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Surat Basin Rail Project
SEIS – Surface Water Response
Surat Basin Rail Pty Ltd

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1. Introduction

1.1 Background

The Surat Basin Rail Project, herein referred to as 'the Project', is a proposed open access, multi-user railway connecting the Western Railway System, situated 230 km west of Toowoomba, with the Moura Railway System, located near Banana 130 km west of Gladstone. The Project covers a linear distance of 210 km, with a corridor width of approximately 60 m.

The Project has been optimised for coal freight traffic and can accommodate the following operating scenarios:

- Narrow gauge coal railway
- Narrow gauge coal freight railway
- Dual gauge coal freight

The Project consists of a single track with up to eight passing loops. Provisional allowance in the Project's design has been made to allow for future electrification of the rail line.

The Project will have a minimum design life of 50 years and is expected to reach full operational capacity within five to ten years of construction.

1.2 Purpose of report

This document has been prepared as an appendix to the Surat Basin Rail Project Supplementary Environmental Impact Statement (SEIS) document with the aim of addressing the issues raised during the Project's Environmental Impact Statement (EIS) consultation period pertaining to the surface water environmental values of the project area.

This report provides information additional to that provided in the Water Resource (surface water section) chapter of the EIS as well as providing clarification of issues raised during the submission process in regards to information provided in the Water Resources (surface water section) chapter. A separate report (Groundwater Impact Assessment – Surat Basin Rail Joint Venture (SBRJV)) has been prepared which address's issues raised in regards to the groundwater section of the Water Resources chapter. This report should be read in conjunction with the SEIS - Soils Response report (Aurecon Hatch, 2009), the SEIS - Construction Water Response report (Aurecon Hatch, 2009) and the Groundwater Impact Assessment - SBRJV report (AECOM, 2009).

1.3 Scope

Information provided in this report includes the following:

- Additional surface water legislative requirement information included in this report relevant to the Project incorporating watercourse determination, Riverine Protection Permits and how they relate to this Project, requirements for the Project in relation to work that interferes with the course of flow, and how overland flow is treated in the project area under the Water Resource (Fitzroy Basin) Plan 1999.

- Hydraulic information is provided, including a summary of work undertaken to date, results from the work and work proposed for the future

- Potential impacts on water quality from the Project, including salinity, on-farm erosion control, stock routes and potential impacts to existing users and the Castle Creek wetland are also outlined

- Mitigation measures additional to those in the EIS are recommended where needed following consideration of potential impacts identified in this report

- An erratum list is provided clarifying issues raised during the EIS consultation period with information provided within the EIS
- A summary of the submissions received on the Water Resources (surface water) chapter of the EIS has been provided. The submissions are cross referenced to the relevant sections within this document containing additional information relating to each issue is provided in Appendix A.

2. Surface water legislative requirements

2.1 Water Act 2000

2.1.1 Watercourse definition

Under the *Water Act 2000*, a watercourse is defined as:

- A river, creek or stream in which water flows permanently or intermittently in a natural channel, whether artificially improved or not
- Or in an artificial channel that has changed the course of the watercourse. It also includes the banks and any other element of a river, creek or stream confining or containing water

It should be noted that if there is any doubt over whether a feature is a watercourse or not, a qualified Department of Environment and Resource Management (DERM) departmental officer is required to undertake a watercourse determination.

2.1.2 Riverine Protection Permit

Based on consultation with DERM, a Riverine Protection Permit is required for all crossings along the alignment where activities that involve clearing vegetation, extracting material or placing fill will occur in a watercourse during construction. One application can be lodged which will cover all watercourses intersected and crossed by the Project.

Where there is uncertainty about whether a drainage line would be considered a watercourse or otherwise, a determination by a qualified DERM Departmental Officer is required. Given the onerous nature of determining watercourses along the entire Project alignment and the low risk nature of activities undertaken with Riverine Protection Permits, it has been agreed with DERM that identification of watercourses will be undertaken outside the SEIS process and will be undertaken during the permitting process when more detailed design information about each individual crossing is known to assist with the determination and permitting process.

Therefore, it was identified through discussions with DERM that a site visit for determining a large number of watercourses for the purpose of Riverine protection permitting was not necessary at this stage in the Project.

In order to facilitate a smooth permitting process for a Riverine Protection Permit, the watercourse determination process and permit application should be lodged in the order of six months prior to the commencement of construction. Riverine Protection Permits are generally valid for two years from the date of issue.

