7. Hydrology/hydraulics and surface water quality

7.1 Summary

A summary of the comments received during the JRYUP EIS consultation process relevant to hydrology/hydraulics and surface water quality issues are outlined below.

- Further details required on stormwater management during construction.
- Requirement to consider the use of baseline data collated by the Department of Natural Resources and Water (NRW) for Plane Creek.
- Request to include additional information (ie metadata) to support the monitoring data used in the EIS.
- Commitment required to continue collection of baseline data until the construction period commences.
- Clearer definition for the event-based sampling monitoring program.

7.2 Stormwater management

As the construction process is dynamic, with the number and scale of active areas varying significantly from time to time, it is not possible to foresee exactly where and when sediment controls will be installed. Instead the Draft Construction Environmental Management Plan (CEMP) outlines processes and procedures for the control of stormwater and sediment control (including sediment dams). The CEMP provides for undertakings to develop maps and plans ahead of the development to ensure that all such controls are in place as and when needed.

The intent is that any water captured during wet periods will not be released into watercourses for disposal during dry weather. The captured water, should opportunity be available, will be used for irrigation or used for construction purposes such as road watering or conditioning of fill.

The CEMP also has a water quality monitoring schedule and specification. This covers the monitoring of turbidity as a substitute for TSS as instantaneous turbidity data is more useful (allows for an immediate response to an issue) than the 5-7 day turnaround required for TSS.

As for the completed facility, the design team are cognisant of the requirement to design in appropriate sediment controls. At this stage locations and designs for these controls have not been developed as their design is dependent upon the overall hydraulics and drainage regime of the site which is still under development.

7.3 Surface water quality

It is acknowledged that, without adequate site controls throughout construction and an adequate operational phase management plan, surface water runoff from the project site has the potential to impact on the existing water quality values of the surrounding creek systems. The CEMP (refer Appendix H) addresses key requirements for onsite controls and site management practices for all phases of the Project.

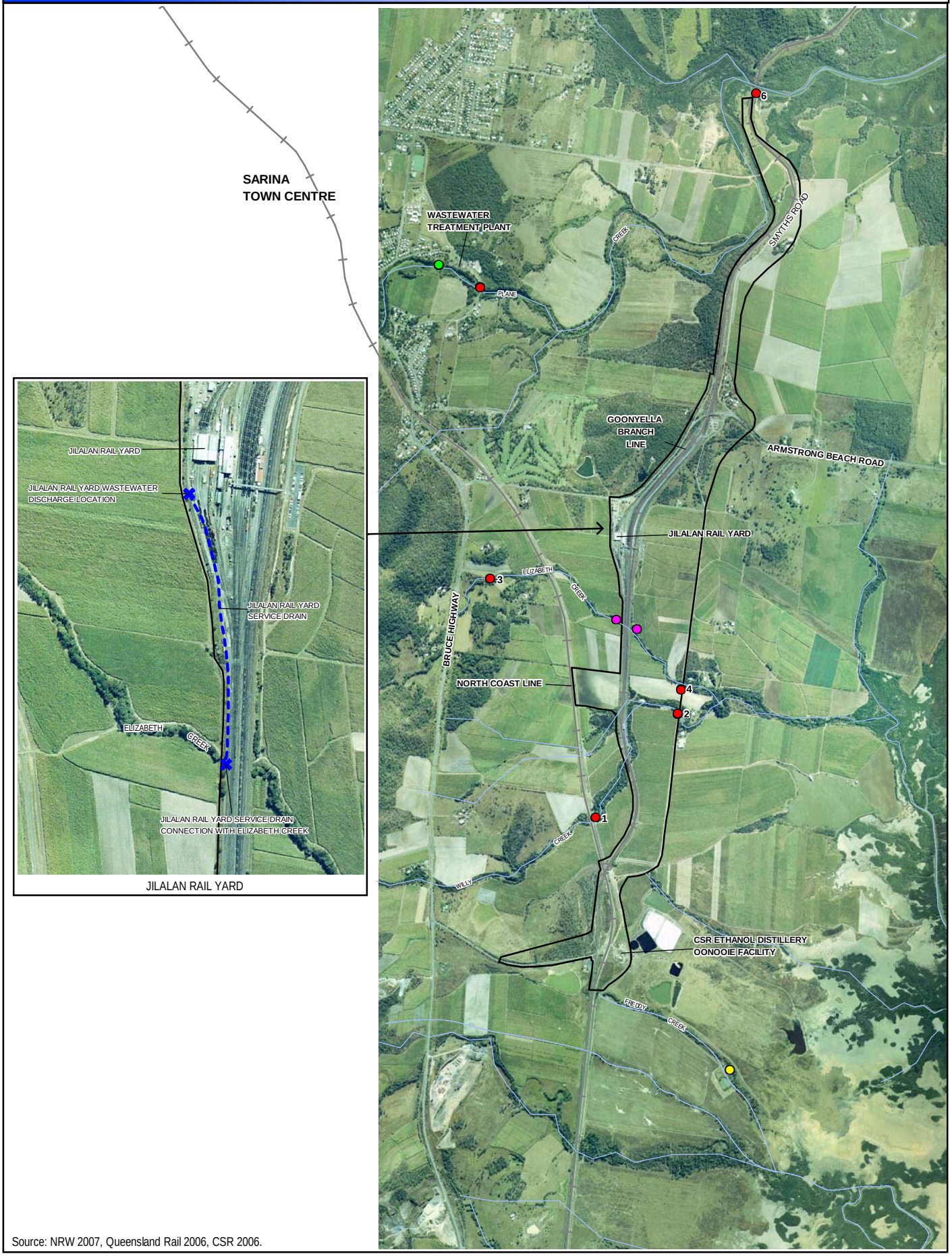
7.3.1 Incorporation of additional NRW data for Plane Creek

