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Alex Mitchell
C/o Resolve Urban Planning

11th February 2022
Ref 22-020

Attn: Paul McLean
By email to: paul@resolveurbanplanning.com.au

RE: 1 PROGRESS ROAD MOUNT HUTTON NSW
BUSHFIRE HAZARD ASSESSMENT
CONSTRAINTS AND OPPORTUNITIES REVIEW

Dear Paul,

Thank you for engaging Australian Bushfire Consulting Services to provide a review and bushfire hazard assessment for this property. The intent of this document is for planning advice only and it is not suitable as a submission document as part of a development application through Council nor is it a Complying Development Certificate.

The following information provides an investigation into the potential for new residential and potential rezoning and commercial / industrial development at 1 Progress Road Mount Hutton, NSW. It includes a review and summary of bushfire protection measures that will be applicable to any future development within the site covering a granny flat or secondary dwelling, dual occupancy or multi occupancy development, as well as options for rezoning and non-habitable industrial or commercial development.

Properties considered to be bushfire prone land are identified on Councils Bushfire Prone Land Map as being:

- *within or within 100 m of Category 1 (high) hazards or,*
- *within or within 30 m of Category 2 (low) hazards or,*
- *within or within 30 m of Category 3 (medium) hazards.*

The NSW Rural Fire Services (RFS) planning policy *Planning for Bush Fire Protection 2019* (PBP) is applicable to all development on bushfire prone land. This includes an assessment of the proposals adequacy in providing an appropriate combination of bushfire protection measures in terms of asset protections zones (APZs), landscaping, access, service supply and emergency management planning. PBP also provides a means of determining the necessary level of building construction under *AS3959 – 2018 Construction of buildings in bushfire prone areas (AS3959).*

The Bushfire Prone Land Map identifies this property as being within the 30 metre buffer zones from a Category 3 Vegetation. Therefore, it is appropriate to apply *Planning for Bush Fire Protection 2019* to the proposal.

Image 01: Aerial image extract from Dept Lands Property Information

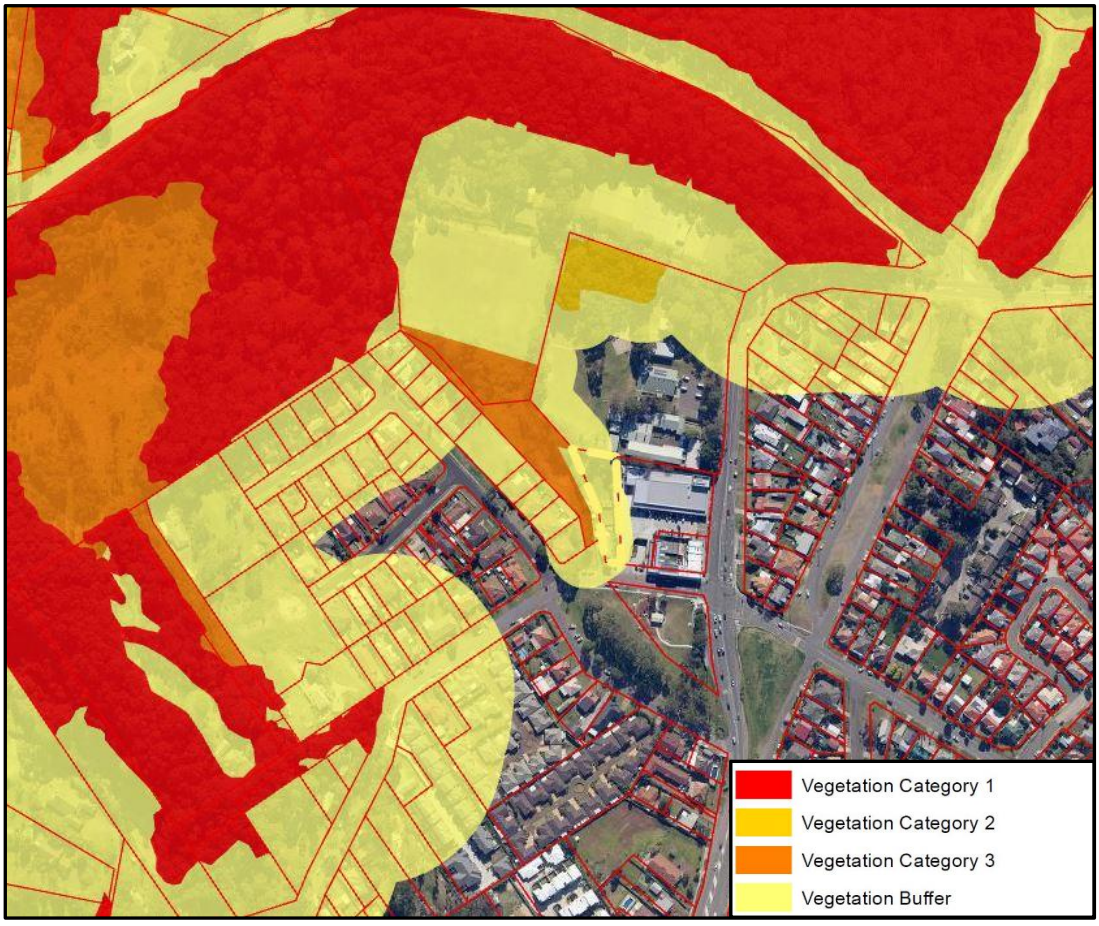


Image 02: Extract of Council's Bushfire Prone Land Map from Dept Lands Property Information

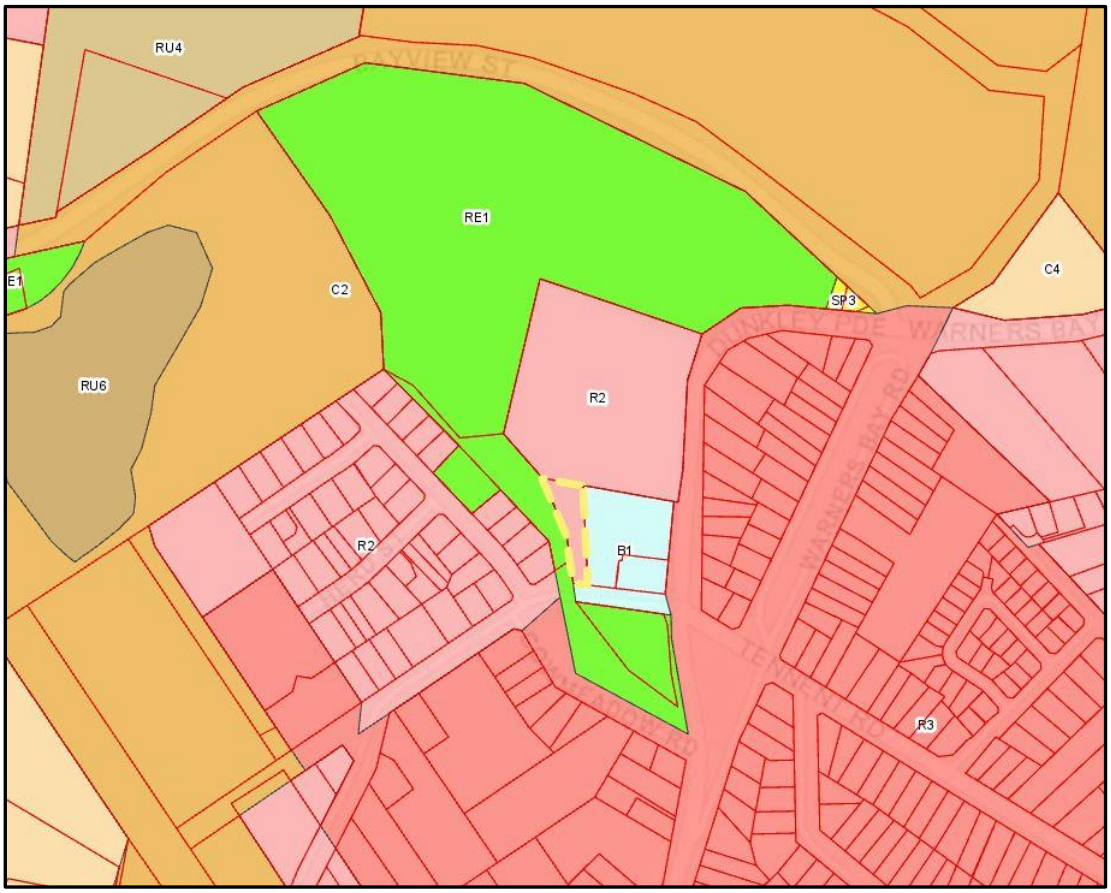


Image 03: Extract of Council's LEP Land Zone Map from Dept Lands Property Information