Information provided in the River Protection Permit application will include:

- Applicants details
- Details of the activity: name of watercourse, lake or spring, duration of activity including start and finish dates, lot and plan numbers for the locations of the activities
- Proposed activity: whether native vegetation will be destroyed in the watercourse, lake or spring, including the length, width, area and type of vegetation to be destoyed. Whether excavation will be undertaken within the watercourse, lake or spring including the length, width, depth, total volume and type of material to be removed. Whether fill

will be placed in the watercourse, lake or spring including the length, width, depth, total volume and type of fill to be used.
- Purpose or reason for activity
- Method of operation: machinery, chemical or other
- Location of activity: A plan showing the location of the activity, including property boundaries, Lot/Plan descriptions and the position of the watercourse, lake or spring
- Adjacent owner approval: only if land adjacent to the watercourse, lake or spring is not owned by the applicant.
- Culvert design information

During discussions with DERM it was also confirmed that watercourse identification can begin prior to the preparation of permit applications by providing information, such as photos, locations etc where they are available at this stage to begin the process of watercourse determination.

2.1.3 Water License (to interfere with the course of flow)

Water licenses will be required for any activity that interferes with the course of flow of water under Section 206 of the *Water Act 2000*. Under this legislation, the DERM Chief Executive may grant licenses for interfering with the flow of water.

The words “diverting” or “changing “ in the context of this licence application does not refer to an action where water is taken from the watercourse, lake or spring by mechanical means and used on land. Any increase to, or reduction of the flow that occurs between the upstream and downstream extent of the diversion must solely be as a result of changes in the characteristics of the watercourse, lake or spring.

If a license or licenses to interfere with the course of flow by diversion are required as per the above criteria, the applications will be assessed against the Australian Coal Association Research Program (ACARP) guidelines for stream diversions for the Bowen Basin including:

- ACARP Maintenance of Geomorphic Processes in Bowen Basin River Diversions, Stages 1,2 and 3 – to assist with the design of the diversion channel
- ACARP (2001) Monitoring and Evaluation Program for the Bowen Basin River Diversions

The location of watercourse diversions along the alignment will be identified during the detailed design stage of the Project. Where there is uncertainty as to whether works would require a water license to interfere with the course of flow, it is recommended that detailed design plans for culverts and crossings be submitted to DERM for their consideration during the detailed design stage of the Project.

Based on discussions with DERM it is also understood that should a watercourse diversion be considered during a future stage of the Project that a detailed site inspection and assessment information will be required as part of a Water License (to interfere with the course of flow) application.

2.1.4 Water Resource (Fitzroy Basin) Plan 1999

Overland flow is regulated under the Water Resource (Fitzroy Basin) Plan 1999 (WRP). Overland flow is water that flows across the surface of the land. It can be derived from runoff during rainfall events and/or from river breakout on a floodplain.

Overland flow take has been restricted since the introduction of the WRP. Under this legislation landholders are able to continue to take overland flow for stock and domestic purposes, under an authority issued by DERM or to satisfy the requirements of an environmental authority.

Regulations (Water Resource (Fitzroy Basin) Plan 1999) limit the construction of new overland flow storages to a maximum of 5 ML capacity for purposes other than stock and

domestic (limited capacity works) or unless an Environmental Authority has been issued by the DERM under the *Environmental Protection Act 1994* (EP Act).

Proponents constructing new stock and domestic storages and/or limited capacity works are required to undertake a self assessment using the Codes developed by DERM. Stock and domestic works are restricted to the 'Code for self assessable development for taking overland flow water for stock and domestic purposes' whilst limited capacity works need to complete the 'Code for self assessable development for taking overland flow water using limited capacity works'.

It should be noted that on 6 June 2008, the minister announced his in intention to prepare a Fitzroy Basin draft water resource plan to replace the Water resource (Fitzroy Basin) Plan 1999. Water resource plans are subordinate legislation and it is necessary to review and replace plans prior to the end of a plan's 10 year life (DERM, 2009).

3. Hydraulic investigation

3.1 Previous hydraulic assessment investigations

During development of the Stage 3 rail alignment a hydrological and hydraulic investigation was undertaken in order to investigate the impact of the proposed alignment upon the existing watercourses.

