Murra Warra Wind Farm

Sediment Erosion and Water Quality Management Plan

Final V1.21

Author: Kevin Garthwaite **Date:** 11th May 2017 **Ref:** 02418-006352

PLANNING AND ENVIRONMENT ACT
YARRIAMBIACK PLANNING SCHEME
PERMIT NO. PA1600128
ENDORSED PLAN
SHEET 1 OF 34
SIGNED FOR
MINISTER FOR PLANNING
DATE: 15/8/17

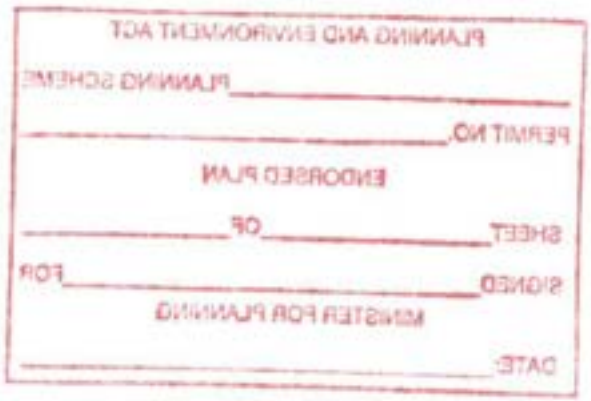
PLANNING AND ENVIRONMENT ACT
HORSHAM PLANNING SCHEME
PERMIT NO. PA1600127
ENDORSED PLAN
SHEET 1 OF 34
SIGNED FOR
MINISTER FOR PLANNING
DATE: 15/8/17

ENDORSED TO COMPLY
WITH CONDITION
43
OF PLANNING PERMIT
PA1600127 + PA1600128

Revision History

Issue	Date	Author	Nature And Location Of Change
01	28 Mar 2017	Kevin Garthwaite	Final V1.2
02	11 May 2017	Kevin Garthwaite	Final V1.21

The drawings and/or site plans included in this plan are based on layouts submitted by MWWF as part of its planning application for the Murra Warra Wind Farm project. The wind farm permits, (HRCC: PA1600127, YSC: PA1600128 and YSC PA1600129) allow actual locations of wind turbines to be subject to final micro siting up to 100 m and/or minor changes to access track locations and associated plant, equipment and construction facilities, within the boundary of existing constraints and the narrow infrastructure zone defined by the permits. The project could also be constructed in stages.



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Introduction

The Sediment, Erosion and Water Quality Plan (SEWQMP) has been prepared for the Murra Warra Wind Farm (MWWF) as part of the overall Environmental Management Plan (EMP) in response to planning permit conditions issued by the Minster for Planning PA1600127, PA1600128 and PA1600129.

In accordance with the planning permit condition 43, the EMP must include a SEWQMP, which must be prepared in consultation with the Wimmera Catchment Management Authority.

The requirements for SEWQMP are set out in the planning conditions presented in Table 1, which also includes references to sections in this plan.

Table 1: Relevant planning permit conditions from Permit No. PA1600127 (Horsham Rural City Council) and PA160128 (Yarriambiack Shire Council).

Condition Number	Abbreviated condition details	Plan Section/s
43.a.	Identification of all construction and operational processes that could potentially lead to water contamination.	5.1, 5.2
43.b.	Procedures to ensure that silt from batters, cut-off drains, table drains and road works is retained on the site during and after construction and replaced as soon as possible.	7.3, 7.4, 7.5
43.c.	The installation of geo-textile silt fences (with sedimentation basins where appropriate) on all drainage lines from the site which are likely to receive run-off from disturbed areas	7.4.3, 7.4.7
43.d.	Procedures to ensure that steep batters are treated in accordance with EPA Victoria Publication 275Construction Techniques for Sediment Pollution Control	7.4.2
43.e.	Procedures for waste water discharge management	9.1, 9.2, 9.3, 9.4
43.f.	A process for overland flow management to prevent the concentration and diversion of waters onto steep or erosion prone slopes	7.4.5. 7.4.6

43.g.	Pollution management measures for stored and stockpiled materials including waste materials, litter, contaminated run-off and any other potential source of pollution to ground or surface waters	6.1, 7.4.11
43.h.	Incorporation of appropriate pollution control measures outlined in EPA Victoria Publication 480 Environmental Guidelines for Major Construction Sites	7.4.1, 11.2
43.i.	An agreed program and appropriate capacity for annual inspection and regular maintenance of any on-site wastewater management system	11.1, 11.2, 11.3
43.j.	Siting of any concrete batching plant and any on-site wastewater disposal treatment fields at least 100 metres from any watercourse	8.1.1, 8.1.2
43.k.	A program of inspection and remediation of localised erosion within a specified response time	11.2, 11.3

In meeting the requirements of this plan it is taken that the requirements of Condition 16 of PA1600129 have also been met.

1.1 Objectives

The objectives of this SEWQMP are to:

- stipulate erosion and sediment control design guidelines to be employed during and after construction
- describe the standard erosion and sediment control measures to be implemented to prevent soil erosion and associated surface water management on site document ongoing maintenance requirements for the controls
- stipulate an inspection framework which ensures proactive management of erosion and sedimentation controls
- outline reporting and review requirements
- establish responsibilities for erosion and sedimentation management.

2 PROJECT DESCRIPTION

Key infrastructure components of the Murra Warra Wind Farm are described in the following sections.

2.1 The turbines:

116 wind turbine generators (WTGs) of which up to 70 turbines are sited in YSC and up to 46 turbines are proposed in HRCC.

Each having an expected capacity of approximately but not limited to 3.6 MW (rated capacity will depend on final turbine selection) with an indicative combined generation capacity of up to 417 MW.

Each having a maximum tip height of 220 m above ground level and will be three bladed, with tubular steel tower, mounted by a nacelle containing the generator, gear box and electrical equipment.

Incorporating crane pads (crane hard stands) of approximately 40 x 60m, which will be located at the base of each turbine tower.

Transformer and switchgear will be housed inside the tower base, or externally, immediately adjacent to the base. Should an external transformer be required, typical dimensions are 5.5 m long by 3 m wide by 3 m high.

2.2 Supporting infrastructure

A network of turbine access tracks and entrances from public roads, which are not subject to planning approval, will be required to support the wind turbine infrastructure.

The access tracks will generally be 6 m wide to allow access for construction and for ongoing maintenance throughout the life time of the wind farm. Where possible, site access tracks will be established to utilise existing access points and roads. It is estimated that there will be approximately 75 km of new tracks and upgraded roads required and approximately 50 access points from minor rural roads. There may be a need for some alterations to existing road junctions close to the site (all are minor local roads).

Six potential locations have been identified for the placement of hub height anemometry masts. These will be used for monitoring the performance of the wind farm. Final selection of no more than four permanent locations will be made after final turbine selection has been made.

There will be a utility area which will be within a secure enclosed compound comprising of an operations building, car parking, warehousing/ workshop

facility and an external yard area for storage which may include a bunded area for fuel storage, and other ancillary equipment.

The collector/switchyard is where overhead and underground cables from the wind farm collection system are terminated. Typically, this comprises of bus bars, switchgear, metering, a control building, reactive and harmonic filtering plant and other ancillary equipment.

Overhead and underground internal electrical reticulation system. Internally, electricity will be distributed from each wind turbine to the Terminal Station via a network of medium voltage 33 kV underground and overhead cables. It is estimated that there will be approximately 18 km of overhead line, with pole heights of approximately 30 m and 70-75 km of underground cabling.