Ambient data for Plane Creek at Sarina (at the weir downstream of the Bruce Highway) has been provided by NRW. The data provided by NRW consists of samples collected at approximately monthly intervals commencing 18 July 2006, with the most recent data recorded on 13 June 2007. This data has been incorporated into the baseline data set included in the SEIS (refer Table 7.1).

Further to this, additional data has been sourced from QR for Elizabeth Creek and this has also been incorporated into the baseline data set (refer Table 7.2)

Figure 7.1 (previously EIS Figure 7.1) shows all relevant monitoring sites proximal to the study area.

Jilalan Rail Yard Upgrade Project



Source: NRW 2007, Queensland Rail 2006, CSR 2006.

V:\Projects\Qld_Rail\HR5003\GIS\Workspaces\Jilalan_109.wor By: SLG Date: 21/11/07 Version 1

N

0 1250 (m)

Scale 1:25 000 (m) (@ A3 size)

LEGEND

- Rail
- Project Area
- Watercourse

Water Quality Monitoring Location

- CSR
- NRW
- Queensland Rail
- Connell Hatch

WATER QUALITY MONITORING LOCATIONS

FIGURE 7.1

7.3.2 Provision of metadata

Tables 7.1 to 7.3 provide updated parameter values incorporating the additional QR and NRW data sourced (as discussed in Section 7.3.1), and provides further detail to support the monitoring data.

The period of observations used for the purpose of median calculations is included in parenthesis. Data for each of the creeks in the study area were sourced from the following:

- Plane Creek – NRW and Connell Wagner (July 2006 – June 2007)
- Elizabeth Creek – QR and Connell Wagner (September 2006 – October 2007)
- Willy Creek - Connell Wagner (June 2007)
- Freddy Creek – CSR and Connell Wagner (February 2002 – March 2007)

Older EPA data for Plane Creek and Elizabeth Creek has been excluded from the baseline data set on the basis of being outdated and unrepresentative of current creek conditions.

Table 7.1 Water quality results for Plane Creek

Parameter	Plane Creek upstream dry season	Plane Creek downstream dry season	Water Quality Objective
Turbidity (NTU)	6 (1)	22 (1)	25
Chlorophyll-*a* (µg/L)	**21 (1)**	5 (1)	10
pH	7.7 (7)	7.7 (1)	7.0-8.4
Conductivity (µS/cm)	470 (7)	12,670 (1)	N/A
Suspended Solids (mg/L)	4 (7)	**34 (1)**	25
Dissolved Oxygen (% sat)	70 (7)	85 (1)	70-100
Total Nitrogen (µg/L)	278 (7)	**600 (1)**	450
Ammonia (µg/L)	2 (7)	**185 (1)**	30
Oxides of Nitrogen (µg/L)	5 (7)	**228 (1)**	15
Total Phosphorous (µg/L)	38 (7)	**140 (1)**	40
Filterable Reactive Phosphorous (µg/L)	9 (7)	**93 (1)**	10

Table Note:
Bold indicates exceedance of water quality objective
Numbers in brackets indicate the number of samples from which the median value has been derived (ie n=)