The SBRJV have commissioned several drainage investigations in order to develop a preferred rail alignment and to assess the existing hydrological and hydraulic regime and impacts of the proposed rail alignment upon the existing watercourse systems. These studies include:

3.1.1 Stage 1 Surat Basin Rail Pre-feasibility Study

As part of the Project a pre-feasibility (desktop) study was undertaken. The study investigated the following issues:

- Location of drainage routes impacted upon by the proposed rail alignment
- Delineation of drainage catchments contributing flow to the identified drainage routes
- Determination of peak flood discharges along the rail alignment using
  - Rational Method (for catchments less than 5,000 ha)
  - RORB hydrologic model (for catchments greater than or equal to 5,000 ha)
- Hydraulic analysis of selected culverts
- Hydraulic analysis of significant flows with HEC-RAS
- Review of hydraulic analysis outcomes and recommendations for a drainage strategy

The study identified significant hydraulic structures, but was based upon limited topographical information. Accordingly, recommendations were made to undertake further investigations during later stages of the project using more reliable topographical data.

3.1.2 (Stage 2) Flooding and Drainage Report

This report built upon the Stage 1 study and outlined the methodology, outcomes and recommendations of a drainage assessment and stormwater management plan (SMP) for the alignment.

Based upon the available topographical data, a total of 74 catchments were found to be contributing flow beneath the proposed rail alignment. Cross drainage requirements were determined using culvert and/or bridge structures which were sized to convey peak discharges for a 1% annual exceedance probability (AEP) (100 Year ARI) event. This investigation also provided preliminary information regarding scour protection requirements for nominated cross drainage locations.

The adopted investigation criteria was to identify peak water elevations and consequent afflux for the 1% AEP event resulting from construction of the proposed hydraulic structures across the nominated watercourses.

3.1.3 Stage 2 Surat Basin Rail Feasibility Report

This study further developed the concepts and models developed during the Stage 1 and Flooding and Drainage reporting.

The report concluded that flood behaviour at a number of bridge locations should be subject to review and unsteady two dimensional (2D) hydraulic analysis during later stages of the Project. The report also concluded that this detailed modelling should be based upon Aerial Laser Survey (ALS), where possible.

3.1.4 Wandoan Coal Project Flood Study Technical Report

The Wandoan Joint Venture commissioned a report to investigate the hydrological and hydraulic condition of Juandah Creek and to assess the potential impact of the Wandoan Mine upon the existing Juandah Creek hydraulic regime. The scope of the study was:

- To quantify storm discharge using hydrological modelling and calibration to available field data
- To undertake hydraulic modelling to determine existing flow patterns, extents of flooding and flood levels
- To determine potential impacts on flooding upstream and downstream of the rail corridor using the hydraulic model
- To recommend appropriate mitigation measures to prevent impacts on flooding and to determine appropriate flood protection to various infrastructure elements

The above information produced prior to the Stage 3 hydraulic investigation was reviewed and recommendations identified at the end of the Stage 2 Surat Basin Rail Feasibility study were adopted as appropriate

3.1.5 Stage 3 Hydraulic Investigation

The Stage 3 Hydraulic Investigation report is provided as a stand alone report. The report summarises the Stage 2 Surat Basin Rail Feasibility Report and Flooding and Drainage Report and describes the resulting flood assessment undertaken by Aurecon Hatch as part of the Stage 3 investigation. A number of bridge structures were nominated for further investigation during Stage 2 of the Project.

The following bridge structures were deemed to have significant afflux and/or significant impacts upon surrounding public and private infrastructure and were suitable for assessment using 2D TUFLOW hydraulic models. Accordingly the crossings were assessed using 2D hydraulic models during the Stage 3 investigation:

- Roche Creek (North / South)
- Mayne and Cockatoo Creeks
- Ross Creek
- Cracow Creek
- Delusion Creek
- Orange Creek
- Castle Creek
- Juandah Creek

Table 1 summarises the findings from the 2D modelling undertaken during the Stage 3 investigation.