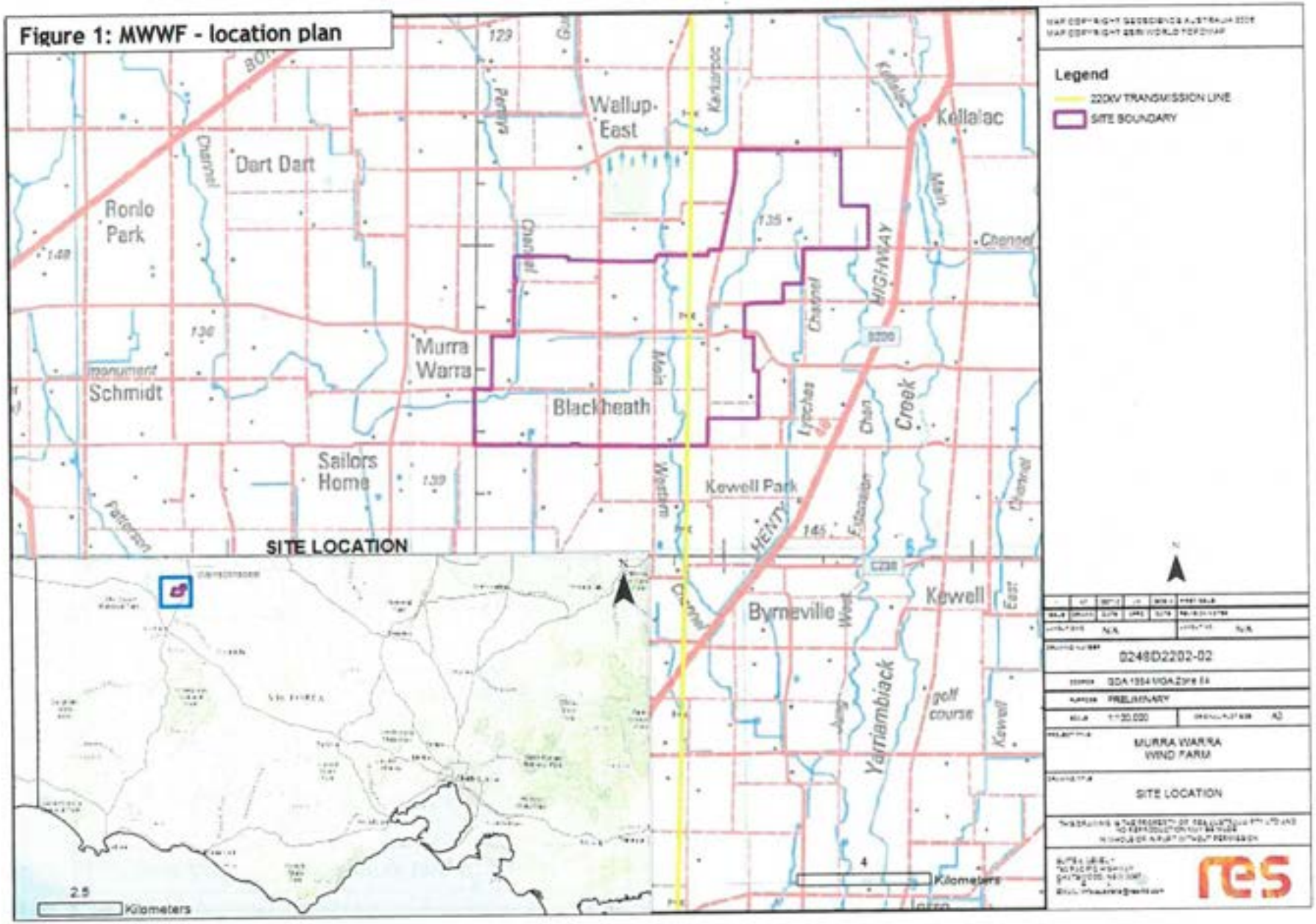
2.3 Temporary construction compounds

Main construction compound will be located adjacent to the Terminal Station and quarry. The compound will comprise a concrete batching plant, site offices, workshops, laydown areas, a water storage dam and bunded fuel storage and other ancillary construction facilities and equipment.

Due to the extent of the site, there may be need for an additional two general construction compounds, one in the south-west adjacent to the Kings Roads and one in the north-east adjacent to the Kewell North School Road. These compounds will contain a sub-set of the elements described above for the main compound. All of the temporary infrastructure will be removed at the end of the construction programme with the compound sites rehabilitated as required by regulators and landowners.

An on-site quarry and associated crushing plant, materials stockpiling, and water storage will be sited adjacent to and immediately north of the main construction compound and Terminal Station (in YSC). The quarry will be approximately 12 ha inclusive of temporary stock piles for overburden material and will be used to provide base materials for road building.

