

BERRYBANK WIND FARM

Wildfire Prevention & Emergency Response Plan

prepared for

Berrybank Development Pty Ltd

Suite 403, 68 York St

Sydney NSW 2000

In satisfaction of conditions attached to

Planning Permits 20092820 & 20092821

February 2016

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The only documents to which reference has been made are related to the Project, as Conditions or other consultant reports, and information extracted from local Plans of Management such as VMOs and BMOs.

Numerous other Fire Management Plans covering Victoria and other States have been reviewed over the years. General ideas, layout concepts and the like were developed based on those documents, but no wholesale lifting of text occurred and no specific acknowledgments are made.

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1. INTRODUCTION

1.1 Background

Berrybank Development Pty Ltd (BDPL) is currently undertaking the necessary studies to obtain the appropriate development approvals for construction and operation of the Berrybank Wind Farm (BBWF), to be located in the Golden Plains Shire and the Shire of Corangamite Local Government Areas in the state of Victoria.

The two Planning Permits, 20092820 in the Golden Plains Shire, and 20092821 in the Shire of Corangamite were granted by the Minister for Planning under the *Planning and Environment Ac. 1987* on the 24 August 2010. Both Permits allow for the use and development of land for a wind energy facility including anemometers (wind monitoring masts), business identification signage, access roads, substation, water storage tanks and removal of native vegetation subject to conditions.

The availability of larger and more efficient turbines triggered a review of the wind turbine technology that could be utilised, as a result a number of turbines were removed from the approved layout, and subsequent changes to the alignment of the access track system that would improve efficiency and reflect desired cropping practice changes by some of the host landowners. The BBWF turbine layout has been revised to have up to 79 wind turbines and associated infrastructure.

This revision to the endorsed Wildfire Prevention & Emergency Response Plan is based on original principles and methodologies derived from the consultation and liaison with the Country Fire Authority Victoria (CFA) during the preparation of the original release of this plan issued in August 2012. The main changes in this report are the amendments to the maps to reflect the turbine layout and access track alignment.

1.2 Objective

The objective of this report is to produce a wildfire prevention and emergency response plan addressing the relevant conditions of the Planning Permits outlined below. Once completed and endorsed it will form part of the Planning Permit.

Before the development starts an Environmental Management Plan must be prepared to the satisfaction of the Minister for Planning, in consultation with the Department of Sustainability and Environment, Corangamite Shire Council, Golden

Plains Shire Council, Country Fire Authority and other agencies as specified in Permit Condition 13 or as further directed by the Minister for Planning. The Environmental Management Plan may be prepared in sections or stages. When approved, the plan will be endorsed by the Minister for Planning and will then form part of the Permit.

The Environmental Management Plan must include a wildfire prevention and emergency response plan prepared to the satisfaction of the Minister for Planning in consultation with the Country Fire Authority, the Department of Sustainability and Environment, Corangamite Shire Council and Golden Plains Shire Council. The plan must include and consider:

- (i) The provision of strategic fire suppression and access areas through the wind farm clear of raised-bed cropping; [4.4]*
- (ii) Constructed roads should be a minimum of (4) four metres trafficable width, with a four metre (4m) vertical clearance for the width of the formed road; [3.2.1, 4.4]*
- (iii) Roads should be constructed to a standard so that they are accessible in all-weather conditions and capable of accommodating a vehicle of 15 tonnes for the trafficable road width; [4.4]*
- (iv) The average grade should be no more than 1 in 7 (14.4%, 8.1°) with a maximum of no more than 1 in 5 (20%, 11.3°) for no more than 50 metres; [4.4]*
- (v) Dips in the road should have no more than a 1 in 8 (12.5%, 7.1°) entry and exit angle; [4.4]*
- (vi) Water access points shall be located in safe easily identifiable areas, accessible in all-weather conditions; [4.5]*
- (vii) Water access points should be designed, constructed and maintained for a load limit of at least 15 tonnes; [4.5]*
- (viii) A turning point with a minimum radius of 10 metres is required for fire appliances at all water access points; [4.5]*
- (ix) Fire brigade appliances should be able to park within four (4) metres of the water supply outlet on a hard standing area; [4.5]*

- (x) *Bulk static water storages (22,500 litre) should be provided adjacent to main access tracks for fire fighting. Locations should be determined in consultation with CFA Fire safety officers and with operational staff; [4.5]*
- (xi) *All tanks should be manufactured with at least one (preferably two) 64mm, 3 thread/25mm x 60 mm nominal bore British Standard Pipe (BSP) round male coupling 50 mm from their base. Outlets should be a minimum of two (2) metres apart; [4.5]*
- (xii) *Water access points are to be marked by appropriate signage as per CFA's Guidelines for Identification of Street Hydrants for Fire Fighting Purposes; [4.5.2]*
- (xiii) *Grass should be no more than 100mm in height and leaf litter no more than 10mm deep for a distance of (30) thirty metres around constructed buildings and viewing platforms; [4.6.1]*
- (xiv) *A fuel reduced area of (4) four metres should be maintained around the perimeter of electricity compounds and sub station type facilities; [4.6.1]*
- (xv) *There should be no long grass or deep leaf litter in areas where plant and heavy equipment will be working; [4.1.1]*
- (xvi) *All plant and heavy equipment should carry at least one 9 litre Water Stored pressure fire extinguisher with a minimum rating of 3A; [4.1, 4.2]*
- (xvii) *Internal fire protection systems, where appropriate, to assist with fire suppression; [4.2]*
- (xviii) *Lighting protection devices, where appropriate, installed on each wind farm; [4.2]*
- (xix) *Dedicated monitoring systems within each wind turbine that detect temperature increases in turbines and shuts them down when the threshold temperature is reached; [4.2]*
- (xx) *Construction of the wind farm outside the fire season where possible.[4.1]*

(xxi) *A program of training of volunteer and paid CFA personnel in fire suppression in and around the wind energy facility; [4.7]*

Note: For the purpose of this condition, consultation with the CFA must include CFA at headquarters level, the CFA Regional Office and local volunteer brigades on and surrounding the wind energy facility. [4.7]

Numbers in [square brackets] indicate the sections in the report where these conditions are addressed.

Additional points raised by CFA officers during the preparation of this report have been addressed, and their requests for additional measures have been incorporated.

2. SITE DESCRIPTION

2.1 Regional and Local Context

The Berrybank Wind Farm (BBWF) site is located within South Western Victoria approximately 14km east of Lismore and 16km to the west of Cressy. The site is approximately 130km west of Melbourne within the Victorian district known as the Western Plains or Western District; refer to *Figure-1* for the Locality Map.

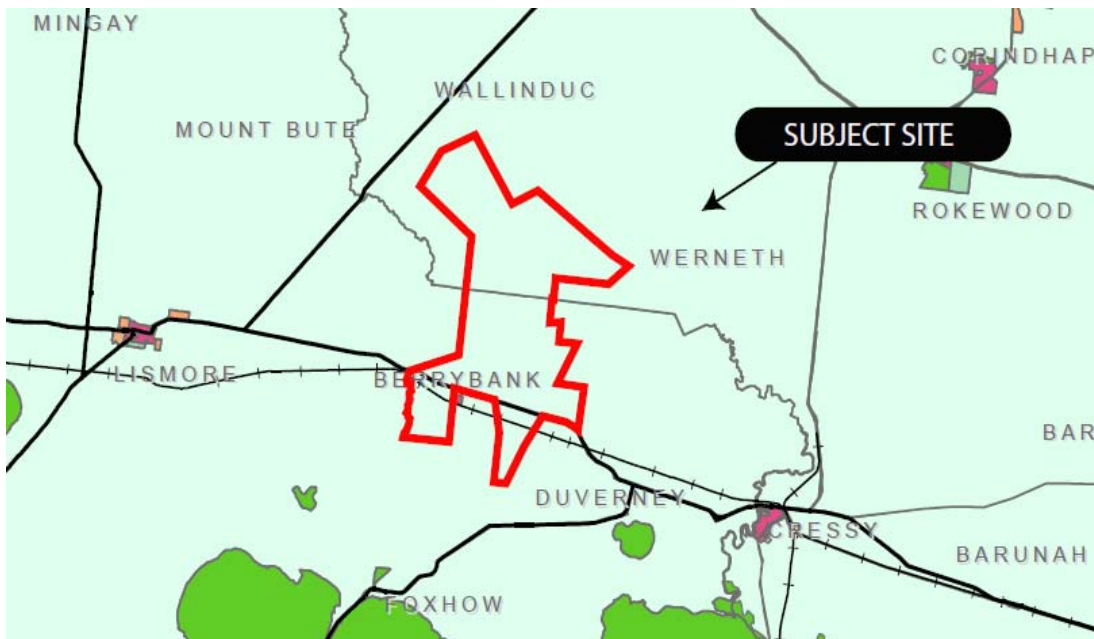


Figure 1 - Locality Map

Lismore and Cressy are small townships with populations of 532 and 123 respectively. The closest large town in the region is Colac which is approximately 40km south of the proposed wind farm site.

This site is split between two municipalities by Boundary Road, with Golden Plains Shire north of Boundary Road and Corangamite Shire to the south. Berrybank is a rural locality containing a scattering of buildings centred on a railway siding south of the corner of Hamilton Highway and Foxhow Road.

The land use of the site is primarily agricultural across large dry land broad-acre land holdings. Common agricultural activities include grazing of sheep and cattle, and cropping of wheat, canola and other cereals. Most crops are grown in winter owing to the more reliable rainfall in this season. Raised cropping beds are used in the locality as a method for improving drainage.

This land use is reflected in the zoning of the site, which is farming under both the Corangamite and Golden Plains Planning Schemes. A small part of the subject site near the centre of Berrybank (that does not contain any infrastructure or works) is zoned 'Township Zone'.

2.2 Site Information

The site covers an area of approximately 5,034Ha and comprises 12 different landholders. Approximately four-fifths of the site is to the north of Hamilton Highway with the remainder to the south bisected by the railway line. The site comprises approximately 140 individual lots of various sizes. The site contains several rural farmhouses at a low density typical of broad-acre regions, with some of these uninhabitable. The area in general and the site in particular are essentially flat land with occasional deep drainages.

2.2.1 Climate

From a bushfire perspective, the site is within an area subject primarily to winter rain and summer drought. Several days of strong, hot, dry north to north-westerly winds throughout summer may be followed by a south-westerly wind change.

2.2.2 Environmental Constraints

This intensively managed agricultural land is not subject to any particular flora and fauna protection constraints. Some resident and migratory bird populations were examined during the panel hearings. None of the works associated with the proposed fire protection measures will have an effect on these populations beyond those associated with the wind farm itself.

2.2.3 Vegetation Protection Overlay (VPO)

Some roadsides within the BBWF site are subject to VPO restrictions. None of the proposed treatments within this *Plan* are on land subject to a VPO.

2.2.4 Raised Bed (RB) Cropping

Within the area of the BBWF, the agricultural practice of Raised Bed (RB) cropping creates difficulties for conventional grass fire fighting. Within RB fields, vehicles other than tractors with appropriate track width have difficulty traversing along the beds. All vehicles have difficulty travelling across, at right angles or on a diagonal, of RBs.

RB paddocks have a headland of about 15-20m in width at each end of the rows, where farm machinery and conventional vehicles (especially grain trucks) can turn or cross the fields. These areas are normally planted with the same crop as the rest of the field, and do not function as any useful sort of fuel-break. In addition, some farmers leave a width of up to 5m unplanted beside fences, and these strips may be kept in a condition which can provide some utility for fire access or fire fighting.

Adjacent RB paddocks are not necessarily aligned in the same direction, as subtle slope differences and difficulties with concentrating excessive water flow dictate the optimum drainage pattern.

2.2.5 Existing Land Management Plans

There is a *Plan of Management* for the Hamilton Highway, and the CFA have a works program for roadside fuel management. The works specified in this *Plan* have been integrated with the existing activities.

2.2.6 Bushfire Management Overlay (BMO)

The BBWF site is not subject to any BMO restrictions.

3. WILDFIRE PROTECTION PRINCIPLES AND PRACTICES

3.1 Objective

The objective in fire fighting is to minimise all fire damage. While in most instances this is achieved by minimising the area burnt, circumstances may arise where a greater area burnt of a lesser-valued crop is the better control plan.

3.2 Wildfire Protection Principles

From the point of view of overall fire protection and fire damage mitigation, the ability to prevent ignition of fires on the site, and the ability to quickly suppress those that do so or that enter the site from outside, are paramount. From the point of view of liability, BBWF operators are most exposed to fires commencing on the site as a result of BBWF operations or activities, and leaving the site. Whether kept on the site or not, the toll in terms of loss of life and property damage from fires can be extraordinary. Keeping all fires as small as possible limits the potential damage. The ability to keep fires within the BBWF site, where BBWF operators can exercise a greater degree of control over at least the passive protection measures in place, is an important factor in limiting exposure to civil litigation.

None of the built assets of BBWF will be at risk of damage from fires in vegetation on the site. The separation from fuels and the nature of the construction of the towers and the substation will be such that they and the equipment within them will be impervious to the smoke, heat and flames of any fire able to become established on the site. Conductors will be underground.

Existing structures on the site, primarily farm houses and sheds, plus assets such as fences and windbreak plantations are at risk of damage by fire.

3.2.1 Prevention Measures

Passive measures in the form of fuel-breaks, access roads and trails are assumed to be restricted to the site and its perimeter, including public roads where native vegetation protection issues do not arise.

Research by CSIRO on the effectiveness of fuel-breaks concluded that, in the absence of trees and shrubs able to throw embers from an elevated position, 5m was the optimal width. There was a steady increase in effectiveness against head-

fire progress up to 5m, but fires able to cross such a break were generally not stopped by anything less than 15m. Fires have crossed much wider breaks under extreme conditions, but within the BBWF, internal breaks will be built to at least 5m width in recognition of best practice. Given the practice of creating RBs and ditches with a 2m width, the trafficable surface on all tracks throughout the site will be no less than 5m in width, with 0.5m on each side to form drainage gutters.