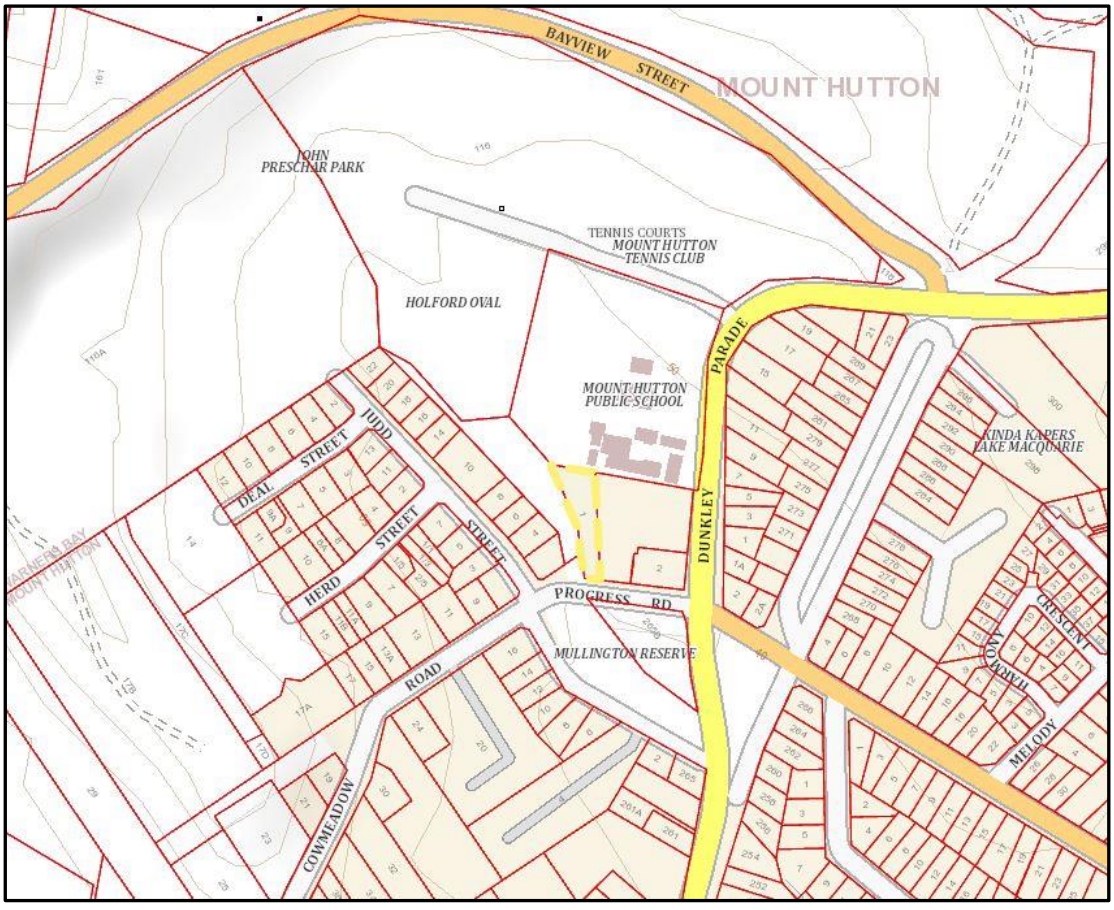


Image 04: 10 m topographic mapping from Dept Lands Property Information

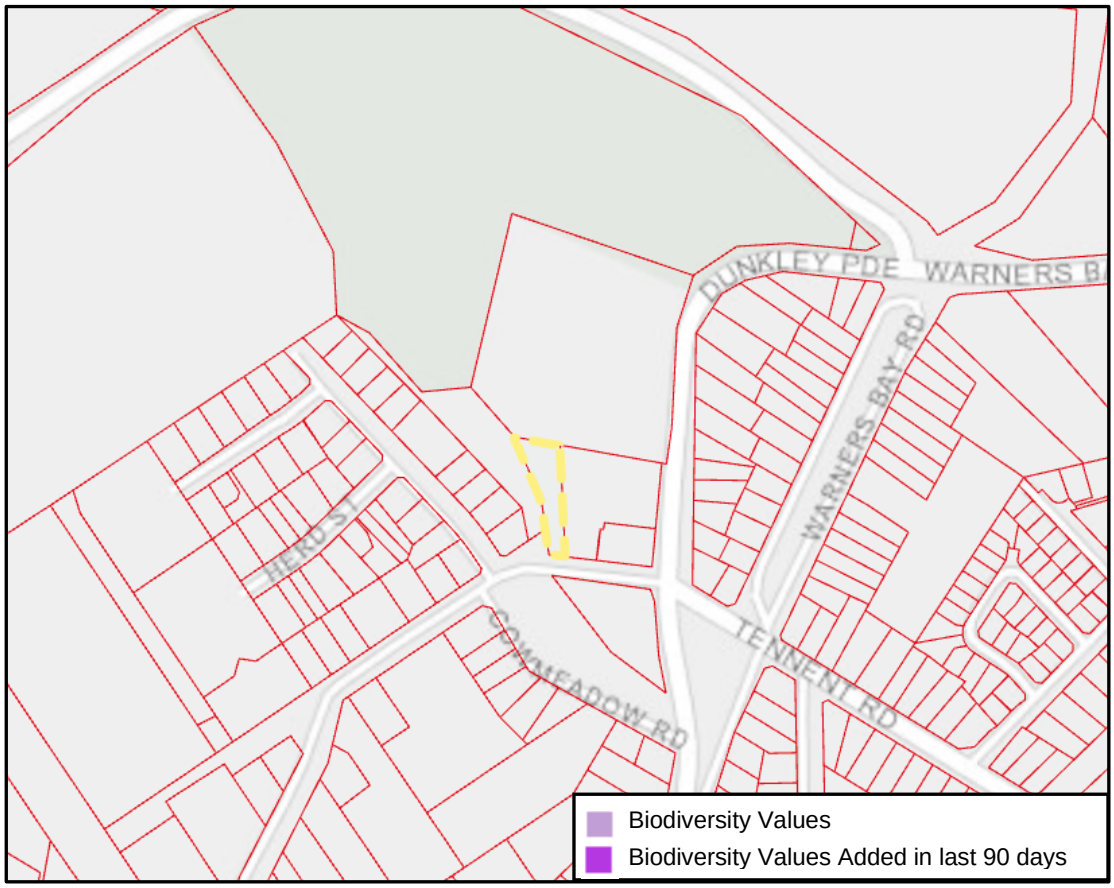


Image 05: Extract of Biodiversity Values Map from Dept Lands Property Information

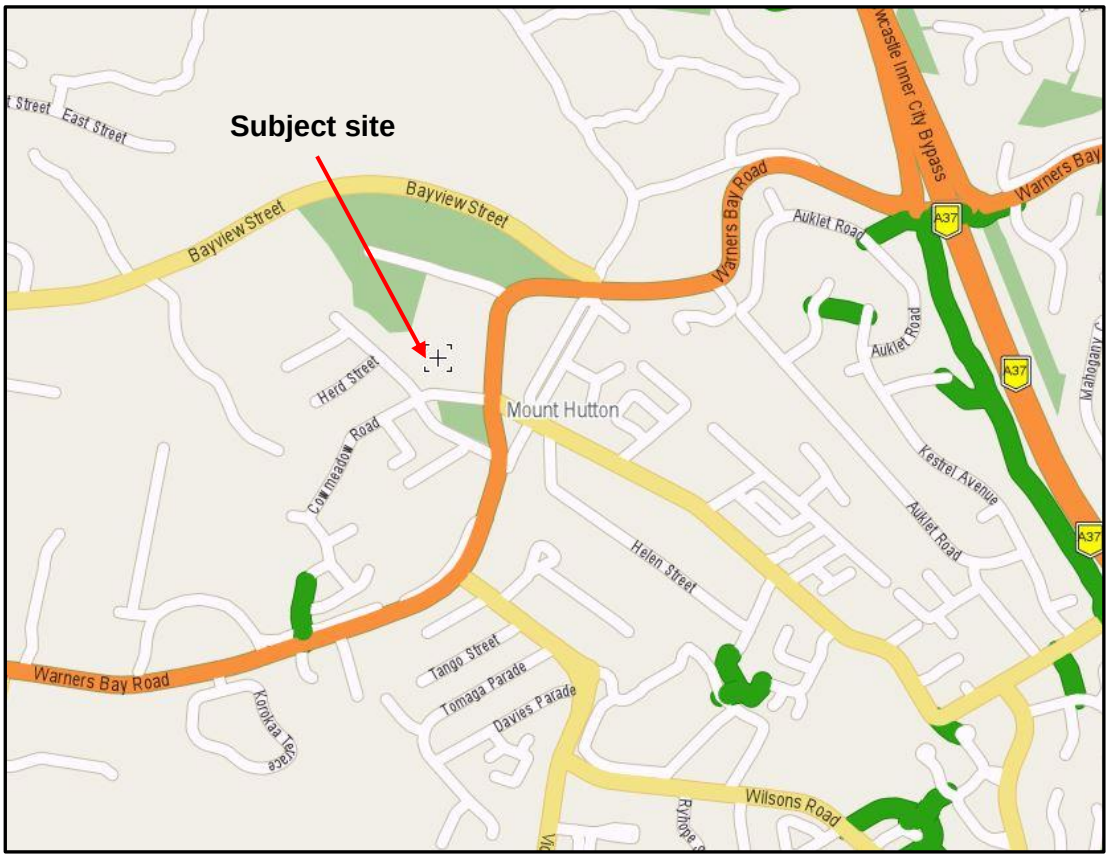


Image 06: Extract from Where-is NSW mapping database'

Field assessment summary:

West

Immediately west of the subject site is a grassed drainage culvert. At the time of my inspection the grasses were ≥ 100 mm long, within and immediately adjacent to the drainage culvert. Further west and adjacent to the residential development along Judd Street the grasses were mown in a strip that coincided with a public thoroughfare through to Holford Oval. Without a formal plan of management or easement over this area to ensure that grasses can be kept below 100 mm the area will be identified by the NSW RFS as a bushfire threat. Therefore for the purposes of this bushfire review the area has been assessed as a grassland hazard.