Figure 1: MWWF - location plan



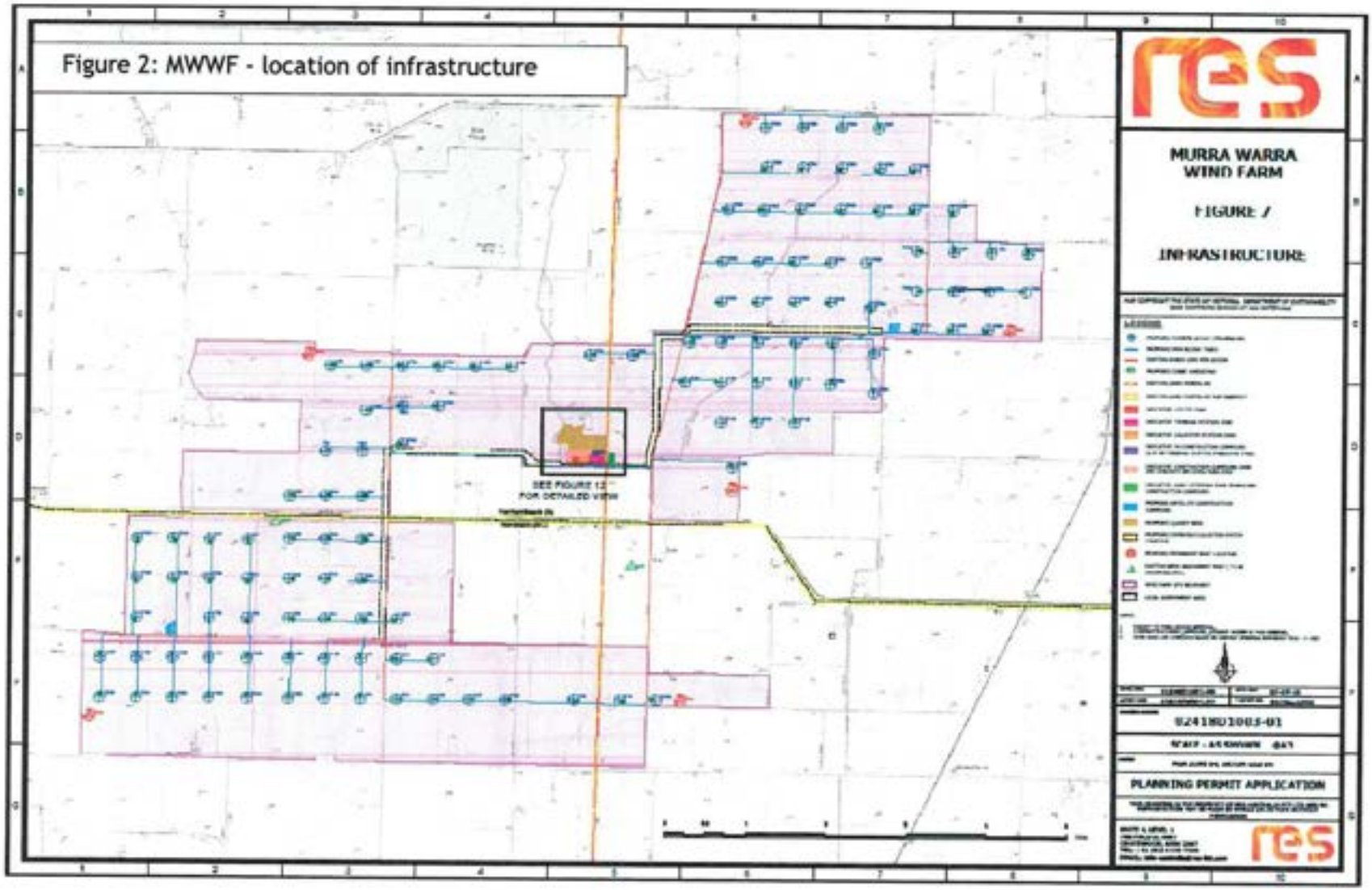
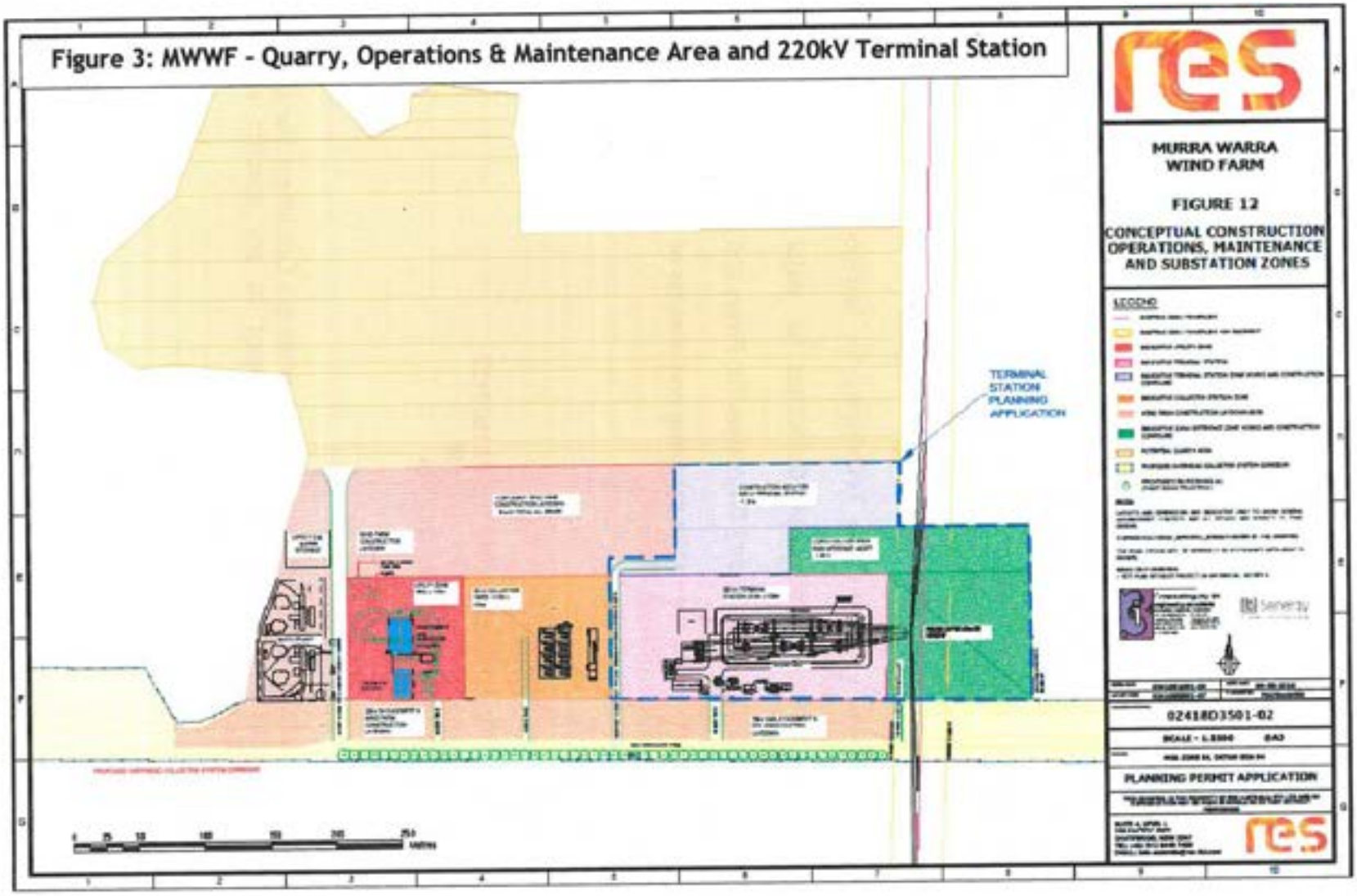


Figure 3: MWWF - Quarry, Operations & Maintenance Area and 220kV Terminal Station



3 POLICY AND STATUTORY CONTEXT

3.1 State legislation

This management plan has been developed in accordance with the following legislation:

- *Environmental Protection Act 1970* (Vic)
  - State Environment Protection Policy (Waters of Victoria) (SEPP WoV)

3.2 Relevant standards and guidelines

There are several guidelines that are used in Victoria to assist in determining the level of management necessary to meet SEPP requirements. These include:

- EPA Victoria, 1998, Environmental Guidelines for the Concrete Batching Industry, Publication 628
- EPA Victoria, 1991, Construction Techniques for Sediment Pollution Control Measures, Publication 275
- EPA Victoria, 1996, Environmental Guidelines for Major Construction Sites, Publication 480
- EPA Victoria, 2003, Water Quality Objectives for Rivers and Streams - Ecosystem Protection
- EPA Victoria, 2009, A Guide to the sampling and analysis of water, wastewaters, soils and wastes, Publication IWRG701
-

3.3 Licenses, approvals and permits

- Horsham Rural City Council Permit No: PA1600127
- Yarriambiack Shire Permit No: PA 1600128
- Yarriambiack Shire Permit No PA1600129

3.4 Liaison with key stakeholders

Relevant agencies and stakeholders (including the Wimmera Catchment Management Authority (CMA)) have been consulted with regard to any specific approval requirements in relation to this plan.

4 SITE CHARACTERISTICS

The site is located within the Wimmera CMA region and lies 7 km west of the Yarriambiack Creek and 27 km east of the Wimmera River. There are no designated waterways or minor streams within the site.

4.1 Local hydrology

The site drains generally north and the land falls at an approximate rate of 1 m per 1,000 m. The Wind Farm straddles the now obsolete "Main Western" and "Rainbow" irrigation channels that were formerly part of the extensive 17,500 km earthen open channel network that distributed water annually in the Wimmera and Mallee Regions. These open channels, managed by GWM, water have recently (2006 to 2010) been replaced with a 9,000 km piped water distribution system which provides continuous pressurised water supplies to approximately 9,000 farms and 34 townships across the Wimmera and Mallee. The channels are not required for drainage purposes and are being filled in and the land returned to agricultural use

There are no designated waterways within the site that require a Works on Waterways licence to be obtained.

5 CONSTRUCTION AND OPERATIONAL CONSIDERATIONS

5.1 Construction

Given the flat nature of the site it is not anticipated that construction works will cause scour or adverse sedimentation impacts, however, design has considered potential impacts from:

- Access tracks and hard standings
- Turbine foundations.

5.1.1 *Access tracks and hard standings*

Appropriate design, construction and maintenance of access tracks will ensure that any effects on water flows can be minimised. Design has been undertaken with consideration of the following:

- Minimise length of on-site track
- Utilise the existing road network where possible
- Avoidance of ecologically sensitive areas.

5.1.2 *Turbine Foundations*

Micro-siting of the turbines will take account of the following considerations:

- avoid existing trees and vegetation
- consider geological conditions to avoid areas with large depths of overburden and minimise the volume of excavation required
- avoid natural low-points which could disrupt natural water flow and/or drainage during wet periods.

5.2 Operation

- Permanent erosion control features (if required) should be monitored during operation and rehabilitated as necessary. Rehabilitated areas will be monitored during wind farm operation for any evidence of compromise or failure of rehabilitation measures.

6 MANAGEMENT AND MITIGATION

The following procedures have been developed for deployment during construction and operation to prevent environmental damage to surface waters through the management of erosion and sedimentation.

6.1 Construction

An assessment of the soil acidity will be undertaken prior to construction works commencing with turbine foundation concrete mix specifications adjusted accordingly.