Table 1 Summary of Stage 3 Study Investigations results

Creek	1% AEP Afflux (m) at bridge	Observations
Roche Creek (North/South)	0.07/0.08	• Increases in flood extents extend approximately 430 m upstream of the crossing on the northern bank only • There is a small area with a reduction in flood extents on the northern bank downstream of the crossing • Increase in downstream peak velocity to 1.9 m/s
Mayne and Cockatoo Creeks	0.69	• Increase in flood extents extend approximately 950 m upstream of the crossing • There is a large inundation of farming pasture land on the northern bank immediately upstream of the rail crossing • Afflux is more extensive on the Northern Bank • Increase in downstream peak velocity to 2.6 m/s
Ross Creek	0.01	• Increase in flood extents extend beyond approximately 130 m upstream of the crossing, predominantly along the northern bank • Increase in downstream peak velocity to 2.5 m\s
Cracow Creek	0.15	• Afflux extends approximately 680 m upstream of the crossing • Increase in downstream peak velocity to 1.6 m/s
Delusion Creek	0.01	• Negligible impact on existing flood extents • No change in peak velocity
Orange Creek	0.47	• Increases in flood extents extend approximately 100 m upstream of the crossing • Peak velocities were not assessed
Castle Creek	0.78	• Increase in flood extents extend approximately 900 m upstream of the crossing. The majority of upstream inundation is located along the northern bank • Afflux on the northern bank upstream of the crossing caused increased inundation along 300 m of Castle Creek Road. This is an increase from the 60 m of inundation estimated for the existing case • There is a reduction in the flood extents downstream of the crossing along the southern flood limit • No change in peak velocity
Juandah Creek	0.37	• Increases in flood extents extend approximately 1,100 m upstream of the crossing • The limits of flooding increase on both the northern and southern banks in areas of pasture • There is a reduction in the flood extents on the southern bank downstream of the crossing • Bridge length reduced from the Stage 2 investigation • Increase in downstream peak velocity to 2.8 m/s

A review of the Stage 3 hydraulic model results indicate that the peak water levels at each of the selected rail crossing do not overtop the rail embankment for the 1% AEP design event.

The estimated peak water level elevation for the nominated rail crossings from the developed 2D hydraulic models are presented in Appendix E of the Stage 3 Hydraulic Investigation report. The predicted post-development affluxes are also included in Appendix E of the Stage 3 Hydraulic Investigation report.

For further information regarding the Stage 3 Hydraulic Investigation, provided as a stand alone report.

3.2 Proposed detailed hydraulic structure assessment and design investigations

As a result of the investigations described in Section 3.1, it is recommended that the following assessments using the following detailed design criteria be undertaken to further refine the investigations findings.

3.2.1 Detail design criteria

The following design criteria shall be adopted for the detailed design:

- Top of Rail 1% AEP immunity
- Rail Formation 2% AEP immunity
- Assessment using appropriate hydrologic techniques including Rational Method or modelling using RORB for use in steady or unsteady state hydraulic models
- Assessment using appropriate hydraulic techniques including analytical, one-dimensional and two-dimensional modelling
- Negligible impact upon land adjacent private or public land not owned by the SBRJV
- Obtain applicable approvals from Statutory Authorities, including Waterway Barrier Permits and water licenses (to interfere with the course of flow) required under the *Fisheries Act 1994* and *Water Act 2000* respectively.
- Based upon modelling results, location and impacts, mitigation measures may be implemented to reduce potential impacts. Potential mitigation measures include relocation of infrastructure, land resumption, additional culverts, and separate banks of culverts. In areas where there is a potential increase in velocity as a result of the rail alignment, rock protection will be installed.

Hydraulic structures and appurtenances shall be designed in accordance with the following hierarchy:

- QR Limited standard drawings and specifications
- Queensland Department of Transport and Main Roads (formerly Queensland Department of Main Roads) standard drawings and specifications
- Supplemental standard drawings and specifications

3.2.2 Hydrological modelling

It is proposed that the detailed design of the Project alignment shall be fully assessed using previous hydrological modelling and reporting which shall be reviewed and adopted or modified as appropriate. This will involve:

- Review and modification of previously identified drainage routes intercepting the final rail alignment
- Identified drainage routes and watercourses (defined and un-defined) catchment boundaries will be revised and finalised for each watercourse intercepting the final rail alignment
- Review of existing hydrological models of each watercourse, including:
  - Rational method calculations providing peak discharge information for catchments less than 5,000 ha
  - RORB hydrologic modelling providing discharge hydrographs for catchments greater than 5,000 ha or being modelled using a 2D hydraulic model

3.2.3 Hydraulic modelling

Hydraulic models previously developed will be reviewed, modified or replaced with more appropriate models as necessary. It is proposed that three hydraulic models shall be utilised for different types of watercourse crossings during the detail design phase including:

- Analytical Culvert Master (Bentley) models of minor catchments conveying cross drainage via culverts
- 1D HEC-RAS of well defined watercourses with the majority of flow contained within the watercourse banks with culverts and/or minor bridge crossings
- 2D TUFLOW model of significant bridge structures or areas with complex flow patterns and significant bridge structures potentially impacting upon existing or proposed infrastructure.