The topography of the land is on a short embankment down to the drainage line then upslope on a shorter bank to a flatter area further west. There is also a gentle fall from the north to the south along the drainage line.

The effective slope within the grassland has therefore been assessed as 0-5° downslope.

Northwest

Further north along the creek the area is heavily infested with weeds and exotic species. There was a narrow corridor of native trees along the boundary with Mount Hutton Public School and other weed trees were scattered through the area. There was evidence of recent under scrubbing is parts of the area closest to the subject site.

The vegetation was measured to be approximately 0.55 ha in size and did not provide an effective fire run of greater than 50 metres directly towards the subject site. Therefore in accordance with section A1.11.1 within PBP 2019 and for the purposes of this bushfire review, the area has been assessed as a remnant hazard. This allows for the use of a rainforest class to determine the asset protection zones and bushfire attack level regardless of the actual floristic structure present.

The topography of the land to the northwest is on a gentle upslope along the drainage to the north. The effective slope within the remnant hazard has therefore been assessed as 0° & upslope.

Asset Protection Zones:

An Asset Protection Zone (APZ) is a buffer zone between a bush fire hazard and buildings, which is managed progressively to minimise fuel loads and reduce potential radiant heat levels, flame, ember and smoke attack. A fuel-reduced, physical separation between buildings and bush fire hazards is the key element in the suite of bushfire protection measures.

A fuel-reduced, physical separation between buildings and bush fire hazards is the key element in the suite of bushfire protection measures.

There are no minimum APZs for sole occupancy dwelling applications however the aims of PBP 2019 are to limit the potential for flame contact and material ignition. This is taken to be 29 kW/m^2 radian heat impact (which equates to BAL 29 construction). If a new sole occupancy dwelling cannot be easily located within the BAL 29 area, I can support a footprint extending outside this area. PBP 2019 does not prohibit BAL 40 or BAL FZ sole occupancy applications.

However my advice is to avoid the BAL FZ areas if at all possible. Being within the BAL FZ would lead to expensive construction material requirements and the material choices can be very limited and restrictive when you are within 10 metres of the fire source feature.

For BAL FZ applications AS3959 – 2018 requires all elements of construction that are less than 10 metres from the persistent vegetation to be constructed out of materials or systems tested to AS1530.8.2. There are very little materials available tested to this standard and generally you will need to work with a fire engineer and an A1 or C10 accredited certifier for construction material choices.

As an example, double brick construction or tilt up slab is not as yet tested to AS1530.8.2 and is not a deemed to satisfy material accepted by the bushfire standard. A fire engineered solution is therefore necessary for this type of construction where any APZ is less than 10 metres.

Similar to sole occupancy development there are no minimum asset protection zones for commercial / industrial development or non-habitable buildings. However the aims and objectives of PBP 2019 still apply and the NSW RFS will generally impose construction requirements to these types of structures. When a structure is located within the BAL FZ area or is within 6 metres of a habitable dwelling full construction requirements are typically applied.

I reiterate that where a building is located within 10 metres of a fire source feature the construction requirements can be quite restrictive and this applies to commercial or industrial development the same as residential dwellings.

A BAL Ribbon diagram has been provided to assist you in locating future buildings outside the BAL FZ area.

Minimum APZs for subdivisions, multiple occupancy dwellings or secondary dwelling applications must be such that, during a bushfire event, a building footprint is not exposed to greater than 29 kW/m^2 radiant heat impact (BAL 29). A building footprint for any form of increased density development can not be located within the BAL 40 or BAL FZ area.

Asset Protection Zones can be determined from the deemed to satisfy tables within PBP 2019 or by design fire modelling consistent with Method 2 Appendix B of AS3959 – 2018 Construction of buildings in bushfire prone areas.

The required setback from a hazard interface for increased density development on this allotment is:

West	12 metres
Northwest	11 metres

Using design fire modelling and a colourbond fence as a radiant heat shield it may be possible to reduce the minimum setbacks by 1 metre to 11 and 10 metres respectively subject to NSW RFS approval.

The development consent conditions will require that any land not built upon is to be managed as an inner protection area (IPA) in accordance with Appendix 4 of PBP 2019 and the NSW RFS document *Standards for an asset protection zone*.

Asset Protection Zones / Inner Protection Areas (IPA's)

The IPA is the area closest to the asset and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and be a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous. In practical terms, the IPA is typically the curtilage around the dwelling, consisting of a mown lawn and well maintained gardens. When establishing and maintaining an IPA the following requirements apply:

Trees:

- canopy cover should be less than 15% (at maturity)
- trees (at maturity) should not touch or overhang the building
- lower limbs should be removed up to a height of 2m above ground
- canopies should be separated by 2 to 5m
- preference should be given to smooth barked and evergreen trees

Shrubs:

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings
- shrubs should not be located under trees
- shrubs should not form more than 10% ground cover
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass:

- should be kept mown (as a guide grass should be kept to no more than 100mm in height)
- leaves and vegetation debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA as described above should be undertaken regularly, particularly in advance of the bush fire season. When maintaining a garden that is part of an APZ you should:

a) Ensure that vegetation does not provide a continuous path to the buildings;
b) Remove all noxious and environmental weeds;
c) Plant or clear vegetation into clumps rather than continuous rows;
d) Prune low branches two metres from the ground to prevent a ground fire from spreading into trees;
e) Rake and clear fuel from areas under fences, fence posts and gates and trees;
f) Provide suitable impervious areas immediately surrounding buildings such as courtyards, paths and driveways.
g) Provide grassed areas/mowed lawns/ or ground cover plantings in close proximity to buildings.
h) Locate vegetation far enough away from the buildings so that plants will not ignite the buildings by direct flame contact or radiant heat emission;
i) Plant and maintain short green grass around the buildings as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the buildings;
j) Ensure that shrubs and other plants do not directly abut the buildings. Where this does occur, gardens should contain low-flammability plants
k) Not use organic mulch in garden beds adjacent buildings and nonflammable material should be used instead, e.g. Scoria, pebbles, recycled crushed bricks.
l) Not erect brush type fencing and planting “pencil pine” type trees next to buildings, as these are highly flammable.

Construction & Design:

	AS3959 – 2018
BAL Low	It is predicated on low threat vegetation and non-vegetated areas. This Standard does not provide construction requirements for buildings assessed in bushfire-prone areas as being BAL-LOW.
BAL-12.5	BAL-12.5 is primarily concerned with protection from ember attack and radiant heat up to and including 12.5 kW/m^2 where the site is less than 100 m from the source of bushfire attack.
BAL-19	BAL-19 is primarily concerned with protection from ember attack and radiant heat greater than 12.5 kW/m^2 up to and including 19 kW/m^2.
BAL-29	BAL-29 is primarily concerned with protection from ember attack and radiant heat greater than 19 kW/m^2 up to and including 29 kW/m^2.
BAL-40	BAL-40 is primarily concerned with protection from ember attack, increased likelihood of flame contact and radiant heat greater than 29 kW/m^2 and up to and including 40 kW/m^2.
BAL-FZ	BAL-FZ is primarily concerned with protection from flame contact together with ember attack and radiant heat of more than 40 kW/m^2. Construction in the Flame Zone BAL-FZ may require reliance on measures other than construction. The requirements for construction of a building in the Flame Zone are regulated by the building authorities having jurisdiction in the States and Territories of Australia.

AS3959 – 2018 *Construction of buildings in bushfire prone areas* provides for six (6) levels of building construction these being BAL - Low, BAL - 12.5, BAL - 19, BAL - 29, BAL - 40 and BAL - FZ. A Bushfire Attack Level (BAL) is a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and is the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire.

Any future building will need to be constructed in accordance with the respective BAL as detailed within section 3 and 5-9 of *AS3959 – 2018 Construction of buildings in bushfire prone areas* or NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas 2014 as appropriate.

The additional requirements applied by the NSW Rural Fire Services as detailed within section 7.5 of PBP 2019 are also applicable to any future construction.

There are no BAL requirements applied to any detached non habitable Class 10 buildings (shed, garage, carport or the like) that are located greater than 6 metres from any dwelling.

The design of a building also influences bushfire survivability and detail such as the use of re-entrant corners, box gutters and complicated roof design should be avoided where possible.

Repeating my earlier advice for BAL FZ applications AS3959 – 2018 requires all elements of construction that are less than 10 metres from the persistent vegetation to be constructed out of materials or systems tested to AS1530.8.2. There are very little materials available tested to this standard and generally you will need to work with a fire engineer and an A1 or C10 accredited certifier for construction material choices.

As an example, double brick construction or tilt up slab is not as yet tested to AS1530.8.2 and is not a deemed to satisfy material accepted by the bushfire standard. A fire engineered solution is therefore necessary for this type of construction where any APZ is less than 10 metres. This applies to commercial or industrial development the same as residential dwellings.

Any new fences and gates within the APZ areas should be made from non-combustible materials only.