Mitigation strategies that would be employed during the construction phase to manage the potential for adverse environmental impacts are outlined below.

6.1.1 Access Tracks and Hard standings

- Maintenance of drainage system and track and hard standing surfaces.
- Site preparation works and major earthwork activity will be planned to occur during drier months. Where this is not possible, earthwork activity will be avoided during heavy rain events.
- Dust suppression regime for all roads and hard standings to be in place for the entire construction period including:
    - The amount of exposed earth left as a result of clearing (for site preparation) at any one time should be kept to a minimum.
    - All stockpiles to avoid loss of material during high wind events, and where practicable will be placed in areas sheltered from the wind. Where significant amounts of material are lost, a review of storage procedures should be undertaken to avoid recurrence of the event.

- Stabilisation and rehabilitation of disturbed surfaces as soon as practicable after works.
- Installation of erosion and sediment controls (RES, 2016).

6.1.2 *Turbine Foundations*

- During excavation for foundations, subsoil will be separated from topsoil for rehabilitation purposes. Topsoil from the excavation sites will be stockpiled and replaced to its original depth for seeding and fertilizing.
- Landforms will be stabilised and rehabilitated as soon as practicable after works.
- Stockpiling of material excavated from turbine bases will be placed outside drainage paths, protected with silt fences if required. Areas disturbed during turbine installation, and not required to remain cleared, are to be reinstated to their previous condition (as far as practicable), or as agreed by landowners/Council.
- Careful consideration of the placement and management practices of any temporary concrete batching plant/s will occur; and suitable bunding arrangements adopted to prevent contamination of the surrounding soils (RES, 2016).

There is a risk of contamination to soils as a result of hydrocarbon infiltration and on-site toilet facilities. To address these risks, the following mitigation measures will be implemented during construction:

- allowance for bunded site storage areas for potential contaminants
- Appropriately sized storage of hydrocarbon spill kits on-site
- operation and maintenance of machinery in a manner that minimises risk of hydrocarbon spill
- concrete wash would be deposited in an excavated area, below the level of the topsoil
- minimise risk of chemical spills and ensure prompt and effective clean-up of any accidental spills
- ensure appropriate disposal of effluent from onsite staff facilities (RES, 2016)

6.2 Operational

The operational phase of the wind farm will require minimal use of on-site access tracks by maintenance personnel. The access tracks will be constructed to accommodate oversize and over mass loads. Once the wind farm is constructed, the access tracks would be available for use by the landowners to provide access throughout their properties. No soil or landform impacts are anticipated to be generated during the operational phase given the following recommended measures to restrict runoff and thus limiting off-site impacts:

- monitoring of drainage systems and sediment control devices and maintain as required

- construction mitigation measures listed above are instigated if sizable maintenance works are required
- all vehicles on-site shall follow established tracks (RES, 2016).

7 PROCEDURE: EROSION AND SEDIMENT CONTROLS

7.1 Definitions

There are four main erosion types as depicted in Figure 4.

Splash erosion: is caused by the direct impact of falling rain drops on the soil particles. This impact dislodges soil particles and splashes them into the air. The dislodged soil particles can then be easily transported by the flow of surface runoff.

Sheet erosion: refers to the removal of a layer of exposed surface soil by the action of raindrop splash and runoff. The water moves in broad sheets over the land and is not confined in small depressions.

Rill and gully erosion: is caused by concentrated runoff in waterways, cutting several inches deep into the soil surface. These grooves are called rills. Gullies may develop in unrepaired rills or in other areas where a concentrated flow of water moves over the soil.

Stream and channel erosion: is caused by increases in the volume and velocity of runoff.

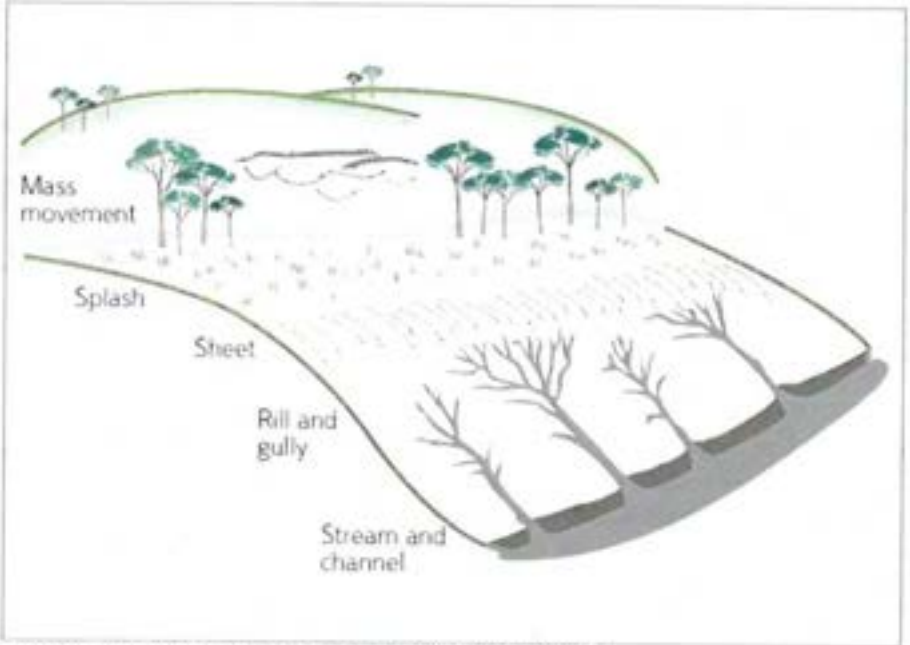


Figure 4: Types of erosions (NSW DPI, 2009)

7.2 Guiding management principles

The following guiding principles will be followed in order to prevent impacts on surface waters and ensure effective sediment and erosion control:

- a series of location specific site plans will be prepared for each major worksite prior to commencement of construction. These plans must clearly identify:
  - areas prone to erosion that must be avoided
  - the location of all drainage lines including buffer zones
  - Procedures for site establishment inlcuding
    - stockpile locations
    - equipment lay down locations
    - equipment wash down locations
    - locations of sediment fencing, diversion drains etc and other devices to capture or redirect runoff
    - location of equipment entry and exit points and the location of on- site access tracks
    - waste stockpile areas
    - fencing areas for vegetation, buffer zones and erosion control areas
    - equipment lay down locations
    - equipment wash down locations
- up-slope water should be diverted around worksites to prevent contamination where applicable. This can be done with bunding or spoon drains.
- site entry/exit points must be clearly identified and stabilised to avoid erosion or water logging. This can be done with gravel or more permanent measures if entry and exit points are to be in place for extended periods.
- site disturbance area and the duration of disturbance should be minimised
- areas should be immediately and progressively rehabilitated as this becomes possible.
- sediment controls must be installed along the lower edge of construction sites where applicable.
- stockpiles should be established in the mapped locations and graded appropriately. Stockpiles should not mix soil types and must be regularly monitored to ensure their integrity.
- on-site run-off from any equipment, concrete batching, washing and/or cutting should be contained on-site for disposal to a treatment facility.
- continual monitoring and maintenance of all control measures must be undertaken.
- compaction of backfilling of trenches must be undertaken as soon as possible restoring soil profiles to their original condition.

Plans will be forwarded to the Wimmera Catchment Management Authority prior to commencement of construction for information.

7.3 Preconstruction

The following procedures should be noted during the preconstruction and design phase:

- prior to commencement, all site personnel must be made aware of their responsibilities under this control measure.
- designers shall, as far as practical, balance the cut and fill ratio of the earthworks at the site to minimise earth moving and associated construction activity.
- designers shall design all associated infrastructure at the site to possess the minimum footprint and volume of earthworks.
- sediment control measures (silt fencing) will be installed downstream of access tracks as required, around sensitive areas and downstream of construction sites to minimise soil erosion, sediment run-off and prevent any turbid plumes from entering the waterways.
- The location of all stockpiles will be marked out prior to construction. Stockpile areas will be selected that are at least 10 m from drainage lines. All stockpiles areas will be bounded by a properly installed sediment fence at their downstream perimeter.