3.3 *Wildfire Origin*

Wildfire protection requires consideration of three possible scenarios:

- Approaching fire originated off-site
- Fire originated on-site
- Fire leaving site

3.3.1 *Approaching Fire Originated Off-site*

The most severe fire weather pattern in this part of Victoria is dominated by northerly winds, possibly followed by a westerly or south-westerly change. Thus the sides of the project from which protection against encroaching fire is most needed are the northern and western boundaries.

The turbines are most unlikely to be at risk from heat from grassfires or from the accompanying winds and convection columns. During periods of extreme winds the turbines shut down automatically, and can also be over-ridden manually to protect them against damage. Most infrastructure consists of power and communication cables, and will be underground. Only the main high voltage sub-station will be located above ground, and fuel management around this site will be undertaken.

Approaching fires may already be on a large front, and their flanks may already be under attack by ground and aerial fire fighting equipment.

As fire-fighting aircraft are unable to be used at low altitude within the site, they may be directed to continue to restrict the lateral spread of fire up to the points at which flanks enter the no-fly zone in and around the BBWF site. That would help ensure that work done within the site is not be over-run by later-arriving secondary runs, or threaten fire fighters working on flanks within the site.

3.3.2 Fires Originating On-site

(a) Operator caused - infrastructure

Fires originating on-site will be of most concern to the BBWF operator if they are caused by their infrastructure, both from the point of view of damage to their assets, and potential liability issues.

If fire originated within a turbine, by virtue of its height above ground, embers or other burning material (e.g. liquid) could be spread by high wind for some distance from the base. The higher the wind speed the greater the possible spotting distance, but also the more time for a partly buoyant ember to burn out before falling to the ground. There are no available data on this phenomenon.

The turbines at BBWF will be equipped with devices monitoring internal temperature and other sensors warning of impending malfunction, and may be fitted with appropriate internal fire extinguishment capability; if such equipment becomes commercially available from or approved by the turbine manufacturer.

As it is not practical to construct adequate fuel-breaks to contain escaped fire from such a location especially with strong wind conditions, a rapid response to the area downwind of an overheating or burning turbine will be required.

Fire originating within the substation needs to be able to be kept within its boundary. The perimeter defences against approaching fire will double as a containment barrier.

(b) Operator caused - activities

During the construction phase, a high level of immediate fire detection and control capability will be maintained. This will involve everyone, and in particular observers in elevated positions such as in cranes or atop towers, keeping a constant lookout for smoke, within their immediate work area, around the site generally, and more distant. They will be provided with the communications equipment to be able to report sightings immediately, to other workers, on-site fire teams and the CFA.

Vehicles driven through vegetation on uncleared tracks must be parked on cleared ground wherever possible. If necessary to stop a vehicle within

flammable vegetation, the driver must check beneath it to ensure that the hot exhaust system does not cause ignition to grasses or crops.

Immediate response capability with on-site fire fighting equipment will be provided during the construction phase when crops are in a flammable condition.

Once construction has been completed, operations staff will patrol the site as needed on maintained trails and have no need to traverse vegetated land. Maintenance activities which have the potential to start fires (welding, angle-grinding) will require the provision of both fire detection and immediate on-site suppression capability whenever nearby crops are in a flammable condition. Unless in an emergency, such activities should be suspended on days of High or greater fire danger.

(c) Farming activity caused ignitions

While the operator has no responsibility for such ignitions, on-site staff and their equipment will participate in initial attack on all fires commencing within the site. On-site staff will develop a good working knowledge of the access tracks and RB paddock layout, and may be among the most readily available initial attack crews on the site.

Ignitions arising from farming activities will most likely occur within paddocks or on individual properties, where the ability to navigate within farms will largely determine the success of direct initial attack.

(d) Public-caused ignitions

Normal roadside ignitions associated mainly with the travelling public require rapid response to the ignition point, and the ability to access the internal road network.

3.3.3 *Departing Fires*

If fires are not contained or extinguished within the site, whether originating in it or having passed through, aircraft may again be available to assist in fighting them.

When crews leave the BBWF site, and particularly RB sections of it to continue fighting the flanks of a departing head-fire, it is essential that no part of the flank relights and escapes. That could trap fire fighters between the main fire and the

fresh escapes from the site. Therefore, as with fires entering the site, continued patrol of the sides of the fire on the site must be maintained.

3.4 *Limitations in Raised Bed Cropping Areas*

3.4.1 *Ground-based Fire Fighting*

In an RB setting, ground crews are unable to follow the flank of a fire unless it happens to follow an existing track or bed alignment; therefore a greater degree of indirect attack is necessary. In that case, crews should attempt to use existing 'control lines' from which to stop the lateral and forward spread of fire. This may include burning out from suitably prepared access tracks, roads and other features such as still-green paddocks. Burning out the area between a proposed control line and the side of a running fire in RB paddocks may be difficult if the burnout fire is unable to cross the drain/ wheel rut, attempting to spread partly against the wind direction, from one RB to its neighbour, thus limiting the extra width that can be achieved.

The presence, removal and alignment of Raised Beds are subject to change at any time, depending on the management objectives of the property manager. Roads established to access towers will not be changed in the event of abandonment of RB farming, and newly created RBs will have to align with the existing internal road system. However, installation of signs designating entry to an RB paddock, with or without an indication of the alignment, may be dangerously misleading, therefore is not recommended. Support / planning staff and fire controllers need to rely on local knowledge of possible ground travel wherever RB cropping practice is used.

In most RB settings, access is generally poor, and restricted to the edges of paddocks and unformed farm access paths of no utility as fuel-breaks. Most internal roads are homestead access roads, which are usually planted with screens of wind-break trees. Mostly Cypress Pines were used, a species with no ability to function as any form of fire-break, but block the sight of approaching danger. Any fire reaching a row of these trees will cross the accompanying roadway without pause, throw spot fires up to about 50m, and attain flame heights and intensity for such a duration that crews using such roads would be exposed to potentially lethal radiant heat levels.

The network of gravel access tracks within the BBWF provides improved direct access, safer to use and of more utility for fire-fighting, to the whole of the site. Control of the head of major fires under extreme conditions is dependent on major fuel-breaks. Under lesser conditions, improved access within the site will enable greater direct attack options.

The use of aerial observers to help direct the best implementation of indirect attack strategies where access is restricted is recommended.

3.4.2 Aircraft-based Fire Fighting

Restrictions on flying within the site apply only to low-level flight, such as water-bombers, and not to aircraft overflying the site in an intelligence-gathering role or carrying observers/controllers directing fire fighting activities.

In a normal grassfire setting, direct fire fighting aircraft are most useful for initial attack, to hold small new fires until ground crews arrive. A secondary role is support of crews who have difficulty with fuel or access, and to provide temporary protection for isolated assets such as residences or other vulnerable structures.

Within a wind farm area, flying in windy, turbulent and smoky conditions is extremely hazardous to pilots, aircraft, and the turbines. It is assumed that fire-fighting aircraft will not to be utilised within the BBWF site, but may be used around the site perimeter to assist with approaching or departing fires.

Aircraft have limited capability against grassfires under extreme fire weather conditions, because grassfires can travel far more rapidly than aircraft can construct containment lines. In addition, the callout time for aircraft may exceed half an hour within the Berrybank vicinity. Under extreme fire weather conditions, a fire not contained by a combination of passive pre-suppression measures and direct attack by ground forces will have grown to a size beyond control by aircraft alone.

The use of aircraft to provide temporary protection to structures is lost within the wind farm site. All of the landowners who may be affected by this restriction are participants in the project, and are aware of the need to provide passive protection measures in place of, rather than to supplement, air support.

4. WILDFIRE PREVENTION MEASURES

Wildfire prevention measures include steps which will be implemented or updated on a daily basis by BDPL in order to minimise the likelihood of fires starting within the Site, and are considered in two phases – construction and operation of the wind farm.

During the Fire Danger Period (fire season) staff will obtain from the CFA or the Bureau of Meteorology on the morning of each working day a forecast including the Grassland Fire Danger Index, the expected wind direction, and any forecast wind changes.

Crews working on the site will be informed of the key points arising from the forecast, and amendments will be made to previously planned activities, as dictated by the expected weather.

Every ignition, however easily and rapidly it is controlled, will be recorded and investigated with a view to developing, refining and implementing safer working practices.

Smoking in the open on a day of Total Fire Ban is not permitted. At all other times throughout the summer period, smoking is only allowed when the smoker is essentially stationary and within an area cleared of all flammable surface material for a minimum distance of 2.5m in all directions. Smoking is not permitted in motor vehicles or plant items moving on the site.

4.1 Wildfire Prevention Measures During Construction

Plan Permit Condition 13 e) (xx) specifies avoiding construction, to the extent possible, during the fire danger period. Construction of the entire project is likely to take over a year, and some construction works would be compromised or rendered unacceptably dangerous during wet winter months. It is therefore probably unavoidable that some works will be undertaken during at least one summer. It therefore becomes a matter of implementing safe work practices that minimise the likelihood of ignitions, and allow effective initial direct attack on those that occur.

All site workers need to be made aware in their induction training that prevention of ignitions is of primary importance throughout the whole project and particularly during summer. **One careless avoidable incident has the potential to have**

construction shut down for months, and negligent inattention to fire safety should be considered a serious and potentially dismissible offence. That said - everyone should be encouraged to report possible systemic problems without fear of retribution for doing the right thing and acting in the best interests of all concerned.

4.1.1 *Prior to Access Track Construction*

On days of Total Fire Ban, no outdoor work will be undertaken apart from travelling along formed roads, and work (in cleared areas only) that does not involve flame or the possible generation of sparks. Examples of allowable activities include pouring concrete, tying already bent steel, surveying. Banned activities include all forms of welding and angle-grinder or other power tool use, any use of flames or other heating equipment, and anything which could foresee ably create sparks, however unlikely or rarely.

On days not subject to Total Fire Ban, vehicles travelling through paddocks with crops in a flammable condition should operate only on pre-formed tracks or roads from which all flammable material has been removed. The exception may be those plant items forming roads, but such equipment (eg graders) is generally well suited to direct attack on fresh fires by quickly creating a break around them. Under very hot and dry weather conditions where, for example, a grader blade striking a rock is likely to throw a strong enough spark to start a fire, no plant or equipment should be operating.

Throughout the fire danger period, all vehicles, plant and heavy equipment on the site will carry:

- a 4.5kg dry powder fire extinguisher;
- a 9 litre Water - Stored pressure fire extinguisher with a minimum rating of 3A;
- a filled 35 litre capacity knapsack spray;
- a McLeod Tool (rake-hoe);
- a set of fencing wire cutters;
- a torch, first aid kit, tow rope or snatch strap, and sufficient fire blankets to cover each occupant (at least 2 blankets).

Refuelling vehicles must also carry whatever statutory fire suppression equipment is required.

Outside the fire danger period, all vehicles, plant and heavy equipment on the site will carry:

- a 4.5kg dry powder fire extinguisher;
- a 9 litre Water - Stored pressure fire extinguisher with a minimum rating of 3A, or a filled 35 litre capacity knapsack spray;
- a set of fencing wire cutters;
- a torch, first aid kit, and tow rope or snatch strap

When works with the potential to start fires are to be undertaken, they should be done on an area of bare ground large enough that the furthest spark likely to be thrown will land at least 5m from any flammable vegetation. Angle grinder operators in particular should test their equipment, become familiar with the distance over which they can throw sparks with the wind, and ensure that they use them safely.

In the event that an activity starts a fire, work with any potential to start fires at other locations on the site should be suspended immediately to ensure that a second ignition does not occur at a time when initial attack capability is compromised.

4.1.2 *Post Access Track Construction*

Following track construction, a fairly intensive network of internal trails will exist. Some of these tracks terminate at fences next to existing public roads but are not permitted to be connected to them for normal access. These dead-end tracks have been created intentionally to allow emergency access out of the site by fire crews. If the break barriers at the end of the dead-end tracks have already been knocked down by the fire crews, then it may be possible for the fire crews to use these locations to re-enter the site for the purpose of fire fighting in and around the site. They are an exception to the usual best practice which does not condone dead-end trails, but they are sited to allow easy extension if needed for fire-fighting.

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- a set of fencing wire cutters;
- a torch, first aid kit, tow rope or snatch strap, and sufficient fire blankets to cover each occupant (at least 2 blankets).

Refuelling vehicles must also carry whatever statutory fire suppression equipment is required.

Outside the fire danger period, all vehicles, plant and heavy equipment on the site will carry:

- a 4.5kg dry powder fire extinguisher;
- a 9 litre Water - Stored pressure fire extinguisher with a minimum rating of 3A, or a filled 35 litre capacity knapsack spray;
- a set of fencing wire cutters;
- a torch, first aid kit, and tow rope or snatch strap

4.2 *Wildfire Prevention Measures During Operation*

Only operations and maintenance crew will be present and working on-site after construction is completed, and most functions of the BBWF will be monitored from the site office control room or remotely. These crews should have no need to travel off the prepared access tracks.

Should the need arise to undertake potentially fire-hazardous maintenance or repair work, the same procedures as for the post-track construction phase should be observed.

As required by Plan Permit Condition 13 e) (xix), obvious signs of equipment malfunction with the potential to create ignitions will trigger the automatic shut-down

of the problematic item if that action has not been done manually. In that event a notification will be sent to the CFA and the BBWF site fire tanker will attend the possible problem location.

Lightning protection devices will be fitted as appropriate on each wind farm, as required by Plan Permit Condition 13 e) (xviii).

Throughout the fire danger period, all vehicles, plant and heavy equipment on the site will carry:

- a 4.5kg dry powder fire extinguisher;
- a 9 litre Water - Stored pressure fire extinguisher with a minimum rating of 3A;
- a filled 35 litre capacity knapsack spray;
- a McLeod Tool (rake-hoe);
- a set of fencing wire cutters;
- a torch, first aid kit, tow rope or snatch strap, and sufficient fire blankets to cover each occupant (at least 2 blankets).

Refuelling vehicles must also carry all statutory fire suppression equipment.

