

R E P O R T

Buronga Peaking Power Plant Bush Fire Assessment

Prepared for

International Power Australia Pty Ltd

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Executive Summary

A bush fire assessment was completed as part of the Environmental Assessment process for the proposed Buronga Peaking Power Plant. The proposal is a Major Project pursuant to Part 3A of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act). Whilst the bush fire planning provisions of the NSW *Rural Fires Act 1997* and the EP&A Act do not apply to Part 3A developments, the guidelines for residential developments in bush fire prone land set out in *Planning for Bush Fire Protection* (RFS 2006a) have been addressed and applied to the proposal as a guide for site planning and risk mitigation.

Parts of the site and surrounding land are mapped as 'bush fire prone land' by Wentworth Shire Council and correspond to areas of semi-arid woodland within and surrounding the site. These woodland areas and any nearby stands of grassland constitute a bush fire hazard to the proposed facility. However, fuel loads observed (i.e. ground layer vegetation, leaf litter, logs, etc) in these woodland areas are low to nil and the canopy connection between woodland eucalypts is also very low. Additionally, the site lies on very flat terrain (slopes $<3^\circ$). These conditions combine to determine a low risk of bush fire on the site.

Notwithstanding the above, the proposed facility would be located adjacent to (and partially within) an identified bush fire hazard and accordingly, bush fire protection measures are recommended for the proposal. Consideration of *Planning for Bush Fire Protection* indicates that for the vegetation type and slopes recorded on the site, a 15m Asset Protection Zone (APZ) is required between the outer limit of buildings and structures and the nearest vegetation (i.e. the hazard). The key elements to bush fire protection on the site would comprise:

- An APZ extending a minimum of 15m width from the edge of proposed buildings, services and structures. The APZ would be maintained as a fuel-free zone, with no substantial stands of grass, shrubs or trees, or logs and other combustible fuels;
- Installation of permanent tank water within the facility, for fire fighting purposes;
- Incorporation of infra red beam heat detectors to ensure fire protection and management systems for the site are activated in case of fire from adjoining land;
- Water sprinkler or gaseous (e.g. CO₂) systems on fuel storage system, gas turbine enclosures, transformers, administration and control buildings and the workshop;
- Heat detectors and smoke alarms on built assets to enable automatic commencement of fire suppression;
- Allowance for access for fire fighting vehicles and for maintenance of the APZs. The proposed access road (from Arumpo Road) and internal hard stand areas across the site would provide access and egress for fire fighting vehicles and for staff evacuation;
- 24-hour remote monitoring of the site. Signals and alarms from the site would be attended by a locally-resident Turbine Officer;
- Allowance for a 'defendable space', between the facility and the hazard. The proposed hardstand areas within the site would be suitable for this purpose;
- Design and management of proposed landscaping to avoid creation of a new bush fire hazard; and
- Transportable foam mixing equipment and diesel powered fire pump within the site, to provide additional fire fighting capability.

With the installation and maintenance of the above measures, the risk of bush fire attack on the proposed facility would be managed to an acceptable level. Notwithstanding this, consultation during detailed design with the Rural Fire Service is recommended regarding access, water supply and defendable space.

Section 1

Introduction

1.1 Background

International Power (Australia) Pty Ltd (IPRA) proposes to construct and operate a distillate-fired gas turbine Peaking Power Plant near Buronga in the southwest of NSW. Operating in open cycle mode, the facility would comprise three distillate-fired gas turbine generating units each of up to 50MW capacity subject to final plant selection. These units would be capable of operating individually or in conjunction, together providing a high level of reliable generation capacity embedded within the region.

The plant would be located on Crown land immediately adjacent to the TransGrid 220kV Buronga Switching Station on Arumpo Road, approximately 10km northeast of Buronga. This would facilitate connection into the national electricity grid. IPRA has secured land lease option arrangements with the leaseholder of this pastoral land, which is controlled by the Western Lands Commissioner.

URS Australia Pty Ltd has been engaged by IPRA to prepare an Environmental Assessment (EA), which is to be submitted to the NSW Department of Planning to accompany a Project Application for the proposed facility. This bush fire assessment has been prepared as a supporting document for the EA.

1.2 Statutory Framework

The proposed facility is a Major Project pursuant to *State Environmental Planning Policy (Major Projects)* and accordingly is to be assessed under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), with the NSW Minister for Planning as the consent authority.

The proposal, as a Major Project to be determined under Part 3A of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act), does not require approvals under the NSW *Rural Fires Act 1997* (RF Act). Additionally, the proposal does not require referral to the NSW Rural Fire Service (RFS) under Section 79BA of the EP&A Act as neither residential nor rural-residential development are proposed. Notwithstanding, as part of the Part 3A process, the Department of Planning may choose to refer the application to the RFS for advice.

Whilst there is no formal requirement for consideration of bush fire risk under Part 3A, URS have considered the guidelines and requirements of the RFS (2006a, 2006b) for site planning purposes, to determine the potential risk of bush fire to the proposed facility and to provide mitigation measures to address any potential risk.

