

7.0 HYDROLOGY

7.1 METHODOLOGY

The method for conducting the EIS for the land section of this report was in two stages; a literature review and a field investigation.

Spatial data sources (GIS framework provided with Searle *et al*, 2007; EPA wetlands mapping) were reviewed to consider topographic, drainage (including wetland and flooding), groundwater characteristics likely to exist on site.

A field investigation was undertaken during the 9th, 10th and 11th of September by a Soil and Hydrology Scientist. This included a reconnaissance of the entire project site looking for hydrologic features that were not present in the mapping, including any drainage lines, wetlands, farm dams and groundwater bores.

7.2 EXISTING ENVIRONMENT

7.2.1 Surface Hydrology

The Project site falls within the Condamine- Balonne River Catchment which covers 136,642 km² or 13 percent of the Murray Darling Basin (CSIRO, 2008). The site is located 2.5km west of Kogan Creek, a tributary of the Condamine River, which flows northwards into the Condamine River below the junction with Cooranga Creek. There are no permanent watercourses on the project site (Figure 7.1).

During the field reconnaissance the site was identified as poorly drained flat plains with poorly developed drainage lines. Four small surface storages dams (gully dams) were noted in the vicinity of the site. One was to the North of the site, two on the site, and one was to the South on Paddy Gully (approximate locations of farm dams shown in Figure 7.1. Various low embankments had been constructed on the site to direct water towards the dams.

7.2.2 Sub-surface Hydrology

The soils on the site have a tendency to waterlog at the lower part of the surface profile (see Section 5.1.2.3). This is mainly due to the topsoils being sandy and having high infiltration rates and the subsoils being very heavy clays with low infiltration capacity, thus creating a throttle on downward movement of water into the soil profile at the interface of the texture contrast. However, while waterlogging does occur, the very low slopes on this site make it unlikely there are any more than minor and localised sub-surface flows in the lower surface soils.

7.2.3 Wetlands

Wetlands have been mapped and classified for the Condamine Catchment (EPA, 2005) providing an accurate description of the extent and distribution of wetlands at the time of mapping. A search of the database did not identify any wetlands located on the site or on any adjoining land. The nearest non-riverine wetland downstream of the site was on the Condamine floodplain which is so far removed from the site as to be unaffected by activities on the site.

7.2.4 Flooding

The Project site is not subject to flood risk for the Condamine River or its tributaries. The site is several kilometres from the nearest area defined as floodplain and over 5m above the nearest floodplain level (floodplain level is approximately 320m AHD at the closest point to the east of the site) (see Figure 7.2).

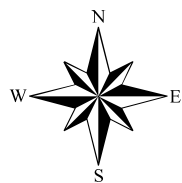
7.2.5 Groundwater

The project site is located on a regional groundwater system and no local groundwater systems are recognised for the area (Searle et al, 2007). Groundwater data for the Condamine Catchment has been summarised by Searle et al (2007). This report concludes that the sub-catchment that the project site is located within has no known salinity locations in the immediate and adjacent areas. Groundwater is estimated to be moderately deep (>10m) with an upward trend. However this groundwater rise is not relevant to the Kumbarilla landscape on which the site is located.