Outside the fire danger period, all vehicles, plant and heavy equipment on the site will carry:

- a 4.5kg dry powder fire extinguisher;
- a 9 litre Water - Stored pressure fire extinguisher with a minimum rating of 3A, or a filled 35 litre capacity knapsack spray;
- a set of fencing wire cutters;
- a torch, first aid kit, and tow rope or snatch strap.

4.3 Fuel Management

Parts of some major public road verges in and around the project site are already burnt, slashed, ploughed or scalped periodically as part of general area pre-season fire protection. These are intended to be more than passive fuel-breaks, as in combination with a well-coordinated direct attack they provide a good opportunity to stop fires outright even under reasonably severe fire weather conditions.

Additional works funded by BDPL will be coordinated into this program, to maximise the benefits and avoid un-necessary works.

The overall perimeter of the site, with the inclusion of a few additional paddocks, is substantially enclosed within a public road network. It is proposed to upgrade

vegetation management on some additional road easements to form the equivalent of a high-quality perimeter road and fuel-break system.

At every entry point to the site there will be an appropriately marked map tube with maps of the site layout including turbine locations, internal and external roads, and water storage points. These will be updated annually by BBWF operators immediately prior to each fire season, and checked / re-stocked monthly throughout summer.

4.3.1 Constraints

Vegetation on some road reserves within and surrounding the site are listed in the Golden Plains Council and Corangamite Council Vegetation Protection Overlays (VPOs). While such listings do not prevent use and active management of those road verges as part of a fuel-break system, it is preferable to minimise disturbance of significant areas and remnants of native vegetation.

Existing and proposed treatments and constraints are shown on *Figure-2*.

Restrictions are noted to be in place as a result of VPOs along the following road verges:

- (a) The eastern end of Urchs Road.
- (b) Berrybank-Werneth/Wilgul-Werneth Road from the Berrybank-Wallinduc Road to Urchs Road.
- (c) A short section of the eastern side of the Berrybank-Wallinduc Road immediately south of Boundary Road.
- (d) The Hamilton Highway.

Boundary Road lies on the boundary between the two Shires, and is presently effectively unmaintained by either Council. The road surface is often untrafficable even to 4WD vehicles, and there appears to be no roadside vegetation management unless by neighbouring property owners or Local Brigade members.

4.3.2 Existing Roadside Treatments

Subject to weather and seasonal conditions, programmed annual roadside burning takes place on one or both sides of most major roads in and around the BBWF site. The usual treatment regime involves early spraying of a 2-3m wide strip beside the

fence line to kill the vegetation and allow vehicles driving along it to flatten it and create a safer (better visibility, lower fuel height) driving surface from which to apply a wet-line during subsequent burning off. Immediate roadside slashing may follow between the road and table drain, and the entire remaining width to the fence on one or both sides of the road burnt, once grass is sufficiently cured.

Some road verges are treated on a 2-3 year cycle rather than annually.

There is a well-established administrative arrangement whereby farmers can be allowed to harvest and remove roadside vegetation at no cost or payment. While this may not be a sufficient treatment to prevent the passage of fire, removal of excess foliage greatly simplifies subsequent burning.

Presently treated roadsides within and around the BBWF site are:

- (a) Berrybank-Wallinduc Road
- (b) Hamilton Highway
- (c) Berrybank-Werneth Road
- (d) Part of Urchs Road and the Lismore-Scarsdale (Pitfield) Road
- (e) Wilgul-Werneth Road
- (f) Railway easement East of Doyles Road
- (g) Doyles Road
- (h) Padgetts lane West of Berrybank-Wallinduc Road

Some of those roadsides are subject to a VPO.

The Western end of the Berrybank-Werneth Road between Berrybank-Wallinduc Road and the Hamilton Highway is currently not utilised for public traffic, and it is not clear if it is being treated according to the intended annual program.

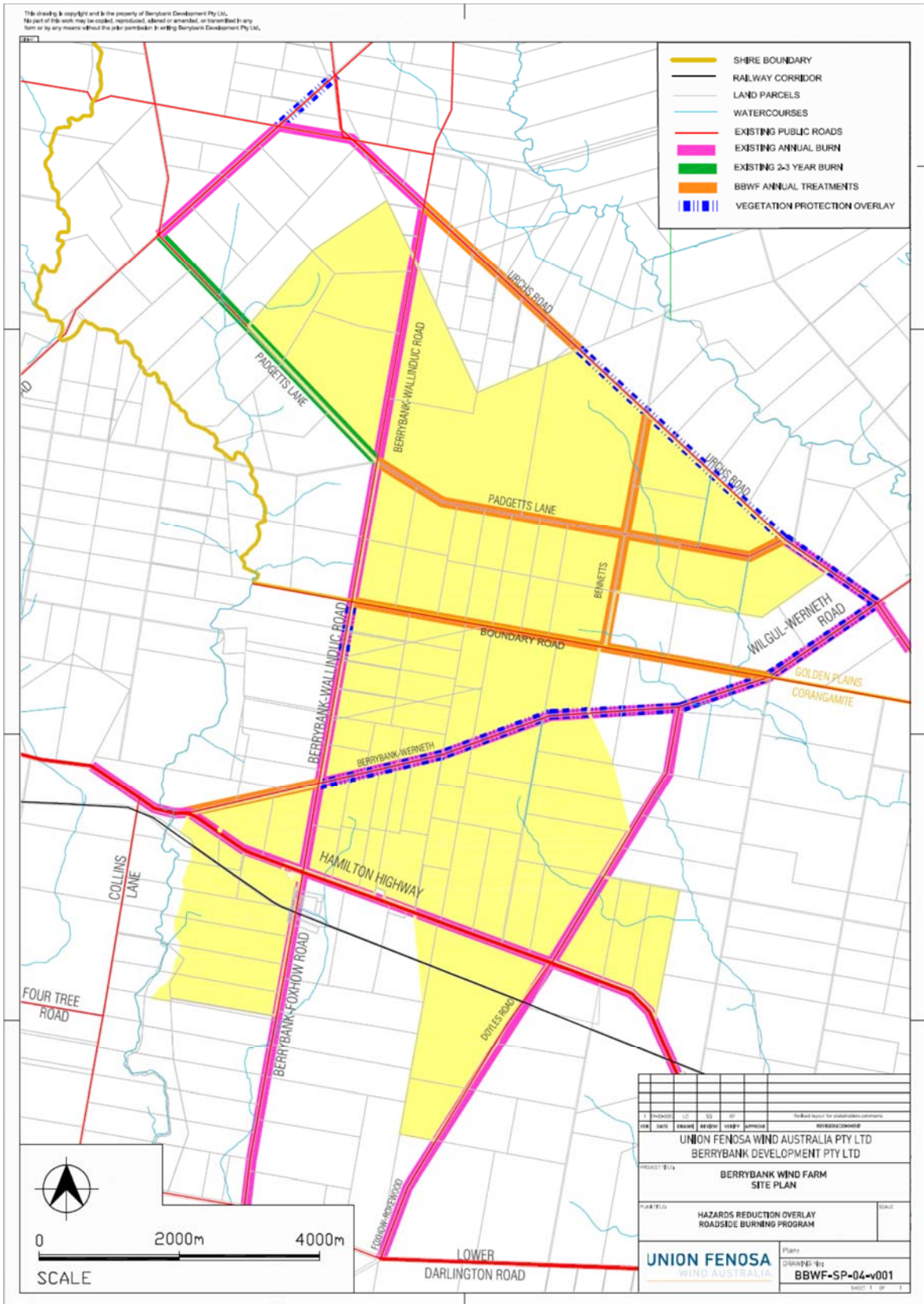


Figure 2 - Hazard Reduction Overlay, Roadside Burning Program

4.3.3 Additional Roadside Treatments

All current programmed works should be continued, supplemented by new measures funded by the BDPL.

(a) Protection against fire approaching from the West

- Continued use of the Berrybank-Wallinduc Road from Urchs Road to the southern end of the project site. The southern end of this section of road will double as a barrier against fire escaping from the western foot of the site, as well as forming the only practicable barrier to fire spread towards the eastern foot of the site.
- Continued use of the section of the Lismore-Scarsdale Road between Padgetts Lane and Urchs Road.

(b) Protection against fire approaching from the North.

- Continued treatment of Pagetts Lane between Berrybank-Wallinduc Road and Lismore-Scarsdale Road.
- Continued treatment of Urchs Road from the Berrybank-Wallinduc Road to the Lismore-Scarsdale Road.
- New treatment of the western part of Urchs Road from the Berrybank-Wallinduc Road to the BBWF site boundary. This will limit the approach of fire to the site boundary and its perimeter tracks.

(c) Protection against movement of fire within the site.

- Continued treatment of the Berrybank-Werneth Road from the Hamilton Highway to Urchs Road. The westernmost sector is an unformed road, and is usually not treated at all. It is recommended that the entire road reserve form the subject of a Roadside Harvesting Agreement, and that actual annual burning be added to the nominal program.
- New treatment of Padgetts Lane between Berrybank-Wallinduc Road and Urchs Road.
- New treatment of Boundary Road between Berrybank-Wallinduc Road and Wilgul-Werneth Road.
- New treatment of Bennetts Road between Urchs Road and Boundary Road.

(d) Protection against fire escaping from the site.

- Continued treatment of the Hamilton Highway under its own Plan of Management.
- Continued treatment of Foxhow-Rokeford (Doyles) Road from Berrybank-Werneth Road to the southern end of the project site.
- Continued treatment of Urchs Road from Padgetts Lane to the Wilgul-Werneth Road.
- Continued treatment in conjunction with VicTrack of the railway easement East of Doyles Road.
- New treatment in conjunction with VicTrack of the railway easement between Berrybank-Wallinduc Road and Doyles Road.

To the extent possible, new roadside treatment works should be conducted annually or biannually (as required by the CFA) and in the same manner as those that are already in place.

4.4 Access Tracks

The wind farm's purpose-built access tracks will also serve as the site's internal fuel-break network. The access track layout is shown in *Figure-3*.

The specifications for internal road construction meet or exceed *Plan Permit Conditions 13. e) (i) to (v)*. Specifically, the all-weather tracks on this essentially flat and treeless terrain will be able to accommodate a 15 tonne vehicle, will be at least 4m in width with 4m overhead clearance, have grades below 8°, and have entry/exit angles under 7°.

Based on the internal tracks to construct and service the turbines, this forms a grid aligned to the direction of RBs where they exist, and following other farm tracks and fence-lines as needed to minimise the disruption to normal agricultural use of the land, and avoiding known low-lying boggy spots.

Some internal roads terminate at fences on property boundaries with public roads. These dead ends are a consequence of the construction-phase restriction on access points. They have been run to fence lines rather than being terminated at the closest turbine tower turnaround point to allow their use as control lines and emergency exit points. At these locations a CFA Break Barrier will be installed to allow emergency exit out of the site onto the public road system.

Some dead-end access trails are in paddocks in which no RBs are present, and fire crews are free to travel in any direction subject to natural drainage lines and the like. These are not seen as dead end trails, in that there is no necessity to stay on the trail itself and therefore no forced end as such. There will be an adequate turnaround capability at the base of each turbine tower, whether located at the end of a trail or at the end of a minor offshoot and not shown as part of the whole site access network. In addition, at the sites shown *in Figure 3*, a full turnaround facility to CFA specifications will be created. In addition, each internal trail network T-junction and turbine access track provides a turning capability.

Appropriate signage will indicate dead end access roads, and dead end roads with emergency exit Break Barriers in place.

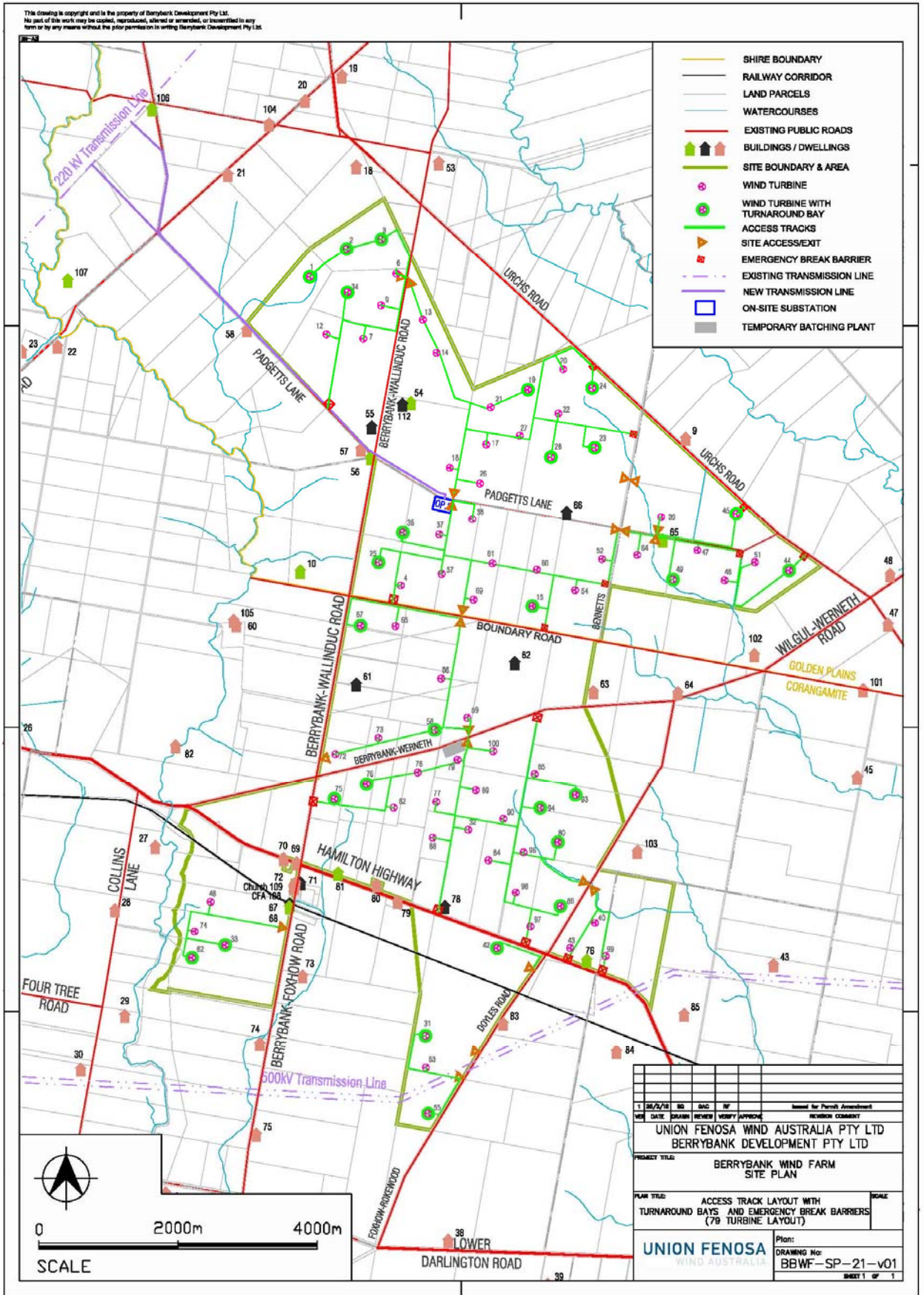


Figure 3 - Access Track Layout with Turnaround Bays and Emergency Break Barriers (79 Turbine Layout)

4.5 Water Access Points and Storage

The area supports approximately 100 farm dams which can be used to refill tankers using self-drafting or pre-positioned quick-fill pumpers – provided that it is not the middle of a major drought, when all dams are dry. In that event, the available filling points will be the 2 nearby CFA depots, the additional tanks installed by the BBWF operator, and individual farm water storage tanks.

