

Fire Management and Emergency Response Plan

WELLINGTON SOLAR FARM



APRIL 2020





Project Title:

Wellington Solar Farm

Project Contractor: Lightsource BP

Project Number: 19-110

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Plan Control

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Copy Number	Issued To	Date	Name
1	Fire and Rescue NSW	27/04/20	Fire Safety Administration Unit
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ACRONYMS AND ABBREVIATIONS

APZ	Asset Protection Zone
CoC	Conditions of Consent
CEMP	Construction Environmental Management Plan
DP&E	(NSW) Department of Planning and Environment
EMS	Environmental Management Strategy
EIS	Environmental Impact Statement
EPA	Environment Protection Authority (Previously DECCW and/or OEH)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwth)
ERSED	Erosion and Sediment
EWMS	Environmental Work Methods Statement
ESCP	Erosion and Sediment Control Plan
FMERP	Fire Management and Emergency Response Plan
HSEQ	Health Safety and Environment and Quality
NSW	New South Wales
MP	Management Plan
SoC	Statement of Commitment
The Principal	Lightsource BP
The Project	Wellington Solar Farm
TMP	Traffic Management Plan

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

Planning approval was received on 25 May 2018 for the construction and operation of a 170 megawatt (MW_{AC}) photovoltaic (pv) solar farm with an energy storage facility, located 2 km north-east of Wellington within the Dubbo Local Government Area (LGA). The Wellington Solar Farm ('the Project') is a State Significant Development (SDD) and represents an important contribution to renewable energy generation in New South Wales.

This Fire Management and Emergency Response Plan (FMERP) has been prepared as part of the overall Environmental Management Strategy (EMS). The purpose of the FMERP is to identify fire risks and controls of the development and all procedures that would be implemented if a fire occurs on site or in the vicinity of the site. The FMERP applies to the operational stage of the Project.

In particular, this FMERP:

- Describes relevant fire risks, controls, and emergency procedures for the Project.
- Describes the fire and emergency related roles and responsibilities of all key personnel involved.
- States objectives and targets for issues that are important to the environmental performance of the Project.
- Outlines a monitoring regime to check the adequacy of controls as they are implemented during construction.

This FMERP is a subplan of the EMS for the Project and is applicable to all staff and sub-contractors associated with the Project.

1.2 THE PROJECT

The Scope of Works under the contract includes all works necessary to design, construct, test, commission, energise, decommission, and train staff in the operation of a 170 MW_{AC} solar farm including energy storage (approximately 25 MW / 100 MW rated capacity), and inverter stations.

The Scope of Works consists of but is not limited to:

- Approximately 500,714 solar panels (up to 4.5 metres (m) in height) and approximately 33 inverter stations (up to 2.9 m in height).
- An energy storage facility (approximately 25 MW / 100 MW rated capacity) with up to 6 purpose-built blocks (which will be constructed at a later date outside the main construction period).
- Underground 33kV, 132 kV or 330 kilovolt (kV) transmission cables connecting the energy storage facility to the TransGrid substation.
- Internal access tracks, staff amenities, car parking, laydown area and security fencing.

The expected operational life of the initial infrastructure is approximately 30 years. However, infrastructure upgrades could extend the operational life well beyond this. The Project also includes decommissioning at the end of the Project life, which would involve removing all infrastructure.

The estimated Capital Investment Value of the Project is \$270 million.

1.3 THE ENERGY STORAGE FACILITY

The Project has been approved to include an energy storage facility (ESF). At this stage, the Project does not involve the installation or operation of the ESF. This Plan has been prepared to address the fire risks associated with the Project including an ESF, however specific details of the ESF are at this stage unknown. The Plan would be updated and re-submitted for Approval at such time in the future when the ESF is proposed for installation. Hence, all controls relating to the ESF contained in this Plan are at this stage only general in nature.

1.4 ENVIRONMENTAL MANAGEMENT STRATEGIC FRAMEWORK

The overall Environmental Management System for construction of the Project is described in the EMS. This FMERP is part of the environmental management framework for the Project. Used together, the EMS, FMERP, strategies and procedures form management guides that clearly identify required environmental management actions for reference by personnel and contractors.

1.5 CONSULTATION

A submission was received from Fire and Rescue NSW during the exhibition period of the Wellington Solar Farm EIS between 14 December 2017 and 28 January 2018. The items raised in the submission have been included in the Statement of Commitments (SoC) (refer Table 2-1).

Key submissions made by Fire and Rescue NSW during the submission period were:

- That a comprehensive Emergency Response Plan (ERP) is developed for the site.
- That the ERP specifically addresses foreseeable on-site and off-site fire events and other emergency incidents, (e.g. fires involving solar panel arrays, bushfires in the immediate vicinity or potential hazmat incidents).
- That the ERP detail the appropriate risk control measures that would need to be implemented to safely mitigate potential risks to the health and safety of firefighters and other first responders (including electrical hazards). Such measures would include the level of personal protective clothing required to be worn, the minimum level of respiratory protection required, decontamination procedures, minimum excavation zone distances and a safe method of shutting down and isolating the photovoltaic system (either in its entirety or partially, as determine by risk assessment).
- Other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the site should also be included in the ERP.
- Two copies of the ERP are stored in prominent 'Emergency Information Cabinet' which is located in a position directly adjacent to the site's main entry point/s.
- Once constructed and prior to operation, that the operator of the facility contacts the relevant local emergency management committee (LEMC).

This FMERP was developed in consultation with the RFS and Fire & Rescue NSW.

2 PLANNING

2.1 LEGISLATIVE AND OTHER FIRE MANAGEMENT REQUIREMENTS

Legislation relevant to fire management and emergency response includes:

- *Rural Fires Act 1997*

2.1.1 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this FMERP include:

- Planning for Bush Fire Protection (PBP) guidelines (RFS, 2006)
- Draft Planning for Bush Fire Protection (PBP) guidelines (RFS, 2018)
- Development Planning: A guide to developing a Bush Fire Emergency Management and Evacuation Plan (NSW RFS 2014)
- Standards for Asset Protection Zones
- AS1940-2004: *The storage and handling of flammable and combustible liquids*
- AS4777-2015: *Grid Connection of Energy Systems via Inverters*
- AS 3959 – 1999: *Construction of buildings in bushfire-prone areas*
- *Energy Storage Safety: common Consumer Questions*, Clean Energy Council (CEC) 2014
- AS IEC 62619:2017: *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications*

2.2 OBJECTIVES AND TARGETS

2.2.1 Objectives

The key objective of the FMERP is to identify the fire risks and controls associated with the Project and identify procedures that are to be implemented in case of a fire on site or in the vicinity of the site. Specific objectives include:

- Secure the health, safety and welfare of all personnel on site.
- Contain an emergency.
- Protect property, plant, equipment and the environment.
- Manage the recovery and resumption of normal operations.

To achieve this objective, Lightsource BP will:

- Ensure appropriate controls and procedures are implemented during operations to minimise fire risks.
- Ensure appropriate measures are implemented to address the mitigation measures detailed in the EIS, RTS and CoC.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 2.1 of this FMERP.

2.2.2 Targets

The following targets have been established for the management of fire risks and impacts during construction of the Project:

- Ensure full compliance with the relevant legislative requirements.
- Ensure full compliance with relevant requirements of the EIS, RTS and CoC.

2.3 CONDITIONS OF CONSENT

CoCs and Statements of Commitment (SoC) from the Response to Submission (RTS) are detailed below in Table 2-1.

- Schedule 3, Condition 25 of the CoC's identifies requirements for operating conditions, including those relating to fire risks.
- Schedule 3, Condition 26 of the CoCs requires preparation of a FMERP prior to the commencement of operations.

This plan meets these requirements.

