

## **CHAPTER 17**

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### **Water Assessment**

## 17. WATER ASSESSMENT

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This chapter reviews existing water conditions in accordance with relevant legislation and policies from the Director-General's Requirements (DGR's) as listed in **Chapter 5** Planning Context.

The Project site is not under a Gazetted Water Sharing Plan (WSP) as prepared under the *Water Management (WM) Act 2000*. The Project does however fall under the Southern Rivers Catchment Management Authority (CMA), and there are a number of water management targets in place including water sharing, water quality, management of water supply and wastewater, water conservation and efficiency, and river and wetland protection and rehabilitation. Water required for the Project, as discussed in **Chapter 3** Project Description, will be sourced from an existing man-made dam rather than any natural surface flows, such as rivers and streams.

### 17.1 Existing Situation

#### 17.1.1 Groundwater Source

The highest recorded groundwater table on-site was measured from existing boreholes at 10 m in the Yandra Cluster and 7 m in the Sherwins Cluster. Across the remainder of the Project site the groundwater table varies between 20 m to 39 m for first Water Bearing Zones (WBZ).

According to the *State of the Environment Report 2008*, groundwater in the Cooma-Monaro Shire and Bombala Council catchment areas are of good-to-moderate quality with a low yield (Department of Land and Water Conservation (DLWC) 1999). However both have a steadily decreasing water table (Department of Water and Energy (DWE) 2008) mainly due to decreased local rainfall and increased extraction (Beale et al 2004).

Salinity levels in the low-lying Monaro plains, south of Cooma, result in poor quality water, only suitable for livestock and limited domestic/industrial use; whereas the area around Bombala is of good quality groundwater suitable for human consumption (DLWC 1999). Groundwater around the Project site is currently used for watering stock, town water supply and irrigation.

#### 17.1.2 Riparian/Watercourse Zone

The Project occurs in the Southern Rivers CMA and straddles two local catchment areas. There are a number of dry creeks and lakes occurring on-site, including Boco Creek, Gentle Barlow Creek and Coopers Lake. The major waterway on-site is the MacLaughlin River, which is dammed, with controlled and variable water flow throughout the year. The MacLaughlin River flows across the site from west to east and feeds into the Snowy River 30 km south of the Project.

Using the Strahler System (as detailed below), the streams on-site generally consist of:

- 1st Order – near the ridges as common open drainage lines with no channel and limited vegetation;
- 2nd Order – occur in parts of the north and west of the Study area and in Snow Gum Woodland. Drainage lines are common in the east of the Study area; and
- 3rd/4th Order – the MacLaughlin River and a number of its major tributaries.

To ensure adequate protection for the different classed streams a core riparian zone (CRZ), which is the land contained within and adjacent to the channel, is created under the *Water Management Act 2000*. **Table 17.1** provides the different CRZ widths for different stream orders.

**Table 17.1 Water Management Act 2000 CRZ widths**

Types of Watercourses	CRZ Width
Any first order watercourse and where there is a defined channel where water flows intermittently.	10 m
Any permanent flowing first order watercourse or any second order watercourse where there is a defined channel where water flows intermittently or permanently.	20 m
Any third order watercourse or greater watercourse and where there is a defined channel where water flows intermittently or permanently. Includes estuaries, wetlands and any parts of rivers influenced by tidal waters.	20 – 40 m

#### 17.1.3 *Wetlands*

There are a small number of ephemeral wetlands found to the west in the Project site. Currently these wetlands are dry and many have been sown with exotic flora species. The wetlands are more likely to be characteristic of the Upland Wetlands of the New England Tablelands (New England Tableland Bioregion) and the Monaro Plateau (South Eastern Highlands) Bioregion community, however due to the average cover of introduced species the wetlands are not covered under the *EPBC Act* (further information provided in **Chapter 10**).

#### 17.1.4 *Aquatic*

Aquatic life in the Project area is limited to the MacLaughlin River and supporting tributaries. Due to previous land use and drought conditions, water in the MacLaughlin River and supporting tributaries is limited, restricting the quality of life for aquatic species. However, willows have recently been removed from the banks of the MacLaughlin River to improve water flow, while rehabilitation with native species is being carried out to provide food and habitat for the river ecosystem (Southern Rivers CMA 2008). The dominant fish species in the river is Trout, with the reintroduction of native Australian Bass currently taking place.

#### 17.1.5 *Water Management Strategies/Dams*

The existing on-site dam is fed by a spring located on within the Study area and occupies a storage capacity of 91 ML. Construction of the dam finished in May 2008 and started draining into the MacLaughlin River in June 2009.

The Proponent has consulted with the NOW and negotiated terms to use the dam for all on-site water requirements, as discussed in **Chapter 3** Project Description. There are no current plans to alter any existing dam structures or carry out remedial work on the dam.