Added water storage capability at the locations shown on *Figure-4* will be signposted and equipped with turnaround, hardstanding and fittings to *Plan Permit Conditions 13e) (vi) to (xii)*. Specifically, the locations as discussed with local officers of the CFA are safely accessible within 4m for 15-tonne vehicles, and offer a minimum 10m turning radius, will be signed to CFA specifications, and will have at least two 64mm, 3 thread/25mm x 60mm bore BSP round male couplings not less than 2m apart.

- (a) At each of the Berrybank and Wallinduc CFA stations, BDPL will fund and in cooperation with the local Brigade Captain, arrange the installation of approximately 25,000 litres of additional water storage capacity, plumbed to connect with the existing tanks including their filling and drafting pipework.
- (b) Near the dwelling at 7520 Hamilton Highway (north side of the road), a new approximately 25,000 litre tank will be supplied and installed with the specified hardstanding, turnaround and plumbing fittings. The location will be determined in consultation with the property owner, and water collection from an available roof will be arranged if possible. Failing access to a roof, BBWF will arrange to fill the tank initially, and to inspect and top it up at the commencement of each fire season and as required following use for fire fighting.
- (c) Near the dwelling east of the intersection of Hamilton Highway, and Foxhow-Rokewood Road (north side of road), a new approximately 25,000 litre tank will be supplied and installed with the specified hard standing, turnaround and plumbing fittings. The location will be determined in consultation with the property owner, and water collection from an available roof will be arranged if possible. Failing access to a roof, BBWF will arrange to fill the tank initially, and to

inspect and top it up at the commencement of each fire season and as required following use for fire fighting.

- (d) Near the shed on the eastern side of Pagetts Lane (south side of road), a new approximately 25,000 litre tank will be supplied and installed with the specified hardstanding, turnaround and Water Access Points plumbing fittings. The exact location will be determined in consultation with the property owner, and water collection from an available roof will be arranged if possible. Failing access to a roof, BBWF will arrange to fill the tank initially, and to inspect and top it up at the beginning of each fire season and as required following use for fire fighting.
- (e) Near the BBWF substation site on the western side of Padgetts Lane (south side of road), a new approx 25,000l tank will be supplied and installed with the specified hardstanding, turnaround and plumbing fittings. The location will be determined in consultation with the property owner, and water collection from an available roof arranged if possible. Failing access to a roof, BBWF will arrange to fill the tank initially, and to inspect and top it up at the beginning of each fire season and as required following use for fire fighting.
- (f) Near the temporary Batching Plant site on the Berrybank-Werneth Road (south side of road), a new approximately 25,000 litre tank will be supplied and installed with the specified hardstanding, turnaround and plumbing fittings. The location will be determined in consultation with the property owner, and water collection from an available roof arranged if possible. Failing access to a roof, BBWF will arrange to fill the tank initially, and to inspect and top it up at the commencement of each fire season and as required following use for fire fighting whether on the site or not. This will remain as a permanent water source following decommissioning of the Batching Plant.

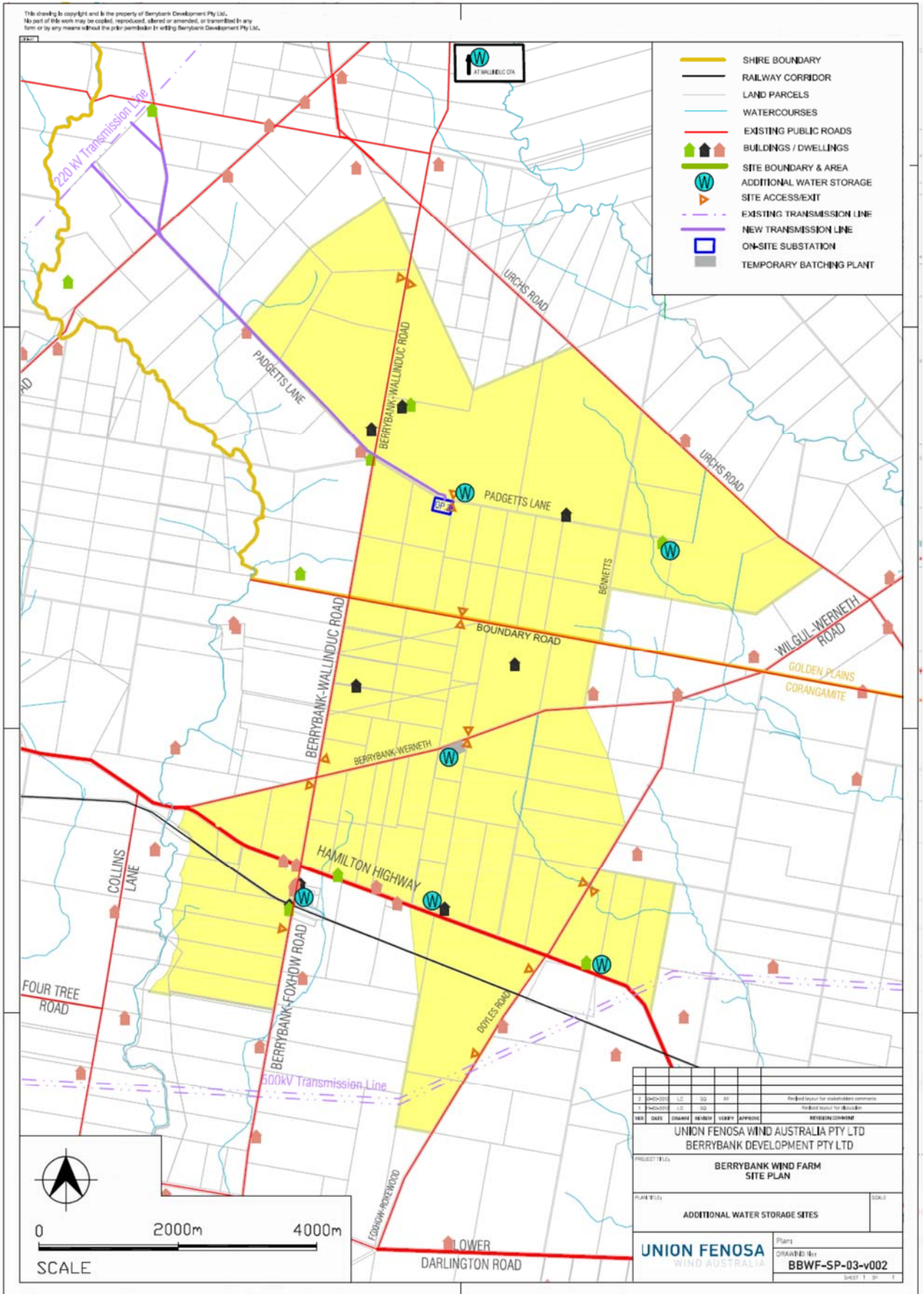


Figure 4 - Additional Water Storage Sites

4.5.1 *Water Delivery*

BBWF will donate to each of the Wallinduc and Berrybank Brigades a trailer with quick-fill pumper and appropriate suction and delivery hoses to be stationed at each of Berrybank and Wallinduc CFA stations.

4.5.2 *Signage*

All added water points must be labelled with appropriate signage as per CFA's *Guidelines for Identification of Street Hydrants for Fire Fighting Purposes*.

4.6 Vegetation Management

4.6.1 Vegetation Management Around Facilities

Above-ground structures must be built to the current Building Code of Australia (BCA) standards, and surrounded by areas cleared of all flammable materials for the specified distances.

The only structures expected to be built apart from the towers supporting the turbines will be the electrical sub-station and control room complex. These will be surrounded by extensive clearings well in excess of bushfire-mandated specifications, in addition to security fences. Specifically, grass will be kept mown to less than 100mm and leaf litter depth kept at less than 10mm for at least 30m around them.

4.6.2 Existing Vegetation Around Dwellings.

These points are not particularly a BDPL's responsibility, but are included in the interests of improved fire safety.

Within the site, it is recommended that bare earth breaks be created and maintained on the northern and western sides of all existing vegetation shelterbelts, in an attempt to prevent their ignition by grassfires.

Vegetation, primarily for wind protection or visual screening around farm houses and other buildings, should be treated by removal of as much litter as possible to minimise the likelihood of trees flaring in close proximity to a structure. A gradual program of shelter tree replacement with less flammable species would improve overall safety. Given the unavailability of aircraft support in fire fighting, those hosting turbines have to assume a greater degree of responsibility for protection works to offset the decreased fire-fighting capacity.

4.6.3 Screen Planting

Additional screen planting for aesthetic or acoustic purposes should use so-called non-flammable species, and ideally species which are native to the area. Screen planting is dealt with in a separate report.

4.7 Personnel Competence and Training

4.7.1 Authority

All fire fighting activities will be conducted under the control, direction and co-ordination of the Country Fire Authority of Victoria (CFA). Individual members and their equipment may self-respond to new fire sightings. Once any CFA officer arrives, he will assume control and direct participating units. Drivers of non-CFA affiliated units are at liberty to depart, and may be directed to leave the fire-ground. If permitted to stay they are under the control of the CFA.

4.7.2 Personnel Training

Immediately prior to the start of each fire season, the BBWF operators will arrange a site visit by the CFA District Officers of Districts 6 & 15, the Municipal Fire Prevention Officers of Colac and Golden Plains, including local, Lismore and Grenville Group Officers and Brigade Captains.

The tour will include the present and planned construction of internal roads, water storage and hazard reduction works. Telephone (including mobile and after hours) and radio contact details of all organisations, key personnel and residents on the site should be exchanged/updated and circulated. The meeting will also review the Roles and Responsibilities for Management, Fire Wardens and Communication Officers (see Appendix B), the emergency response actions (Appendix F) and the activities checklists which form part of the fire prevention and response guidelines and that is included in Appendix E

BDPL will fund a program of training of volunteer and paid CFA personnel in fire suppression in and around the wind energy facility and annual training, by the CFA, of its local staff in the use of the BBWF light tanker to be kept on the site.

Copy of Contact List included in Appendix D and site plans in Appendix C to be provided to local and supporting Brigades and group officers for Pre-Incident Planning purposes.

5. WILDFIRE SUPPRESION PLANNING AND COORDINATION

5.1 Basic Fire Fighting Principles and Initial Attack

All of the residents of this part of Victoria are aware that the area is prone to fires, and should have taken adequate steps to protect themselves and their houses from the sort of fire expected to occur here.

Bush fire fighting is all about protection of life and property. 'Life' here refers to human life, and firstly that means the lives of fire fighters.

BBWF employees and its contractors are not professional fire fighters, and are not generally trained above the most basic level in fire fighting. They have no official recognition as fire fighters. They should not put themselves at risk trying to save property.

No bushfire in human history has grown smaller with time, or been easier to extinguish than immediately following ignition. It is important to do everything possible to detect fires early, and attack them safely as soon as possible. For example, one person with a knapsack spray right now may be more productive than two people with a tanker in 5 minutes time. On the other hand, there is no point one person with a knapsack trying to take on an already running fire under severe conditions. Judgement calls have to be made all the time, and often with limited information by people without the best qualifications.

It is normal for fires to be detected within about 10-15 minutes following ignition, when they have developed size and are creating enough heat to produce smoke visible over a reasonable distance. In dry summer conditions with fully cured grasses early smoke production is limited and fires spread more rapidly, resulting in bigger fires at detection. Most smoke will be released at the head of the fire, unless it ignites something like a house, a hayshed or a vehicle along the way.

Something to remember is that where the head of a grassfire is on detection is not where it will be when units start arriving. While attack should commence at the rear and advance towards the head, keep in mind that grassfires are highly mobile and those in their path need to be warned of its approach.

Back-burning, the practice of burning back into the wind from existing roads and trails in the path of an approaching fire is something that must not be attempted unless specifically directed by the CFA.

5.1.1 Grassfire Fighting

Prior to the arrival of directing CFA staff, and then while working under their direction, BBWF staff and employees participating in fire fighting should be aware of and adhere to the following procedures unless otherwise directed:-

Always make sure that fire cannot spread from behind you and overtake you as you are working on an active fire edge. This means ensuring that fire from the opposite side on which you are operating cannot spread around the rear of the ignition point; this is called 'anchoring' the fire-line.

Unless otherwise directed, after anchoring the line, give priority to attacking the Northern and Eastern sides of the fire, working from the rear towards the front or head of the fire.

Grassfire fighting under severe fire weather conditions generally requires fire fighters to establish a safe anchor point at the rear of the fire, so that a fresh outbreak does not allow fire to run beside a freshly extinguished edge, negating the work done and endangering those working on the edge further downwind. Generally tankers then run in convoy along the edge of the fire,

- (a) knocking down the worst of the flames;
- (b) extinguishing the fire; and then
- (c) making the edge safe against relights (mopping up).