Section 2

Methodology

2.1 Desktop Review

A bush fire assessment was carried out by URS in August 2007 and involved a desktop review and site inspection.

The desktop study involved detailed review of the planning and hazard management requirements contained in the RFS (2006a) document *Planning for Bush fire Protection* (PBP) and a review of the relevant standards under the Building Code of Australia¹. Bush fire prone land mapping² for Wentworth LGA was obtained from Council.

2.2 Field Survey

A site inspection was carried out on 16 August 2007 during which the following were surveyed and determined:

- the potential bush fire hazard in the vicinity of the proposed facility;
- vegetation type, condition and class (as per PBP) on land surrounding the proposed site;
- slope in these surrounding areas; and
- fuel load on the ground within vegetated areas.

Vegetation formation and slope for the site are required in order to determine the appropriate bush fire protection measures under PBP.

2.2.1 Vegetation

Vegetation typically provides the primary source of fuel for bush fires, and different vegetation types provide different fuel loads and therefore bush fire risk. Accordingly, PBP provides broad categories for vegetation class to assist in the determination of bush fire risk. The vegetation type, condition and class within the area surrounding the proposed site of the facility (which constitutes the potential bush fire hazard on and adjacent to the site) was assessed during the site inspection. PBP requires that the predominant vegetation formation be determined for 140m in all directions from the site.

2.2.2 Slope

Slope affects the speed and intensity of bush fires with steep slopes carrying a greater hazard than flatter slopes or down slopes. Using topographic data (in GIS) and on-site inspections, the slope of the proposed site and surrounding land was assessed over a distance of 100m, measured from the proposed footprint towards the adjoining bushland in all directions. This was used to calculate 'effective slope', which is defined under PBP as 'that slope within the hazard which most significantly affects fire behaviour of the site'.

2.3 Consultation

URS consulted with Wentworth Council and the RFS as part of the preparation of this report. A copy of the draft concept plan, showing plant layout, access, water supply and distillate tank locations, was forwarded to the RFS Fire Control Centre at Dareton. The RFS provided comment on bushfire management issues raised by URS. A summary of issues raised and response is provided in **Appendix A**.

¹ PBP recognises AS 3959 – 1999 as the appropriate guide for certain classes of building. Where development occurs in a bush fire prone area certain bush fire provisions of the BCA will apply for building classes 1, 2, 3, 4 and class 9 buildings that are also for special fire protection purposes.

² Bush fire prone land mapping is required of all NSW Councils under Section 146 of the EP&A Act.

Section 3

Bush Fire Hazard Assessment

3.1 Bush Fire Prone Land

The Wentworth Shire Bush Fire Prone Land Map (Wentworth Council, 2004) indicates that part of the site and the surrounding land is mapped as bush fire prone land (category 2). The mapped areas correspond to areas of vegetative canopy cover visible in aerial photography and in vegetation mapping of the site.

The areas mapped as bush fire prone correspond generally to the stands of Mallee Woodland and Chenopod Shrubland that are mapped and described in the Flora and Fauna Assessment which is provided within **Appendix E** and **Chapter 12** of this EAR.

3.2 Asset Protection Zones

Asset Protection Zones (APZs) are recommended in PBP as a key measure for the mitigation of bush fire risk. They are an interface area between the proposed development and the adjacent bushland that is managed to minimise fuel loads. The aim of an APZ is to minimise fuel loads to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with a building.

The APZ generally comprises two sections: an Inner Protection Area (IPA) and Outer Protection Area (OPA). The IPA is located adjacent to the building with the aim of reducing heat intensity at the building surface. It is maintained largely fuel-free and can contain widely spaced trees, but low density understorey vegetation and low fuel loads in the ground layer. Perimeter roads, car parks and cycleways can be located in the IPA and serve as a 'defendable space' for fire fighting activities and for access to manage the APZ. The OPA is managed as a fuel-reduced zone between the IPA and the adjoining bushland and aims to reduce the length of flames, filter embers and suppress a crown fire. The OPA can be maintained as managed bushland, with canopy thinning so there is limited canopy connection into the IPA and a reduced density of understorey vegetation.

Appendix 2 of PBP was used to determine what APZ would apply if the proposal was considered as equivalent to a residential subdivision.

The procedure for determination of APZs for rural and residential subdivisions is as follows:

1. determine vegetation formation (for areas that adjoin the proposed development and hence constitute a bush fire hazard);
2. calculate effective slope within the vegetation surrounding the site; and
3. determine the 'fire (weather) area' of the site. The site lies within the 'South Western' NSW Fire Area, which is ascribed a general Fire Danger Index (FDI) of 80³.

The resulting vegetation formations, effective slopes and minimum specifications for APZs (for FDI 80 areas) in all directions from the proposed development site are listed in **Table 3-1**.

³ FDI = Fire Danger Index, a measure of probability of fire within a given region.