Table 2-1 Conditions of Consent and Statements of Commitments

Item	CoC/SoC	Where addressed
Conditions of Consent		
25	The Applicant must:	Design phase
	a) minimise the fire risks of the development	Construction phase
	b) ensure that the development: <ul style="list-style-type: none"> • includes at least a 10 metre defendable space around the Electric Storage Facility as well as the perimeter of the solar array area that permits unobstructed vehicle access; • manages the defendable space and solar array area as an Asset Protection Zone; • complies with the relevant asset protection requirements in the RFS's Planning for Bushfire Protection 2006 (or equivalent) and Standards for Asset Protection Zones; • is suitably equipped to respond to any fires on site including provision of a 20,000 litre water supply tank fitted with a 65mm Storz fitting located adjacent to the internal access road; 	Design phase
	c) assist the RFS and emergency services as much as practicable if there is a fire in the vicinity of the site; and	Section 4.1 Appendix B
	d) notify the relevant local emergency management committee following construction of the development, and prior to the commencement of operations.	Section 4.1
26	Prior to the commencement of operations, the Applicant must prepare a Fire Management and Emergency Response Plan for the development in consultation with the RFS and Fire & Rescue NSW. This plan must identify the fire risks and controls of the development, and the procedures that would be implemented if there is a fire on site or in the vicinity of the site. Two copies of the plan must be kept on site in a prominent position adjacent to the site entry point at all times.	This plan
Statement of Commitments		
	Establish safe minimum evacuation zone distances.	Appendix B Appendix C
	Once constructed and prior to operation, the operator of the facility will contact the relevant local emergency management committee (LEMC).	Section 4.1

Item	CoC/SoC	Where addressed
	Two copies of the Emergency Response Plan (ERP) are stored in a prominent 'Emergency Information Cabinet' which is located in a position directly adjacent to the site's main entry point/s.	Section 4.4
	Design of the Energy Storage Facility (ESF) would be undertaken to address fire risks (spacing and setbacks).	Design phase Section 3.3.2
	Dangerous or hazardous materials would be stored and handled in accordance with AS1940-2004: <i>The storage and handling of flammable and combustible liquids</i> .	Section 3.3
	Protocols would be developed for lithium-ion battery storage, maintenance, and incident response to mitigate Li-ion fire risks.	Section 3.3.2
	The transportation of new and waste lithium-ion batteries would comply with the requirements of the Dangerous Goods Code, including specific 'special provisions' and 'packing instructions' applying to the transportation of Li-ion batteries.	TMP
	<p>Develop a Bush Fire Management Plan to include but not be limited to:</p> <ul style="list-style-type: none"> • Specific management of activities with a risk of fire ignition (hot works, vehicle use, smoking, use of flammable materials, blasting) • Incorporation of fire safety and response in staff and contractor induction, training, OHS procedures and Work Method Statements • Designation of a staff safety officer tasked with ensuring implementation of the plan and regular liaison with firefighting agencies • Document all firefighting resources maintained at the site with an inspection and maintenance schedule • Monitoring and management of vegetation fuel loads • A communications strategy incorporating use of mobile phones, radio use (type, channels and call-signs), Fire Danger Warning signs located at the entrance to the site compounds, emergency services agency contacts <p>In developing the Fire Management Plan, NSW RFS would be consulted on the volume and location of water supplies, fire-fighting equipment maintained on-site, fire truck connectivity requirements, proposed APZ and access arrangements, communications, vegetation fuel levels and hazard reduction measures.</p>	<p>Section 3.3</p> <p>Section 4.2</p> <p>Section 4.1.1</p> <p>Section 3.3.6</p> <p>Section 3.3.1</p> <p>Section 3.3.6, Section 4.3</p> <p>Section 1.5</p>
	<p>Fire risks associated with the Energy Storage Facility would be managed by:</p> <ul style="list-style-type: none"> • Locating the ESF as far as practicable from any sensitive receivers (residences) or large stands of vegetation. • Installing reliable automated monitoring (voltage and temperature), alarm and shutdown response systems. • Installing reliable integrated fire detection and fire suppression systems (inert gas). • Ensuring the battery buildings/containers are not vulnerable to external heat effects in the event of a bushfire. • Designing appropriate separation and isolation between individual battery containers and between batteries and other infrastructure. • Compliance with all relevant guidelines and standards. <p>Preparation of a specific Battery Fire Response Plan under the general Fire Response Plan, in consultation with fire authorities, fire suppression experts, storage team, and with reference to relevant standards and guidelines.</p>	Section 3.3.2
	<p>An APZ of minimum 10 metres would be maintained between remnant or planted woody vegetation and solar farm infrastructure. The APZ around the perimeter of the site would incorporate a 4 metre wide gravel access track.</p> <p>Average grass height within the APZ would be maintained at or below 5 centimetres on average throughout the October-March fire season. Average grass height outside the</p>	Section 3.3.3

Item	CoC/SoC	Where addressed
	APZ, including beneath the solar array, would be maintained at or below 15 centimetres throughout the fire season.	
	Appropriate fire-fighting equipment would be held on site to respond to any fires that may occur at the site during construction. This equipment will include fire extinguishers, a 1000 litre water cart retained on site on a precautionary basis, particularly during any blasting and welding operations. Equipment lists would be detailed in Work Method Statements.	Section 3.3.6
	The NSW RFS and Fire and Rescue would be provided with a contact point for the solar farm, during construction and operation.	Section 3.3.6 Appendix B.1
	Following commissioning of the solar farm, the local RFS and Fire and Rescue brigades would be invited to an information and orientation day covering access, infrastructure, firefighting resources on-site, fire control strategies and risks/hazards at the site.	Section 3.3.6
	The perimeter access track would comply with the requirements for Fire Trails in the PBP guidelines. All access and egress tracks on the site would be maintained and kept free of parked vehicles to enable rapid response for firefighting crews and to avoid entrapment of staff in the case of bush fire emergencies. Access tracks would be constructed as through roads as far as possible. Dead end tracks would be signposted and include provision for turning firetrucks.	Design phase Construction phase
	A Hot Works Permit system would be applied to ensure that adequate safety measures are in place. Fire extinguishers would be present during all hot works. Where possible hot works would be carried out in specific safe areas (such as the Construction Compound temporary workshop areas).	Section 3.3.5
	Machinery capable of causing an ignition would not be used during bushfire danger weather, including Total Fire Ban days.	Section 3.3.5
	<p>Prior to operation of the solar farm, an Emergency Response Plan (ERP) must be prepared in consultation with the RFS and Fire & Rescue NSW. This plan must include but not be limited to:</p> <ul style="list-style-type: none"> • Specifically addresses foreseeable on site and off-site fire events and other emergency incidents. • Detail appropriate risk control measures to mitigate potential risks to the health and safety of firefighters and other first responders • Outline other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the site. • A copy of the ERP is to be stored in a location directly adjacent to the site's main entry points <p>Once constructed and prior to operation, the operator is to contact = the relevant local emergency management committee regarding the site.</p>	<p>This plan</p> <p>Section 3.2, Appendix D</p> <p>Section 3.3.6</p> <p>Section 3.3</p> <p>Section 4.4</p> <p>Section 4.1, Appendix E</p>
	All electrical equipment would be designed in accordance with relevant codes and industry best practice standards in Australia.	Design phase Construction phase
	All design and engineering would be undertaken by qualified and competent person/s with the support of specialists as required.	Design phase
	Design of electrical infrastructure would minimise EMFs.	Design phase

3 RISKS AND CONTROLS

3.1 EXISTING ENVIRONMENT

The Project site is within the area of operation of the Orana Bush Fire Management Committee (BFMC). A Bush Fire Management Plan (BFMP) has been established for the Orana BFMC area (BFMC, 2011).

The bush fire season in the Orana BFMC area generally commences on 1 October and concludes on 31 March. The area experiences warm to hot summers, ranging from 17°C to 34°C, with some extremes exceeding 38°C for multiple days (BFMC, 2011). Prevailing weather conditions associated with the bush fire season in the Orana BFMC area are north to westerly winds created by consecutive high-pressure systems causing high daytime temperatures and low humidity.

The Orana BFMC area has on average 250 fires per year, of which 10 – 15 are considered major fires. The main sources of ignition in the Orana BFMC area are campfires, lightning strikes, electrical power supply lines, agricultural machinery, vehicle exhaust systems when in contact with vegetation on the sides of roads, escaped controlled permit burns, burning of stolen vehicles, arson activity and careless acts by individuals (such as the use of cutting/welding equipment).

The Orana Rural Fire Service team has over 60 Rural Fire brigades, covering an area of 12,803 square kilometres. Fire brigades in the locality include Wuuluman and Maryvale. A NSW Rural Fire Service station is located in Wellington town.

The Project site is currently used for grazing and agricultural purposes, therefore understorey bush fire fuel loads vary from season to season. Existing bush fire hazards are present onsite, including several patches of open woodland, as well as planted rows of trees at several locations within the Project area. There are several existing powerlines (66 and 132kV) intersecting the site, mostly in a north-south direction and in alignment with the existing Wellington Substation. The existing Wellington Substation is within the Project site in the south-eastern section. There is one dwelling located near the centre of the Project site. The closest designated campsites are in Wellington Riverside Park in the northern end of Wellington town. Mount Arthur Reserve, which permits camping, is located 4km west of the site.