A convoy of tankers will work in series. As the lead (knockdown) vehicle runs out of water and peels off to refill, the second takes over the lead function, number three takes over from two, and number four commences mopup. Additional arriving tankers join the queue at the rear, able to respond to relights, but primarily waiting their turn at the active front.

After the fire is contained or controlled, additional work along the edge, probably involving a grader to create a bare-earth perimeter as well as further blacking out of any smouldering material, will occur.

5.1.2 Active Fire-Fighting Measures

In the event of fire, a designated BBWF person (the Fire Warden) needs to be in charge on the site until the CFA arrives and assumes control. He should have grassfire control expertise, be CFA-trained to the level of at least a Crew Leader, and need not be the most senior employee or contractor's representative present. That person or an equally-trained deputy needs to be permanently available whenever works are being undertaken during daylight hours, to safely, efficiently and effectively guide the rest of the construction crew members in their initial attack efforts.

All construction crew members must have basic training in the safe and effective use of the equipment they may be called upon to use, and an outline of the basic procedures and actions they may be called upon to implement. Those likely to be tasked to man the site light tanker unit should receive basic fire fighter training from the CFA. All key bushfire personnel (Fire Warden(s) and probable light tanker crew members) should participate in an annual basic fire fighting course and take part in the annual pre-season CFA site tour.

5.1.3 Initial Attack Capability

Prior to the onset of the first fire danger period (fire season), BBWF will provide a dedicated fire fighting unit, consisting of a 4WD utility carrying about 600 litres of water with a pumper and a pair of hoses. This vehicle should be fitted with tyres and wheels able to support the load and best suited to negotiating RBs in both dry and wet conditions. Local knowledge may suggest the locally preferred configuration, and the vehicle can be second-hand.

Rapid detection and reporting of fires is the key to effective initial attack, and provision of radio-based communications between all static and mobile supervisors and workers (including plant items) will be provided. This network should be interlinked to or able to be monitored by the CFA, to allow the most rapid possible response to fires. Radio discipline will be needed so that urgent radio traffic can be transmitted with minimal delay if the network is in use for more routine message-passing.

On learning of a fire on the site, the highest priority of everyone present will be to contribute immediately to fire containment and suppression, to the extent of their

knowledge and ability and without compromising site safety by leaving another activity in a hazardous condition,

One member of the construction team present on site during daylight hours on working days throughout the fire danger period will need to be CFA-trained to the level of Crew Leader, which includes basic fire behaviour understanding. That person should be the designated director of fire operations until a ranked CFA officer arrives and assumes control, or another more appropriate (local resident, more experienced, etc) person is prepared to take over, by agreement. Fire fighting directions are given by the appointed fire controller, regardless of that person's standing in the normal working hierarchy.

When works with the potential to start fires (e.g. use of equipment capable of throwing sparks, as opposed to an activity with virtually no perceived ignition threat) are under way at a site, the dedicated BBWF light tanker should be on standby nearby.

No specific dedicated crew need be provided, but a sufficient number of the workforce and supervisors should be able to drive and operate it that a driver and hoseman, both wearing appropriate clothing, can be found immediately¹. The BBWF light tanker should be regarded as expendable, and in the event of a fire it may be driven over rough terrain (i.e. Raised Beds) in order to directly attack fresh ignitions. The intention is not to encourage abuse of or damage to the vehicle, but to avoid missing the opportunity to aggressively attack a fire sufficiently through fear of damaging the vehicle.

Graders are first-class grass-fire fighting plant items, and if experience with any part of the normal working activities on the site suggests that an activity is high-risk in terms of ignition potential, then a grader or equivalent plant item with a competent operator nearby should be added to the standby roster in daylight hours during summer when that activity is taking place. A rubber-tyred loader may be of even more utility, in that it may be able to prepare a track useable by normal vehicles

¹ Appropriate clothing consists of non-flammable (cotton or Proban®-treated fabric, or Nomex®) with long sleeves shirt and full-length trousers, boots with cotton or wool socks, cotton or other non-synthetic underwear, a wide-brimmed hard hat of non-flammable material, leather or cotton gloves and non-flammable smoke goggles able to be fitted over glasses, if worn

more rapidly than a grader in RB settings by virtue of having its earth-moving blade at the front rather than between the front and rear axles.

5.2 *Emergency Response Plan*

5.2.1 *During Construction*

5.2.1.1 *Prior to Access Track Construction*

Notify BBWF Control, who will notify CFA on telephone 000 and/or by radio and advise local landholders. BBWF Control will alert the designated site Fire Warden who will dispatch the BBWF tanker unit to operate in conjunction with other plant items if they are present. Cease other activities with any potential to start fires.

It is assumed that a grader will be the primary track construction plant item. Should this equipment or its operator somehow start a fire, or see a fire unrelated to his activity, he should first raise the alarm and then proceed as follows. The recommended order is based on the possibility of a West to Southwest wind change under worst conditions, and the importance of rounding up the Northeast flank to limit the width of what would become the new head. The idea of starting on the flank on the other side of the origin is to slow the spread of fire around the back of the fire-line and then parallel to the newly-created perimeter break.

Create a break by lightly scalping the vegetation around the fire, commencing from a point about 10m to the Southwest of the origin point, in a Northwest direction and around the back of the fire, and then along the Northeast flank of the fire towards its head.

- (a) If operating entirely outside the burnt perimeter, direct the windrow outwards.
- (b) If operating on the fire edge, turn the windrow in to the burn area.
- (c) **If fire is seen behind you on the other (out) side of a newly created break, immediately turn and round up the break-away.** On the already burnt ground may be the safest place to be. It does not matter how close you are to completely rounding up the head or anything else, unless immediate work is needed to protect life ahead of you, the fire behind you is the number one priority. **You must not, ever, get between two fire edges; a fire behind you is potentially fatal.**

The operator should continue around the head of the fire, and then back to the origin before completing another lap.

Following containment, the windrowed material should be spread – being ultra-careful not to distribute burning material across the line, or to stir up smouldering material which may blow across the fuel-break already constructed. A large tanker should be in attendance for this operation, able to commence mopping up and blacking out any smouldering material entrapped in the windrowed soil.

The operator should pick a sensible as well as convenient line. For example, if operating close to a fence surrounding an RB paddock, make use of the headland or non-profiled land beside the fence to minimise the damage to RBs. Part of the job of fire fighting is damage mitigation.

All fire fighting equipment and vehicles operating in paddocks should be equipped with wire cutters to allow easy passage through fences without excessively damaging the fence itself, or risking having broken wires entangle drive trains and the like and thereby disable the vehicle and expose the crew to danger.

5.2.1.2 *Post Access Track Construction*

Notify BBWF Control and CFA. Dispatch the BBWF tanker unit to operate in conjunction with other plant items if they are present. Cease other activities with any potential to start fires.

In the event of a fresh ignition on the site, immediate direct attack by available plant and fire units should be attempted. In addition, use can be made of the existing tracks, green crops and previously burnt areas as fuel-breaks to try to hold the spread of fire. If a fire can be steered into an existing trail, for example, it may hold a length of the fire flank so that time need not be spent on that portion, and more rapid progress made towards the front.

It is not expected that site staff and crews will be, or become, skilled fire fighters and fire controllers. In the event of a major fire, the CFA hierarchy will assume control and determine strategy and tactics.

5.2.2 *During Operation*

On-site duty staff should notify CFA and respond with the BBWF tanker to nearby ignitions if possible, provided that by so doing they will not be abandoning an important control room function which may require their attendance.

6. CONCLUSIONS AND RECOMMENDATIONS

A dense network of high-quality all-weather tracks will provide access for ground-based initial attack within a presently largely inaccessible area in which fire-fighting is currently highly compromised. The supplementary public roadside hazard reduction program will add to the strategic regional protection measures already in place. These and the added water storage both within and bordering the site should more than compensate for the loss of aircraft-based direct attack capability, which would be unlikely to be able to be deployed in a timely manner for initial attack and which would be of limited value against a large and established running grass-fire under severe weather conditions.

A strict set of work practices will be in place, intended to maintain fire safety awareness among the work crews and to prevent accidental ignitions during construction of the facility. A dedicated on-site first response capability with a trained crew in a light tanker is provided to minimise the likelihood of fires escaping during all phases from construction to operation.

Ongoing training and liaison with local and Regional CFA personnel will keep all parties abreast of advances and concerns related to the facility and to wind farms generally, and able to adjust preparedness and response plans as required.

Figure 5 summarises the activities proposed in terms of present and proposed roadside hazard reduction works, turbine locations and internal track layout with access points, turnarounds and emergency break barriers, and supplementary water points.

This Plan should be reviewed and if necessary revised when construction has commenced, and following completion of the construction phase, and following the inclusion of significant amendments arising from such reviews, to ensure that previously unforeseen factors are included and that operations continue in the safest manner reasonably possible.

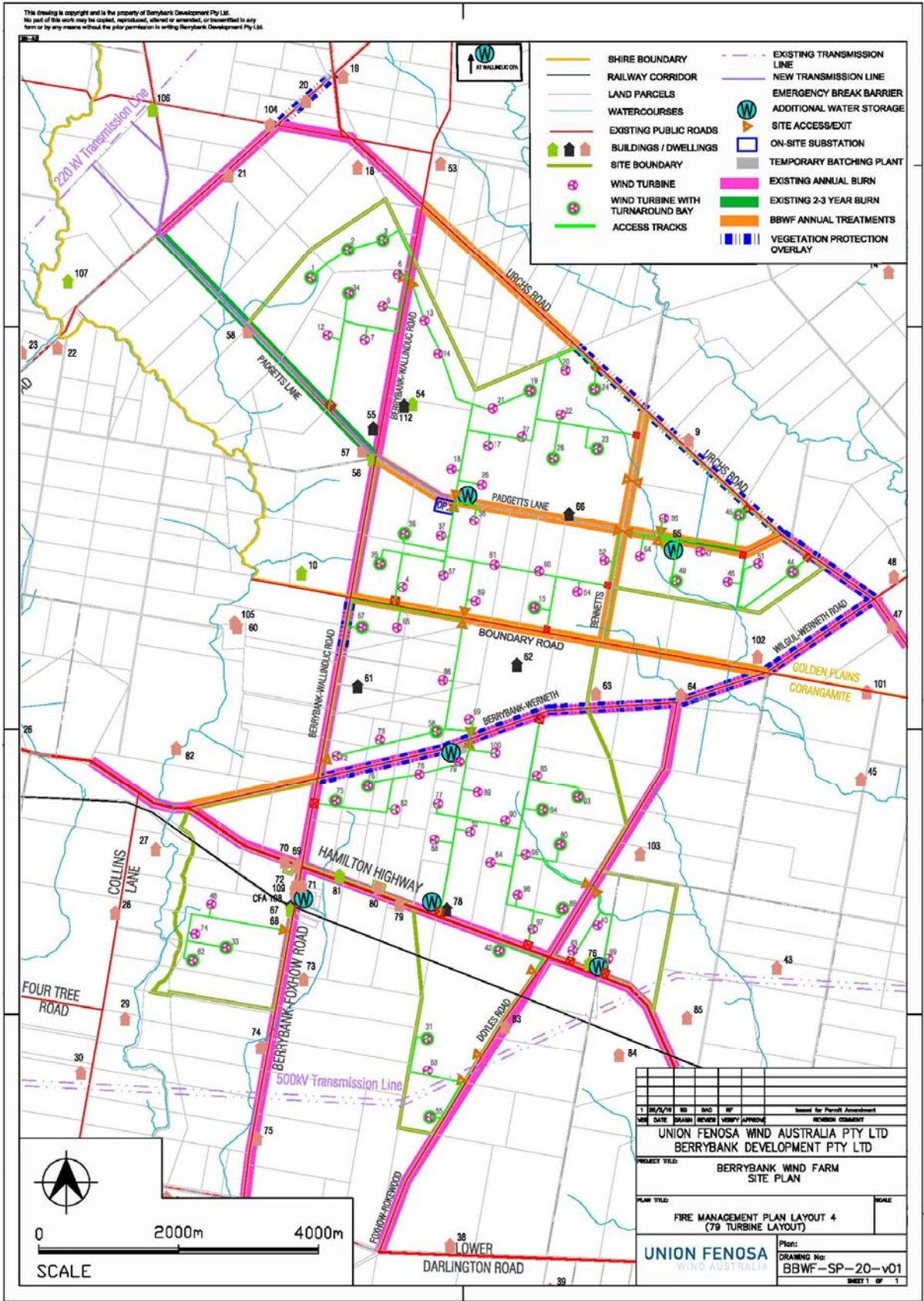


Figure 5 - Fire Management Plan (79 Turbine Layout)

7. REFERENCES AND RELATED DOCUMENTS

Standard reading on the subject of grass fire should include:

- Bushfires in Australia, Luke & McArthur, AGPS 1978
- Grassfires: fuel, weather & fire behaviour, Cheney & Sullivan, CSIRO 1997
- Landscape & building design for bushfire areas, Ramsay & Rudolph, CSIRO 2003
- Synopsis of the knowledge used in prescribed burning in Victoria, Tolhurst & Cheney, (Vic) DNRE, 1999
- McArthur Grassland Fire Danger Meter Mk V