The following procedure will be observed during site establishment:

- The site should be prepared in direct accordance with the Construction and Work Site Management Plan.
- Distinct work sites such as transmission pole foundations and concrete batching plant areas will be prepared in accordance with EPA Victoria (1991) 'Construction Techniques for Sediment Pollution Control Measures.
- diversion banks or spoon drains will be installed up gradient of the worksite to divert clean runoff around the construction site where applicable.
- all sediment controls will be installed as per the instructions in this document and established prior to construction of relevant work area
- silt traps/sedimentation basins will be installed to capture and detain construction site runoff. These should be sized as per the guidance below.
- sediment control will be installed along access tracks and access track construction sites. The devices will be installed at low points where surface water flows are directed.
- where applicable, sediment control will be installed along major drainage lines where construction activity is taking place within 100 m of these lines. If there is a lack of vegetation and grassed (i.e. bare soil) areas between construction areas and water bodies the installation of sediment control will be considered even if the water body is further than 100 m away
- Vegetation located down-slope of the work site assists in filtering out sediment. Where practicable, maintain downstream vegetation such as grass, riparian and other vegetation in a healthy state during the construction process.

7.4 Construction

Construction activities are to:

- avoid where possible clearing highly erodible soils or steep slopes
- reduce the time exposed surfaces remain unstabilised
- rehabilitate cleared areas promptly
- be limited (or stopped) in wet weather conditions where it is noted that sediment laden water is pooling, or where sediment controls appear to the have the potential to be overwhelmed or breached.

7.4.1 *Identify and manage areas prone to erosion*

- Areas prone to erosion should be mapped and clearly identifiable prior to construction commencing.
- These areas are off-limits unless an engineering solution has been provided / except where absolutely necessary to construct project access, if necessary fencing should be established to demark "No Go" areas.
- Implement a preventative maintenance program for pollution-control installations as per EPA Victoria Publication 480

7.4.2 *Steep batters/slopes*

- Follow the procedures outlined in the EPA Victoria Publication 275 'Construction Techniques for Sediment Pollution Control' to ensure that steep erodible batters are treated appropriately for sediment pollution control (see Figure 5).
- That restoration works for borrow areas include that permanent batters be at no steeper slope than 2H:1V (preferably flatter) to permit soil placement for re-vegetation:
    - if imported rock is required to stabilise access tracks then consideration of sealing these tracks is to be undertaken noting that a combination of trafficking and rain would lead to a loss of imported rock over time if the road is left unsealed. This is especially important if grades of up to 18% are to be adopted and heavy loads will be accessing the site
    - The topsoil on steep batters can be retained by installing horizontal boards, mesh, branches, logs or other suitable material held and secured by vertical stakes, rods or other methods. Fibre mesh or mulch pinned firmly onto batters can also help to trap topsoil

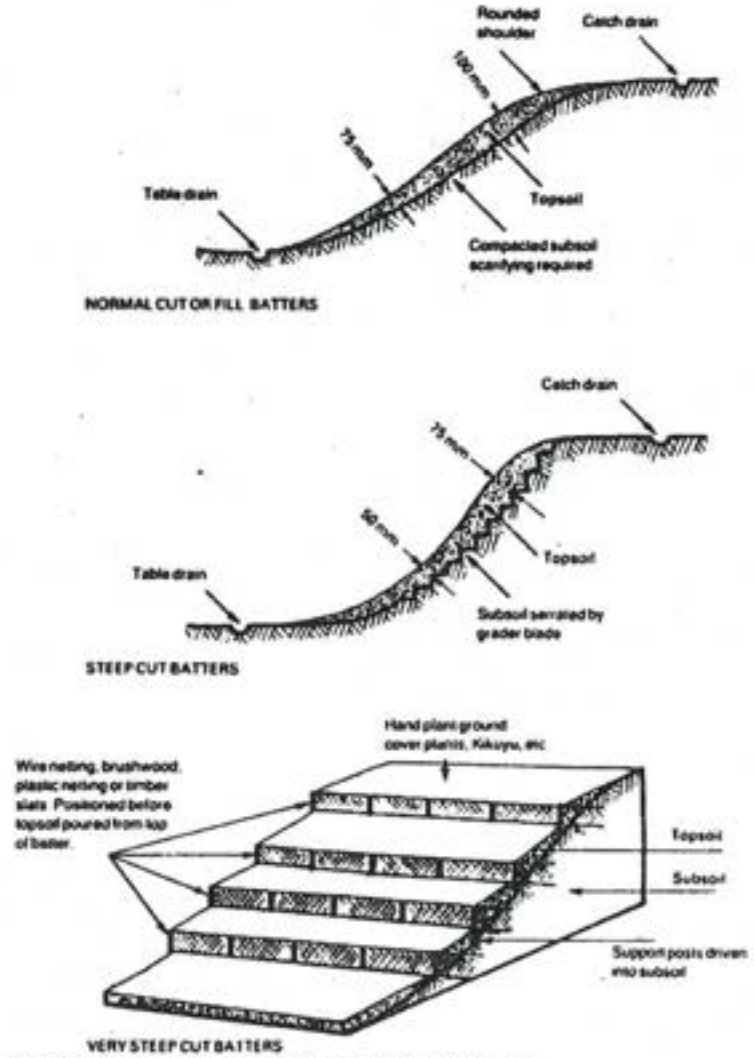


Figure 5: Techniques to retain topsoil on batters

7.4.3 *Soil excavation*

All areas of disturbance will be cleared and excavated as follows:

- Installation of temporary erosion controls on all drainage lines from the site which are likely to receive run-off from disturbed areas
- covering vegetation will be removed along with the underlying topsoil layer and stockpiled together.
- underlying subsoil will be excavated to the required depth and stockpiled separately to the vegetation/topsoil stockpile. The operator must take care to minimise mixing of soil horizons.
- stockpiles should be established as per the guidance in this document.
- relocated excess excavated material should not impinge on the likely floodplain, and not change surface water flow patterns.

7.4.4 Trench backfilling

To avoid unnecessary soil erosion, service trenches should be backfilled with the same subsoil material extracted, capped with topsoil and compacted to a level at least 75-100 mm above the adjoining ground level as soon as possible.

7.4.5 Erosion and sediment control measures

All sediment control measures must remain in place and fully operational during any stage or pause in construction.

7.4.6 Diversion (spoon) drains

- Surface drainage should be installed upstream of worksite to redirect excess water around work sites.
- Subsurface drainage systems can include gravel filled (dutch) drains, slotted or perforated pipes along gravel filled trenches and thick filter membrane materials.
- Drains should be appropriately sized to divert expected flow levels.
- Drains should discharge to vegetated areas to allow water to spread without causing erosion.

7.4.7 Sediment fences

- Silt fences should be installed in accordance with EPA Victoria Publications 275 and 480 to stop entrapment and transport of sizeable quantities of sediment by runoff.
- Silt fences are typically installed at the following locations before construction commences:
    - at the downstream boundary of the overland flow path for runoff from the disturbed areas within the construction site
    - immediately downstream of the stockpiles however circling of all unstabilised stock piles and batters with silt fences should be considered
    - immediately upstream of the grass buffer zones
    - on contours for progressive filtering
    - at toe of the slopes of erosion prone areas.
- Sediment fences must be installed as per the diagrams in Figure 6 and Figure 7.
- Sediment fences should be installed along a line of constant ground elevation where possible
- Support posts should be no more than 2 meters apart unless the fence is supported by top wire or a wire mesh backing in which case 3m spacings are acceptable
- Four staples or tire wires per stake should be installed.