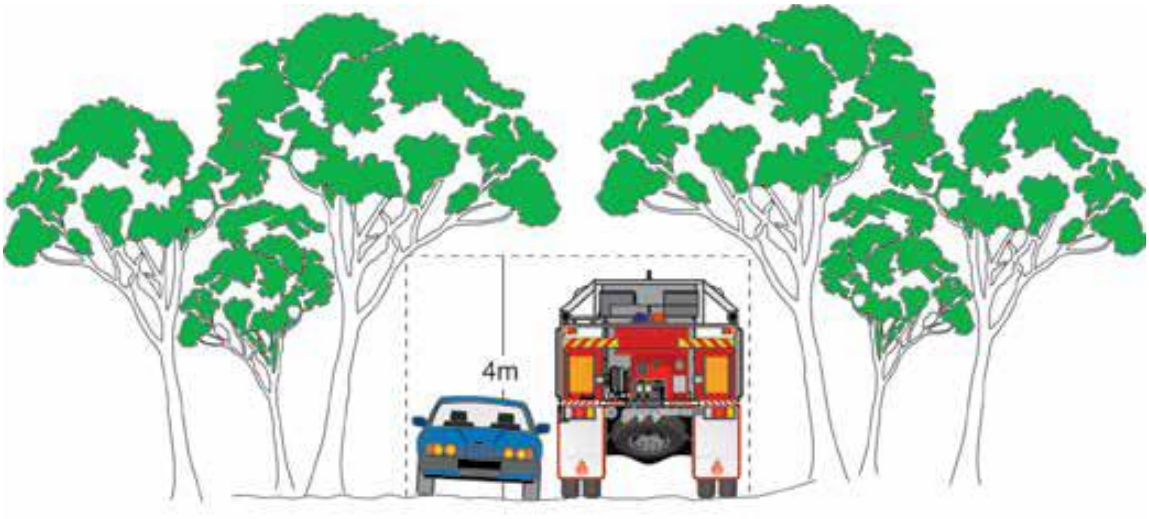
Access:

The subject property has access to Progress Road to the south. Persons seeking to egress the subject site will be able to do so via the property access drive and the existing road infrastructure. It is encouraged that any future occupants complete a Bush Fire Safety Plan addressing “Prepare, Act, Survive” as advocated by the NSW RFS http://www.rfs.nsw.gov.au/ under publications / bushfire safety.

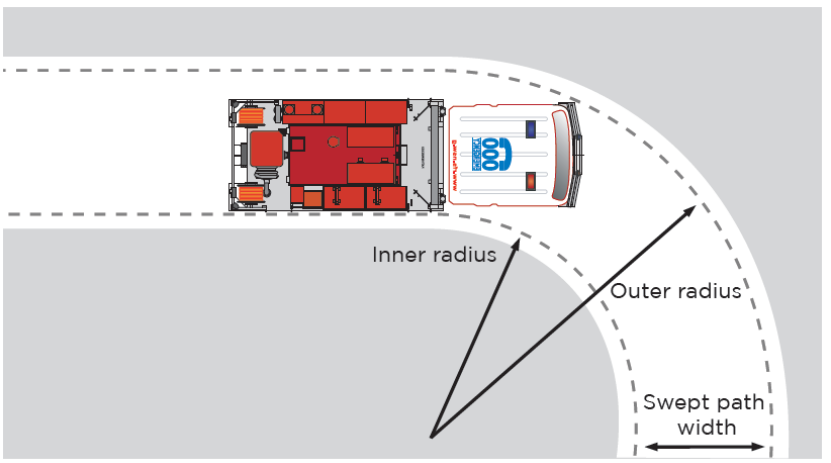
Where the most disadvantaged point of any building footprint is located greater than 70 metres from a public through road the access and water requirements of Table 7.4a within PBP 2019 will be applicable as follows.

- property access roads are two-wheel drive, all-weather roads;
- the capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes);
- maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads;
- minimum 4m carriageway width;
- a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;
- property access must provide a suitable turning area in accordance with Appendix 3;
- curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress;
- the minimum distance between inner and outer curves is 6m;
- the crossfall is not more than 10 degrees;

  Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed.

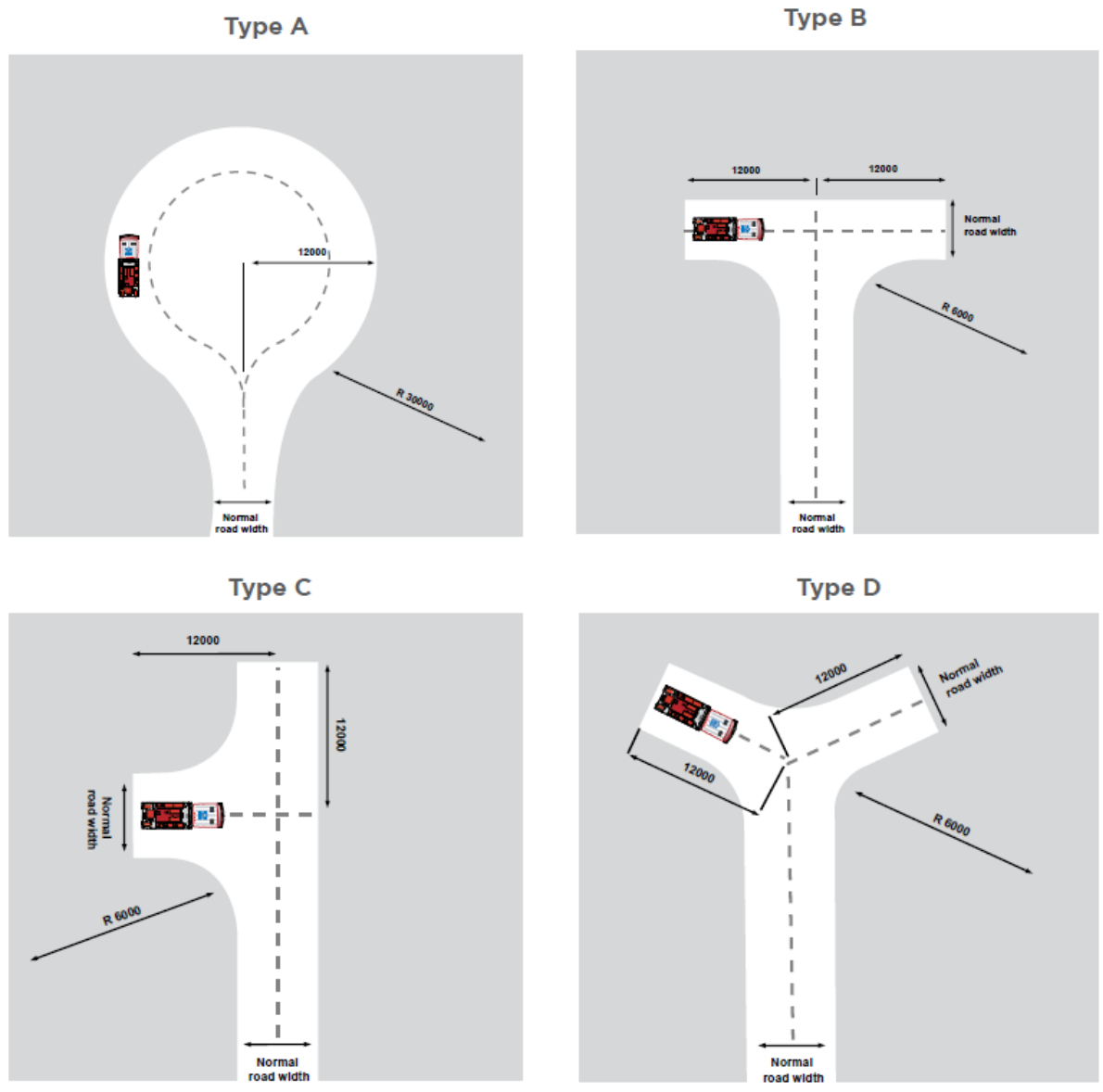


Property access road
4m wide carriage way



Minimum curve radius for turning vehicles.

Curve radius (inside edge in metres)	Swept path (metres width)
< 40	4.0
40 - 69	3.0
70 - 100	2.7
> 100	2.5



Services:

Planning for Bush Fire Protection also addresses the installation of services (i.e., water, electricity and gas) within bushfire prone areas. The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity services so as they do not contribute to the risk of fire to a building.

Electricity:

There is overhead electrical supply provided along Jarret Street. The location of any new electricity service connections shall be installed so that it limits the possibility of ignition of surrounding bush land or the fabric of buildings

- Where practicable, electrical transmission lines are underground.
- Where overhead electrical transmission lines are proposed:

  - lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and

  - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines

Gas:

Reticulated gas mains supply is available in this area. The location and design of any new gas services shall be installed so that it will not lead to ignition of surrounding bushland or the fabric of buildings.

- Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 - *The storage and handling of LP Gas*, the requirements of relevant authorities, and metal piping is used;
- polymer-sheathed flexible gas supply lines are not used, above-ground gas service pipes are metal, including and up to any outlets.

Water:

The subject site is connected to reticulated water mains and a reticulated water supply available in this area. The nearest hydrant is located directly in front of the subject site and along the eastern boundary within the adjacent shopping centre car parking areas.