APPENDIX (A) - *Glossary of terms*

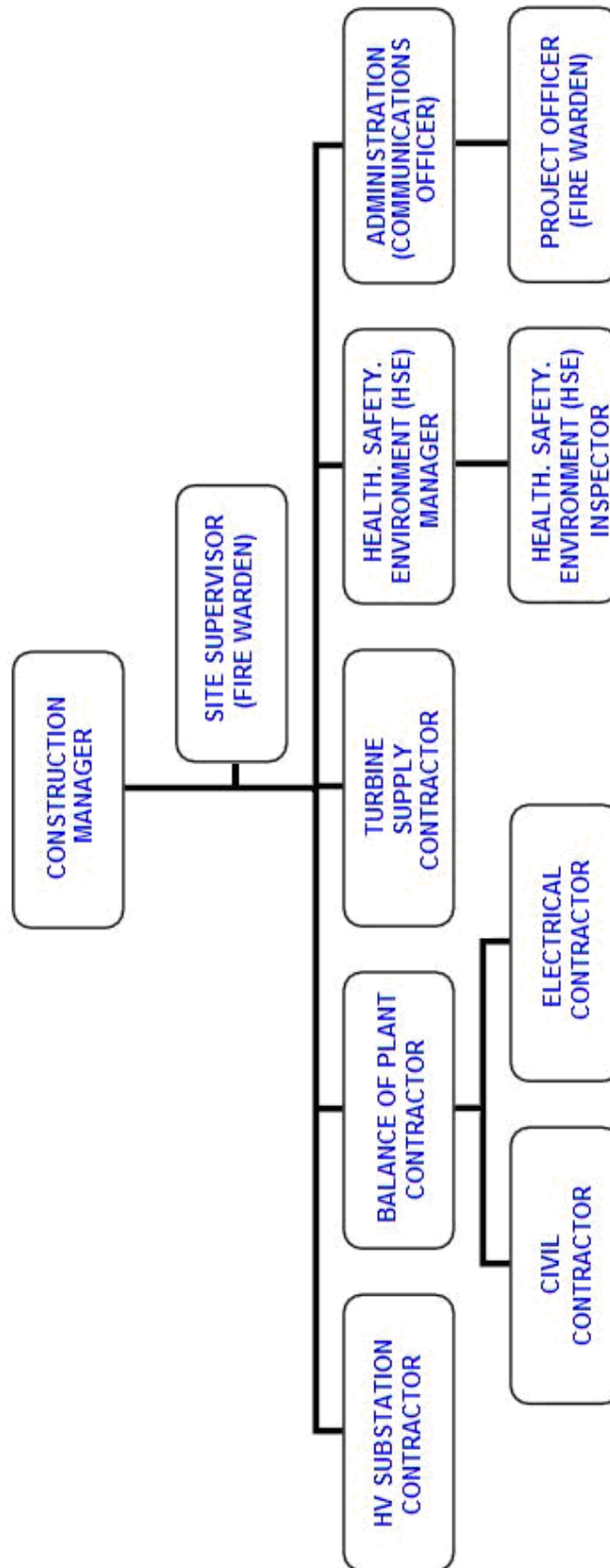
TERM	DEFINITION
<p>Back-burning</p>	<p>The practise of burning out the vegetation between a proposed control or containment line, and the head of an approaching fire. The intentionally lit fire is burning back into the wind, albeit very slowly. In order to achieve sufficient width the stop a fast-moving grassfire, most back-burns have to be commenced up to some hours before the original ignition.</p> <p>Back-burning is a very high-risk fire-fighting technique and is not to be attempted by the inexperienced or unauthorised. If it fails, you are probably directly in front of a very fast-moving fire which will probably kill you. If your back-burn jumps over your control line, you have accelerated the spread of the main head-fire and further endangered those downwind.</p> <p>See also Hazard reduction, and Indirect attack.</p>
<p>Bush fire control</p>	<p>The process of stopping the spread of fire in vegetation. Unlike structural fire fighting, where the objective is to put out a burning object, we are trying to stop the fire from igniting the next bit of vegetation. One process is static – basically, turn up where it is and pour water on it – and ours is highly mobile. Turn up where it is now – not where it was when it was reported – and add water or remove the fuel with a grader or whatever, travelling as you do so. Both the equipment and the thinking have to deal with a mobile process, rather than a static event.</p>

TERM	DEFINITION
Fire	When organic material (vegetation, in a bush fire setting) is heated, it first gives off water vapour, and then flammable gasses which burn as flames. The solid residue burns by surface combustion, leaving non-combustible ash.
Fire-break	A term usually incorrectly used instead of fuel-break.
Fire Flank	The sides of a fire, sometimes further broken down to front and rear flanks.
Fire Head	The front of a fire moving under the influence of the wind and slope. This is the hottest part of the fire, and the fastest-moving.
Fire Rear or back	The part of the fire generally upwind and / or downhill of the ignition point. A backing fire is travelling, slowly, into the wind, with flames leaning away from the unburnt fuel.
Flame, or flaming combustion	Combustion of flammable gasses. Contains traces of small carbon particles which are burning by Glowing combustion, and which radiate heat.
Flame angle	The angle between horizontal and the front surface of a flame front, assuming it to be a (tilted) wall of flame. This gets complicated if the fire is burning on a slope, and by some users referring to the average angle of the centre of the flame as seen in cross-section. The lower the angle, the more the fire is leaning over, and the faster it will travel.
Flame depth	The distance from one side of the base of a flame to the back of the actively flaming area. It is usually applied to the front of a fire, but can be used to refer to the flanks and rear.
Flame height	The distance from the ground to the top of a flame.

TERM	DEFINITION
Flame length	The distance from the front of the base of a leaning flame to its top, measured along the flame. For an upright flame, its height equals its length.
Fuel	What burns. In the BBWF context it includes grass and crops, plus organic material (seeds, fine bits of leaves and stems, dead roots, animal droppings) in the topmost soil layer. This layer can be stirred up by a strong wind, and allow fire to travel very rapidly, and absolutely uncontrollably, over an apparently bare paddock.
Fuel-break	A natural or man-made break in available fuel, by or from which fire control can be attempted.
Hazard reduction	The practice of reducing fuels, usually by burning, mowing, herbicide application or grading, to slow or prevent the spread of fire. It is a pre-season fire protection measure, carried out under selected weather conditions and careful supervision to a pre-determined plan.
Heat and Intensity	There are two measures of intensity – the overall heat output of a fire, about 80% of which goes up as hot gasses (smoke etc), and the rest which is given off as radiant heat. The convective heat that pushes smoke up into the air is of limited interest to grass-fire fighters. The main thing is the heat which radiates out from flames, or from the glowing carbon particles in the flames, and which keeps fire-fighters from getting too close. This radiant heat is also the main driver of the process of drying out the fuel ahead of the flames, and then driving off the gasses that keep the flames going.

TERM	DEFINITION
Indirect attack	The practice of creating a fire containment line some distance from an active fire edge, so that the approaching fire will not cross it on arrival. Creation of a sufficiently wide control line may require burning out the strip between the control line and the fire edge. If done at the front of a fire, i.e. downwind of the head, it is called a backburn. At the sides of a fire, and in a setting where the forward (downwind) spread of the fire you are lighting will not take off uncontrolled, it is called also burning out and is part of parallel attack.
Rate of Spread (ROS)	How fast the fire is travelling. Generally applied to the front, can be applied the flanks and rear. On level ground under normal summer conditions the front will spread about ten times faster than either flank, but as both flanks are spreading, the fire gets about 5 times longer than it is wide, measured just behind the head. The rear of a grassfire spreads at about 0.5-0.7m/minute, pretty much regardless.
Surface, Smouldering or Glowing Combustion	Surface oxidation of organic material after it has finished flaming. Most usually seen as glowing charcoal.

APPENDIX (B) - Roles and Responsibilities



These roles and responsibilities may be updated prior to the construction commencement to accommodate the contract structure at that time. The responsibilities will continue regardless of the final structure of the construction management team.

BDPL CONSTRUCTION MANAGER

Responsible for the overall management and coordination of the wind farm's engineering and construction activities in accordance with relevant State and Commonwealth legislation and conditions, and for delivery of the project as per the predetermined program and budget.

Presence on site: Full-Time.

BDPL SITE SUPERVISOR

Responsible for the day-to-day activities on-site, nominating the assembly areas, carrying out head subcontractor site inductions, Safe Work Method Statements, recording all site activities including attendance of work crews, deliveries, auditing, visitors, etc.

Implementation of management systems and compliance with regulatory requirements such as Health & Safety and Environmental Management, in conjunction with the HSE management team. The site supervisor will be one of the dedicated Fire Wardens during the construction program. Monitoring materials testing in accordance with the design specification.

Presence on site: Full-Time.

ADMINISTRATION/ COMMUNICATIONS OFFICER

Responsible for day-to-day administration of the site and assisting the Construction Manager and Site Supervisor with financial and legal commitments. Also responsible for internal radio network operations, discipline, battery recharging/maintenance and preparing, updating and circulating: telephone, pager and radio callsign lists.

Presence on site: Full-Time.

PROJECT OFFICER(S)

Responsible for assisting the Construction Manager and Site Supervisor in day-to-day activities on the project site, including contractor employee site inductions. These positions will supply additional staff for Fire Warden roles.

Presence on site: Full-Time.

HEALTH, SAFETY AND ENVIRONMENT MANAGER

Responsible for implementing the company's health, safety and environment framework policies, ensure compliance with OH&S regulations, review and implementation of specific risk and hazard assessment, review and implementing safety plans, monitoring programs and Safe Work Method Statements. Liaise with site supervisor in stopping work in the event unacceptable impact is likely or has occurred.

Responsible for training of the site fire crew personnel.

Presence on site: Part-Time

HEALTH, SAFETY AND ENVIRONMENT INSPECTOR / AUDITOR

Responsible for inspecting and auditing of the worksite to ensure there are no physical hazards, and to ensure that the contractors' work practices are in compliance with the worksite rules in relation to health, safety and environmental obligations, and quality assurance. Monitor and ensure availability of water at the designated site water points. Oversee the provision and restocking of maps and contact lists at the site entry points.

Presence on site: Full-Time

TURBINE SUPPLY CONTRACTOR

Responsible for turbine & tower supply and delivery, erection, supervision for installation and commissioning. Subcontractors: Haulage, and Erection.

HIGH VOLTAGE SUBSTATION CONTRACTOR

Responsible for procurement, delivery and construction of the 220kV substation and the 220kV power line to reach the existing transmission line.

Subcontractors: Civil / Electrical suppliers, and construction.

BALANCE OF PLANT CONTRACTOR

Responsible for procurement, delivery and construction of access roads, access tracks, turbine foundations, 33kV electrical underground reticulation, 33kV switchboard at the control room facilities. Responsible for maintenance of the site fire response vehicle and its manning by suitably trained crew.

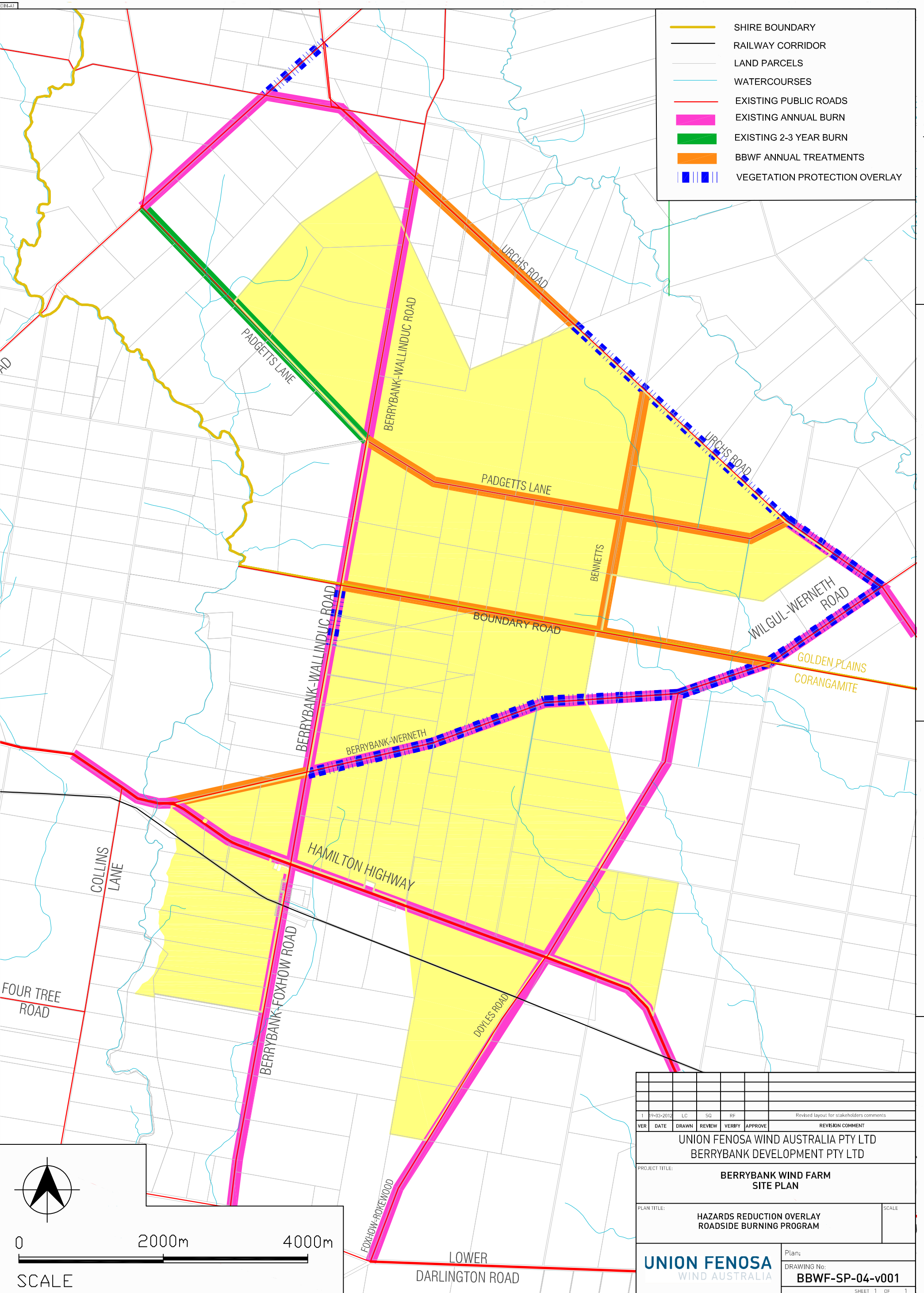
Subcontractors: Civil / Electrical suppliers, and construction.

