NSW Aquifer Interference Policy.

### Post approval

- All bores must be installed with a meter and groundwater extraction recorded and reported to NRAR in line with the reporting requirements in the 'Non-Urban Water Metering Policy' and abide by the reporting requirements under the Water Management (General Regulation 2018) exemption Clause 21(6).
- The meter is required to ensure the extraction limit volumes are not exceeded.
- All bore works must be constructed in accordance with 'The Minimum Construction Requirements for Water Bores in Australia (4<sup>th</sup> edition)'.

- Specific additional construction requirements may be required for individual bore on a case by case basis to be determined at the time of endorsement of the Bore Field Extraction Plan(s).

### **3. Monitoring Plan**

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#### **3.1 Explanation**

The proponent has provided an outline for the development of a soil and water management plan, including objectives, purpose and requirements, relevant guidelines and standards, example management measures, and related strategies, plans or requirements (EIS Appendix I).

The specified objectives of that plan are to avoid or minimise erosion, sedimentation, and water-quality impacts on surrounding water courses. Accordingly, the plan as proposed does not make provision for ensuring compliance with any water licensing requirements or for managing groundwater-level impacts.

#### **3.2 Recommendations**

##### Post approval

- The soil and water management plan should address compliance with any water licensing requirements and managing groundwater-level impacts.

### **4. Licensed bore decommissioning**

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#### **4.1 Explanation**

Ten existing groundwater bores, including seven private bores and three government monitoring pipes, within the proposed construction footprint would require decommissioning.

#### **4.2 Recommendations**

##### Prior to approval

- The proponent must address compensation or alternative water-supply arrangements for the decommissioning of any bores as a result of the proposal.

##### Post approval

- Within 18 months all government monitoring bores decommissioned to make way for the project should be replaced at the proponent's expense. Consultation with DPIE Water will be required to establish the bore design criteria and location of the new work in proximity to the original bore location.

### **5. Surface Water**

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#### **5.1 Explanation**

The proponent has described existing flood behaviour in detail, using modelling of afflux. However, requirement to assess propensity to scour, erode or change has not been fully met at this stage. The proponent uses NSW River Styles database to characterise rivers in terms of river type ('style'), bed material, geomorphic condition and fragility (sensitivity to adjust). This information should be used to inform further assessment that identifies the adjustment potential and likelihood of degradation at sites that are at greater risk.

The proponent has undertaken detailed flood modelling showing existing afflux and changes resulting from construction and operation. However, analysis of potential impacts of construction and operation on waterways is at this stage inadequate. The proponent proposes to defer more detailed hydraulic modelling and analysis of geomorphic impacts associated with structures until the detailed design phase, in consultation with DPIE Water. This is addressed in part by mitigation FH2 (Chapter B3.5.2) of the EIS. The proponent also proposes to develop a geomorphic monitoring program during the detailed design phase, in consultation with DPIE Water.

Mitigation measures outlined for potential risks to watercourses have not been fully described. Reference is made to 'suitably designed scour protection' and basic diagrams of scour protection designs are provided. However, this is inadequate to assess whether the mitigation will fully minimise the risk, or whether there may be a residual risk.

No assessment has been undertaken as to whether the project complies with the requirements within Management Zone AD and Management Zone B of the Floodplain Management Plan for the Lower Namoi Valley Floodplain 2020.

## **5.2 Recommendations**

### Prior to approval

- The proponent should assess whether the flood related impacts of the project comply with the assessment criteria of the Floodplain Management Plan for the Lower Namoi Valley Floodplain 2020 and the Draft Floodplain Management Plan for the Macquarie Valley Floodplain 2018.

### Post approval

- Proponent should explicitly identify sites that are at higher risk of change. Identification of sites at greater risk should include those close to an erosion threshold (as identified in flow velocity analysis), those with high fragility and moderate or good condition and those belonging to a rare River Style (e.g. chain of ponds). Mitigation options should take account of this, along with more detailed hydraulic modelling (see further recommendations below).
- Proponent must undertake detailed modelling and analysis to address SEAR 10.3, in consultation with DPIE Water. In particular, this should include hydraulic modelling, including analysis of streampower, upstream and downstream of structures to assess factors including but not limited to:
  - a) Local changes in geomorphic processes resulting from construction of the structure and indirect effects including changed flow behaviour
  - b) Upstream and downstream impacts for a reach
  - c) Changes in geomorphic process and form at re-entry points, where overland flood flow joins the main channel – afflux modelling in Appendix G demonstrates new flow path activation is likely, and hydro-geomorphic impacts of these should be assessed
  - d) Changes in habitat availability associated with adjustment to river forms and flows (e.g. pools and riffles, large woody debris), with reference to aquatic species distributions
  - e) Results of changes in roughness where riparian vegetation is impacted
- The geomorphic monitoring program to be developed in consultation with DPIE Water must provide for collection of adequate baseline data and include indicators of potential change that are meaningful for the river type. This should draw on the River Styles analysis already undertaken. The monitoring program must also define appropriate monitoring frequencies and over a suitable spatial scale, including potential impacts upstream and downstream of direct construction activities. The monitoring program should also extend well beyond the construction phase, to ensure that mitigation measures are having the intended impact.
- As part of detailed design, following modelling described in previous recommendation, the proponent should provide full details of mitigation measures to prevent damage to watercourses, including scour protection design. Measures should be developed that are appropriate to the river type and the range of processes occurring at that site. For example, the requirements to maintain river character and condition will likely be different for a partly-confined, low sinuosity river as opposed to a laterally unconfined valley fill.

- The proposed development crosses 47 watercourses (including the Macquarie River, Castlereagh River and the Narrabri Creek/Namoi River). Where works are required near or within watercourses there is the potential for impacts both at the construction sites and downstream. It is understood an overarching Construction Environmental Management Plan (CEMP) will be prepared along with a Soil and Water Management Plan. This concept is supported, and the plan/s will need to ensure adequate buffers and controls are put in place to minimise impacts to watercourses. This will need to be consistent with the “Guidelines for Controlled Activities on Waterfront Land” and industry standard erosion and sediment control guidelines eg. “Managing Urban Stormwater: Soils and Construction (Landcom 2004)”.
- Proposed work in waterways will need to ensure maintenance of water flow downstream to key water users and the environment and/or minimise the time these activities are required.