Powerlink Western Downs EIA Rivers and Creeks

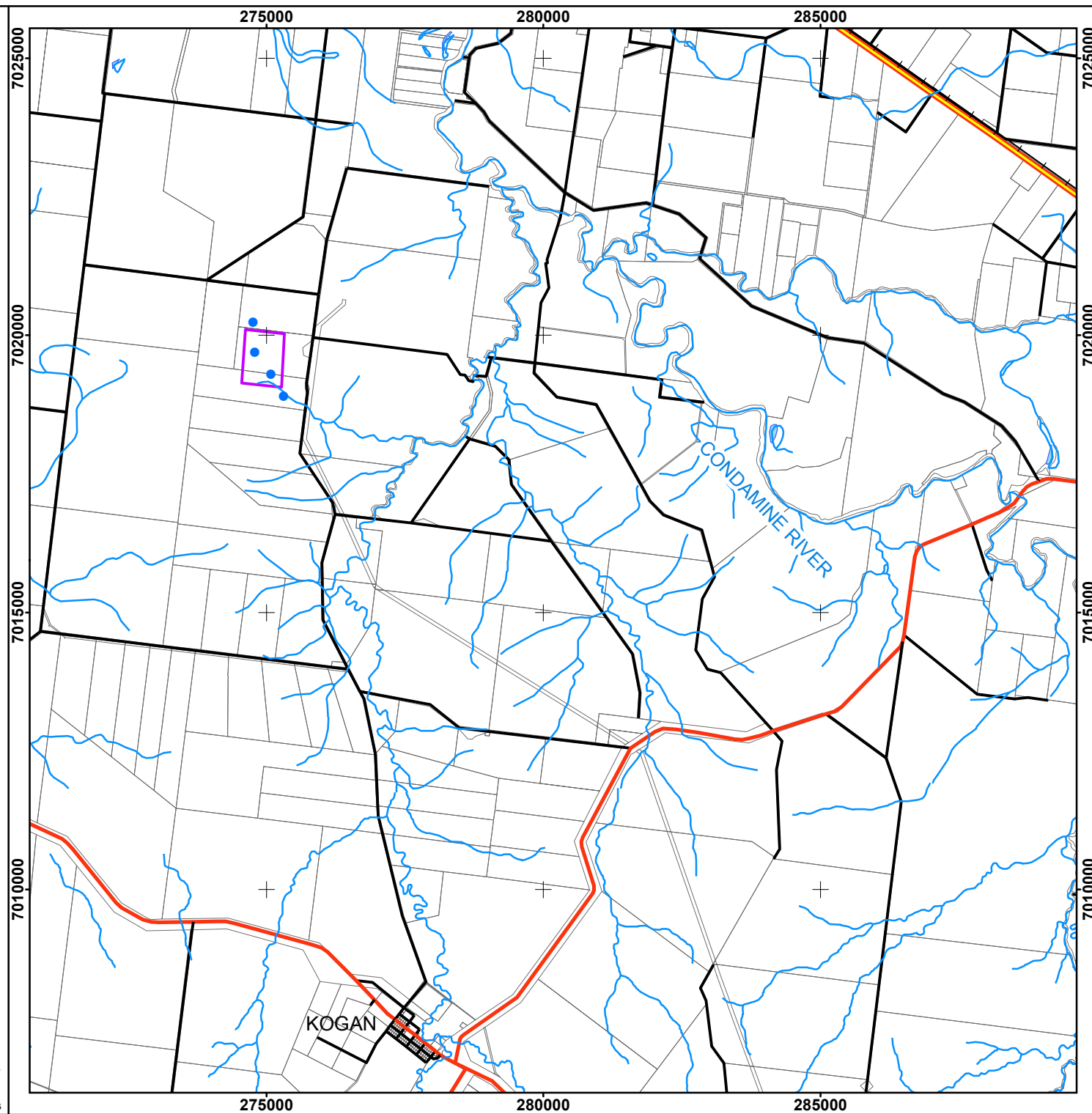
Figure 7.1

- Farm Dam
- Watercourse
- Highway
- Major Road
- Local Road
- Lake / Reservoir
- Sub-station
- Cadastre



0 500 1,000 2,000 3,000 4,000
Meters

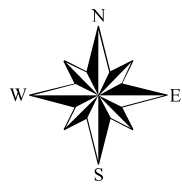
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Datum / Projection: GDA94 MGA Zone 56