APPENDIX (C) - *Site Maps (A3 Format)*

- Figure 2 - Hazard Reduction Overlay, Roadside Burning Program
- Figure 3 – Access Track Layout with Turnaround Bays and Emergency Break Barriers (79 Turbine Layout)
- Figure 4 - Additional Water Storage Sites
- Figure 5 – Fire Management Plan (79 Turbine Layout)

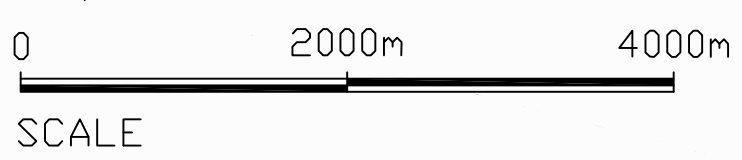
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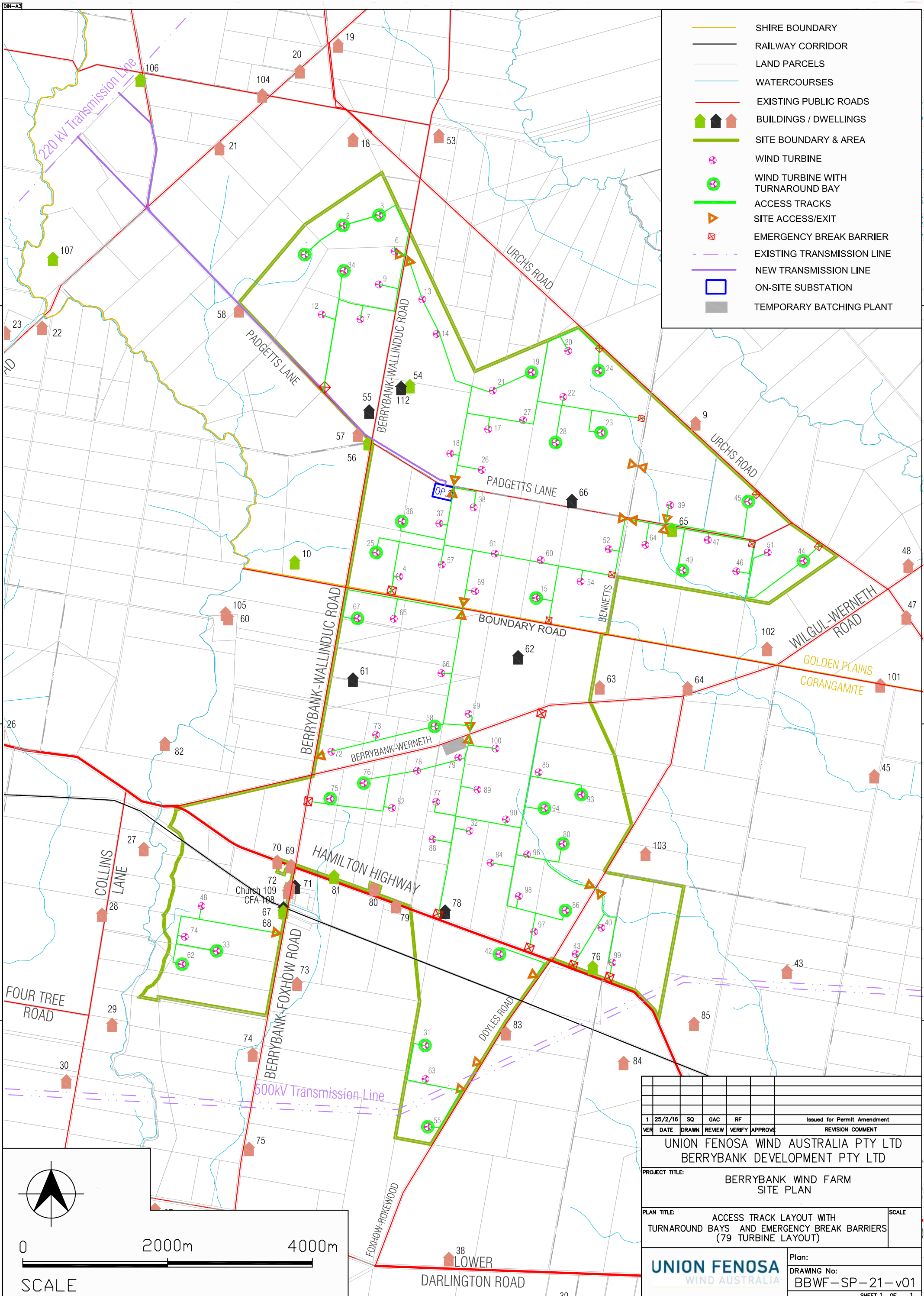


- SHIRE BOUNDARY
- RAILWAY CORRIDOR
- LAND PARCELS
- WATERCOURSES
- EXISTING PUBLIC ROADS
- EXISTING ANNUAL BURN
- EXISTING 2-3 YEAR BURN
- BBWF ANNUAL TREATMENTS
- VEGETATION PROTECTION OVERLAY

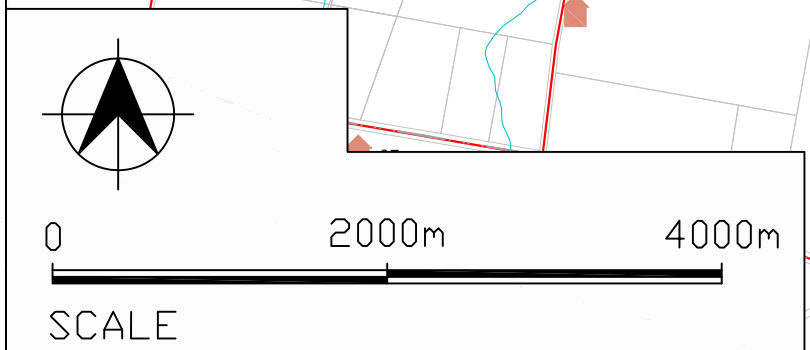
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VER	DATE	DRAWN	REVIEW	VERIFY	APPROVE	REVISION COMMENT			
UNION FENOSA WIND AUSTRALIA PTY LTD BERRYBANK DEVELOPMENT PTY LTD									
PROJECT TITLE: BERRYBANK WIND FARM SITE PLAN									
PLAN TITLE: HAZARDS REDUCTION OVERLAY ROADSIDE BURNING PROGRAM								SCALE:	
UNION FENOSA WIND AUSTRALIA								Plan: DRAWING No: BBWF-SP-04-v001	
SHEET 1 OF 1									



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- SHIRE BOUNDARY
- RAILWAY CORRIDOR
- LAND PARCELS
- WATERCOURSES
- EXISTING PUBLIC ROADS
- BUILDINGS / DWELLINGS
- SITE BOUNDARY & AREA
- WIND TURBINE
- WIND TURBINE WITH TURNAROUND BAY
- ACCESS TRACKS
- SITE ACCESS/EXIT
- EMERGENCY BREAK BARRIER
- EXISTING TRANSMISSION LINE
- NEW TRANSMISSION LINE
- ON-SITE SUBSTATION
- TEMPORARY BATCHING PLANT



1	25/2/16	SQ	GAC	RF	Issued for Permit Amendment
VER	DATE	DRAWN	REVIEW	VERIFY	APPROVE
UNION FENOSA WIND AUSTRALIA PTY LTD BERRYBANK DEVELOPMENT PTY LTD					REVISION COMMENT
PROJECT TITLE: BERRYBANK WIND FARM SITE PLAN					
PLAN TITLE: ACCESS TRACK LAYOUT WITH TURNAROUND BAYS AND EMERGENCY BREAK BARRIERS (79 TURBINE LAYOUT)					SCALE
					Plan: DRAWING No: BBWF-SP-21-v01
SHEET 1 OF 1					

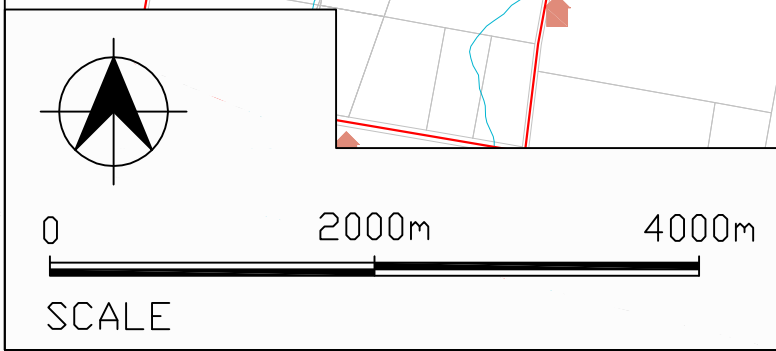
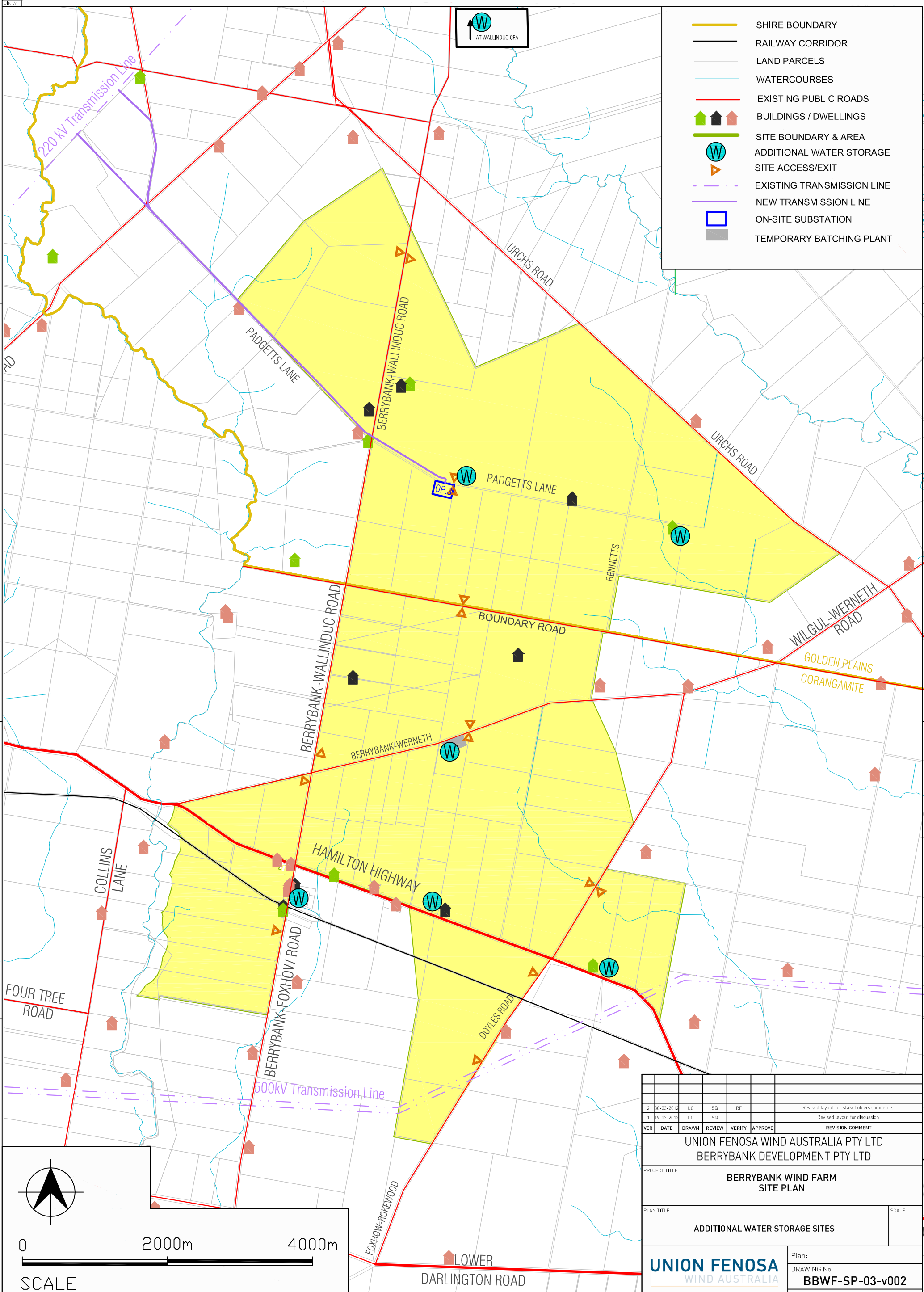
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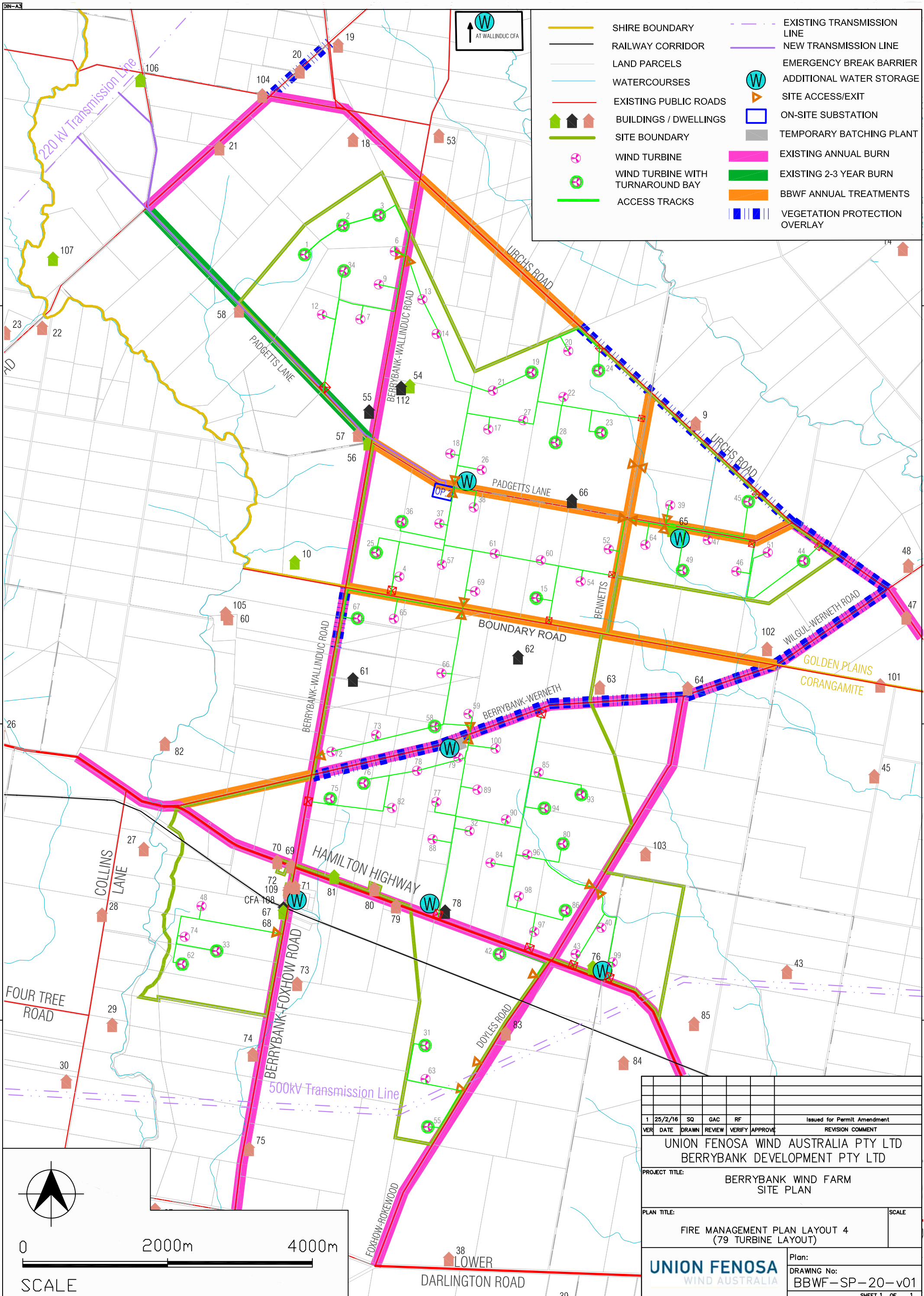