3.2.4 Design and mitigation

Design and mitigation will be undertaken in accordance with the Road Drainage Design Manual (DMR, 2002) and QR standard drawings and specifications. The following will be considered:

- Ability to convey the peak discharge for the 1% AEP event
- Determination of peak water levels
- Determination of velocity and mitigation options
- Locating structures in the natural drainage channels delineated during catchment analysis
- Additional investigations as outlined above in Section 3.2 will also be undertaken.

4. On-farm erosion control

4.1 Background

The Project will intersect and/or potentially impact approximately 25 on-farm erosion control areas. Information on the locations of on-farm erosion control measures intercepted by the Project is provided in the SEIS - Soils Response report.

Erosion control measures such as contour banks could potentially be disturbed when the rail corridor and associated infrastructure cuts across the banks therefore opening channels for overland flow. This uncontrolled overland flow has the potential to increase erosion of soils with the subsequent impacts on surface water identified below.

4.2 Potential Impacts

Potential impacts to surface water include:

- Increased sedimentation of watercourses through the discharge of uncontrolled overland flow
- Nutrients from agricultural activities entering surface water bodies resulting in elevated nutrient levels
- On-farm contaminants (such as hydrocarbons and pesticides) entering watercourses or water bodies
- Changes to overland flow regimes resulting in increased surface ponding and increased velocities and surface scour
- Changes to surface and sub-surface drainage resulting in changes to watertable levels

4.3 Mitigation measures

- Construction of new contour bank drains along the alignment where the alignment intercepts contour banks. The location of these contour bank drains is provided in SEIS - Soils Response report.
- Contour bank drains should be designed and constructed in accordance with the Soil conservation measures—Design manual for Queensland (2004) produced by DERM
- Construction of the contour bank drains should be consistent with the methods outlined in the Best Practise Erosion and Sediment Control (Witheridge 2008)
- Construction in the vicinity of waterways should be staged to avoid periods of expected seasonal rainfall

- Negotiations regarding alteration and planned reconstruction, reinstatement and reconfiguration of existing contour banks will be undertaken with and designed in accordance with affected landholders

5. Occupational crossings

5.1 Background

The construction of the proposed railway alignment will result in a number of occupational crossings being constructed for the Project and realignment of the stock route in the area. Of these, approximately 25 of the occupational crossings and one stock route crossing occurs within or adjacent to waterways. Details of these crossing locations are provided in the SEIS - Soils Response report. Locating these crossings within or adjacent to waterways has the potential to cause impacts on surface water quality as a result of a potential to increase soil erosion around the crossings.

5.2 Potential Impacts

Potential impacts to surface water as a result of locating crossings in and adjacent to waterways include:

- Surface water quality degradation due to sedimentation caused by
  - Removal of vegetation by stock / vehicle trampling
  - Destabilisation of soils caused by stock movement
  - Increased soil compaction increasing runoff
  - Destabilisation of soils caused by uncontrolled stock watering in waterways
  - Erosion of destabilised or newly exposed soils by concentrated flow paths in the waterways
  - Introduction of contaminant concentrations for example stock manure and hydrocarbons

5.3 Mitigation measures

Mitigation measures to prevent impacts on surface water from stock routes and occupational crossings:

- Where possible crossings should be relocated away from waterways and areas of erosive soils. Specific areas where these erosive soils occur are provided in the SEIS - Soils Response report
- Negotiations regarding the locations and design of crossings will be undertaken with affected landholders and DERM
- During detailed design further investigations into grade separated crossing locations for stock movement should be undertaken

6. Soil salinity

6.1 Background

A review of the Soils Chapter in the SBR EIS indicates that soil salinity along the alignment ranges from being non-saline to moderately saline. Two samples collected indicated highly saline sub-surface materials and one sample collected indicated extremely saline soils. Impacts to surface water quality can occur when surface or sub-surface hydrological regimes are disturbed by the Project in areas where saline soils occurs.