Section 3

Bush Fire Hazard Assessment

Table 3-1 Recommended APZs for the Proposed Peaking Power Plant

Boundary	Vegetation Formation ⁴	Effective Slope ⁵	Recommended APZ ⁶ (m)	Available APZ (m)
Northern (measured from distillate pipe)	Semi-arid Woodland	0-5°	15	20
Western (measured from western limit of turbines)	Semi-arid Woodland	0-5°	15	40
Eastern (measured from distillate pipe)	Semi-arid Woodland	0-5°	15	20
Southern (measured from distillate pipe)	Semi-arid Woodland	0-5°	15	20

Table 3-1 shows that the vegetation formation surrounding the proposal site is 'semi-arid woodland', which forms the main fire hazard of relevance to the proposal. Woodland vegetation occupies the flat terrain within and surrounding the site. The canopy cover of the mallee eucalypts comprising the woodland is of low foliage projective cover (<10%). The ground layer is sparsely covered in a low density of shrubs and grasses, with low levels of leaf litter and organic matter, and large expanses of bare soil. Hence, fuel loads in the ground layer are low. **Plates 6-1** and **6-2** show the typical vegetation cover and fuel load across the site.

Effective slopes within and around the site are between 0-3°. PBP (Table A2.5) indicates that for semi-arid woodland vegetation in the South Western fire region, with slopes of 0-5°, the APZ required on these boundaries is 15m, comprising an Inner Protection Area of 10m and an Outer Protection Area of 5m. Given that the Peaking Power Plant contains a number of separate above ground structures, it is recommended that the APZ apply from the outermost structures. Hence, a fuel-free IPA should be implemented for 10m in all directions from structures that are at risk of bush fire attack, such as the distillate tanks, pipelines and administration buildings. As shown in **Figure 3.1**, a 15m APZ can be created around the full perimeter of the site, measured from the proposed inner fenceline. Hence the actual APZ on each structure will be greater. Depending on the final locations of structures, and given the low density of vegetation present, only minor modifications to the existing vegetation would be required to create a satisfactory APZ on these boundaries.

3.3 Bush Fire Attack Assessment

PBP also prescribes minimum building standards or level of construction, according to the Building Code of Australia (BCA), for buildings in bush fire prone areas. In NSW the bush fire protection provisions are applied to Class 1, 2, 3 buildings, parts of Class 4 buildings and Class 9 buildings that are for Special Fire Protection Purposes. Building classes 5-8 and 10 include industrial facilities such as the proposed Peaking Power Plant.

Reference to Table A3.4 of PBP (with a FDI of 80 and a vegetation class of semi-arid woodland), and based on GIS calculations of the distance between proposed buildings and the nearest vegetation at between 15-50m, indicates that the category of bush fire attack and corresponding building standard is Level 1 Medium, according to Australian Standard AS 3959-1999.

⁴ As measured over 140m from the proposed boundary of the facility.

⁵ As measured over 100m within the adjoining bushland.

⁶ Source: Table A2.4 of PBP.