Where the most disadvantaged point of the dwelling footprint is located greater than 70 metres from Progress Road the water supply requirements of Table 7.4a within PBP 2019 might be applied. PBP 2019 requires that for properties 1,000 - 10,000 m^2 a static water supply (SWS) of 10,000 litres is to be provided. The SWS shall have;

- a connection for firefighting purposes;
- a 65mm Storz outlet with a ball valve is fitted to the outlet;
- ball valve and pipes are adequate for water flow and are metal; supply pipes from tank to ball valve have the same bore size to ensure flow volume;
- underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank;
- a hardened ground surface for truck access is supplied within 4m;
- above-ground tanks are manufactured from concrete or metal;
- raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959);
- unobstructed access can be provided at all times;
- underground tanks are clearly marked; tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters;
- all exposed water pipes external to the building are metal, including any fittings;
- tanks do not have to be dedicated for fire services.

Alternative options to PBP 2019 access and water requirements:

You may consider an alternate approach to NSW RFS requirements by means of compliance with the *Fire & Rescue NSW Fire Safety Guidelines for minor residential development Version 2 1 Sept 2016* (attached).

If a fire appliance can be located within 60 metres of a hydrant and be within 90 metres of the most disadvantaged point of the rear building envelope compliant with the NSW Fire & Rescue policy then you will not need a static water supply and onsite turning provisions are not required. You will only need to provide a 4 metre wide access drive into the property to the point where the fire appliance will be within 90 metres of the rearmost building footprint.

As this is a Fire & Rescue NSW coverage area compliance with their access provisions should be acceptable and the need to comply with NSW Rural Fire Services requirements should not be seen as the only solution.

I have considered a plausible layout and the development would only need to provide a 4 metre wide access drive for the first 15 metres into the property and compliance with the Fire & Rescue NSW Policy would be achieved. This can be further reviewed and fine-tuned when an indicative site layout is provided.

Conclusion:

The subject property is determined to be bushfire prone land and the proposal must achieve compliance with the aims and objectives of *Planning for Bush Fire Protection 2019*. This is achieved by providing a combination of bushfire protection measures including asset protection zones and construction measures to mitigate against the impacts from bush fire including smoke, embers, radiant heat and flame contact and include suitable access, services supply and a means of maintaining the bushfire protection measures for the life of the development.

Having reviewed the site potential for residential development the most important considerations include the following;

Asset Protection Zones;

- There are no minimum APZs for sole occupancy dwelling applications however the aims of PBP 2019 are to limit the potential for flame contact and material ignition. This is taken to be 29 kW/m^2 radian heat impact (which equates to BAL 29 construction). If a new sole occupancy dwelling cannot be easily located within the BAL 29 area, I can support a footprint extending outside this area as PBP 2018 does not prohibit BAL 40 or BAL FZ sole occupancy applications.

- However my advice is to avoid the BAL FZ areas if possible. Being within the BAL FZ would lead to expensive construction material requirements and the material choices can be very limited and restrictive when you are within 10 metres of the fire source feature.

- Similar to sole occupancy development there are no minimum asset protection zones for commercial / industrial development or non-habitable buildings. However the aims and objectives of PBP 2019 still apply and the NSW RFS will generally impose construction requirements to these types of structures. When a structure is located within the BAL FZ area or is within 6 metres of a habitable dwelling full construction requirements are typically applied.

- A building footprint for any form of increased density development cannot be located within the BAL 40 or BAL FZ area. The required setback from a hazard interface for increased density development on this allotment is:

West	12 metres
Northwest	11 metres

- Using design fire modelling and a colourbond fence as a radiant heat shield it may be possible to reduce the minimum setbacks by 1 metre to 11 and 10 metres respectively subject to NSW RFS approval.

- The development consent conditions will require that any land not built upon is to be managed as an inner protection area (IPA) in accordance with Appendix 4 of PBP 2019 and the NSW RFS document *Standards for an asset protection zone*.

Construction;

- The future buildings will need to be constructed in accordance with the respective BAL requirements as detailed within sections 3 and 5-9 of *AS3959 – 2018 Construction of buildings in bushfire prone areas* or NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas 2014 as appropriate.

- The additional requirements applied by the NSW Rural Fire Services as detailed within section 7.5 of PBP 2019 are also applicable to any future construction.

- For BAL FZ applications AS3959 – 2018 requires all elements of construction that are less than 10 metres from the persistent vegetation to be constructed out of materials or systems tested to AS1530.8.2. There are very little materials available tested to this standard and generally you will need to work with a fire engineer and an A1 or C10 accredited certifier for construction material choices.

Services;

- Conditional approval of any future development will also require compliance with services supply (electricity and gas). Specific details on these matters have been included within this review.

Access;

- The assessment of the access requirements to comply with the NSW RFS policy *Planning for Bush Fire Protection 2019* are detailed herein. I note that site constraints may make providing this access inclusive of the turning head difficult or costly. A static water supply of 10,000 litres could also be required.

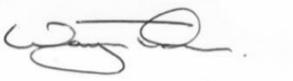
- You may also consider an alternative approach by means of compliance with the *Fire & Rescue NSW Fire Safety Guidelines for minor residential development Version 2 1 Sept 2016*. As this is a Fire & Rescue NSW coverage area compliance with their access provisions should be acceptable. The need to comply with NSW Rural Fire Services requirements should not be seen as the only solution.

- I have considered a plausible layout and the development would only need to provide a 4 metre wide access drive for the first 15 metres into the property and compliance with the Fire and Rescue NSW Policy would be achieved. If this is provided then onsite turning heads and a static water supply will not be required, subject to NSW RFS approval. This can be further reviewed and fine-tuned when an indicative site layout is provided.

Comments provided are based on the requirements of the *Environmental Planning and Assessment Act* 1979, the *Rural Fires Act* 1997, the *Rural Fires Regulations* 2013, the RFS document known as *Planning for Bush Fire Protection 2019* and *Australian Standard 3959 2018 'Construction of buildings in bushfire-prone areas'*.

Should you have any further questions please do not hesitate to contact me.

Australian Bushfire Consulting Services



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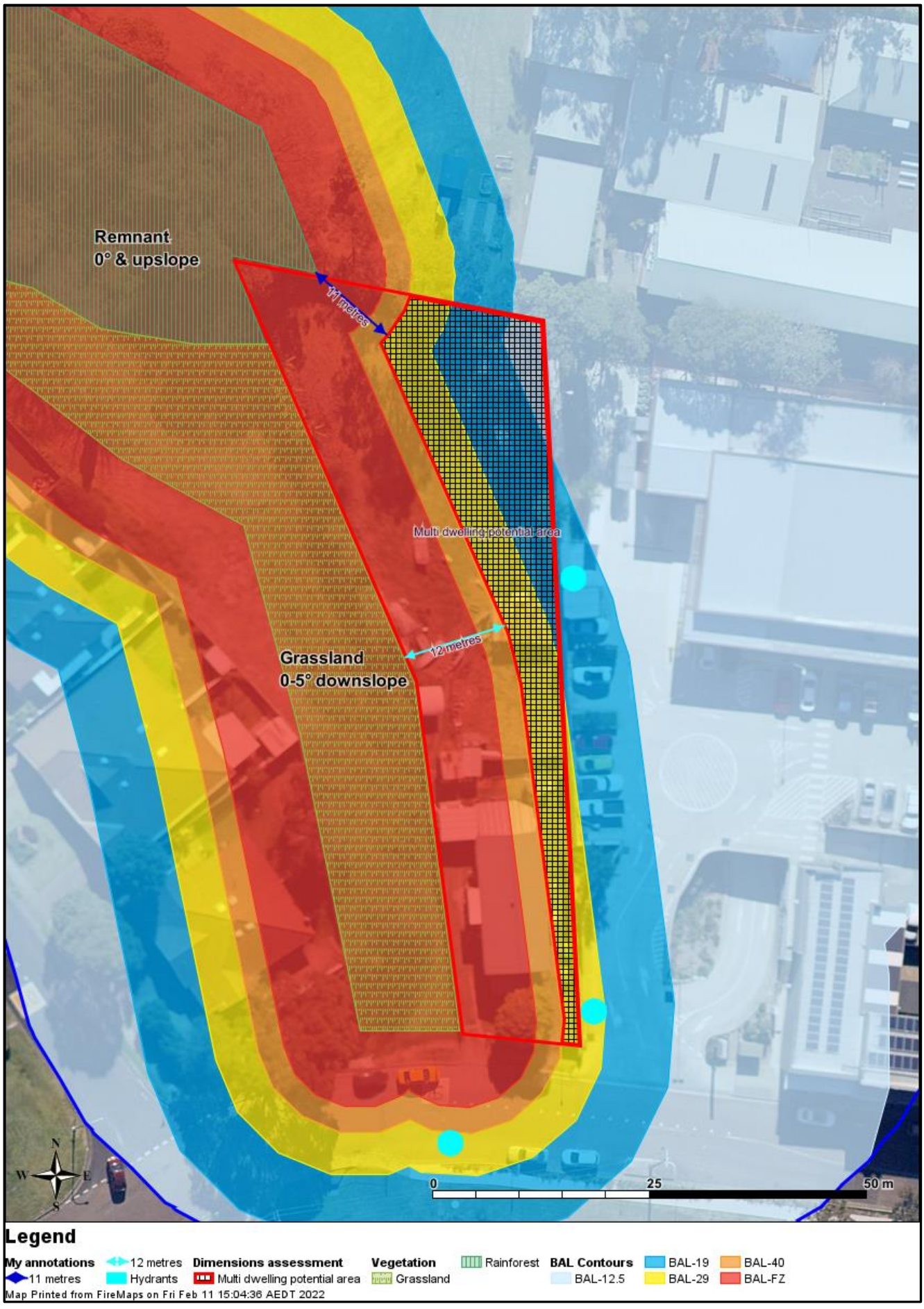

Attachment 01: Site assessment summary

Attachment 02: Asset Protection Zone assessment summary for multi dwelling development

Attachment 03:

Fire & Rescue NSW Fire Safety Guidelines for minor residential development Version 2 1 Sept 2016

Fire & Rescue NSW

Fire safety guideline

Fire hydrants for minor residential development

Version 02
Issued 1 September 2016

Fire Safety Branch
Community Safety Directorate

Published by
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Community Safety Directorate
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01	15 Apr 2009	MSFSU	ADBER
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Contents

1 Purpose

The purpose of this document is to provide guidance on the provision of vehicular access to minor residential developments for firefighters and water for firefighting in the instance of a fire occurring within the development.