6.2 Potential Impacts

Potential impacts to surface water include:

- Impacts on the downstream environment as a result of disposing drained saline groundwater

- Disruption of hydrological regimes has the potential to increase soil sodicity and salinity and therefore increase the vulnerability of soils to erosion, sedimentation and salinisation issues
- Excavation or cut and fill activities exposing saline soils to overland flow or infiltration resulting in contamination of runoff and subsequent contamination of watercourses or water bodies with saline soils and/or seepage
- Storage or use of water resources that results in infiltration into a saline water table, due to the infiltration the water table is raised bringing saline groundwater to the surface where it can contaminate surface water

6.3 Mitigation measures

Mitigation measures to prevent impacts on surface water from soil salinity:

- Where possible, the rail alignment and associated hydraulic infrastructure will be designed to ensure there is no ponding as a result of the railway infrastructure
- Where surface ponding cannot be avoiding through other design measures, interception drains and toe drains will be installed to assist with conveying flow down the catchment
- Water storages should be adequately lined to prevent infiltration into the underlying water table
- Assess excavation and cut and fill areas for soil salinity prior to undertaking these activities. Where possible avoid disturbing areas suspected to contain saline soils
- Where saline soil or waters cannot be avoided, adequate drainage and runoff containment should be provided to prevent contamination of runoff and overland flow
- Retain vegetation in groundwater recharge and discharge areas to assist with maintaining existing water tables
- Rehabilitation of vegetation with suitable endemic native species in areas disturbed during construction activities that are not required for ongoing operations
- Where subsurface drainage of saline flows is identified/recommended during the detailed design stage of the Project, investigations will be undertaken to ensure impacts on the downstream environment/users do not occur

7. Existing users

A water supply assessment (SEIS – Construction Water Response) for the Project was undertaken as part of the SEIS. The assessment identified three surface water options available for construction. Abstraction of this water has the potential to impact on existing downstream water users by reducing stream flow and therefore reducing the volume and quality of water that might otherwise be available to these users.

An outline of these surface water supply options is provided below which details the potential impacts associated with each of the surface water supply options.

7.1 Water allocations from the Dawson River

Water allocations in the Dawson Valley Water Supply Scheme (DVWSS) are established by entitlement through the WRP and the Fitzroy Basin Resource Operation Plan 2009 (ROP). Water allocations are separate to land and therefore are tradeable according to limits and rules defined in the ROP. Water allocations are eligible to be bought, sold or leased, in part or in full, permanently or temporarily.

Water allocations have been issued with a priority group depending on the use of the allocation. An allocation can either be in the high, medium or medium A priority group. A water allocation with a high priority has a high level of performance in terms of reliability of providing water (95 % to 100 %) when compared to medium (82 % to 88 %) and medium A (82% to 88%) priority water allocations. High priority water allocations are mostly used for urban and industrial purposes.

In terms of the Project, water allocations would either have to be bought or leased directly from an allocation holder or indirectly from a water broker, due to there being only 600 ML of unallocated water for state significant projects within the DVWSS.

The construction of the proposed Nathan Dam may increase the volume of unallocated water in the system. Allowances for an additional 190,000 ML of water allocations in the medium priority water group have been made in the WRP.

7.1.1 Potential impacts

It is expected that there would be no potential impacts on existing users from using a water allocation through the DVWSS. This water is already allocated under the ROP, the potential impacts associated with abstracting this water have already been assessed through the development of the ROP which converted previous authorisations to allocations.

Any movement of water (eg water trading from one zone to another) in the system is subject to the requirements of both Water Allocation Security Objectives (WASOs) and Environmental Flow Objectives (EFOs). Integrated Quantity Quality Modelling will be undertaken to ensure any proposed allowable changes meet the strict requirements.

Potential impacts from providing access to water abstraction sites could include bank disturbance associated with pump site establishment, vehicle access points and refueling, repairs and maintenance of pumps.

7.1.2 Mitigation measures

- Where possible; existing infrastructure and access points will be utilised to minimise impacts on undisturbed sites. Preferential water abstraction sites will be weirs, floodways, and existing/constructed crossings.
- Where required, a development application will be lodged for a watercourse pump (Part K_2) under the *Integrated Planning Act 1997*

7.2 Water permits for ephemeral streams

Water permits for surface water are issued under section 237 of the *Water Act 2000*.

For surface water, water permits are often used to enable water from rivers and ephemeral watercourses to be abstracted. The Dawson River and a number of its tributaries are located in the vicinity of the Project. Whilst the Dawson River is overseen by SunWater (through the DVWSS), as discussed in the SEIS - Construction Water Response report, the tributaries often have temporary waterholes that could provide small volumes of water for construction purposes. To access this water an application under the *Water Act 2000* must be made to DERM (ie an Application to Take Water form and provision of relevant supporting information). This allows the user to take water as outlined below.