## 17.2 Potential Impacts

### 17.2.1 *Groundwater Source*

It is possible for construction work on the Project to intercept the groundwater table. In the Yandra Cluster where the first WBZ occurs at 10 m, internal road infrastructure will comprise of an upgrade to the existing road, and therefore the chance of interception is considered to be low. In the Sherwins Cluster, where construction of a proposed internal road occurs on the 7 m first WBZ, any excavation close to that depth will be monitored to minimise the risk of interception. The foundations for the turbines will require further investigation at the detailed design stage of the Project to ensure minimal interception with and impact on the groundwater table.

Detailed geotechnical studies will be undertaken prior to construction to determine suitable engineering solutions at each particular turbine location. Where a high groundwater table exists and rock anchor bases are considered, groundwater inception is likely. In this instance suitable protective casing (for example a plastic pipe sleeve) would be used to pass through the ground water zone. This sleeve would allow the foundation/pile material to pass through and form a solid foundation without affecting the groundwater zone. Where rock anchor foundations are the first choice solution but the risks posed as a result of detailed geotechnical studies are too high, alternative bases such as gravity foundations (**Chapter 3** Project Description) will be designed and implemented.

There will be no research into groundwater directions, rates and physical and chemical characteristics at this time, as the Project does not plan to use any bores for water requirements during construction. Should the Project require bore water, similar detailed geotechnical studies will be undertaken to locate suitable bore holes. This will be undertaken in combination with the necessary licensing requirements from the NOW and permissive occupancy rights of the affected landowners.

As there are no previously identified groundwater dependent ecosystems within the Project site, impacts are predicted to be minimal.

### 17.2.2 *Riparian/Watercourse*

The construction phase of the Project will have the highest potential for impact on the areas surrounding the development. For a full description of construction works on-site see **Chapter 3** Project Description, however a brief overview of potential impacts on riparian/watercourses is outlined below.

General construction activities could include excavation, trenching, concrete batching, and other earthworks. These activities can impact on surface waters by:

- Modifying surface drainage characteristics;
- Siltation from erosion and runoff;
- Siltation effects from catchment runoff; and
- Contamination of water resources.

An upgrade to the existing causeway on the proposed internal link road as discussed in **Chapter 3** Project Description will impact on the Riparian corridor along the MacLaughlin River. In its existing

form the causeway has one 0.75 m diameter pipe culvert for low-flows which is considered to be insufficient and is located above the natural stream level, which prevents the upstream passage of fish in low flow conditions.

Mitigation measures to minimise and avoid potential impacts from general construction activities and the upgrade to the existing causeway are detailed below.

#### 17.2.3 *Wetlands*

There is the potential for indirect impacts on wetlands from the construction phase of the Project, involving runoff, erosion, sedimentation and spread of exotic/weed species. However any potential impact will be limited as the ephemeral wetlands are currently dry and only occur across the western part of the Project site.

#### 17.2.4 *Cumulative Impacts*

An assessment of cumulative environmental impacts considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation. It is anticipated that there will be no cumulative effect to groundwater, riparian and watercourse corridors and wetlands from the introduction of the proposed development into the area.

### 17.3 **Management and Mitigation**

DWE have stated that any access tracks (with the exception of crossings) and all other works and disturbances should not be located in any CRZ, to ensure the integrity of the riparian corridors is not compromised. The design of the Project complies with this requirement.

The reconstruction of the causeway, as discussed in **Chapter 3** Project Description and **Section 17.2.2** will be in accordance with DWE under the *Water Management Act 2000* and the NSW Department of Primary Industries *Fish Friendly Waterways Crossing Guidelines*.

A Soil and Water Management Plan (SWMP) will be prepared in line with the 'Blue Book' (Landcom 2004) as part of the Construction Environmental Management Plan (CEMP) for the Project site, given the extent of the proposed access tracks and the nature of the soil on-site. The main objectives of the SWMP will be:

- To minimise soil disturbance;
- To prevent erosion events from increased surface runoff; and
- To prevent disturbance of water resources in the area.

Specific measures that will be considered for inclusion in the SWMP include:

- All drainage from the Project is in accordance with the *Protection of the Environment Operations (POEO) Act 1997*;
- Avoid removal or disruption to naturally occurring drainage stabilisers;
- Installation of water retardation and diversion devices around construction areas, including devices to manage surface runoff from hardstand areas and surfaced access tracks;