A small portion of the Project area is identified as Bush Fire Prone Land in the NSW Planning Viewer (DPE, 2017) (Figure 3-1). There are several large patches of open woodland that occur immediately north and west of this portion of the Project site, which link to larger areas of open woodland to the west and along the Macquarie River.

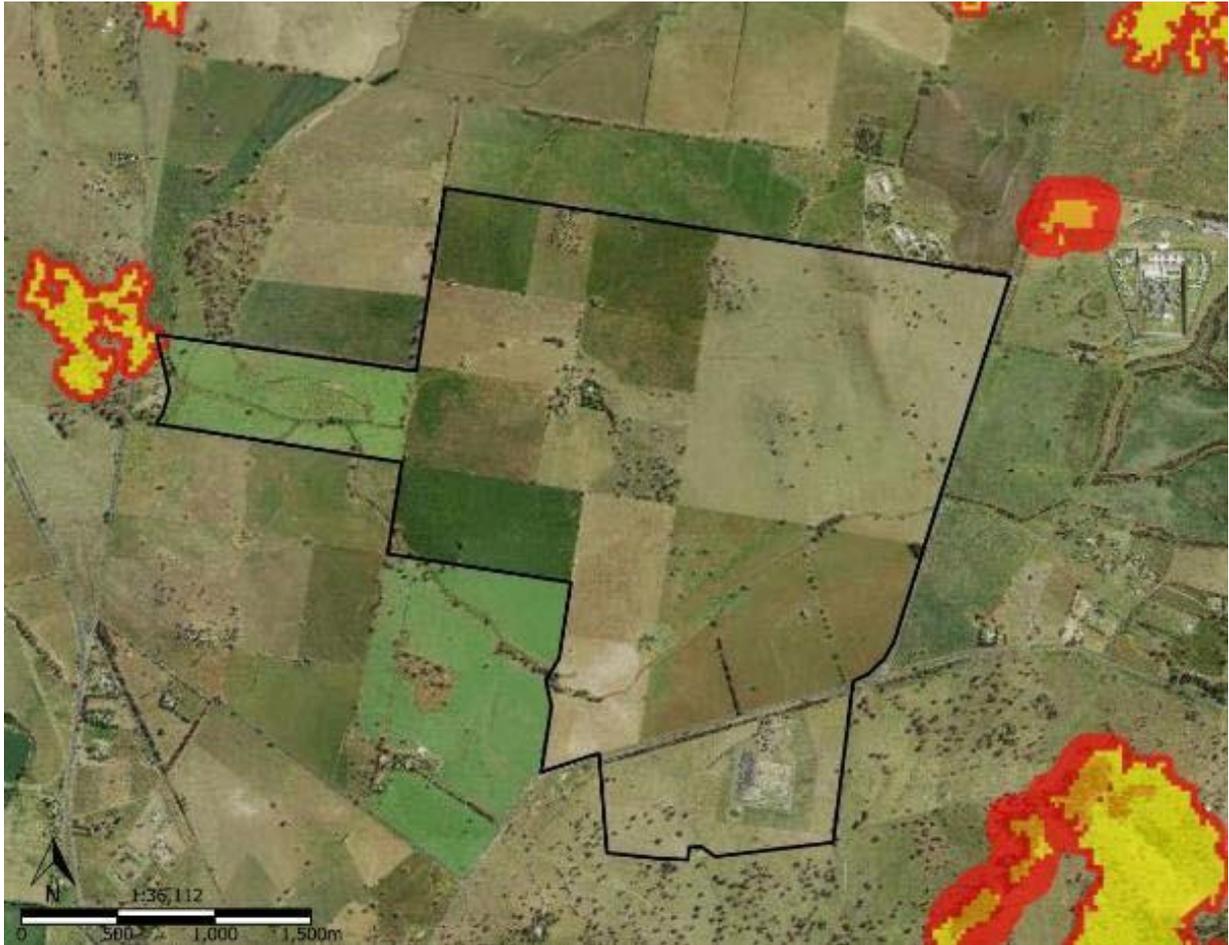


Figure 3-1 Bush Fire Prone Land (Project site outlined black) (NSW DPE, 2017)

Water resources at the Project site include farm dams, and water tanks associated with the residential dwelling. Two ephemeral watercourses traverse the site, including Wuuluman Creek.

The effect of anthropogenic climate change on extreme weather, increasing the number of hot days and heatwaves, is driving up the likelihood of very high fire danger weather (Climate Council, 2016).

The indicative Project layout is provided in Figure 3-2.

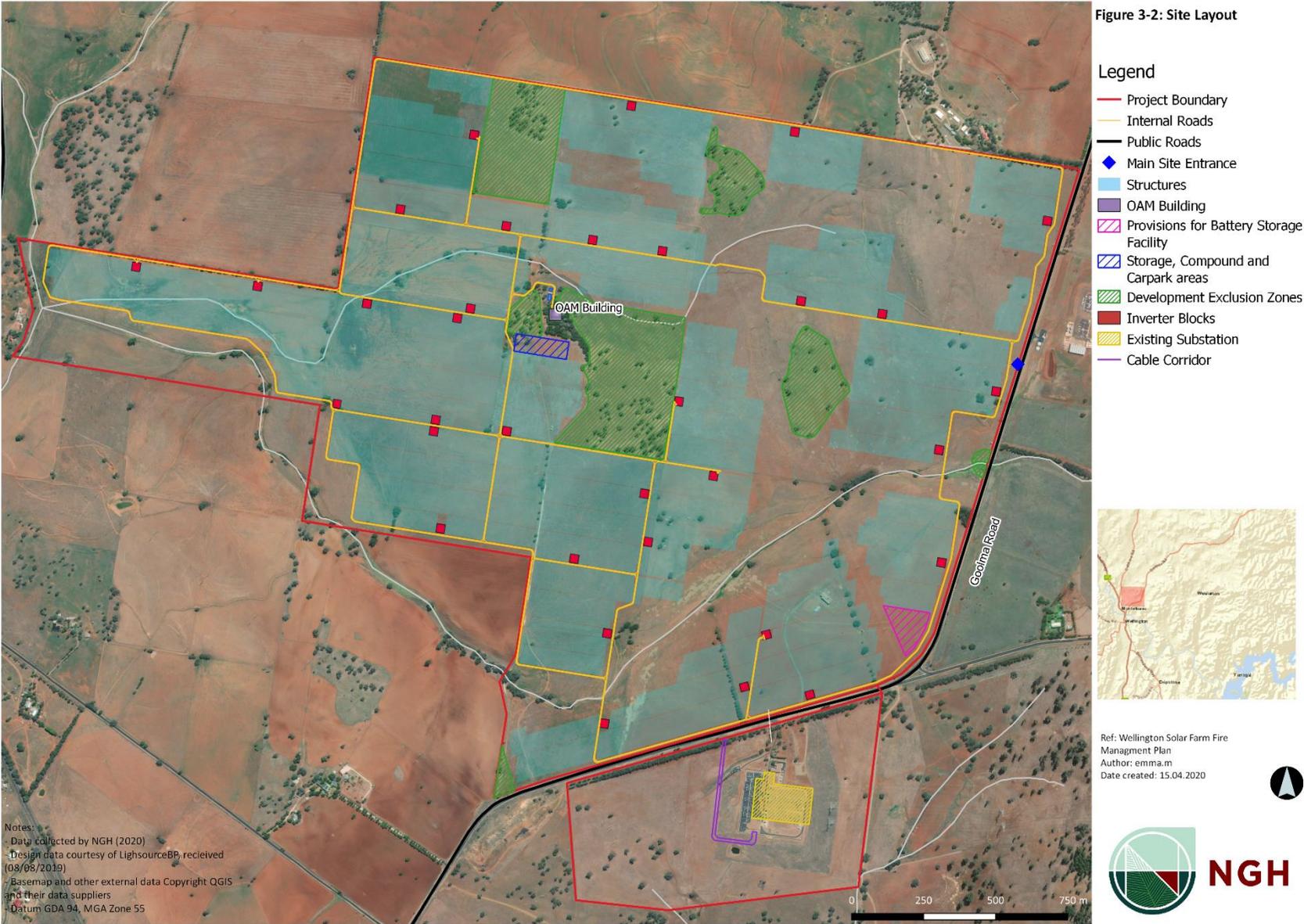


Figure 3-2 Indicative site layout

3.2 IDENTIFICATION OF FIRE RISKS

Potential risks of fire at the site include:

- Bushfire and structural fire risk.
- Maintenance (i.e. hot works) and use of combustible materials.
- Lithium-ion battery storage.