7.2.1 Water permit applications

Under the *Water Act 2000* section 237, an applicant can apply for a water permit for taking water for an activity. At the time of the application the activity must have a reasonably foreseeable conclusion date. The application must be in the approved form and supported by sufficient information so a decision can be made.

The chief executive may require further information about the application, to enable a decision to be made. This decision must take into account:

- The application and additional information given in relation to the application
- Any WRP or ROP that may apply to the permit
- Existing water entitlements and authorisations to take or interfere with water
- Any information about the impacts on natural ecosystems
- Any information about the impacts on the physical integrity of watercourses, lakes, springs or aquifers

- Policies developed in consultation with local communities for the sustainable management of local water
- The public interest

The chief executive may also consider whether the applicant has committed an offence against the Act previously.

If the chief executive is satisfied that the application should be granted or granted in part, then the chief executive must grant all or part of the application for a stated period, with or without conditions. The chief executive has 30 business days in which to provide the applicant with an information notice regarding the decision, after the chief executive has made a decision.

If the application was successful the chief executive has 30 days to provide the applicant with a water permit.

A water permit relates to the location or locations stated on the permit and must be granted for a stated period. A water permit cannot be transferred, amended, renewed or suspended and the water permit must be for the stated activity.

A water permit may be cancelled if the chief executive is satisfied that the permit should be cancelled.

7.2.2 Potential impacts

The potential impact to existing users of sourcing water from ephemeral streams through the water permit process under the *Water Act 2000* is expected to be minimal. As indicated in the SEIS - Construction Water Response report there will be a low reliance placed on this water source as a construction water supply and any abstractions are likely to be small, opportunistic and short term in nature.

As indicated in the *Guidelines – Application for permit to take water*, when deciding the application, the decision making authority must take into account existing water entitlements.

7.2.3 Mitigation measures

- Surface water permit (issued under Section 237 of the *Water Act 2000*) applications will be prepared in accordance with the *Guidelines – Application for permit to take water*
- Where required, a development application will be lodged for a watercourse pump (Part K_2) under the *Integrated Planning Act 1997*

7.3 Overland flow

As discussed in the SEIS - Construction Water Response report, overland flow is a possible construction water supply option.

Regulations (Water Resource (Fitzroy Basin) Plan 1999) limit the construction of new overland flow storages to a maximum of 5 ML capacity for purposes other than stock and domestic or unless an Environmental Authority has been issued by DERM under the EP Act. However, there are a number of situations where overland flow storages could be constructed with a greater storage volume than the 5 ML for purposes other than stock and domestic usage under the current legislation:

- Reconfiguration of existing notified works
  - Landholders have previously given notice to DERM outlining the size, location and purpose of the storage
  - Storages would be required to be surveyed to calculate a total volume
  - Application is made to DERM to allow for reconfiguration of existing storages into a single storage with the same storage capacity of those storages to be reconfigured

  - DERM approves application, new storage is constructed whilst other storages are decommissioned
- Construction of a stock and domestic storage with a volume greater than 5 ML
  i) Completion of the 'Code for self assessable development for taking overland flow water for stock and domestic purposes'
  ii) Application to DERM for a water permit to use water in the storage for purposes other than stock and domestic
  iii) Approval by DERM for a water permit.
  iv) Once construction of the Project has been finalised, storage will revert back to a stock and domestic storage.

7.3.1 Potential impacts

Reconfiguration of existing works

Potential impacts to existing users through the reconfiguration of existing works would be no greater than that already allowed for under current operating uses for the water storages.

Construction of new stock and domestic storage (with temporary abstraction for construction purposes)

As indicated in the SEIS - Construction Water Response report there will be a low reliance placed on this water source as a construction water supply source. Any new storage will be constructed as per the guidelines outlined in the code of self assessable development for taking overland flow water for stock and domestic purposes. Applications for water permits will be subject to the same criteria as outlined in Section 7.2. Potential impacts on existing users include a reduction in overland flow that potentially could be available to existing downstream users.

Structures will only be developed at sites assessed as stable and where extensive additional clearing is not required. All sites will be assessed during the detailed design phase.

Any new structures developed will be established using the procedures and methodology outlined in an Environmental Management Plan (EMP) developed by SBRJV to ensure compliance.

7.3.2 Mitigation measures

- Surface water permit (issued under Section 237 of the Water Act) applications will be prepared in accordance with the *Guidelines – Application for permit to take water*
- Where overland flow storages are constructed for construction water supply the structures will be located where they will not intercept flow that would otherwise flow into existing water storages. An EMP will be established to facilitate all works to minimise the impact to the environment and downstream users.