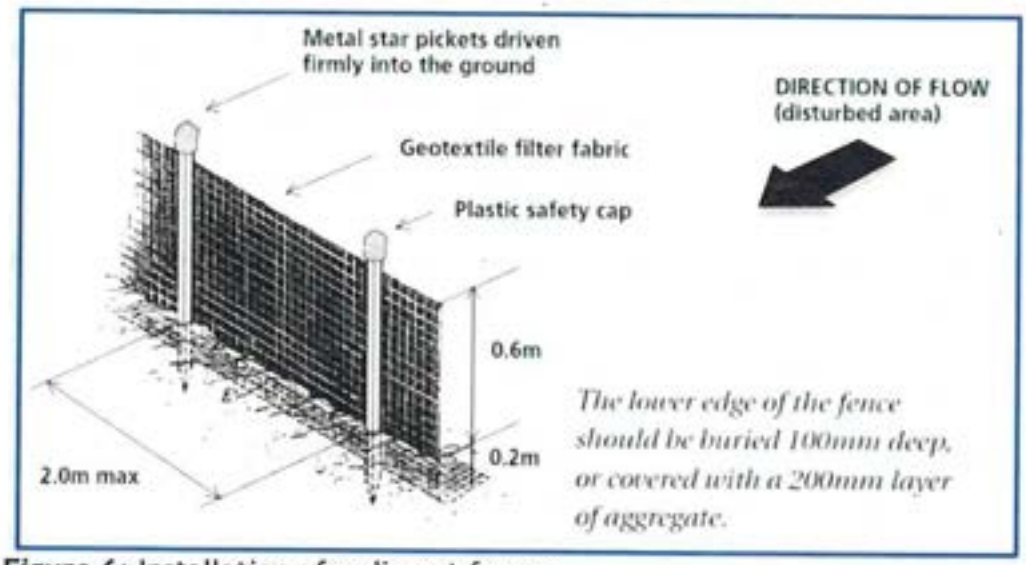


Figure 6: Installation of sediment fences

Figure 7: Correctly installed sediment fence

7.4.8 Vegetation strips

- Vegetation strips are bands of permanent, dense, low vegetation, usually grasses, planted across slopes to intercept runoff before it develops into a concentrated flow and trap sediment before it has a chance to move into watercourses.
- The strips are most useful where the land use precludes permanent groundcover.

- Vegetation strips should be installed along steep banks or in areas where surface water is directed or dewatering is taking place to break the flow of water and disperse it over a larger area.

7.4.9 *Constructed banks*

Earthen banks can be used to divert clean water around disturbed soil to avoid the soil becoming contaminated with sediments. Banks are used to break up slopes into shorter lengths to reduce depth and speed of runoff flow, and convey water to a stable watercourse, water storage or water absorption area. They reduce peak runoff flows from catchments by slowing the speed of the water and forcing it to travel longer distances to move through the property.

The shape and type of the bank depend on the situation and land use and the need for trafficability by different types of machinery, but there are some basic principles.

- Make the channel created by the bank large enough to carry runoff from heavy rain.
- Design the bank outlet so that it discharges water without causing more erosion i.e. to a well vegetated and lightly sloping area (see Figure 8).
- Depending on the slope grade, different bank slopes should be adopted (see Figure 9).

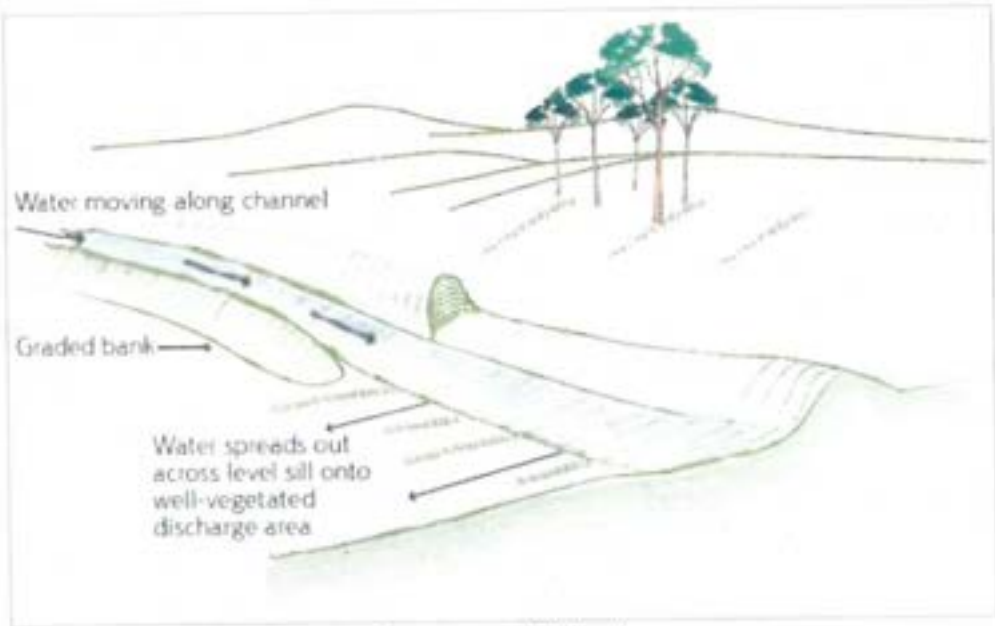


Figure 8: Spreading water from a graded bank

Bank shape	Land slope	Slope of bank batter to channel	Example
Broad	0–3%	1 : 6 or flatter	
Semi-broad	3–8%	1 : 4	
Peaked	8–20%	1 : 1.5	

Figure 9: Bank shape recommendation for different slopes

7.4.10 Sedimentation basins

Sediment traps/basins prevent eroded soil from leaving the property and/or entering a permanent watercourse.

- The location, and footprint of appropriately sized sedimentation should be included on site plans if they are intended to be installed.
- Appropriately sized means the ability to handle a one-in-two-year storm event with an intensity of six hours in correlation to the catchment size.
- Once a trap reaches 60% capacity, the sediment has to be removed and stabilised at an appropriate site.
- Sedimentation basins should be constructed as per the layout in Figure 10.

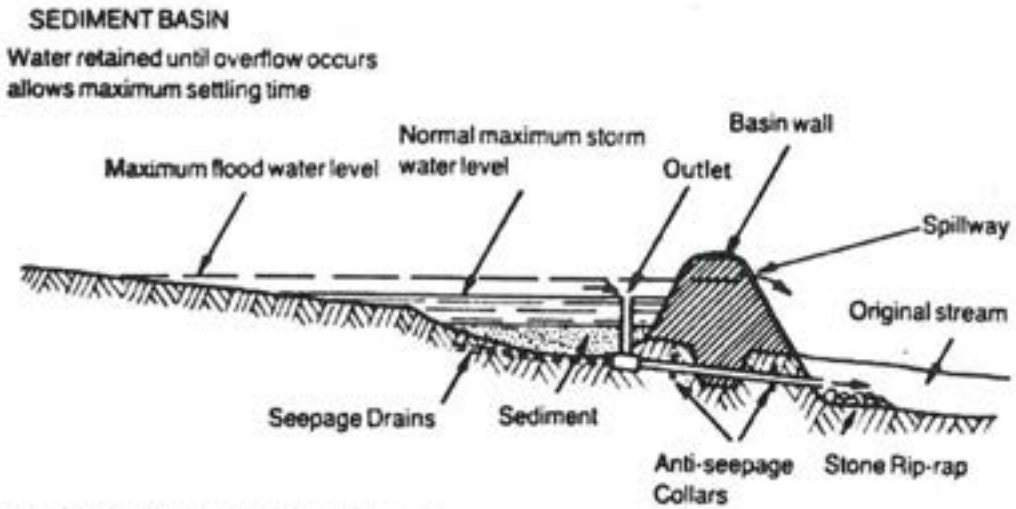


Figure 10: Sedimentation basin layout

7.4.11 Stockpile - establishment and management

Stockpiles should be installed as per the steps below:

- All stockpiles must be located within the approved project boundary.
- The size and number of stockpiles should be minimised at all times.
- stockpiles must be located away from areas subjected to concentrated overland flow or with the potential to be subjected to flooding. Wherever practical, sand and soil stockpiles should be located within the general sediment control envelope of the work site if one has been established. Stockpiles should be located in areas where exposure to wind is limited. If this is not possible fencing, covering, seeding or wetting down of the stockpiles should be undertaken as required
- where required a flow diversion bank or spoon drain shall be placed up-slope of a stockpile to direct overland flow around the stockpile (see Figure 11). All soil stockpiles should remain in a free-draining condition to avoid long-term soil saturation. Silt fencing or spoon drains or equivalent sediment controls are to be installed around all stockpiles

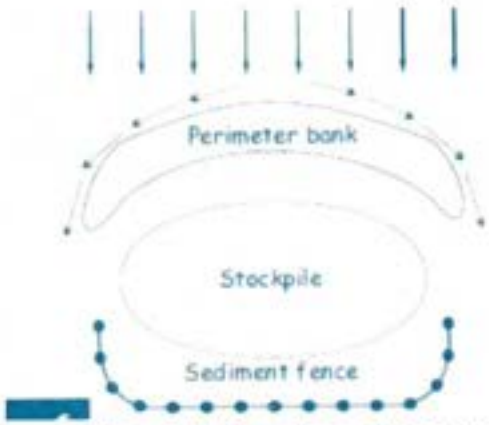


Figure 11: Installation of a perimeter bank

- stockpiles are to be located at least 10 metres from all roads, residential properties, drainage lines and stormwater drains
- stockpiles are not to be located within a Tree Protection Zone, where the Radius Tree Protection Zone = 12 x DBH (DBH = Diameter at Breast Height = trunk diameter measured 1.4 m above ground level)
- stockpiles of different materials are to be kept separate and be clearly identifiable especially topsoil
- stockpiles shall be low in height, have a flat-top, be graded and compressed to achieve a smooth and compact surface, and be in the shape of an elongated mound. Construct the stockpiles with flat slopes with no slope greater than 2:1 (horizontal to vertical). A lesser slope may be required where the erosion risk of the stockpiled material is high
- stockpiles that will remain bare for more than 28 days are to be stabilised using approved soil binders, by covering with mulch, anchored geotextile fabrics, or seeding with sterile grass/hydroseed.

- stockpiles should be visually monitored during windy periods and adequate protective measures including mulch, anchored fabrics or water down with an approved water supply to suppress dust on stockpiles during dry or windy conditions.

7.5 Post Construction

On completion of construction activities disturbed sites should be rehabilitated to their original condition where possible / practical:

- The original surface contours should be restored as far as possible.
- Soil should be placed back in its original profiles.
- Vegetation should be restabilised.
- Sediment controls should be removed when it is assessed that they are no longer required.
- Permanent erosion control features should be monitored during operation and rehabilitated as necessary.

8 PROCEDURE: CONCRETE BATCHING PLANT

The following siting criteria and management practices have been developed in line with the Guidelines for Siting Batching Plants (EPA Victoria (1998) Publication 628).

They are to be observed when establishing the location of temporary concrete batching plant/s and during the plants establishment, operation and removal.

8.1 Preconstruction

8.1.1 Location considerations

- Concrete batching plants must be located at least 100 metres from any watercourse.
- Batching plants should be sited on land that is not flood prone
- Vehicle access routes to the plant location must utilise established tracks.
- The batching plant should be located at least 100 m from any sensitive receptors such as domestic houses, sensitive flora and fauna or other noise, dust or emission sensitive areas.
- Preferred locations for temporary batching plants should be determined prior to construction and these areas clearly marked on the site plan.

The requirements for planting siting (Table 2) and water quality (Table 3) are summarized below.

Table 2: Requirements for plant siting (Source: EPA Victoria, 1998)

Issue	Requirement
Buffer zone	At least 100 metre buffer between plant and residential zone
Groundwater	No shallow groundwater in the plant's vicinity
Winds	Bunkers located out of prevailing winds
Access	Plant access minimise potential impacts on amenity
Amenity	Batching plant does not detract from local amenity

(Source: EPA Victoria, 1998)

Table 3: Water quality requirements

Issue	Requirement
Paving	All working areas are paved in hard non-porous surface
Bunding	Bunding is able to contain runoff
Collection pit and recycle tank	Primary and secondary pumps fitted to collection pit
	Excess water pumped to recycle tank
	Collection pit empty of water, sand and gravel
	Level controls working properly
	Recycle tank large enough to store runoff from 20 mm rainfall event
Monitoring offsite discharges	Visual alarms on console - to indicate when water is discharged from site - are installed and operable
	pH of offsite wastewater discharges between 6.0 and 9.0
	Suspended solids levels of wastewater discharges less than 80 mg/L
Fuel and chemical storage	Chemicals and fuels are stored in a dedicated and adequately protected store
	Bund around the storage facility is adequate
	Material Safety Data Sheet available for all chemicals
	Underground storage tanks tested in accordance with applicable regulations

8.1.2 *Site setup*

- A site plan will be established for each distinct batching plant location that covers key issues and the placement of infrastructure, stockpiles, waste storage, bunding of hazardous materials, entry and exit points, sedimentation controls, waste water management, washout areas, identification and fencing of vegetated areas, areas prone to erosion.
- The construction site should be setup prior to delivery of plant and any other material. This includes:
    - surface water diversion around the site
    - sediment traps/fences downstream of the site
    - stockpile areas established
    - spill kits put in place
    - waste collection areas established
    - fencing of sensitive areas.
- Due to the nature of the activity further site establishment mechanisms are required:

- the area of the site which generates contaminated stormwater runoff should have a separate dedicated drainage and treatment system to discharge clean stormwater from the site
- all contaminated stormwater and process wastewater must be directed to a collection pit for recycling
- the wastewater capture system must be able to store the contaminated runoff generated by 20 mm of rain in 24 hours
- wastewater stored in the recycling system should be reused (or disposed of offsite) at the earliest possible opportunity
- there must be no dry weather wastewater discharges from the site
- any unavoidable wet weather discharges should be monitored for pH and suspended solids and the records retained.

- Washout area

  - Any washout area will be located at least 100 metres from waterways or stormwater drains and within the batching plant site.
  - The washout area will consist of a washout tray/bucket or a geotextile lined ditch with silt fence or coir logs at the downstream end that is appropriately sized for the volume of concrete washout that is expected to take place during this project.
  - The washout area will be used for washout of the concrete agitator and chute (at the conclusion of a concrete pour), or for wash out of onsite equipment.
  - Washout water containing concrete residue (that has collected in the washout tray) will be managed in the following preferential order:
  - direct washout water back into the concrete agitator
  - allow the washout water to remain in the wash out tray and evaporate
  - once the concrete slurry has dried, it must be sent for recycling or stored until recycling can take place.
  - Shovel, sweep any spillage and excess concrete slurry or residue immediately after completing the job
  - Contaminated runoff or washout water must not be disposed of to waterways or stormwater drains
  - To minimise the amount of washout water generated, scrape excess concrete off the equipment before it is washed
  - A high pressure, low volume water spray nozzle conserves water and reduces maintenance of sediment controls.

8.2 Construction

8.2.1 Dust suppression

- Sand and aggregates must be kept damp.
- Belts and hoppers must be covered or enclosed.
- Keep pavements and surfaces clean.
- Fit cement silos with high level alarms, multibag pulse jet filters, airtight inspection hatches and automatic cut off switches on the filler lines.
- Keep duct work airtight.

- Enclose the loading bay.
- Develop and implement an inspection regime for all dust control components.
- Clean up spills immediately using the on-site spill kit.

8.2.2 Waste

- Waste concrete generation should be minimised.
- Waste concrete must be taken to an appropriate off-site disposal site, it must not be disposed on on-site.
- Investigate ways to recycle excess material from agitators.
- Other wastes should be stored in designated areas and disposed of off-site by accredited waste contractors.