2 Scope

This guideline details Fire & Rescue NSW (FRNSW) recommendations for:

a) providing vehicular access for FRNSW fire appliances

b) providing water to allow firefighting operations to be undertaken

c) installing a fire sprinkler system in dwellings not readily accessible to firefighters.

3 Application

This guideline applies to new residential development comprising solely of class 1 and class 10 buildings, as per the *National Construction Code (NCC) Series Volume Two*, within any fire district.

Where a minor residential development contains any other classification of building the provisions of *NCC Series Volume One* are to be applied to those building classifications, including any requirements for fire hydrant coverage as required by Australian Standard *AS 2419.1 Fire hydrant installations – System design, installation and commissioning*.

This guideline assists land owners, developers and urban planners/designers to plan minor residential development giving appropriate consideration to the needs of FRNSW to undertake firefighting operations during a fire emergency.

This guideline has been developed in the public interest, and is intended to be used by any consent authority considering a development application for minor residential development (refer to section 79C(1)(e) of the *Environmental Planning and Assessment Act 1979*).

Note: Under section 80A of the *Environmental Planning and Assessment Act 1979*, the consent authority may impose requirements from this guideline on the owner/developer as a condition on the development consent.

4 Definitions

The following definitions apply in this document:

Carriageway — means any public road, private access road, shared traffic zone, laneway, accessway or the like, whether having a sealed surface layer or not, that is specifically designed for the carriage of vehicles.

Dwelling — means a building, or group of attached buildings, that is privately owned to be occupied as a place of residence or abode (e.g. a house, townhouse or villa).

Fire appliance — means a purpose designed emergency vehicle that provides firefighting, rescue and hazmat capability at an emergency incident.

Fire district — means an area to which the *Fire Brigades Act 1989* applies in relation to fires and contributions to costs. Fire districts are constituted by the Governor under Section 5 of the *Fire Brigades Act 1989* by order published in the NSW Gazette.

Fire hydrant — means an assembly installed on a mains water or private water pipeline, which provides a valved outlet to permit a supply of water to be taken for firefighting.

Fire hydrant, feed — means a fire hydrant used to supply water to a fire appliance.

Fire hydrant, private — means a fire hydrant installed on a water pipeline which is owned and maintained by private lot owners, and is used to supply water to a fire appliance.

Fire hydrant, street — means a fire hydrant installed on a mains water pipeline which is owned and maintained by the relevant water supply authority, and is used to supply water to a fire appliance.

Mains water — means a continuous pressurised supply of water through a pipe network, usually below ground, providing potable or recycled water for domestic use.

Minor residential development — means any development that involves the subdivision of new or existing land into separately titled lots for private dwelling ownership and where not all dwellings have direct frontage onto a public road. This can include battleaxe block style housing involving a single dwelling, or multi-dwelling estates under strata or community titles.

Pinch point — means a narrow point of passage for a fire appliance around an immovable object (e.g. gate, barrier, bollard, pylon, utility pole, tree, drain, existing structure).

Turning circle radius — means the minimum arc radius that provides wall-to-wall clearance for a fire appliance turning at full steering lock (e.g. to negotiate corners or turnaround areas).

Water supply authority — means an authority recognised under the *Water Management (General) Regulation 2011* to supply water to consumers.

5 Background

When fire occurs, it is life-critical to get firefighters and equipment as close to the affected dwelling in the shortest time possible. A typical dwelling (e.g. house) with direct frontage to a public road is generally accessible during a fire emergency.

However, minor residential developments often present firefighters with unique challenges which may include:

- locating the affected dwelling if it is hidden behind another, remote from the street access, or nestled amongst a cluster of dwellings in close proximity to each other
- life-critical delays to firefighting operations if firefighters are required to traverse longer distances between the fire appliance (i.e. equipment) and the dwelling
- fire appliance access to dwellings remote from the public road when the private carriageway does not provide appropriate access
- greater potential for fire spread between dwellings located in close proximity.

For typical dwellings, firefighting operations also involve the fire appliance drawing water from the nearest street fire hydrant connected to the mains water supply. The nearest street fire hydrant may not be suitable for certain minor residential developments. Developments should therefore offer either equivalent water supply provisions for firefighting, or an alternative water source to assist with fire suppression activities.

6 Access for fire appliance

6.1 Minor residential development should ensure no part of any dwelling is more than 90m from a carriageway that can be readily accessed and traversed by a fire appliance (see Figure 1 and Figure 2).

Note: The 90m distance is equivalent to three lengths of standard 30m firefighting hose being connected to the fire appliance.

6.2 The carriageway should be constructed to support a fire appliance weighing up to 15 tonnes, including being sealed with guttering and drainage. The carriageway is required to have:

a) an unobstructed width of 4.0m, including from any parked vehicles (see Figure 2)

b) a pinch point providing a minimum clearance of 3.0m and is not longer than 30m

c) a minimum 3.5m clearance from any overhanging obstructions

d) a gradient no greater than 1:6

e) a turning radius of not less than 10m (see Figure 3 and Figure 4).

Note: For further information refer to FRNSW *Guidelines for emergency vehicle access* which is available at firesafety.fire.nsw.gov.au.

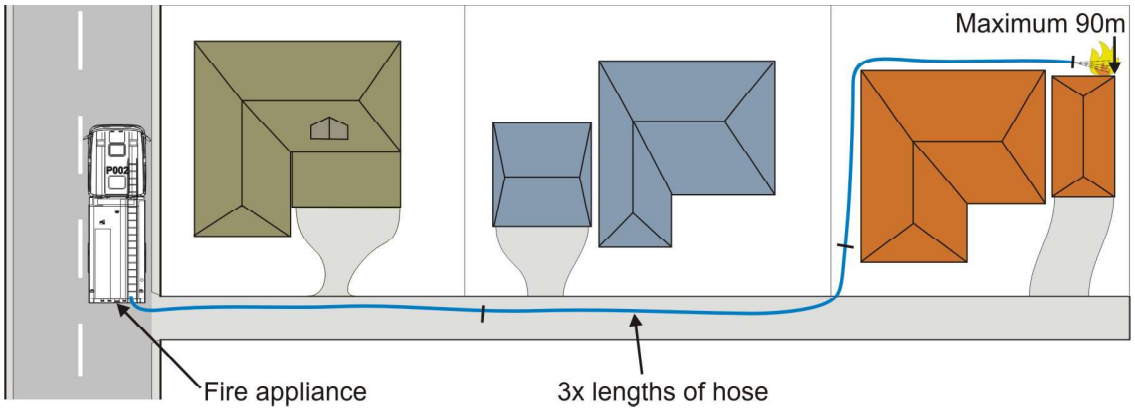

Figure 1 Example of 90m hose coverage from a public road

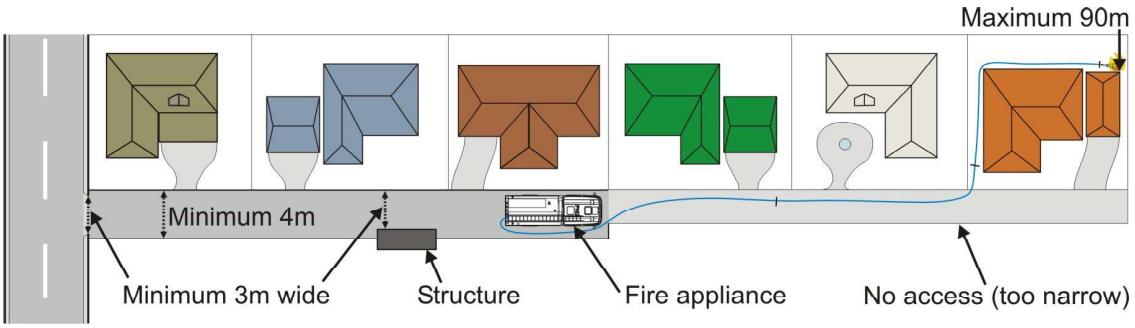

Figure 2 Example of 90m hose coverage from an accessible private carriageway

6.3 Any private carriageway longer than 120m from the public road is to include suitable turnaround provisions for a fire appliance, which can include a cul-de-sac turning area (see Figure 3), three-point turning bay, or continuous ring-road (see Figure 4).

6.4 If local area traffic management principles are to be adopted within the development, any traffic control devices installed must not prohibit access for fire appliances.