- SHIRE BOUNDARY
- RAILWAY CORRIDOR
- LAND PARCELS
- WATERCOURSES
- EXISTING PUBLIC ROADS
- ■ ■ BUILDINGS / DWELLINGS
- SITE BOUNDARY & AREA
- ⊙ ADDITIONAL WATER STORAGE
- ▾ SITE ACCESS/EXIT
- - - EXISTING TRANSMISSION LINE
- NEW TRANSMISSION LINE
- ON-SITE SUBSTATION
- TEMPORARY BATCHING PLANT



2	30-03-2012	LC	SQ	RF		Revised layout for stakeholders comments
1	19-03-2012	LC	SQ			Revised layout for discussion
VER	DATE	DRAWN	REVIEW	VERIFY	APPROVE	REVISION COMMENT
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PROJECT TITLE: BERRYBANK WIND FARM SITE PLAN						
PLAN TITLE: ADDITIONAL WATER STORAGE SITES						SCALE:
UNION FENOSA WIND AUSTRALIA						Plan: DRAWING No: BBWF-SP-03-v002
SHEET 1 OF 1						

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1	25/2/16	SQ	GAC	RF	Issued for Permit Amendment
VER	DATE	DRAWN	REVIEW	VERIFY	APPROVE
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PROJECT TITLE:					BERRYBANK WIND FARM SITE PLAN
PLAN TITLE:					FIRE MANAGEMENT PLAN LAYOUT 4 (79 TURBINE LAYOUT)
SCALE:					
					Plan: DRAWING No: BBWF-SP-20-v01
					SHEET 1 OF 1

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APPENDIX (D) - *Contact List*

Sydney Headquarters

Berrybank Development Pty Ltd (BDPL) Construction Management

Address: Suite 403, 68 York Street Sydney NSW 2000

Phone: 1800 457 181

Email: info@unionfenosa.com.au

* Contact list to be update and distributed by the Communications Officer

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APPENDIX (E) - Daily (Fire Season) checklists

Construction and Post-Construction Phase

Note that some of the restrictions applied by the BBWF management within the BBWF site exceed standard CFA guidelines. Report any possible safety-related defects. If you are in doubt about the safety of any proposed activity, exercise CAUTION, NOT COURAGE.

- (1) Is there a Total Fire Ban in place?
 - If **YES**, cancel all planned activities which involve any form of heat or spark generation, and all vehicle movement apart from essential traffic on prepared roads only. Broadcast the wind details. Advise all drivers to check that mandatory fire equipment (extinguishers, knapsacks, rakehoes and wire-cutters etc) are in place and filled or otherwise ready for use. **NO SMOKING ON SITE.**
 - If **NO**, broadcast the day's expected Grass Fire Danger Index and Rating plus wind speed and direction and any changes expected. Advise all drivers to check that mandatory fire equipment (extinguishers, knapsacks, rakehoes and wire-cutters etc) are in place and filled or otherwise ready for use.
- (2) BBWF Control and the Fire Warden should be kept aware of the location of the primary fire-fighting equipment – the light tanker, rubber-tyred earth-moving plant and bulk water carriers in particular – so that they can be deployed most rapidly and effectively on the discovery of fire.
- (3) On discovery or detection of fire, immediately notify the CFA. This can be done directly on telephone 000 or by radio through BBWF Control. Also notify Control if you have first called 000 directly.
- (4) BBWF Control may direct staff or crews members to attend, check and report on the availability for use of static water supplies.
- (5) BBWF Control will advise which operations may and which may not continue while uncontained fire (if any) is present on or near the site.

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APPENDIX (F) - *Emergency Response Actions*

F1. Turbine Fire

1. Ring '000' to report the incident(s) to appropriate emergency services
2. Advise on-site control room
3. Alert Staff & Contractors, and issue Warning, Stopwork, or Evacuation orders as appropriate;
 - Warning, advise that emergency services traffic will be using the road network in a particular area, or that a problem may be on the way; or
 - Stopwork, advise that an incident requiring attendance by emergency response crews has occurred. While there is no perceived threat to the bulk of the site, immediate response to a further incident will be compromised, and therefore some or all works may have to be suspended; or
 - Evacuate to assembly areas. Nominate safe areas plus routes and directions of travel which **ARE**, and which **ARE NOT**, safe for use. Take account of incoming emergency services traffic and probable headfire movement as well as the capacity of each refuge/assembly area;
4. Despatch and direct emergency response crew as appropriate and conduct initial fire attack if safe to do so;
 - In the event of a nacelle fire, no attempts should be made to climb the turbine tower for fire fighting. Extinguish spot fires on the ground caused by falling embers from the nacelle fire, a safe distance from the turbine base should be adhered to by the ground crew (this is subject to wind conditions);
5. Advise landowners;
 - The Fire Warden, assisted by BBWF Control staff, must ensure notification of host landowners on the site (starting with those downwind) and neighbours who may become affected by the incident is attempted by telephone as a priority;
6. Account for staff & Contractors;
7. Allocate staff to meet and liaise with CFA and other emergency services at the site entrance(s) and direct them as appropriate. Allocate staff to direct internal site traffic, and issue safety briefings in the event of unusual hazards;
8. CFA to assume control. Obey direction given by CFA Officer in Charge;

F2. Substation Fire

1. Ring '000' to report the incident(s) to appropriate emergency services;
2. Advise on-site control room;
3. Alert Staff & Contractors, and issue Warning, Stopwork, or Evacuation orders as appropriate;
 - Warning, advise that emergency services traffic will be using the road network in a particular area, or that a problem may be on the way; or
 - Stopwork, advise that an incident requiring attendance by emergency response crews has occurred. While there is no perceived threat to the bulk of the site, immediate response to a further incident will be compromised, and therefore some or all works may have to be suspended; or
 - Evacuate to assembly areas. Nominate safe areas plus routes and directions of travel which **ARE**, and which **ARE NOT**, safe for use. Take account of incoming emergency services traffic and probable headfire movement as well as the capacity of each refuge/assembly area;
4. Despatch and direct emergency response crew as appropriate and conduct initial fire attack if safe to do so;
 - Attempt to control the fire within the substation perimeter boundary if you can do so in safety. If you can stop or slow the spread of the head by immediate action, do so without getting yourself in the path of headfire spread if the part you have extinguished rekindles. WATCH BEHIND YOU. DO NOT LET FIRE CREEP AROUND THE BACK AND OVERTAKE YOU;
5. Advise landowners;
 - The Fire Warden, assisted by BBWF Control staff, must ensure notification of host landowners on the site (starting with those downwind) and neighbours who may become affected by the incident is attempted by telephone as a priority;
6. Account for staff and Contractors;
7. Allocate staff to meet and liaise with CFA and other emergency services at the site entrance(s) and direct them as appropriate. Allocate staff to direct internal site traffic, and issue safety briefings in the event of unusual hazards;
8. CFA to assume control. Obey direction given by CFA Officer in Charge;

F3. Wildfire On-Site

1. Ring '000' to report the incident(s) to appropriate emergency services;
2. Advise on-site control room;
3. Alert Staff & Contractors, and issue Warning, Stopwork, or Evacuation orders as appropriate;
 - Warning, advise that emergency services traffic will be using the road network in a particular area, or that a problem may be on the way; or
 - Stopwork, advise that an incident requiring attendance by emergency response crews has occurred. While there is no perceived threat to the bulk of the site, immediate response to a further incident will be compromised, and therefore some or all works may have to be suspended; or
 - Evacuate to assembly areas. Nominate safe areas plus routes and directions of travel which **ARE**, and which **ARE NOT**, safe for use. Take account of incoming emergency services traffic and probable headfire movement as well as the capacity of each refuge/assembly area;
4. Despatch and direct emergency response crew as appropriate and conduct initial fire attack if safe to do so;
 - Attempt to control the fire if you can do so in safety. If you can stop or slow the spread of the head by immediate action, do so without getting yourself in the path of headfire spread if the part you have extinguished rekindles. Otherwise, start at the rear of the fire and work towards the front. WATCH BEHIND YOU. DO NOT LET FIRE CREEP AROUND THE BACK AND OVERTAKE YOU;
5. Advise landowners;
 - The Fire Warden, assisted by BBWF Control staff, must ensure notification of host landowners on the site (starting with those downwind) and neighbours who may become affected by the incident is attempted by telephone as a priority;
6. Account for staff and Contractors;
7. Allocate staff to meet and liaise with CFA and other emergency services at the site entrance(s) and direct them as appropriate. Allocate staff to direct internal site traffic, and issue safety briefings in the event of unusual hazards;
8. CFA to assume control. Obey direction given by CFA Officer in Charge;

F4. Wildfire Off-Site

1. Ring '000' to report the incident(s) to appropriate emergency services;
2. Advise on-site control room;
3. Alert Staff & Contractors, and issue Warning, Stopwork, or Evacuation orders as appropriate;
 - Warning, advise that emergency services traffic will be using the road network in a particular area, or that a problem may be on the way; or
 - Stopwork, advise that an incident requiring attendance by emergency response crews has occurred. While there is no perceived threat to the bulk of the site, immediate response to a further incident will be compromised, and therefore some or all works may have to be suspended; or
 - Evacuate to assembly areas. Nominate safe areas plus routes and directions of travel which **ARE**, and which **ARE NOT**, safe for use. Take account of incoming emergency services traffic and probable headfire movement as well as the capacity of each refuge/assembly area;
4. Despatch and direct emergency response crew as appropriate and conduct initial fire attack if safe to do so;
 - If the fire is in the road reserve, attempt to control the fire if you can do so in safety. If the fire is in the adjacent neighbouring property (not in the project site) only attempt to control the fire from roadside (do not abandon your post and enter private property unless advised by CFA). If you can stop or slow the spread of the head by immediate action, do so without getting yourself in the path of headfire spread if the part you have extinguished rekindles. Otherwise, start at the rear of the fire and work towards the front. WATCH BEHIND YOU. DO NOT LET FIRE CREEP AROUND THE BACK AND OVERTAKE YOU;
5. Advise landowners;
 - The Fire Warden, assisted by BBWF Control staff, must ensure notification of host landowners on the site (starting with those downwind) and neighbours who may become affected by the incident is attempted by telephone as a priority;
6. Account for staff and Contractors;
7. Allocate staff to direct internal site traffic, and issue safety briefings in the event of unusual hazards;
8. CFA to assume control. Obey direction given by CFA Officer in Charge;

F5. Medical Emergency

1. Ring '000' to report the incident(s) to appropriate emergency services;
2. Advise on-site control room;
3. Alert Staff & Contractors, and issue Warning, Stopwork, or Evacuation orders as appropriate;
 - Warning, advise that emergency services traffic will be using the road network in a particular area, or that a problem may be on the way; or
 - Stopwork, advise that an incident requiring attendance by emergency response crews has occurred. While there is no perceived threat to the bulk of the site, immediate response to a further incident will be compromised, and therefore some or all works may have to be suspended; or
 - Evacuate to assembly areas. Nominate safe areas plus routes and directions of travel which **ARE**, and which **ARE NOT**, safe for use. Take account of incoming emergency services traffic and probable headfire movement as well as the capacity of each refuge/assembly area;
4. Advise landowners;
 - If the medial emergency on site has potential to affect the host landowner or neighbours, the Fire Warden, assisted by BBWF Control staff, must ensure notification of these landowners by telephone as a priority;
5. Account for staff and Contractors;
6. Allocate staff to meet and liaise with Emergency Services at the site entrance(s) and direct them as appropriate. Allocate staff to direct internal site traffic, and issue safety briefings in the event of unusual hazards;
7. Emergency Services Controller (ESC) to assume control. Obey direction given by ESC Officer in Charge;

APPENDIX (G) - *Post Incident Reporting*

When the Emergency Response Action procedures have been completed and the CFA and/or other emergency services authorities have advised that the wind farm site area is safe for the site personnel to recommence work, the site supervisor, assisted by deputy Fire Wardens, should:

1. Declare the area safe for resumption of work.
2. Prepare a report on the cause (including brief weather details), response and consequences of the incident, including recommendations for amending prevention, safety, and reaction capability & procedures.