3.2.1 Bushfire and structural fire risk

Potential bushfire (including grass fire) hazards relate to the risk of the Project's infrastructure causing a bushfire and the risk of any bushfires affecting the solar farm. This could include:

- Electrical fires caused by faults and failures.
- Fires caused by poor practices at the site offices, such as poor storage of flammable materials and smoking in prohibited areas.

3.2.2 Maintenance and materials

Potential ignition sources associated during maintenance activities would include:

- Hot works activities such as welding, soldering, grinding and use of a blow torch.
- Sparks and contact ignition from vehicles in long combustible vegetation.
- Smoking and careless disposal of cigarettes.
- Use of petrol-powered tools.
- Operating plant fitted with power hydraulics on land containing combustible material.
- Electrical faults during testing and commissioning.
- Storage of chemicals and hazardous materials.

There is low fire risk during construction from the use of materials. The buildings on site will be constructed of low combustibility or non-combustible materials suitable for buildings of class 5 to 8 and 10 in accordance with the Building Code of Australia (BCA). All electrical components will be designed and managed to minimise potential for ignition. The solar array, which will occupy the majority of the site, will be largely constructed of glass, silicon, steel and aluminium and will have very low flammability.

3.2.3 Lithium-ion battery storage

The Project involves battery storage which involves the operation of an energy storage facility (ESF). This comprises of power packs that contain lithium-ion (li-ion) cells. All ESF carry risks associated with the uncontrolled release of energy. The location of the battery storage facility is shown in Figure 3-2. Risk associated with the ESF include:

- Li-ion cells contain highly flammable electrolytes.
- Overheating batteries causing a chemical chain reaction, causing venting of gases.
Overheating can be caused by a range of factors including:
 - Electrical shortage.
 - Rapid discharge.

- Overcharging.
- Manufacturers defect.
- Poor design.
- Mechanical damage.
- When coming into contact with air and an ignition source, gas may combust.

Monitoring of module temperature and voltage prevents excessive overcharging and overheating. Design features, such as separation of units and APZs, prevent propagation of fire among modules in the event of ignition.

Battery overheating may be caused by a range of factors including electrical shorting, rapid discharge, overcharging, manufacturers defect, poor design and mechanical damage (Butler, 2013). Lithium-ion batteries do not produce any exhaust gases during normal operation, but they can produce flammable and toxic gases if there is a fault (Department of Commerce, 2017).

3.3 FIRE RISK CONTROLS

3.3.1 Bushfire Protection Guidelines

In accordance with the Planning for Bush Fire Protection (PBP) Guidelines, an acceptable level of protection from bushfires is achieved through a combination of strategies which:

- Minimise the impact of radiant heat and direct flame contact by separating the development from the bush fire hazard.
- Reduce the rate of heat output (intensity) of a bush fire close to a development through control of fuel levels.
- Minimise the vulnerability of buildings to ignition from radiation and ember attack.
- Enable relatively safe access for the public and facilitate fire-fighting operations.
- Provide adequate water supplies for bush fire suppression operations.
- Facilitate the maintenance of Asset Protection Zones (APZs), fire trails, access for firefighting and on-site equipment for fire suppression.

The PBP guidelines provide six key Bush Fire Protection Measures for developments:

1. The provision of clear separation of buildings and bush fire hazards, in the form of fuel reduced APZ (comprising inner and outer protection areas and defendable space).
2. Construction standards and design.
3. Appropriate access standards for residents, fire fighters, emergency service workers and those involved in evacuation.
4. Adequate water supply and pressure.
5. Emergency management arrangements for fire protection and/or evacuation.
6. Suitable landscaping, to limit fire spreading to a building.

Only a small portion of the western area of the site is classified as Bush Fire Prone Land. The OAM facility would be located at Narrawa Homestead. This location is a significant distance from the Bush Fire Prone Land.

Any facilities constructed on site would need to be designed and constructed commensurate with the level of bush fire risk, in accordance with the Building Code of Australia (BCA) and National

Construction Code. Buildings will be constructed of low combustibility or non-combustible materials suitable for buildings of class 5 to 8 and 10 in accordance with the BCA. Design and management of all electrical components will minimise potential for ignition.

3.3.2 Energy Storage Facility

A Fire Safety Study will be undertaken at least one month prior to commencement of construction of the energy storage facility, in accordance with Condition 23 of Schedule 3 and the letter received from NSW Department of Planning and Environment on 23 May 2019 (refer Appendix F).

This FMERP will be updated following the completion of the study to reflect these findings and recommendations.

3.3.3 Asset Protection Zones

Appendix 2 of the PBP guidelines provides minimum Asset Protection Zone (APZ) requirements for habitable buildings in residential developments designated as bush fire prone. While the Project is not residential, these APZ prescriptions will be applied to the solar farm infrastructure to provide defensible space and to manage heat intensities at the infrastructure interface.

The PBP guidelines indicate a minimum APZ width of 10 metres for grassy woodlands (total fuel load 15 tonnes/hectare) and semi-arid woodlands (total fuel load 18 tonnes/hectare) on flat ground. This setback is based on the need to conform to Level 3 construction (AS 3959 – 1999) for a building of Class 1 or 2 under the BCA.

Condition 25 (b) of Schedule 3 states that:

The Applicant must:

(b) Ensure that the development:

- *Includes at least a 10 metre defensible space around the Electric Storage Facility as well as the perimeter of the solar array area that permits unobstructed vehicle access*

An APZ of minimum width of 10m will be provided around the solar farm buildings, substation and ESF, and around the outside perimeter of the solar array (Figure 5-1). The 10m APZ setback requirement will also be applied to any woody vegetation plantings undertaken around the perimeter of the solar farm. All of the APZ would be managed as an Inner Protection Area.

The APZ surrounding the proposed ESF and substation will be mown regularly in accordance with TransGrid's requirements in order to minimise the risk of fire escaping from the facilities and the risk of external fire affecting the facilities.

3.3.4 Fuel Hazard Management

According to the PBP guidelines, the APZ should provide a tree canopy cover of less than 15% located greater than 2m from any part of the roofline of a dwelling. Trees should have lower limbs removed up to a height of 2m above the ground. The understorey should be managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season.

There will be no trees or shrubs within the APZ established for the solar farm, or within the solar array area. Grassland Fuel Hazard is a function of grass height and cover, with variation according to curing and species fuel characteristics. Grass fuel would be monitored and managed using stock grazing or mowing to maintain safe fuel levels. Grass height within the APZ will be maintained at or below 5cm throughout the October-March fire season. Grass height outside the APZ, including beneath the solar array, will be maintained at or below 15 centimetres throughout the fire season.

The overhead powerlines at the site will be managed by maintaining appropriate vegetation clearances to minimise potential ignition risks, in accordance with the ISSC 3 Guideline for Managing Vegetation Near Power Lines.

3.3.5 Equipment Management

Machinery capable of causing an ignition would not be used during bushfire danger weather, including Total Fire Ban days.

A Hot Works Permit system would be applied to ensure that adequate safety measures are in place. Fire extinguishers would be present during all hot works. Where possible hot works would be carried out in specific safe areas (such as the site compound).

3.3.6 Firefighting Resources and Preparedness

Fire Danger Warning signs will be located at the entrance to the site compounds.

Condition 25 (b) of Schedule 3 states that:

The Applicant must:

(b) Ensure that the development:

- *Is suitably equipped to respond to any fires on site including provision of a 20,000 litre water supply tank fitted with a 65mm Storz fitting located adjacent to the internal access road.*

A 20,000L steel or concrete water storage tank will be installed adjoining the main internal access road for fire- fighting and other non-potable water uses. Rainwater tanks installed beside site buildings for staff amenities would also enable RFS connectivity. Suitable fire extinguishers and PPE will be maintained at site buildings. Additional equipment on site will include a 1000 litre water cart retained on site on a precautionary basis, particularly during any blasting and welding operations. Equipment lists would be detailed in Work Method Statements.