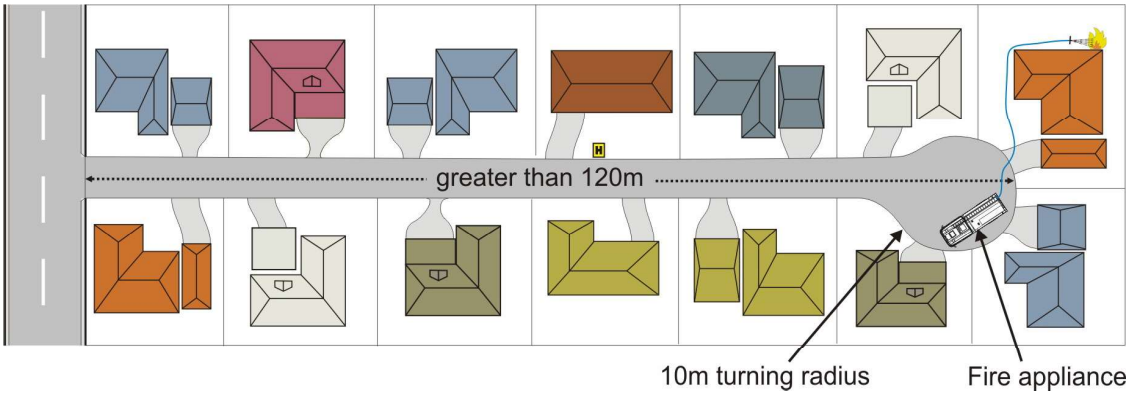

Figure 3 Example of cul-de-sac turning area for fire appliance

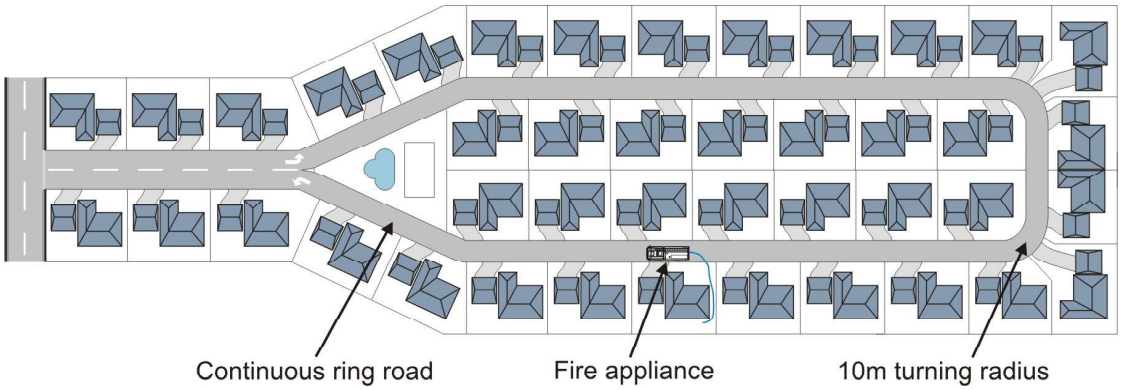

Figure 4 Example of a continuous ring road around a community estate

7 Water for firefighting

7.1 Street fire hydrants

7.1.1 In areas where FRNSW are available to attend a building fire, the appropriate water supply authority is required to provide fire hydrants in accordance with Subdivision 4 of the *Water Management (General) Regulation 2011*. These are generally provided below ground on the mains water supply every 120m along the public road, and are known as 'street fire hydrants'.

7.1.2 If the water supply authority does not have a street fire hydrant within 60m of the entrance to the development (60m being midway between 120m spaced hydrants), a request should be made to the water authority to have a street fire hydrant installed on the mains water supply near the entrance of the development.

Note: Any request made to the water supply authority to have a street fire hydrant installed will most likely be at the expense of the development owner.

7.1.3 Where access is midway between two street fire hydrants (i.e. 60m), a fire appliance positioned at the entrance should still be able to connect to the street mains water supply using two (2) lengths of hose (see Figure 5).

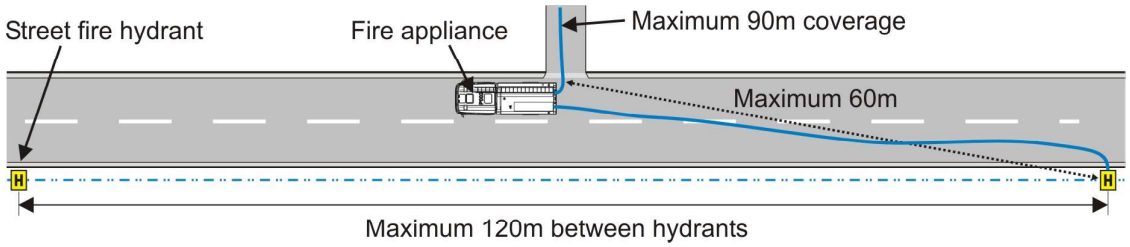

Figure 5 Street fire hydrants installed along public road by water supply authority

7.1.4 If the minor residential development will have a private carriageway providing fire appliance access as per section 6, the distance from a fire appliance on the carriageway to the nearest street fire hydrant should not exceed 60m (see Figure 6).

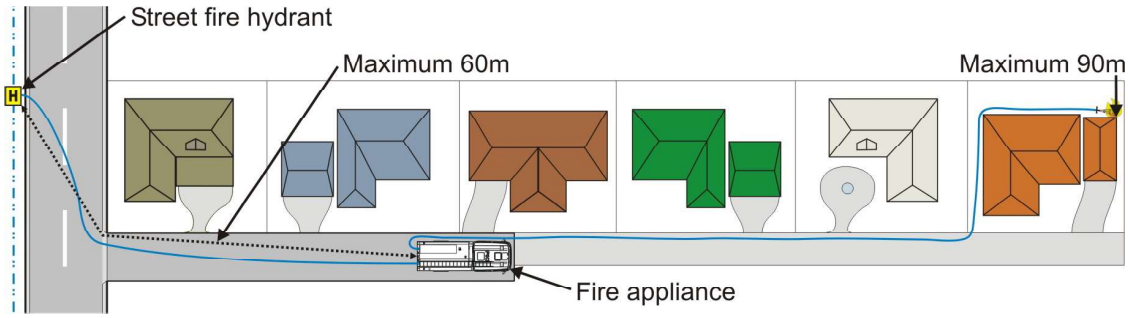

Figure 6 Example of street fire hydrant used by fire appliance on private carriageway

7.1.5 An additional street fire hydrant can be installed at the intersection of the private carriageway and public road, therefore allowing the carriageway to be up to 60m long without a private fire hydrant needing to be installed (see Figure 7).

Note: If fitted, the additional street fire hydrant will be owned and maintained by the water supply authority.

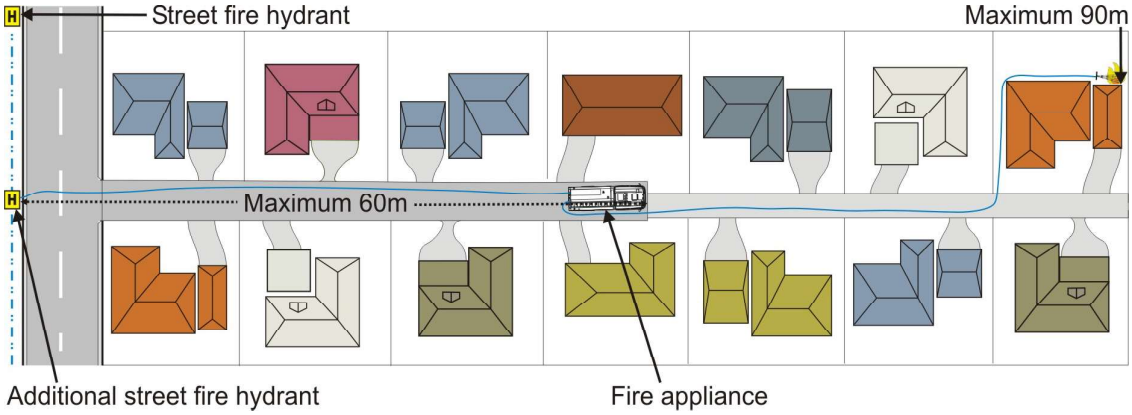

Figure 7 Example of additional street fire hydrant for maximising carriageway length

7.1.6 Where a street fire hydrant requires firefighters to close the public road in order to use the hydrant (i.e. located on the opposite side of the road to the development), FRNSW are to be consulted about the suitability of using that street fire hydrant.

7.2 Private fire hydrants

7.2.1 If a private carriageway provides fire appliance access as per section 6, and the distance from the nearest street fire hydrant to the fire appliance can exceed 60m, then private fire hydrants should be installed (see Figure 8).

Note: Private fire hydrants should provide FRNSW with a water supply to undertake firefighting operations in the absence of any street fire hydrant.

7.2.2 A private fire hydrant should be installed not more than 60m from the public road, then not more than 120m apart along the private carriageway (see Figure 8).