Powerlink Western Downs EIA Floodplain Mapping

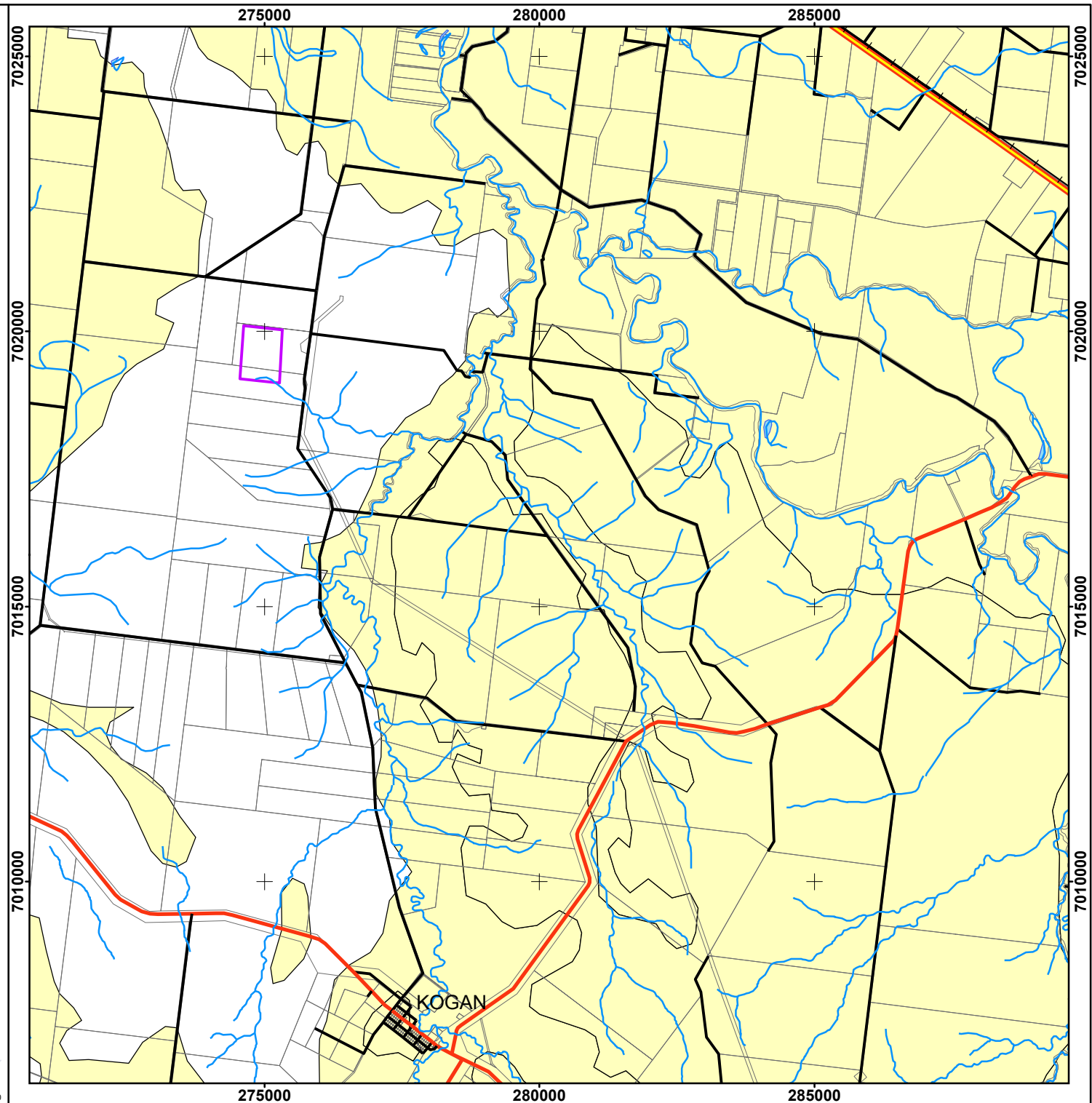
Figure 7.2

-  Watercourse
-  Highway
-  Major Road
-  Local Road
-  Lake / Reservoir
-  Sub-station
-  Cadastre
-  Floodplain