Safe and efficient access (suitable for firefighting appliances) would be established and maintained over the solar farm site. The APZ around the perimeter of the site will incorporate a 4m wide gravel access track. The perimeter track will comply with the requirements for Fire Trails in section 4.1.3 of the PBP guidelines, including:

- A minimum carriageway width of 4m with an additional 1m wide strip on each side of the trail clear of bushes and long grass.
- Capacity for passing using reversing bays and/or passing bays every 200m suitable for fire tankers.
- Connection to the property access road and/or to the through road system at frequent intervals of 200m or less.

Documentation of all firefighting resources will be maintained at the site, including an inspection and maintenance schedule.

Following commissioning of the solar farm, the local RFS and Fire and Rescue brigades would be invited to an information and orientation day covering access, infrastructure, firefighting resources on-site, fire control strategies and risks/hazards at the site. The preparedness of local RFS and Fire and Rescue brigades will be enhanced through site orientation and information events and the facilitation of training in the management of lithium-ion battery fires (once installed).

The NSW RFS and Fire and Rescue would be provided with a contact point for the solar farm, during construction and operation.

4 IMPLEMENTATION AND OPERATION

4.1 STRUCTURE AND RESPONSIBILITY

4.1.1 Environmental Management Team

The roles relevant to this FMERP and their responsibilities are detailed in Table 4-1. Specific roles and responsibilities during an emergency event are detailed in Appendix B.1.

Table 4-1 FMERP Roles and Responsibilities

Role	Responsibility
Site Manager	<ul style="list-style-type: none"> • Ensure that the Emergency Plan is developed, review and approved • Ensure that the Hazard Identification and Risk Management activities include emergency situations • Ensure that the Emergency Control Organisation is established and maintains the requirements associated with this plan
Health Safety and Environment and Quality Officer (HSEQ)	<ul style="list-style-type: none"> • Emergency Planning Committee member. • Review procedures and organize test evacuations. • Report emergencies as per Incident Management Procedure • Ensure that Emergency Equipment inspections are completed as per requirements. • Coordinate Emergency Team meetings. • Ensure Site Emergency Procedure is up to date and communicated adequately to all site personnel. • Plan and facilitate Emergency Evacuation Trials. • Plan and arrange training for Emergency Wardens as required. • Liaise with Chief Emergency Warden and assist as required. • Provide advice to the Local Emergency Management Committee as required • Monitor changes in the work environment which may require the ERP to be updated
Chief Warden	<ul style="list-style-type: none"> • The Chief Wardens' primary responsibility is to respond and co-ordinate the Emergency Control Organisation) ECO as a whole in managing any emergency event until Emergency Services arrive.
Head Count Warden	<ul style="list-style-type: none"> • Ensure copies of sign on sheets are placed in the assembly point boxes each day after pre-start • During an emergency evacuation collect the visitors register and sign on sheets and conduct a Head Count at the muster point • Report head count status to the Chief Warden. "All persons accounted for" or "persons unaccounted for" giving details of missing persons
Emergency Control Organisation (ECO)	<ul style="list-style-type: none"> • Undertake training and familiarisation required to fulfil allocated role in the event of an emergency • Fulfil Specified duties in the event of an emergency, or an emergency drill
Emergency Committee	<ul style="list-style-type: none"> • Develop and maintain ERP and procedures • Allocate Emergency Control Organisation roles • Arrange Training and Drills in accordance with the Plan requirements

Role	Responsibility
	<ul style="list-style-type: none"> • Meet to discuss ERP and requirements as regularly as is deemed necessary, particularly in light of changes to site, activities or key personnel • Ensure all records associated with Emergency Activities are made available and kept in the specified records management system • Monitor changes in the work environment which may require the ERP to be updated
HSSE Professional	<ul style="list-style-type: none"> • Ensure the plan produced is in compliance with this procedure and also <i>AS3745 Planning for Emergencies in Facilities</i> • Ensure that the Hazard Identification and Risk Assessment activities include emergency situations • Provide advice to the Emergency Committee as Required • Monitor changes in the work environment which may require the ERP to be updated
Emergency Services	The role of the Emergency Services is to provide the supporting resources to assist in the management of the emergency.
All Staff and contractors	<ul style="list-style-type: none"> • Perform all duties in a manner which will ensure their own and others safety. • Comply with the responsibilities assigned under relevant legislation. • Comply with all site safety rules and procedures. • Remain alert at all times to potential fire hazards. • Participate in the identification and elimination of hazards. • Immediately report any dangerous occurrence, injury, hazard or defective equipment. • Maintain knowledge of how to implement safe work practices using the hazard identification, risk assessment and risk control techniques. • Maintain knowledge of emergency response procedures, including evacuation protocols and bushfire action statements. • Actively participating in safety meetings and programs, including training. • Actively participating in rehabilitation programs.

4.2 TRAINING, AWARENESS AND COMPETENCE

All site personnel including sub-contractors will be instructed of the correct response to an occurrence, or emergency evacuation in accordance with the various procedures outlined in the appendices to this document, but in particular:

- Emergency Contacts.
- Emergency Response Diagram.
- Emergency Evacuation Protocol.
- Bushfire Action Statement.
- Emergency Services Contact Instruction.

The HSEQ Officer shall ensure that the Project personnel are trained to respond appropriately to fire emergencies.

An evacuation drill will be undertaken annually prior to the bushfire season to ensure understanding of roles and procedures.

4.2.1 Environmental induction

All employees, contractors and staff working on site will undergo induction training covering all procedures and protocols included in this FMERP. The site induction provides an introduction to fire risks and preventative controls as well as emergency procedures. Further details regarding staff induction and training are outlined in the EMS.

4.2.2 Pre-start meetings

Staff and contractors will attend pre-commencement meetings at the beginning of significant maintenance work, which will include, but not be limited to:

- Daily fire-risk rating and predicted weather, including heat index, maximum predicted temperature and wind speeds.
- Recent fire events on or in the vicinity of the site.
- Specific fire risks relevant to the day's activities.

4.3 EMERGENCY COMMUNICATION

Radio and/or mobile telephone communications will be the main means of communications in the event of an emergency. A detailed communications strategy incorporating use of mobile phones, radio use (type, channels and call-signs) will be established and implemented.

During an emergency, personnel are alerted by the call "Emergency, Emergency, Emergency." The Chief Warden responds.

The Chief Warden shall be in control of radio communications during an emergency. In the event of an emergency, persons that are not involved in the emergency shall maintain radio silence so as to allow radio communications between the Chief Warden and other services/ personnel involved in the emergency to flow uninterrupted.

4.4 SITE ACCESS

Security measures for the site will ensure local emergency services are able to access the site at all times. Local emergency services, including the LEMC, will be consulted to establish the best method of ensuring access.

4.5 DOCUMENT AMENDMENT AND DISTRIBUTION

This FMERP will be reviewed:

- Annually.
- When there is a change of method and/or technology that may require this document to be reviewed and updated.
- Following an emergency drill, response, or significant event to which the FMERP is relevant.
- As a result of a non-conformance identified in an audit.

All revisions shall be identified in the Revision Status table (Table 4-2).

Table 4-2 Revision status

Revision	Revision date	Issued Date	Nature of modification
0			
1			
2			
3			
4			
5			

In accordance with Schedule 3 Condition 26:

Two copies of the [FMERP] must be kept on site in a prominent position adjacent to the site entry point at all times.

As per the condition, and as per the SoC established in response to the submission made by Fire and Rescue NSW, two copies of this FMERP will be stored in a prominent 'Emergency Information Cabinet' located in a position directly adjacent to the site's main entry point(s).