Section 3

Bush Fire Hazard Assessment

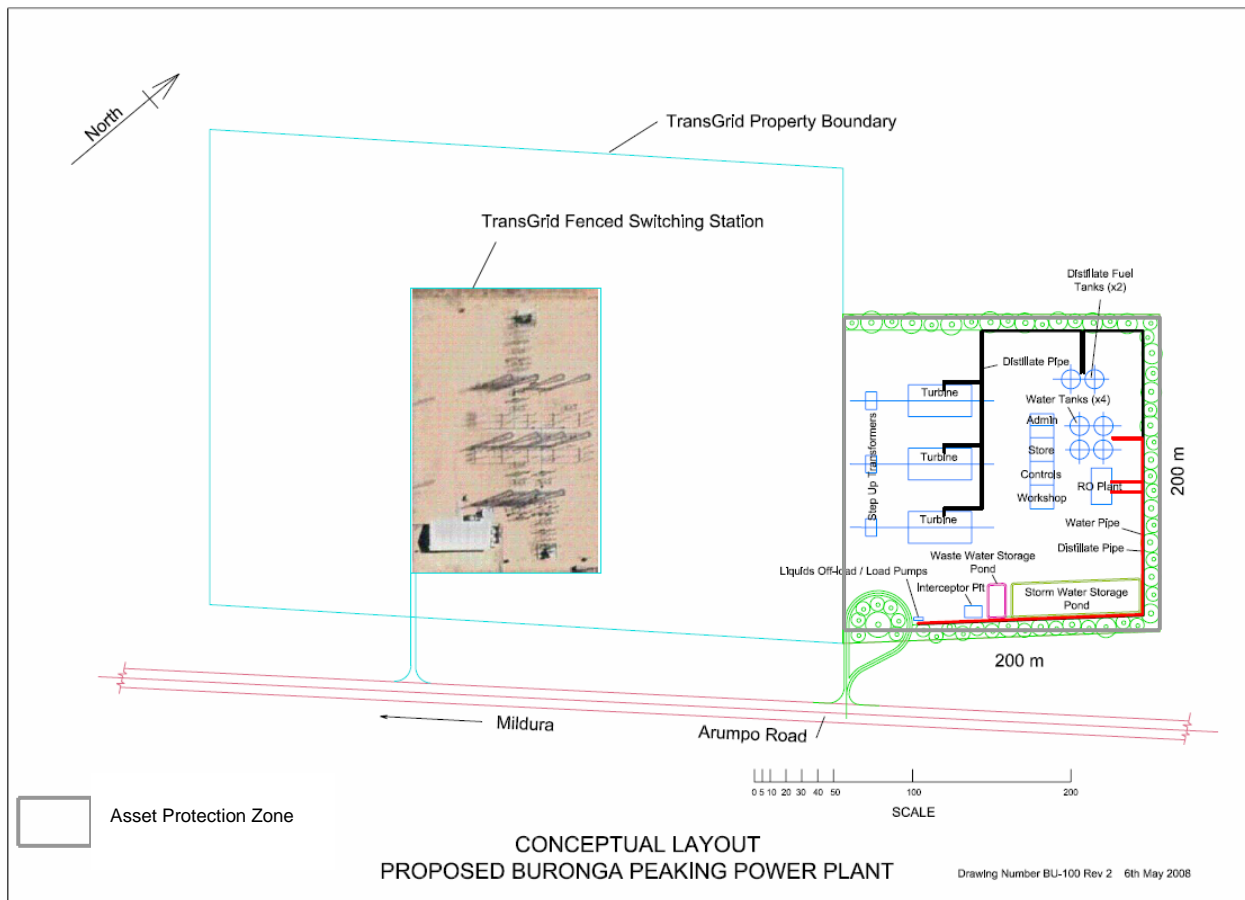


Figure 3-1 Proposed Concept Layout and Asset Protection Zone

Class 8 buildings proposed as part of the facility, such as the workshop, control room, store and administration building, will be within the category of bushfire attack of 'Medium', requiring construction standards to Level 1 of AS3959.

All other items of plant (i.e. the water treatment/RO plant, water tanks, distillate tanks, turbines, transformers, interceptor pit and liquids off-load area) within the site are Class 10 structures. The Building Code of Australia does not provide for bush fire specific performance measures for Class 10 buildings. However, the aims of PBP apply in relation to matters such as access, water and services, emergency planning and landscaping. For developments such as the current proposal, the RFS would assess the project on a merits basis, taking into consideration proposed APZs, water supply and hydrants, access and egress and defensible space.

A summary of the relevant BCA standards for bush fire protection is attached in **Appendix B**. Given that most structures within the facility would be constructed predominantly of sheet metal, concrete or brick, the construction standards that would apply would be met.

Section 3

Bush Fire Hazard Assessment

3.4 Active Mitigation/Suppression

Increased protection for the sites assets will be achieved through a holistic approach to fire mitigation and management with the incorporation of active suppression devices, appropriate management and planning. This will significantly reduce fire risk to the site and surrounding areas.

Fire detection protection and containment concepts within the site would include:

- Incorporation of infra red beam heat detectors to ensure fire protection and management systems for the site are activated in case of fire from adjoining land;
- Water sprinkler or gaseous (e.g. CO₂) systems on fuel storage system, gas turbine enclosure, step-up transformer, administration and control building and workshop;
- Heat detectors and smoke alarms on built assets to enable automatic commencement of fire suppression;
- The site will be remotely monitored at all hours of day and night, signals and alarms from the site will be attended by a locally-resident Turbine Officer; and
- Transportable foam mixing equipment and distillate powered fire pump will be provided within the site, to provide additional fire fighting capability.

An emergency response plan will also be implemented in liaison with relevant local authorities. This will include a "Fire Protection and Management Manual" for the facility which will also incorporate the circumstances under which the site should be attended in the event of off-site fire threats. The RFS Control Centre at Dareton would be consulted during preparation of the Plan.

3.5 Water Supply

Water capacity of 150kL will be reserved for fire protection purposes and 300kL of additional plant process water in storage tanks will be provided on site plus up to 5ML of stormwater could also be available for fire protection purposes. Facilities would include:

- Water access points (RFS compatible) designed to provide active protection of class 8 buildings using a maximum hose length of 60m and 20m maximum distance from truck to water access points;
- Water access point to be provided at the bunded liquids off-load area;
- All above ground water pipes external to the building will be built of metal including any taps;
- Shielded pumps (where provided);
- Above ground tanks are to have their stands protected and be constructed of concrete, metal or comparable fire resistant material;
- Suitable (RFS compatible) connections including a 65mm storz outlet with a gate type or ball type valve; and
- Water sprinkler or gaseous (e.g. CO₂) systems on fuel storage system, gas turbine enclosures, transformers, operation and control buildings, and workshop.

A transportable distillate fire pump and foam mixing trailer will be available on site to assist in rapid control of fire and or management of risk of fire developing at the site from external sources.

Section 3

Bush Fire Hazard Assessment

3.6 Access/Egress

The key access and egress issues for bush fire protection during operation of the facility relate to:

- adequate access for fire fighting vehicles using public roads to a defensible space between an approaching bush fire and the facility;
- safe evacuation egress for fire fighting vehicles and staff vehicles; and
- allowance for a defensible space, which would include a cleared area located between the hazard and the facility that can accommodate fire fighting vehicles safely and provide a staging place for fire fighting.