- Design appropriate sedimentation basins to catch and treat all water from the Project site and consider utilising existing drainage paths for discharge points;
- All outlet structures are to be designed in accordance with the DWE guidelines to minimise construction and operation impacts on watercourse and riparian corridors. Considerations include, but are not limited to:
  - Any stormwater outlets should aim to be 'natural', yet provide a stable transition from a constructed drainage system to a natural flow regime;
  - All ancillary drainage infrastructure, e.g. sediment and litter traps, should be located outside the riparian corridor. Runoff should be of an appropriate water quality and quantity before discharge into a riparian corridor or watercourse is allowed;
  - Discharge from an outlet should not cause bed or bank instability;
  - All stockpiles are to be located away from drainage lines, natural watercourses, road surfaces and trees, and are to be appropriately protected to contain sediment and runoff, e.g. sediment fencing; and
  - All water runoff that contains high silt content should be filtered and flocculated before it drains from the Project site.
- Monitor changes to quantity and quality of receiving waters at the Nimmitabel Wastewater Treatment Facility (Station No. 70067);
- Regular inspection, maintenance and cleaning of water quality and sedimentation control devices; and
- If erosion is detected as a result of inadequate maintenance of drainage control devices, the relevant Environmental Manager shall be alerted and remedial action is to occur immediately, to ensure no re-occurrence of the event.

Specific measures in the SWMP in relation to the design of access tracks would include:

- All roads have a sufficient cross-fall gradient to allow all runoff to be collected and treated;
- All watercourse crossings to be designed in accordance with the DWE;
- The design and construction footprint and the extent of disturbances proposed within the riparian zone should be minimised;
- Maintain existing or natural hydraulic, hydrologic, geomorphic and ecological functions of the watercourse; and
- Stabilise and rehabilitate all disturbed areas.

Specific measures in the SWMP in relation to hydrology would include:

- The establishment and operation of the concrete batching plant(s) facilities must be in accordance with the Environment Protection Authority's guidelines for the Concrete Batching Industry and the Environment Protection Licence issued by Department of Environment and Climate Change (DECC);
- Concrete and cement-carrying vehicles should be washed out in appropriate wash-down facilities off-site;
- Management of hazardous material, waste and sewage;
- Wastewater produced from temporary on-site toilets during construction will be stored and trucked off-site;

- All hazardous materials are to be properly classified and stored away from flood prone areas and drainage lines. Appropriate spill kits and fire protection are to be provided on-site during construction;
- All hazardous materials are to be stored and transported appropriately in accordance with relevant DECC and Workcover guidelines and regulations, to avoid release into the environment; and
- Any on-site refuelling must occur in an area greater than 100 m from the nearest drainage line and ensure correct practices are implemented, including:
  - Refuelling is to be carried out in a specified (not in the vicinity of a waterway), bunded area, according to regulatory requirements; and
  - Use of drip trays and spill mats.

#### 17.4 Summary

The Project will be sourcing its water from an existing 91 ML dam on-site. There will be minimal impacts to surrounding groundwater and surface waters due to limited activities within these areas and effective mitigation actions and management. Potential impacts are likely to occur mostly from construction activities. However with a SWMP in place all potential impacts can be managed resulting in minimising the risk of remediation efforts being required on-site.

#### 17.5 Proposed Transmission Line

The proposed transmission line will be assessed apart from this EA under Part 5 of the *EP&A Act*. Possible impacts and mitigation strategies of the transmission line on water supply and waterways include:

- Drainage from the project must be in accordance with the POEO, so there is no impact on downstream habitats;
- Avoid removal or disruption to naturally occurring drainage stabilisers;
- Install water slowing and diversion devices around construction areas, including devices to manage surface runoff from hardstand areas and surfaced access tracks;
- Design appropriate sedimentation basins to catch and treat all water from the project site and consider utilising existing drainage paths for discharge points;
- All outlet structures are to be designed in accordance with the DWE guidelines to minimise construction and operation impacts on watercourse and riparian corridors;
- Regular inspection, maintenance and cleaning of water quality and sedimentation control devices;
- If erosion is detected as a result of inadequate maintenance of drainage control devices, the relevant Environmental Manager shall be alerted and remedial action is to occur immediately, to ensure no re-occurrence of the event;
- The design and construction footprint and the extent of disturbances proposed within the riparian zone should be minimised;
- Maintain existing or natural hydraulic, hydrologic, geomorphic and ecological functions of the watercourse;
- Stabilise and rehabilitate all disturbed areas in order to restore the integrity of the riparian corridor;

- Any on-site refuelling must occur in an area greater than 100m from the nearest drainage line and ensure correct practices are implemented, including:
  - Refuelling is to be carried out in a specified (not in the vicinity of a waterway), bunded area, according to regulatory requirements; and
  - Use of drip trays and spill mats.

#### 17.5.1 *Cumulative Impacts*

The proposed transmission line development will occur in parallel with the planned upgrade to the existing 66 kV network as described in **Chapter 3** Project Description and the Boco Rock Wind Farm. It is anticipated that there will be no cumulative effect to groundwater, riparian and watercourse corridors and wetlands from the introduction of the proposed transmission line into the area. However, if necessary, an assessment will be included in the Review of Environmental Factors for the transmission line.