Table 7.2 Water quality results for Elizabeth Creek

Parameter	Elizabeth Creek upstream dry season	Elizabeth Creek downstream dry season	Water Quality Objective
Turbidity (NTU)	42 (1)	**53 (1)**	50
Chlorophyll-*a* (µg/L)	5 (1)	5 (1)	5
pH	7.4 (5)	7.5 (5)	6.5-8.0
Conductivity (µS/cm)	**550 (1)**	**380 (1)**	375
Suspended Solids (mg/L)	3 (5)	4 (5)	10
Dissolved Oxygen (% sat)	95 (1)	75 (1)	85-110
Total Nitrogen (µg/L)	**1,350 (2)**	**3,850 (2)**	500

Parameter	Elizabeth Creek upstream dry season	Elizabeth Creek downstream dry season	Water Quality Objective
Ammonia (µg/L)	17 (1)	41 (1)	20
Oxides of Nitrogen (µg/L)	118 (1)	346 (1)	60
Total Phosphorous (µg/L)	500 (2)	5,240 (2)	50
Filterable Reactive Phosphorous (µg/L)	85 (4)	1,945 (4)	20

Table Note:
Bold indicates exceedance of water quality objective
Numbers in brackets indicate the number of samples from which the median value has been derived (ie n=)

Table 7.3 Water quality results for Willy Creek

Parameter	Willy Creek upstream dry season	Willy Creek downstream dry season	Water Quality Objective
Turbidity (NTU)	5 (1)	10 (1)	50
Chlorophyll-*a* (µg/L)	5 (1)	5 (1)	5
pH	7.5 (1)	7.1 (1)	6.5-8.0
Conductivity (µS/cm)	230 (1)	310 (1)	375
Suspended Solids (mg/L)	18 (1)	4 (1)	10
Dissolved Oxygen (% sat)	91 (1)	90 (1)	85-110
Total Nitrogen (µg/L)	600 (1)	900 (1)	500
Ammonia (µg/L)	31 (1)	84 (1)	20
Oxides of Nitrogen (µg/L)	62 (1)	336 (1)	60
Total Phosphorous (µg/L)	30 (1)	210 (1)	50
Filterable Reactive Phosphorous (µg/L)	12 (1)	152 (1)	20

Table Note:
Bold indicates exceedance of water quality objective
Numbers in brackets indicate the number of samples from which the median value has been derived (ie n=)

The above tables indicate that for all three creeks, notable exceedences for nutrient parameters have been observed with respect to Water Quality Objectives (WQOs). A more detailed discussion is provided in the EIS (See Section 7), however the key points are summarised below for ease of reference.

The predominant land uses within the Plane Creek catchment consist of irrigated cropping and cattle grazing, therefore high nutrient levels are not unexpected. Further, the Sarina Sewage Treatment Plant discharges treated effluent into Plane Creek also contributing to elevated nutrient concentrations downstream.

Within Elizabeth Creek catchment, predominant land uses consist of sugar cane cultivation and cattle grazing. Repeated and ongoing disturbance of topsoil resulting in erosion and regular application of fertilisers and soil conditioners are likely to have contributed in part to the elevated nutrient concentrations observed. Based on the single data point available, turbidity also exceeds the WQO, however further monitoring is required to establish a rigorous data set for this parameter. Jilalan Rail Yard also discharges treated wastewater to Elizabeth Creek via a service drain running parallel to the existing rail line.

Willy Creek is also situated within a catchment dominated by land uses with the potential to repeatedly disturb topsoil and generate nutrient enriched runoff. Results indicate that nutrient concentrations are higher downstream, however this is also based upon a single monitoring event and requires additional collation of monitoring data to properly assess water quality trends.

For both Elizabeth Creek and Willy Creek it is important to note that, based on the limited data available, results indicate concentrations for the majority of nutrient parameters exceed the WQOs upstream of the project site.

7.3.3 Commitment to additional baseline monitoring

It is recognised that the quantity of existing water quality data available, particularly for Elizabeth Creek and Willy Creek is less than optimal. To address this, the CEMP (refer Appendix H) contains provisions for the ongoing collection of baseline monitoring data at monthly intervals and following storm events, prior to the commencement of construction. This will enable the collection of approximately 6 months worth of baseline data to supplement the existing information.

7.3.4 Clarification of event-based monitoring programme

The event criteria, monitoring parameters and sampling locations are addressed in the CEMP (refer Appendix H).