The proposed facility will be connected to the public road system via a sealed two-way access road from Arumpo Road. The proposed property access will ensure:

- 6m wide sealed carriageway with at least 1 metre either side;
- A minimum height clearance of 4 metres;
- A centre line radius of 20m;
- An RFS compatible lock within the locked gate system; and
- All operational plant land will be surfaced and suitable for the movement of vehicles.

3.7 Landscaping

With the implementation of the following measures, the proposed landscaping will not increase the risk of bush fire attack on the site. Vegetation surrounding the site and within the APZ will be managed to provide:

- Clearly defined on ground APZ management boundaries, e.g. logs placed on the ground, tagged star pickets or boundary fence;
- A minimum height clearance above road of 4 metres;
- Tree canopy separation (by at least 2 metres where possible);
- Discontinuous shrub layer;
- Vertical separation between vegetation strata;
- Tree canopies not overhanging structures;
- Management and trimming of trees and other vegetation in the vicinity of power lines in accordance with the 'ISSC 3 Guideline For Managing Vegetation Near Power Lines' specifications issued by the Industry Safety Steering Committee (ISSC);
- No landscaping trees within 2 metres of any building;
- Retention of low native groundcovers, including grasses and shrubs (where no connection exists between shrubs and between shrubs and trees);
- Maintenance of fuel loads through mowing/slashing during the spring/early summer months;
- Non combustible mulch, e.g. stones; and
- Planting of 'fire retardant' species where possible.

With regard to the species selected for landscape plantings the following is recommended:

- should be fire retardant or less flammable species;
- should comprise native, local provenance stock; and
- should be representative of the vegetation communities recorded on the site.

Section 4

Mitigation Measures

The site is located within and adjacent to bush fire prone land and the proposed facility would be surrounded by a bush fire hazard to the north, west and east. Whilst the minimum specifications of PBP do not apply to Part 3A development proposals, and although the risk of damage to life and property of bush fire attack on the site is considered low, it is considered prudent to design and manage the proposed facility to minimise the risk of bush fire attack. The key elements to bush fire protection on the site comprise:

- APZs extending out (towards the hazard) to a minimum of 15m from the edge of proposed buildings, plant and structures;
- installation of permanent water tanks;
- creation of access to the site and across the site to the water tanks for fire fighting vehicles and for maintenance of the APZs;
- design and management of proposed landscaping to avoid creation of a new bush fire hazard;
- Incorporation of infra red beam heat detectors to ensure fire protection and management systems for the site are activated in case of fire from adjoining land;
- Water sprinkler or gaseous (e.g. CO₂) systems on fuel storage system, gas turbine enclosure, step-up transformer, administration and control building and workshop; and
- Heat detectors and smoke alarms on built assets to enable automatic commencement of fire suppression which would include sprinkler systems and/or non ozone-depleting fire suppression and sealing of the enclosure to ensure fire is managed within structures.

Table 4.1 identifies the strategy for meeting bushfire planning and management objectives for the proposed facility.

Table 4-1 PBP Bush Fire Planning & Management Objectives

Objective (from PBP 2006)	Approach
Ensure that the bush fire risk to adjoining lands is not increased.	Active mitigation/suppression equipment would be supplied in order to ensure that fire risk on adjoining lands is not increased. APZs and suitable landscaping have been implemented to reduce the potential for fire to move from the site.
Provide a minimum defensible space.	Defensible space for all class 8 structures has been provided. This includes the implementation of APZs above those required under acceptable solutions. All land within vegetated boundaries will be flat and covered with a sealed surface, suitable for the movement of vehicles.
Provide better bush fire protection, on a re-development site, than the existing situation. This should not result in new works being exposed to greater risk than an existing building.	The site is not a re-development site
Ensure that the footprint of the proposed building does not extend towards the hazard beyond existing building lines on neighbouring land.	Not applicable
Not result in an increased bush fire management and maintenance responsibility on adjoining land owners unless they have agreed to the development.	All new bush fire protection measures are contained within site boundaries.
Ensure building design and construction enhances the chances of occupant and building survival.	The proposed construction requirements meet acceptable solutions and significant automated fire suppression mechanisms have been included.

Section 4

Mitigation Measures

A summary of the mitigation measures for bush fire hazard is provided **Table 4-2**.