5 MEASUREMENT AND EVALUATION

5.1 SYSTEM AND MONITORING AND MAINTENANCE

Table 5-1 Audit summary table

No.	Audit	Requirement	Timing	Responsibility	Recipient
1	Internal Audit	<p>Verify that the Project is in compliance with conditions and that environmental control measures are effective.</p> <p>Audits will be planned, carried out and reported to provide assessment of the Project.</p>	<p>Monthly internal compliance audits will be conducted during the construction of the Project. Internal audits will verify that the Project is in compliance with conditions and that environmental control measures are effective.</p> <p>More frequent auditing may occur if environmental checks indicate major deficiencies with environmental management of the site. Audits will be planned, carried out and reported to provide assessment of the Project.</p>	HSEQ Manager, Site Manager	Lightsource BP
2	External Audit	<p>Applicant must commission and pay the full cost of an Independent Environmental Audit (Audit) of the development. The audit must:</p> <ol style="list-style-type: none"> a) be prepared in accordance with the relevant Independent Audit Post Approval requirements (DPE 2018); b) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary; c) be prepared, unless otherwise agreed with the Secretary: <ol style="list-style-type: none"> i. within 3 months of commencing construction; ii. within 3 months of commencement of operations; and iii. as directed by the Secretary; d) be carried out in consultation with the relevant agencies; e) assess whether the development complies with the relevant requirements in this consent, and any strategy, plan or program required under this consent; and 	<ul style="list-style-type: none"> • Within 3 months of commencing construction; • Within 3 months of commencement of operations; and • As directed by the Secretary. 	Lightsource BP	Lightsource BP

No.	Audit	Requirement	Timing	Responsibility	Recipient
		<p>f) recommend appropriate measures or actions to improve the environmental performance of the development and any strategy, plan or program required under this consent.</p> <p>Within 3 months of commencing an Independent Environmental Audit, or unless otherwise agreed by the Secretary, a copy of the audit report must be submitted to the Secretary, and any other NSW agency that requests it, together with a response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations.</p> <p>The recommendations of the Independent Environmental Audit must be implemented to the satisfaction of the Secretary.</p>			

5.2 FMERP MONITORING AND REPORTING

Monitoring will be undertaken to ensure the fire management program is achieving the required outcomes. This allows for an adaptive management approach and will enable the identification of issues and any remedial actions or adjustments to the FMERP.

Table 5-2 Reporting requirements

Reporting/ monitoring requirement	Timing
Prepare fire reports for ecological burns, accidental ignitions and bushfire incidents (See Section 5.3)	Immediately post-fire/incident
Obtain copies of external agency fire reports for burns or incidents on the Offset Area (if managed by the NSW RFS or NSW NPWS)	Immediately post-fire/incident
Review of fire reports to identify improvements needed and/or rehabilitation action – i.e. implementation of an adaptive management approach	Immediately post-fire/incident Annually for reporting purposes
Checklist to ensure all fire mitigation and prepared /response measures and procedures are in place	Annually – pre and post fire season
Fire regime analysis and report on success / failure of fire management activities/ actions	Annually
Vegetation condition and threatened species monitoring	Biannually
Archiving of all fire reports, reviews, fire management actions and monitoring results	As required

5.3 FIRE REPORT FOR ALL FIRE INCIDENTS

A fire report should be completed for all fires that occur on or in the vicinity of the site, including all small fires and ignitions, prescribed ecological burn fires and wildfires.

If the incident is managed by the NSW Rural Fire Service or NPWS, the fire reports from that agency will be obtained, reviewed and kept on record for monitoring and reporting purposes for the Project.

A fire reporting should include details of the following:

- Fire name, ID and location.
- The person / agency responsible for the fire.
- The command and control arrangements / incident team.
- A fire map, including a hand sketch or GIS map of the fire perimeter, at 1:25,000 or greater (e.g. 1:10,000) scale over a topographic base map. Fire mapping should include known or suspected ignition point/s, fire perimeter, fire paths, asset damage, islands of unburnt areas, fire control lines, and other information specific to the fire.
- Fire behaviour at different times and locations.
- Fire management/control measures and strategies. This may include a list of equipment, personnel, vehicles utilised and their role (including agencies/equipment/personnel).
- Any unintended fire impacts to ecological values or other assets.
- Follow up action and additional reporting requirements, such as near-miss or injury, effectiveness of the burn, post-fire assessment requirements.

The annual monitoring for the Project will include a summary of the all ecological burns and fire incidents. The fire reports and outcome will also be used to inform an adaptive management approach (e.g. improvements in fire mitigation procedures and/or response procedures) and incorporated as part of the document amendment procedure (refer Section 4.4).

APPENDIX A SITE CHARACTERISTICS

Facility	
Facility type	Solar Farm
Location	Wellington NSW
Size of facility	288 ha of solar infrastructure, including the OAM facility
Condition of buildings on site	Well-maintained
Is the facility located in a bushfire area	Yes – some area surrounding the site and a small portion of the site to the west is classed as bushfire prone land. See Figure 3-1
How it may be affected by a bushfire	<ul style="list-style-type: none"> • Destruction of infrastructure • Harm to staff and visitors • Grazing stock on site
Are the buildings constructed against bushfire attack?	In accordance with PBP Guidelines, the OAM building will be designed and constructed commensurate with the level of bush fire risk, in accordance with the BCA and National Construction Code.
Is an APZ in place	Yes, in accordance with Appendix 2 of the PBP guidelines prescribing minimum APZ requirements
Staff	
Number of staff on site	3
Number of staff with support needs	Assume at least one
Location of staff on site	Operations and maintenance building
Number of potential temporary occupants	Up to 30
Access and assembly	
Site access information	The site will be accessed off Goolma Road, approximately 4.6 km north of the intersection with the Mitchell Highway.
Emergency assembly point	Carpark near operations and maintenance building

The site layout is presented in Figure 3-2.

APPENDIX B BUSHFIRE ACTION STATEMENT

Stage	Trigger	Action
Preparation	Prior to bushfire season	Ensure all personnel are trained in emergency procedures and roles and responsibilities.
	At start of bushfire season	Ensure all fire control measures are in place. Ensure buildings are prepared to limit impact of a bushfire
Response	Bushfire approaches	Alert emergency services Initiate evacuation procedure (Refer Appendix C)
	Fire front impacts site	Remain at refuge
Recovery	After fire front has passed	Check with emergency services that it is safe to return to site before doing so. Complete post-fire report (Refer Sections 5.2 and 5.3).

B.1 ROLES AND RESPONSIBILITIES

Position	Area of responsibility	Name and Mobile phone number
Chief Warden (CW)	<p>The Chief Wardens' primary responsibility is to respond and co-ordinate the Emergency Control Organisation (ECO) as a whole in managing any emergency event until Emergency Services arrive.</p> <p>Initial actions of the CW</p> <ul style="list-style-type: none"> • Proceed to scene/ area • Evaluate the extent of the Emergency • Activate any alarms as required and request PFES • If safe to do so respond to any fire or spill and attempt to prevent escalation of incident • Coordinate area wardens to initiate evacuation and area sweeps • Shut down plant/ equipment as necessary and if safe to do so <p>Ongoing actions of the CW</p> <ul style="list-style-type: none"> • Continue to coordinate and manage emergency until PFES arrive on site • Ensure the flow of up-to-date information is maintained at regular intervals with AW • Liaise with emergency services <p>Concluding Actions of the CW</p> <ul style="list-style-type: none"> • Prior to standing down ensure all ongoing and outstanding matters and obligations are completed • Facilitate post incident review or investigation process • Complete the log of events for the Project/Operations Manager and the Emergency Committee to review the effectiveness of the emergency. 	
Area Warden (AW)	<p>Initial actions of the AW/ W</p> <ul style="list-style-type: none"> • Proceed to scene/ area • Evaluate the extent of the Emergency • If safe to do so respond to any fire or spill and attempt to prevent escalation of incident • Shut down plant/ equipment as necessary and if safe to do so • Activate any alarms if required • Evacuate personnel and casualties (where required) • Provide for First Aid/medical assistance and / or coordinate first aiders within team 	

Position	Area of responsibility	Name and Mobile phone number
	<ul style="list-style-type: none"> • Notify and provide a situation report to the CW providing a description of the incident and providing details of: <ul style="list-style-type: none"> ○ Threats, injuries, fatalities ○ Environmental threat and damage ○ Equipment threat and damage ○ Actions taken ○ Any further support required at site. • Assist the CW in appropriate plan of action to contain the immediate situation <p>Ongoing actions of the A/ W</p> <ul style="list-style-type: none"> • Continue to review and respond to emergency until the CW arrives on site to manage the emergency; • Ensure the flow of up-to-date information is maintained at regular intervals to the CW • Assist emergency services at the scene; • Account for all personnel within their area (including contractors and visitors) at muster point • Control access to the emergency site and implement restrictions on normal operations as appropriate until the CW arrives on site to manage the emergency <p>Concluding Actions of the A/ W</p> <ul style="list-style-type: none"> • Prior to standing down ensure all ongoing and outstanding matters and obligations are completed. 	
<p>Emergency Log Keeper</p>	<ul style="list-style-type: none"> • Keep a time line record of events / communications during an emergency event. Continually review the Incident Log for accuracy and if recording by electronic means, ensure that the data being entered is saved or backed up • As requested, copy or print off log sheets for interested parties and mark the log sheet as an uncontrolled copy • As this recording role is critical – The Log Keeper must not get involved in any activities other than on this checklist • Clarify any confusion of events/actions as soon as apparent <p>Stand-down Actions of the Log Keeper</p> <ul style="list-style-type: none"> • Under the direction of the CW, help coordinate post incident review or investigation process; • Complete the log of events for the CW. • On advice from the Chief Warden, complete all necessary log keeping and administration requirements 	