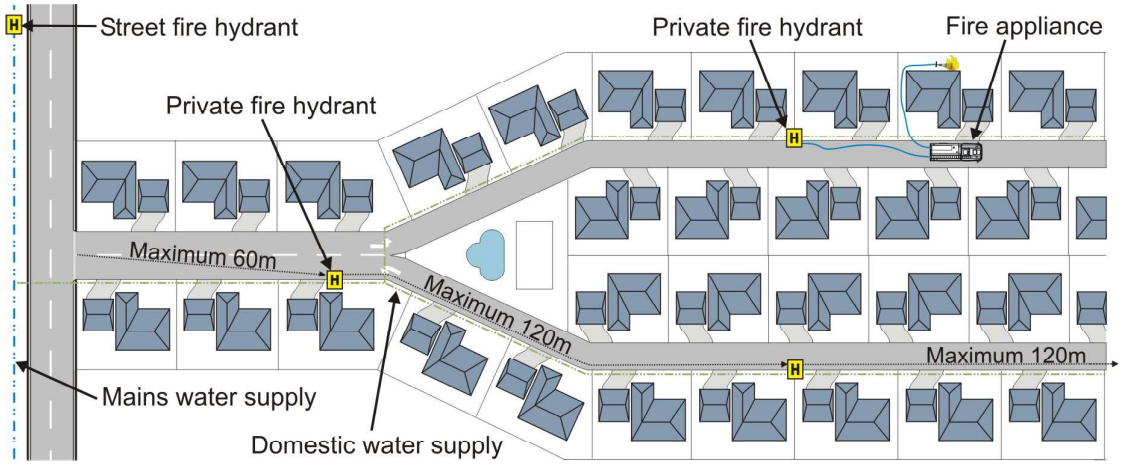

Figure 8 Private fire hydrants installed on domestic water supply

7.2.3 Private fire hydrants should be connected to the domestic water supply pipe for the development, with the supply pipe having a nominal size of not less than DN 100 to allow sufficient water pressure and flow for firefighting operations.

7.2.4 The most hydraulically disadvantaged fire hydrant should be able to deliver at least 10 litres of water per second at 150kPa residual pressure when at the water supply authority's expected 95th percentile performance. When this flow rate cannot be achieved, FRNSW should be consulted.

Note: Significant hydraulic loss will occur at the domestic supply connection point, which is to be fitted with a backflow prevention device in accordance with the water supply authority's requirements. A hydraulic consultant or fire services engineer may need to be engaged to calculate the appropriate diameter, length and arrangement of the domestic water supply pipe.

7.2.5 The domestic water supply pipe should run adjacent to the carriageway so that private fire hydrants are installed in positions readily accessible at all times. Appropriate fire hydrant locations include at carriageway intersections and corners, adjacent to kerbs, within footpaths or in front of lot boundaries (i.e. fence line).

7.2.6 When planning the location of private fire hydrants consideration should be given to ensuring that they cannot be parked over by vehicles (e.g. barriers, bollards) and do not obstruct traffic flow when in use.

Note: Traffic control devices such as pedestrian refuges, slow points and islands can be used as suitable fire hydrant locations.

7.2.7 The private fire hydrants installed should be below-ground spring hydrant valves complying with Australian Standard *AS 3952-2002 (R2015): Water supply - Spring hydrant valve for waterworks purposes* (see Figure 9).

Note: Spring hydrant valves are used with a standpipe which is carried on all fire appliances.

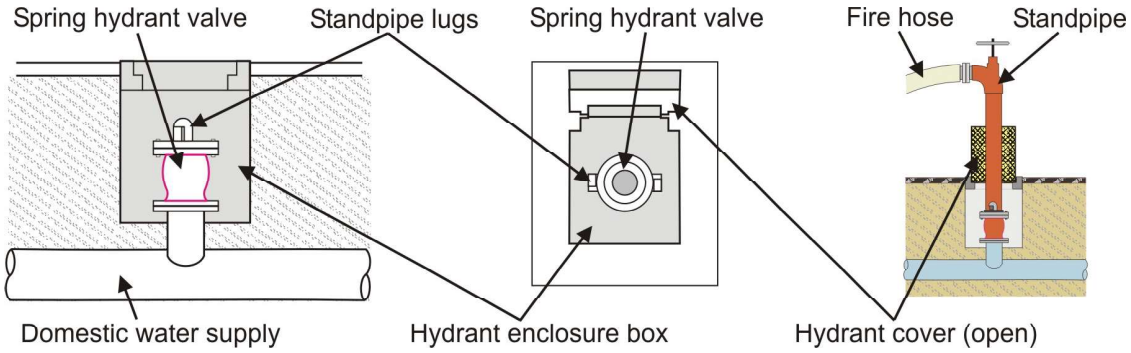

Figure 9 Spring hydrant valve connected to domestic water supply

7.2.8 If there is any potential for below-ground hydrants being parked over by vehicles, a single head above ground fire hydrant valve should be fitted instead.

Note: Above ground fire hydrants are prone to being easily damaged, tampered with, and improperly used by residents. Appropriate measures should be implemented to mitigate these risks (e.g. barriers, bollards, '003' key lock).

7.2.9 Spring hydrant valves should be covered by a yellow hydrant cover plate for easy identification. The cover plate is to be securely mounted (e.g. within a concrete block) for stability. The cover plate must not be marked as the water supply authority.

7.2.10 A blue 'cat eye' reflective road marker is to be fitted on the carriageway opposite each private fire hydrant to assist firefighters locate the hydrant. The reflective marker is to be fitted 25mm off the carriageway centre line on the side the hydrant is located.

7.2.11 A hydrant identification plate (e.g. H, HP, HR) is to be fitted to a white marker post adjacent to each private fire hydrant. The marker post is to be securely mounted (e.g. concrete block), made of metal, white, and protrude at least 1m above the ground.

7.2.12 Private fire hydrants are the responsibility of all owners within the development (i.e. all strata/community title holders), therefore all owners are responsible for ongoing maintenance and repairs necessary for any private fire hydrant.

Refer to the relevant water supply authority's policy on connections for servicing obligations under strata or community titles. Any servicing conditions should be included in the strata or community title management statement.

7.2.13 The consent authority is to consider imposing a condition of consent that requires owners/title holders to arrange the inspection and maintenance of private fire hydrants, scheduled at intervals not greater than one year apart.

7.3 Home fire sprinkler system

7.3.1 If the most disadvantaged point of any dwelling within minor residential development is unable to be reached by a 90m hose lay (i.e. three lengths of hose), the dwelling is to have an automatic home fire sprinkler system installed to provide effective control of the fire while firefighting crews gain access (see Figure 10).

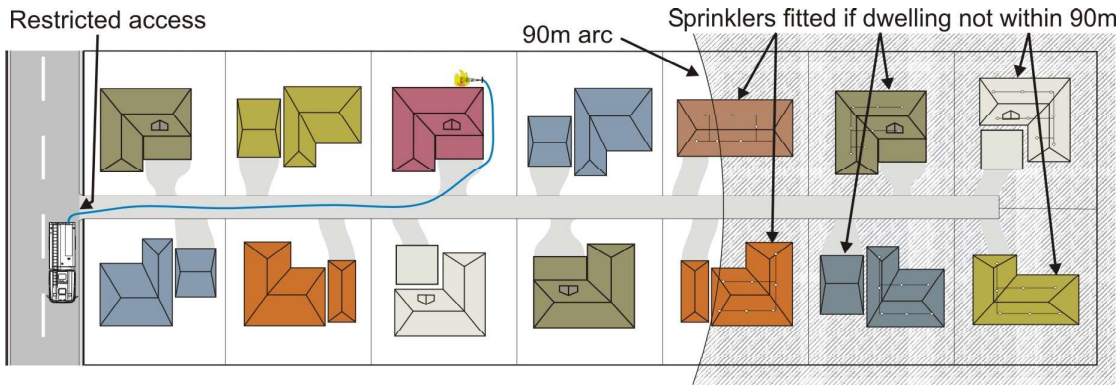

Figure 10 Home fire sprinkler system

7.3.2 The current standard for home fire sprinkler systems is Australian Standard *AS 2118.5-2008 Automatic fire sprinkler systems Part 5: Home fire sprinkler systems*.

7.3.3 Even when a dwelling is fitted with a home fire sprinkler system, consideration should still be given to potential impacts to firefighting operations, including:

a) providing limited vehicular access of not less than 3.0m wide where possible

b) ensuring the distance from the fire appliance to the furthermost dwelling does not exceed 210m to avoid excessively long hose lays

c) providing an accessible static water source with a minimum of 10,000 litres for firefighting use (e.g. water tank with 38mm Storz connector, dam, swimming pool)

d) increasing the minimum separation between dwellings to ensure fire cannot spread to other dwellings in the absence of firefighting intervention.

Note: These considerations may be particularly applicable in semi-rural settings where larger acreage may undergo subdivision (see Figure 11).

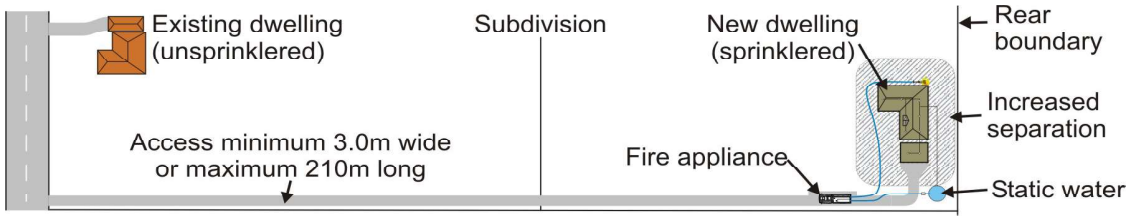

Figure 11 Example of remote dwelling in subdivided lot

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