Table 4-2 Summary of Mitigation Measures

Mitigation Measures	Implementation of mitigation measures		
	Design	Construction	Operation
Prepare Bush Fire Management Plan, which would include management and maintenance of APZs, landscaping and vegetation management water supply, access and other bush fire protection measures for the site.		✓	✓
Ensure minimum 15m APZ exists on all sides of proposed facility (measured horizontal distance from outside edge of above-ground structures), incorporating a fuel-free 10m IPA and low fuel 5m OPA.	✓	✓	
APZs should be managed according to 'Standards for Asset Protection Zones' (RFS 2007). The groundcover and understorey strata should be managed to avoid accumulations of dense grass, weeds or shrubs. Dense swards of grass should be slashed prior to summer or as required. Shrubs (where present) should be thinned only as required to ensure no canopy connection. Remove any weeds from the APZ that constitute a fire hazard.		✓	✓
Ensure adequate water supply (through installation of water tanks) at appropriate locations around the facility, in consultation with RFS. The proposed water supply tank should have fittings suitable for RFS uses. Water should not be reliant upon external power supply.	✓	✓	✓
Ensure all-weather access for fire fighting vehicles to all parts of the site. The proposed hardstand within the site will allow RFS vehicles to access all areas and provide a defensible space between structures and a fire front.	✓	✓	✓
Landscaping (as per Section 3.7): <ul style="list-style-type: none"> • Minimum height clearance above road of 4 metres; • Tree canopy separation (by at least 2 metres where possible); • Discontinuous shrub layer (clumps or islands of shrubs where possible; not rows); • Vertical separation between vegetation strata; • Tree canopies not overhanging structures; • No landscaping trees within 2 metres of any building; • Retention of low native groundcovers, including grasses and shrubs (where no connection exists between shrubs and between shrubs and trees); • Maintenance of fuel loads through mowing/slashing during the spring/early summer months; • Non combustible mulch, e.g. stones; and • Planting of 'fire retardant' species where possible. • Use of fire retardant, local provenance species. 	✓	✓	✓
Trees and other vegetation in the vicinity of power lines should be managed in accordance with specifications in 'ISSC 3 Guideline For Managing Vegetation Near Power Lines' specifications issued by the Industry Safety Steering Committee (ISSC).			✓
Include emergency response provisions for bush fire in site Emergency Response Plan. Ensure Plan includes evacuation arrangements, routines, and nominated control staff for bush fire events. Consult RFS Control Centre at Dareton in preparation of Plan.	✓	✓	✓

Section 5

References

Australian Building Codes Board (2006). *Building Code of Australia*. Commonwealth of Australia

RFS (2006a). *Planning for Bushfire Protection: a Guide for Councils, Planners, Fire Authorities, Developers*. NSW Rural Fire Service and Planning NSW, Sydney, NSW.

RFS (2006b). *Guidelines for Single Dwelling Development Applications*. [Online] Available: http://www.rfs.nsw.gov.au/file_system/attachments/State/Attachment_20071101_F80A043B.pdf (07/11/07). NSW Rural Fire Service, Sydney.

RFS (2005). *Standards for Asset Protection Zones*. NSW Rural Fire Service, Sydney. [Online] Available: http://www.rfs.nsw.gov.au/file_system/attachments/State/Attachment_20060130_7DE0A145.pdf.

Standards Australia (2005) AS 2419.1 – 2005 *Fire hydrant installations – System design, installation and commissioning*.

Standards Australia (1999) AS 3959, *Construction of buildings in bushfire prone areas*.

Section 6

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of IPRA and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared in November 2007 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Plates

Plate 6-1 View North Across the Site Showing Existing Low Fuel Levels



Plate 6-2 View East Across the Site Showing Existing Low Fuel Levels



Appendix A

Records of RFS Consultation

Appendix A

Records of RFS Consultation

Date	Activity	Response
12/10/07	URS (Jeremy Pepper) phoned RFS Southwest Control Centre, Dareton (Steve Walker)	RFS agreed to provide comment on bush fire issues relating to the proposal
12/10/07	URS emailed site concept plan and requested comment on a list of issues related to bush fire: Access and egress for fire fighting vehicles; Location of Distillate Fuel Tanks; Location of Fire Water Tanks - adequate water supply for fire fighting. Also note there is no mains water supply along this part of Arumpo Rd; Proposed concrete hard stand areas that could support fire fighting operations across the facility; Construction standards; APZs - PBP indicates that a 15m APZ would be required; RFS general knowledge of fire history and behaviour in this area; emergency procedures in the event of a bush fire; Operational management of bush fire hazard (e.g. slashing, vegetation management, etc)	RFS acknowledged receipt of email.
23/10/07	RFS contacted URS by phone. Steve Walker (RFS) called Will Barrett (URS) with feedback on layout plan & email communication from Jeremy Pepper.	RFS (Steve's) comments: no fire in the area since 1974; layout plan and proposal acceptable with one clarification required; clarification: RFS fire truck access to water. URS and IPRA to confirm whether vehicles will be provided with access across the site and specifically whether fire trucks would have access to the water tanks; and RFS recommend that a charged water hydrant be provided at the site entrance.
08/11/07	IPRA & URS responded to RFS comments	IPRA & URS response communicated to RFS by telephone 8th Nov: vehicular access will be provided to all major plant components including buildings and water tanks water tanks will be fitted with RFS compatible connections including a 65mm storz outlet with a gate type or ball type valve; water access points (RFS compatible) would be designed to provide active protection of assets at the site using a maximum hose length of 60m and 20m maximum distance from truck to water access points; water hydrant will be provided at the site entrance adjacent to the liquids off-load lay-by area.
08/11/07	RFS contacted URS by phone.	No bush fires recorded on site since 1974

Appendix B

BCA Standards for Bush Fire Protection

According to Table A3.4 of PBP (RFS 2006), the category of bush fire attack for buildings on the site is Level 1 (Medium). Structures (including Class 8 buildings) within the site should be constructed to Level 1 under the Building Codes of Australia⁷.