Position	Area of responsibility	Name and Mobile phone number
	<ul style="list-style-type: none"> • Participate in the debrief • Ensure all information received is filed correctly 	
Head Count Warden	<ul style="list-style-type: none"> • Ensure copies of sign on sheets are placed in the assembly point boxes each day after pre-start • During an emergency evacuation collect the visitors register and sign on sheets and conduct a Head Count at the muster point • Report head count status to the Chief Warden. “All persons accounted for” or “persons unaccounted for” giving details of missing persons 	
Emergency Control Organisation	<ul style="list-style-type: none"> • Undertake training and familiarisation required to fulfil allocated role in the event of an emergency • Fulfil Specified duties in the event of an emergency, or an emergency drill 	
First Aid Personnel	<p>Initial Actions of First Aid Personnel Under the direction of the CW or AW:</p> <ul style="list-style-type: none"> • Proceed to scene with relevant AW • Evaluate the extent of any injuries • Administer first aid (<i>first aid personnel only, and only where safe to do so</i>) or • Assess if injured personnel can be evacuated safely <p>Ongoing actions of First Aid Personnel</p> <ul style="list-style-type: none"> • Evacuate and attend any injuries at muster points • Notify PFES of any remaining personnel, and location, within building • Provide details to PFES of suspected injuries • Assist PFES onsite where required with ongoing treatment of injuries 	
Emergency Services	<ul style="list-style-type: none"> • The role of the Emergency Services is to provide the supporting resources to assist in the management of the emergency. 	

APPENDIX C EVACUATION PROTOCOL

In case of a fire emergency on site, the primary plan of action is evacuation. Details and protocol are described below.

C.1 DESIGNATED ASSEMBLY POINTS

In the event of a bushfire, personnel on site are to proceed to the designated assembly point on site (Figure 5-1), located in the carpark by the Operations and Maintenance building in the centre of the site.

Once all staff have assembled at the designated assembly points, transport to the off-site refuge site will commence. This involves exiting the site via the primary evacuation route, or the secondary evacuation route if the primary route is deemed unsafe, and proceeding to the main site entrance or the emergency egress point, as required.

C.2 TRANSPORT PLAN

Private vehicles will be used to transport personnel to the refuge site. All personnel will evacuate site via the main site access point and be transported to the refuge site (Figure 5-2).

The primary and alternate refuge sites and access routes are described in Section C.3 below.

C.3 OFF-SITE REFUGE

Refuge site	Primary refuge site	Alternate refuge site
Location	Wellington Soldier's Memorial Club 75 Arthur St Wellington NSW 2820	Kennard Park 88 Simpson St Wellington NSW 2820
Is the refuge in an area away from effects of a bushfire	Yes	Yes
Are amenities available	Yes	Yes
Can the refuge accommodate the number of occupants?	Yes	Yes
Are there any personnel with support needs requiring a facility to support them?	Potentially	Potentially
Transportation to refuge	Primary refuge site	Alternate refuge site
Route from site to refuge site	Travel east along Goolma Road. Turn left to travel south along the Mitchell Highway., into the town of Wellington. Refer to Figure 5-2 for route map.	
Distance/time from site to refuge site	4.8 km, 5 minutes' drive	5.6 km, 7 minutes' drive
Is the route to the refuge through or near bushfire risk areas?	The route is not through land mapped as bushfire prone. Should the route be compromised, the Dubbo Council Local Emergency Management Committee is placed to organised detours for access into Wellington town centre, as well as other emergency management procedures for the area.	
Is transport provided on site for all personnel?	Private vehicles will be used.	
Are there any personnel with support needs requiring specific transport?	Potentially. Any personnel with specific transport needs will utilise the same transport (i.e. a specialised vehicle) to depart the site.	