0 500 1,000 2,000 3,000 4,000
Meters

Scale 1 : 100 000
Datum / Projection: GDA94 MGA Zone 56



7.3 POTENTIAL IMPACTS

7.3.1 Surface Hydrology and Localised Flooding

As the project site is flat and the subsoils impermeable, it is likely to suffer some minor local surface water flooding during moderate rainfall events, however this flooding will be limited by the small catchment area above the site (the exact size is difficult to distinguish due to the poorly defined drainage lines and catchment boundaries).

During field reconnaissance it was noted that after <20mm of rainfall, the dams on the site were full, suggesting the site does tend to runoff easily.

There is potential for erosion on the site if water flows are concentrated and impedance of flows across the site should be minimised and sheet flow conditions (as would naturally occur) maintained as much as possible. The minor floods that can be expected to traverse the site will need to be directed around critical equipment, therefore requiring some local drainage channels and drains to divert this water.

7.3.2 Water Quality

During the construction phase of project there is the potential for surface water quality impacts to occur. These impacts relate primarily to erosion of the disturbed site, and sediment being transported via runoff to the local surface drainage network (see Section 5.2.2). In addition, potential impacts may occur from accidental spills of fuel or oil from construction equipment.

Water quality impacts may result from the following activities:

- Surface vegetation disturbance;
- Foundation excavations; and
- Stormwater runoff from the construction site, including access tracks, which could be high in suspended sediment or contain contaminants.

7.3.3 Adjacent Water Use

Given the site will represent only a minor increase in impervious area for the catchment, it is unlikely to impact on adjacent water users.

7.3.4 Groundwater

It is anticipated that groundwater is likely to occur at least 10 to 15 m below ground level (Searle et al, 2007).

Given that earthworks will be minor and foundations will extend a few metres below ground level the potential impacts to groundwater during construction is negligible. In the event that groundwater is intersected during digging for foundations, dewatering may be required. This is unlikely to be the case however, the significance of this would need to be clarified when the potential dewatering requirements are known.

Given that subsoils are characterised by extremely low permeability the risk that contaminants (e.g. spillage of fuels, lubricants and chemicals used during construction) to groundwater is highly unlikely if remediation action is conducted immediately.

7.4 MITIGATION MEASURES

7.4.1 Surface hydrology

Levelling of the site will be conducted in a fashion as to maintain sheet flow of water across the site with the aim of minimising flow concentration. Possible impediments to flow such as roads should either be constructed flat with ground level or constructed of coarse gravel to allow water to flow through.

Where bunding and drainage channels are required to direct water away from areas with critical equipment or where chemical or hydrocarbon storage is required, the bank will be pushed up from the back so not as to expose the sodic subsoils to water flows. The material used to construct the bund and drainage channels should be treated with gypsum, fertilised and seeded with grass to stabilise them as soon as possible.

Where concentration of water flows does occur due to the construction of drainage channels, the discharge points should be on a soil not susceptible to tunnel erosion and be well grassed.

All works are to be undertaken in accordance with the EMP (see Appendix E).

7.4.2 Water Quality

Erosion and sediment controls will be used during construction to ensure sediment-laden runoff does not impact on water quality within the local drains (see Section 5.3.3.1).

However in addition to these erosion and sediment control techniques the following recommendations are made:

- Appropriate bunding around chemicals and hydrocarbons, and maintaining equipment, will limit water quality impacts; and
- The farm dam to the south of the site, on Paddy Gully, will be preserved as a retention basin for the purposes of water quality (to trap sediment) and quantity control.

All works are to be undertaken in accordance with the EMP (see Appendix E).

7.4.3 Groundwater

In the event that an environmental incident occurs during construction, such as a fuel or oil spill, immediate containment, management and remediation actions should be undertaken to ensure migration of the contaminants into groundwater does not occur.