	LEVEL 1 CONSTRUCTION	LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE
Flooring systems	<ul style="list-style-type: none"> • Concrete slab on ground • Enclosed suspended floors - no requirements • Open subfloors; <p>Bearer greater than 600mm above ground – no requirements</p> <p>Bearer less than 600mm above ground require either the floor frame to be protected by non-combustible sheets or timber floor frame to be fire retardant</p>	As for level 1	As for level 2 except that for open subfloors timber floor framing is required to be fire retardant	All floors are to be fully enclosed with a non-combustible material

⁷ Note: This is a summary and does not include all requirements under AS3959. Refer to Section 3 of AS3959.

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	LEVEL 1 CONSTRUCTION	LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE
Supporting posts, columns, stumps, piers and poles	<ul style="list-style-type: none"> • Non-combustible • Fire retardant treated timber treated up to 400mm above finished ground level • Timber mounted on galvanised metal shoes that provide a clearance of 75mm above finished ground or paving 	As for level 1	As for level 2 except that timber in unenclosed floor spaces shall be fire retardant-treated to full height	<p>All floors are to be fully enclosed with non-combustible material</p> <p>All other posts on attached or adjacent structures shall be non-combustible</p>
External Walls	<p>Must have an external leaf with either one or a combination of;</p> <ul style="list-style-type: none"> • Masonry, concrete, pise, rammed earth or stabilised earth • A frame wall that incorporates either a sarking or insulation material immediately behind the cladding • A wall of timber logs gauge planed and the space between the logs sealed to prevent burning debris and to allow for building movement <p>Combustible leaf or cladding must be greater than 400mm above finished ground</p>	<p>As for level 1 except that;</p> <ul style="list-style-type: none"> • PVC cladding is not permitted • External timber wall cladding shall be of fire retardant-treated timber 	As for level 2	<ul style="list-style-type: none"> • External walls shall not include any combustible material • Additional radiant heat protection such as non-combustible fencing or shielding and or a drenching water system

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	LEVEL 1 CONSTRUCTION	LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE
<p>Windows</p> <p><i>Note; A vertical dormer window or clerestory is regarded as a normal window, not a rooflight</i></p>	<p>Openable windows shall be screened with mesh max. aperture 1.8mm that remains in place while the window is open;</p> <ul style="list-style-type: none"> • Aluminium • Bronze • Corrosion resistant steel 	<p>As for level 1 except that aluminium shall not be used</p> <p>In addition, timber shall be fire retardant-treated timber except where protected by non-combustible shutters. Leadlight windows are to be protected by shutters</p>	<p>As for level 2 except that where windows are not protected by non-combustible shutters they shall be glazed with toughened glass</p>	<p>As for level 3 except that non-combustible shutters or windows constructed to withstand 40kw/m² radiant heat exposure for 3 minutes shall be provided on the elevation exposed directly to the hazardous vegetation</p>

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BCA Standards for Bush Fire Protection

	LEVEL 1 CONSTRUCTION	LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE
External Doors	<p>External doors shall be fitted with;</p> <ul style="list-style-type: none"> • Draught excluders, and • Tight fitting door screens fitted with; <ul style="list-style-type: none"> - Aluminium - Bronze - Corrosion resistant steel 	<p>As for level 1 except that aluminium shall not be used</p> <p>If leadlight glazing panels are incorporated in the doors, they shall be protected by shutters constructed of a non-combustible material or of toughened glass</p>	<p>As for level 2 except that;</p> <ul style="list-style-type: none"> • Timber doors shall be fire retardant treated timber or covered in a non-combustible covering <p>OR protected with non-combustible shutters</p> <p>OR shall be solid core having a thickness of not less than 35mm</p> <ul style="list-style-type: none"> • Sliding glass doors may be treated as for windows • If glazing panels are incorporated they shall be of toughened glass 	<p>As for level 3 except that non-combustible shutters or glazing constructed to withstand 40kw/m² radiant heat exposure for 3 minutes shall be provided on the elevation exposed directly to the hazardous vegetation</p>

Appendix B**BCA Standards for Bush Fire Protection**

	LEVEL 1 CONSTRUCTION	LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE
Vents and Weepholes	<p>Vents and weepholes shall be protected with spark guards made from 1.8mm mesh that is either;</p> <ul style="list-style-type: none"> • Aluminium • Bronze • Corrosion resistant steel 	As for level 1 except that aluminium shall not be used	As for level 1 except that aluminium shall not be used	As for level 3
Roofs	<p>Sheeted roofs –Only metal or fibre-cement sheet shall be used. Gaps to be sealed or protected by;</p> <ul style="list-style-type: none"> • Fully sarking the roof with sarking with a flammability index of not more than 5 or • Providing corrosion resistant steel or bronze mesh, profiled metal sheet, neoprene seal, compressed mineral wool or similar material • Rib caps and ridge caps shall be sealed using methods outlined in the AS3959 • Tiled roofs shall be provided with sarking • Shingles and shakes shall not be used • All roofing shall be non-combustible 	As for level 1 construction except that all roof sheeting shall be non-combustible and sarked	As for level 2 construction, except that fibre-reinforced cement or aluminium shall not be used.	As for level 3