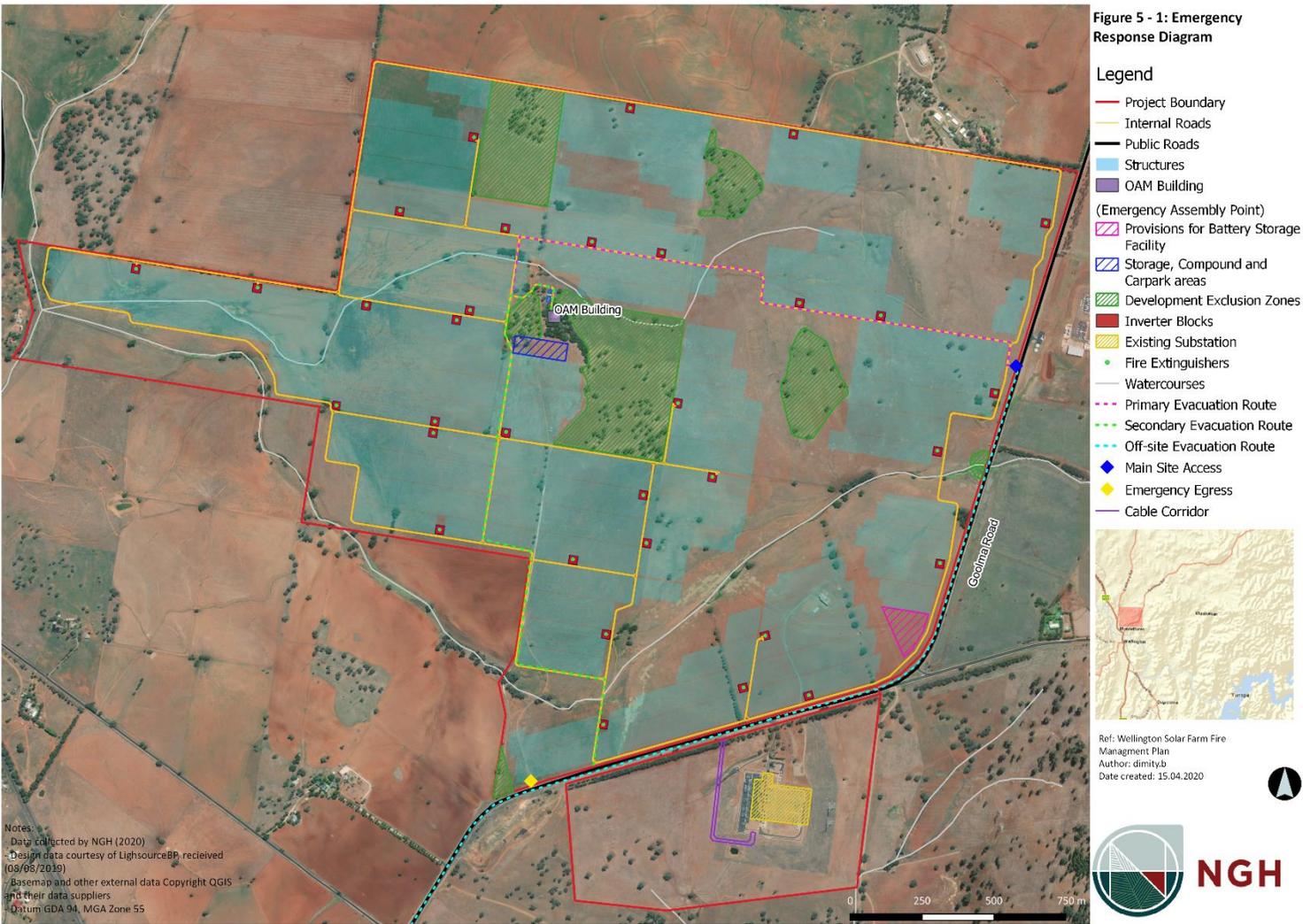


Figure 5-1 Emergency response diagram

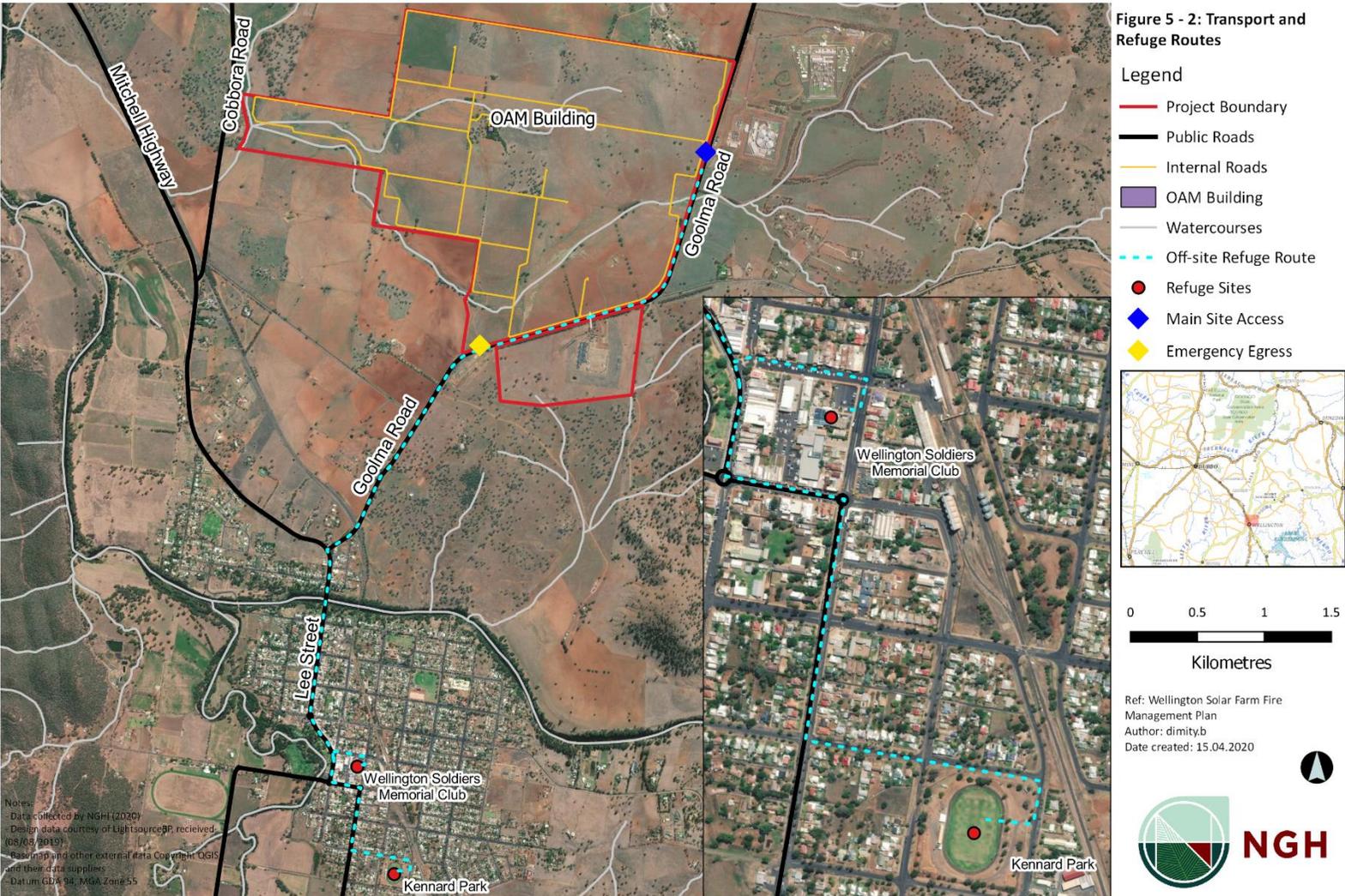
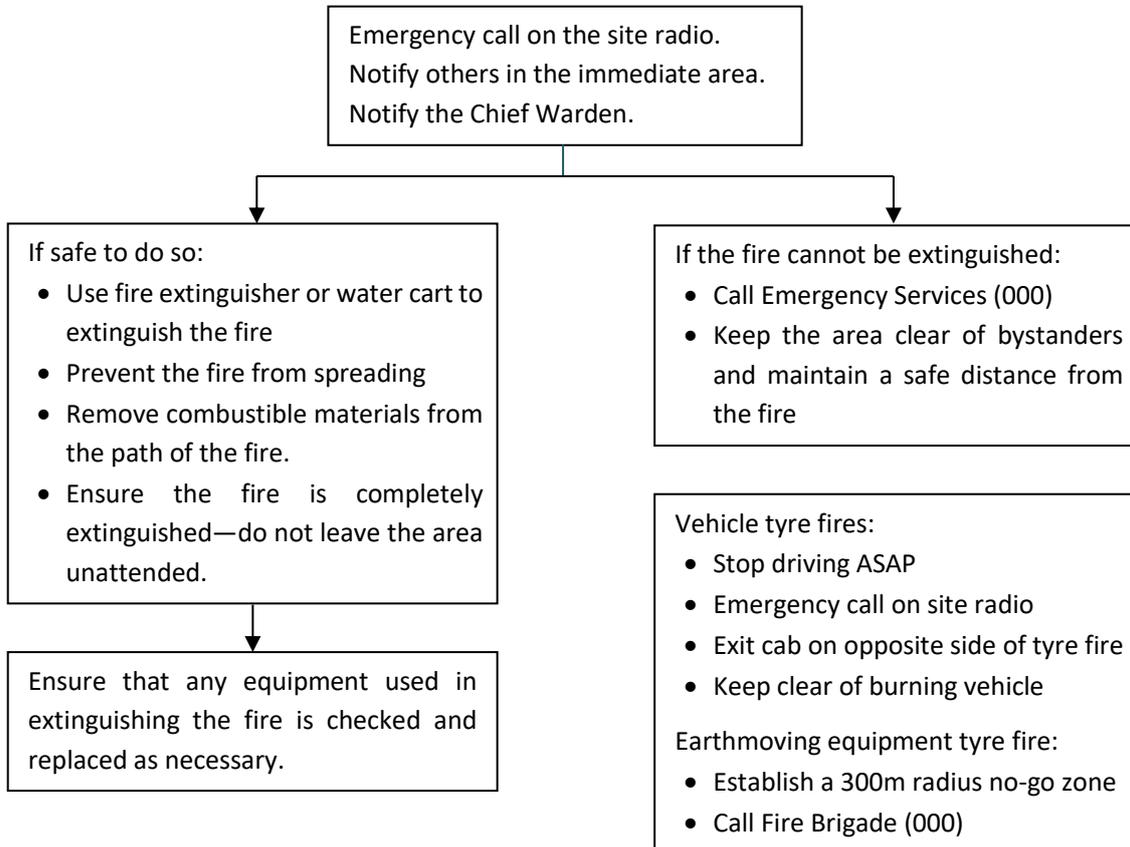


Figure 5-2 Transport and Refuge routes

APPENDIX D EMERGENCY RESPONSE – FIRE EMERGENCY PROCEDURE

In case of fire on site, follow the steps below:



APPENDIX E EMERGENCY CONTACTS

Organisation	Office/contact	Phone number
NSW Rural Fire Service	Orana RFS	02 6881 3900
NSW Rural Fire Service	Bushfire information line	1800 679 737 1800 NSW RFS
NSW Rural Fire Service	Website	www.rfs.nsw.gov.au
Emergency services	Ambulance	000
Dubbo Council Local Emergency Management Committee	Local Emergency Management Officer	02 6840 1757

APPENDIX F FIRE SAFETY STUDY LETTER OF APPROVAL



Planning Services

Resource and Energy Assessments

Contact: Leesa Johnston

Tel: (02) 8289 6861

Email: Leesa.johnston@planning.nsw.gov.au

Mr Adam Pegg
Lightsource BP
Country Manager - Australia
7th Floor, 33 Holborn
London UK EC1N 2HT

C/- Sarah Hillis sarah.h@nghenvironmental.com.au

Dear Mr Pegg

Wellington Solar Project (SSD 8573) Fire Safety Study

I refer to your letter dated 16 April 2019, requesting the Secretary's approval to defer the submission of a Fire Safety Study in accordance with condition 23 of Schedule 3 of the Wellington Solar Project (SSD 8573).

The Department has considered the information you have provided and sought advice from Fire and Rescue NSW, which does not object to the request.

Accordingly, the Secretary will allow the submission of the Fire Safety Study for the Wellington Solar Project to be deferred to at least one month prior to commencement of construction of the battery storage facility.

If you wish to discuss the matter further, please contact Leesa Johnston on 02 8289 6861.

Yours sincerely

23/5/19

Nicole Brewer
A/Director
Resource and Energy Assessments
as nominee of the Secretary