8. Castle Creek Wetland

8.1 Background

The proposed rail alignment runs to the east of a wetland approximately 1 km south of the junction of Castle Creek Road and Defence Road (between chainages 167 and 168). The rail alignment is located was from the main catchment area for the wetland.

The wetland is mapped on the Theodore 8948 map of the Queensland Wetland Map 'Version 3.1' series.

The wetland system is mapped as being approximately 25 ha in extent and is described as a Palustrine System. A Palustrine System is defined as being dominated by persistent emergent vegetation or where water in the deepest part of the basin is less than 2 m in depth where active wave formed shore or bedrock features.

8.2 Potential impacts

- Reduction in the size of the 'Castle Creek' wetlands catchment area
- Change to local overland flow paths
- Reduction in available habitat area for water birds and waders in the vicinity of the wetlands

8.3 Mitigation measures

- Modelling of flow regime and how it will be impacted by the proposed rail alignment will be undertaken during the detailed design hydraulic investigation
- Culverts will be constructed along existing drainage lines crossed by the Project that contribute flow to the wetland to ensure the contributing catchment area is not impacted by construction of the rail alignment

9. Clarifications and errata list

Provided below is an outline of clarifications and errata's from the EIS that should be noted. The list is displayed in order of occurrence within the EIS. The section number, the section heading, section sub headings (if applicable), page numbers and paragraph numbers are provided for cross reference purposes.

6.1.1 Methodology (page 143, paragraph 7)

"water licenses" should instead be "water allocations[1]".

6.1.2 Description of environmental values, Dawson River, Catchment characteristics (Page 144, paragraph 3)

The sentence "Of the tributaries to the Dawson River that are intersected by the Project, only Orange Creek has a weir which impounds water for irrigation usage" should be deleted.

6.1.4 Current water licenses and uses for surface water (page 153, section heading)
"Current water licenses and uses for surface water" should instead be "Current water allocations and uses for surface water"

6.1.4 Current water licenses and uses for surface water, Water licenses (page 153, section heading)
"Water licenses" should instead be "Water allocations"

6.1.4 Current water licenses and uses for surface water, Water licenses (page 153, paragraph 1)
"(managed through Water Licenses)" should be deleted

6.1.4 Current water licenses and uses for surface water, Water licenses (page 153, paragraph 2)
This paragraph should be deleted.

[1] Water allocations are supplemented water entitlements that are not attached to land and are tradeable. Water allocations in the Dawson catchment are related to supplemented allocations on the Dawson River from the upstream limit of the Glebe Weir down to the Don River junction. These entitlements are managed by SunWater.

10. References

ACARP (2001) *Monitoring and Evaluation Program for the Bowen Basin River Diversions*

AECOM (2009) *Groundwater Impact Assessment – Surat Basin Rail Joint Venture*

Aurecon Hatch (2009) SEIS - *Construction Water Response*

Aurecon Hatch (2009) *SEIS – Soils Response*

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Department of Environment and Resource Management (2009), The State of Queensland (Department of Environment and Resource Management), accessed 1 September 2009, <http://www.nrw.qld.gov.au/wrp/fitzroy.html>

Department of Main Roads (2002) *Road Drainage Design Manual*

Department of Natural Resources and Mines (2004) *Soil Conservation Measures – Design Manual for Queensland*

Department of Natural Resources and Water (2006) *Guidelines for permit to take water (Water Act 2000)*

Department of Natural Resources and Water (2008) *Code of self assessable development for taking overland flow water for stock and domestic purposes*

Department of Natural Resource and Water Guideline – *Activities in a watercourse, lake or spring carried out by an entity*

Environmental Protection Agency (2009) *Queensland Wetland Map Version 3.1, Wetlands, Theodore 8948*

Queensland Government (2009) *Environmental Protection Act 1994*. Office of the Queensland Parliamentary Counsel

Queensland Government (2009) *Integrated Planning Act 1997*. Office of the Queensland Parliamentary Counsel

Queensland Government (2009) *Water Act 2000*. Office of the Queensland Parliamentary Counsel

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Surat Basin Rail Pty Ltd Joint Venture (2009) *Surat Basin Rail Project Environmental Impact Statement*

Witheridge (2008) *Best Practise Erosion and Sediment Control, International Erosion Control*