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	LEVEL 1 CONSTRUCTION	LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE
Roof lights <i>Note; A vertical dormer window or clerestory window is regarded as a normal window, not a rooflight</i>	<p>All penetrations of the roof space for the installation of roof lights and associated shafts shall be sealed with a non-combustible sleeve or lining</p> <p>Thermoplastic sheet in a metal frame may be used for a roof light, but in a diffuser installed at ceiling level shall be wired or toughened glass in a metal frame.</p> <p>Vented rooflights shall be provided with corrosion resistant steel or bronze mesh.</p>	<p>As for level 1 except that rooflight glazing shall be of wired glass</p> <p>Thermoplastic or toughened glazing shall not be used</p>	As for level 2	As for level 2 except that glazing shall be required to withstand 40kw/m ² radiant heat exposure for 3 minutes
Ventilators	All components must be non-combustible and shall be protected against the entry of sparks and embers with corrosion resistant steel or bronze mesh.	As for level 1	As for level 2	As for level 3 except that roof ventilators shall not be permitted on the plane of the roof nearest to the unmanaged vegetation
Roof mounted evaporative cooling units	Roof mounted evaporative cooling units shall only be used if openings to the cooling unit are encased in corrosion resistant steel or bronze mesh	As for level 1 except that the case of the evaporative cooler shall be of non-combustible material	As for level 2	As for level 3 except that roof mounted evaporative cooling units shall not be permitted on the plane of the roof nearest to hazardous vegetation

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	LEVEL 1 CONSTRUCTION	LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE
Eaves	Eaves shall be enclosed and the fascias or the gaps between the rafters shall be sealed	As for level 1 except that all timber eaves lining and joining strips shall be of fire-retardant treated timber	As for level 2 except that aluminium shall not be used	As for level 3 except that all materials shall be non-combustible
Fascias	No requirements	Fascias are to be either non-combustible or fire-retardant treated timber	As for level 2 except that no fibre-reinforced cement or aluminium sheet shall be used.	As for level 3 except that all materials shall be non-combustible
Gutters and Downpipes	Any materials or devices used to stop leaves collecting in the gutters shall have a flammability index of not greater than 5 when tested in accordance with AS1530.2	As for level 1	As for level 2	As for level 3
Service Pipes	All exposed piping for water shall be of metal. Pipes of other materials shall be buried to a depth of at least 300mm below finished ground level	As for level 1	As for level 2	As for level 3

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BCA Standards for Bush Fire Protection

	LEVEL 1 CONSTRUCTION	LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE
Verandas and Decks	<p>No timbers shall be allowed to directly connect with the remainder of the dwelling</p> <p><u>SUSPENDED SLAB</u>; supported by posts, columns, stumps, piers and poles that are protected by-</p> <ul style="list-style-type: none"> • Non-combustible material • Fire retardant treated timber treated up to 400mm above finished ground level • Timber mounted on galvanised metal shoes that provide a clearance of 75mm above finished ground or paving • OR Enclosed against the entry of embers. The enclosure shall be non-combustible within 400mm of the finished ground level <p><u>SHEET OR TONGUE AND GROOVE FLOOR</u>; is acceptable where bearer is greater than 600mm above ground (see protection for supports above) A sheet or tongue and groove floor that is less than 600mm above finished ground at any point shall be enclosed. This enclosure shall be non-combustible where it is within 400mm of the finished ground level.</p> <p><u>SPACED DECKING</u>; shall have a clearance of at least 5mm between adjacent timbers. The external perimeter of the decking shall not be enclosed nor shall access to the space beneath the decking be impeded.</p> <p>(see protection for supports above)</p>	<p>As for level 1, except that if spaced decking is used, it shall be non-combustible or fire-retardant-treated timber</p> <p>As for level 1, except that if spaced decking is used it shall be non-combustible or fire-retardant-treated timber.</p>	<p>As for level 2 except that all materials shall be non-combustible or where timber is used, it shall be fire-retardant-treated including any balustrades</p> <p>As for level 2 except that all materials shall be non-combustible or where timber is used, it shall be fire-retardant-treated including any balustrades</p>	<p>As for level 3 except all materials shall be non-combustible including, treads risers, balustrade and any other attachments on the side of the dwelling exposed to the unmanaged vegetation</p> <p>As for level 3 except all materials shall be non-combustible including, treads risers, balustrade and any other attachments on the side of the dwelling exposed to the unmanaged vegetation</p>

Source: NSW Rural Fire Service (2006b) Guidelines for Single Dwelling Development Applications.