8.2.3 Post construction

- Immediately following construction temporary batching plants should be removed and the area fully rehabilitated.
- Site soil profiles and contours should be established and vegetation established.
- Sedimentation prevention controls should remain in place until the site is deemed sufficiently rehabilitated by the Environmental Manager.

9 PROCEDURE: WASTE WATER MANAGEMENT (INCLUDING DEWATERING)

9.1 Guiding principles

- Wastewater shall be treated onsite wherever possible by treatment systems sized to serve the peak flows from the site and to meet water quality requirements as dictated by the SEPP WoV 2003.
- Treatment systems to include sedimentation ponds, sediment fences and discharging to vegetated areas.
- Where onsite treatment is impractical due to site conditions, contaminated wastewater shall be transported away from the site and disposed at a licensed disposal facility .
- Domestic wastewater from portable toilets and other domestic uses will be disposed of off-site by a licensed contractor.

9.2 Preconstruction

- Concrete batching plants and any on-site treatment facilities and waste water discharge areas shall be located at least 100 metres from any watercourse.
- Suitable wastewater management measures will be provided to ensure contaminated wastewater is not discharged to the environment.
- Sufficient domestic waste systems such as portable toilets will be placed at each worksite in sufficient numbers to service the anticipated workforce.

9.3 Construction

9.3.1 Dewatering of sediment control basins and trenches

- The quality of the water to be discharged must be determined prior to any dewatering activities commencing particularly turbidity and pH which must meet SEPP requirements. Visual inspections for oil and grease must also take place.
- Pumping must only occur at a rate the receiving environment will accept without erosion or spillage.
- If there is evidence of overflow/spillage or scouring all pumping must cease until the level in the receiving environment is safe to resume pumping.
- Where dewatering is to be transferred to natural waterways, water quality monitoring must be performed before, during, and after to ensure the water does not exceed water quality standards identified in the SEPP. Water quality monitoring must be undertaken in accordance with EPA Victoria (2009) 'A Guide to the sampling and analysis of water, wastewaters, soils and wastes'.
- Where there is the possibility that water to be dewatered has come into contact with a non-sewage contaminant source (including sediment); the options are as follows:

    - collect the water and dispose of it offsite, in accordance with appropriate procedures
    - disposal to stormwater or surface water is only permitted when the water has undergone onsite treatment to bring it to a quality that meets the requirements of the relevant SEPP guidelines (as determined by appropriate water quality monitoring depending on the contaminant type). Any discharge to surface waters must first be approved by the Environmental Manager and the Wimmera CMA.

- Where it can be shown that there is no possibility that the water to be dewatered has come into contact with sewage, biosolids, sewage infrastructure or any other (non-sewage) contaminant source, the water can be:

    - released onto a vegetated area of sufficient width (>10 m) to remove any suspended solids, with written approval of the Environmental Manager.
    - discharged using a filter sock or other sediment control devices as approved by the Environmental Manager.
    - discharged into the stormwater system or a natural waterway (providing turbidity does not exceed 30 NTU and water quality is within the guideline values outlined in the SEPP). Release to a stormwater system or natural waterway can only be undertaken with the approval of the Project Manager and the Environmental Manager.

9.3.2 *On-site domestic wastewater systems*

- It is preferable that waste-water generated from domestic uses such as toilets flushing, showers and kitchen facilities is transferred off-site for disposal at an approved location.
- If on-site wastewater systems are proposed with on-site disposal (such as via irrigation and trenches) a separate works approval is likely to be required by the EPA Victoria to conduct these activities:
    - any-onsite treatment system must be sized to typical industry standards and be installed and maintained by an accredited organisation with experience in managing this type of infrastructure
    - any treatment system must be located at least 100 m from drainage lines and water bodies
    - consideration should be given to directing treated water onto areas which have been revegetated as part of the site rehabilitation program to reduce potable water usage and help plants established themselves in these areas.

9.4 Post construction

- Following construction any wastewater management systems and devices should be removed and the impacted area rehabilitated.
- Removal of sediment controls should only take place when there is no evidence of sediment release.
- Portable toilets should be removed as soon as they are no longer required.

10 PROCEDURE: WASTE REUSE, RECYCLING AND DISPOSAL

10.1 Preconstruction

- Areas for waste holding prior to removal off-site will be identified on site plans.
- Waste storage areas will be located within the existing site erosion and sediment management controls.
- Hazardous wastes will be appropriately stored and bunded in designated areas as per the Hydrocarbon and Hazardous Substances Plan and will be stored at least 100 m from drainage lines.

10.2 Construction

- Waste generated onsite will be managed to ensure that litter and debris do not find their way into local watercourses.
- Where necessary waste management areas will be fenced to ensure waste is not blown or washed into local waterways.
- Materials for recycling and for landfill will be stored separately.
- Water management areas will be clearly signed.

- Waste will be removed from site at regular intervals by a registered waste management contractor.
- Waste will be transported to nearby approved recycling and landfill facilities.

10.3 Post construction

- Waste management areas will be rehabilitated post construction.
- No waste will to be disposed of on-site or will remain on-site post construction.

11 PROCEDURE: INSPECTION, MONITORING AND AUDITING

11.1 Preconstruction

- The Program of Inspections, Monitoring and Auditing (PIMA) will follow the guidelines provided by EPA Victoria Publication 480 to ensure that environmental risks are adequately managed and that control systems are operating effectively in relation to sediment, erosion and water quality management.

11.2 Construction

- The condition of sediment controls is to be inspected on a weekly basis; and immediately after rainfall events. Remediation and maintenance will be performed as required as outlined in EPA Victoria Publication 480.
- Onsite stormwater runoff will be visually monitored during construction particularly during wet weather events, to ensure the integrity of the systems in place. Identified weak spots will be immediately rectified and new measures installed as required. This could include additional sediment fencing, new or expanded sedimentation basins, and improved upstream water diversion works around worksites. Maintenance of existing sedimentation prevention infrastructure or repositioning of the infrastructure to meet overland flow paths may also be required.
- Erosion control measures such as terracing, placing of vegetation, beaching and measures to dissipate water flows shall be monitored weekly and after rainfall events to ensure their integrity. Problems will be immediately rectified.
- Daily monitoring of erosion prone areas shall be undertaken during construction, when construction works are active in the erosion prone area, to ensure construction activities are not exacerbating existing issues or creating new issues. The Environmental Manager shall be responsible for ensuring that identified issues are rectified immediately through the installation of appropriate mitigation infrastructure.
- Discharge from retention ponds, sediment dams, dewatering of trenches and any proposed pumping of water any stormwater system or natural waterway will be undertaken following consultation with Wimmera CMA. During

dewatering turbidity and pH will be monitored at least hourly and preferably continuously during pumping.

- Stockpiles will be visually managed for signs of wind and rain erosion, and corrective actions put in place if required
- Dust emissions from site will be visually monitored by the Environmental Manager. Should dust become a potential nuisance procedures such as wetting down will take place as deemed required.

11.3 Post-construction

- Erosion and sediment controls will only be removed once the area of disturbance is deemed by the Environmental Manager to have stabilised.
- Remediated areas will be monitored monthly during wind farm operation for any evidence of compromise or failure of rehabilitation measures including evidence of soil erosion, subsidence of backfilled trenches and discharge of turbid water. Problems noted will be rectified immediately.

12 GLOSSARY AND ABBREVIATIONS

CMA	Catchment Management Authority
CWSMP	Construction and Work Site Management Plan
EMP	Environmental Management Plan
EPA	Environment Protection Authority
Km	kilometres
LGA	Local Government Area
M	metres
SEPP(WoV)	State Environment Protection Policy (Waters of Victoria)
SEWQMP	Sediment, Erosion and Water Quality Management Plan
HRCC	Horsham Rural City Council
YSC	Yarriambiack Shire Council

13 REFERENCES

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