

BUSHFIRE EVACUATION RISK ASSESSMENT

95 – 97 Stanhope Road Killara

Lourdes Retirement Village

Introduction

This report provides an assessment of the planning proposal for 95-97 Stanhope Road, Killara Lourdes Retirement Village in terms of bushfire evacuation risk, using the Bushfire Evacuation Risk Assessment methodology applied within the Deferred Areas Planning Proposal.

This methodology provides a valid assessment tool that has recently been used by Council for a Planning Proposal endorsed by the NSW Department of Planning involving consultation with NSW Police and Rural Fire Service.

The two key assessment factors of this methodology include:

- **Identification of land mapped as a Bushfire Evacuation Risk Area (SEPP 5 Seniors Exclusion Zone); and**
- **Assessment of the exit road criteria proposed by Cova (2005)**

Background information and methodology details for the Bushfire Evacuation Risk Assessment – Deferred Areas Methodology are provided within Appendix A.

SEPP 5 Seniors Exclusion Zone

The site at 95-97 Stanhope Road, Killara was not included within the Deferred Areas as it does not meet the criteria of being mapped on the Bushfire Evacuation Risk Map (SEPP 5 Seniors Exclusion Zone).



Excerpt from Bushfire Evacuation Risk Map (SEPP 5 Seniors Exclusion Zone)

While the site and surrounding area is not mapped on the Bushfire Evacuation Risk Map, the site and surrounding area is similar to the areas included the Deferred Areas Planning Proposal in terms of:

- the area being surrounded by bushfire prone land
- only a single exit road

The planning proposal is for an intensification of land uses that are deemed to be special fire protection purposes under the *Rural Fires Act 1997*, i.e accommodating vulnerable people that would pose an evacuation risk in a major bushfire event. As such, it is considered constructive to undertake an assessment of the catchment area against the Cova (2005) minimum exit road criteria.



Excerpt from Bushfire Prone Lands Map 2017

Catchment Area

The catchment area for the assessment of bushfire evacuation risk is shown outlined in red in the image below:



Aerial Photo – Outline showing Catchment Area for Assessment of Bushfire Evacuation Risk

The catchment area encompasses the area at the eastern end of Stanhope Road, from the intersection with Rosebery Road to the cul-de-sac end of Stanhope Road. The area includes the Lourdes Retirement Village and residential dwelling houses.

The catchment area was chosen using the same methodology as those areas included in the Deferred Areas Planning Proposal. In this case, all the properties in the catchment area exit on Stanhope Road, which is the only exit road from this catchment area. The catchment area ends at the intersection with Rosebery Road, as from this point there are multiple exit roads and routes for residents in the event of an evacuation.

Exit Road Criteria - Cova (2005)

The exit road/maximum dwelling criteria as proposed by Cova (2005) is:

Number of households	Minimum number of exit roads	Maximum number of households per exit
1-50	1	50
51-300	2	150
300-600	3	200
601+	4	

Table 2- Cova (2005) Proposed Minimum Exits Table

Below is an assessment of the existing catchment area against the Cova (2005) exit road criteria, and an assessment of the catchment area with the proposed increases in dwellings to the Lourdes Retirement Village which would be permissible under the amendments sought in the Planning Proposal.

It is noted that Master Plan submitted with the Planning Proposal seeks to increase the number of exit roads from the Lourdes Retirement Village, as shown in the image below:



Excerpt from Master Plan (Architectus, January 2018)

However, the proposed additional exit roads from Lourdes Retirement Village exit out onto Stanhope Road – still resulting in only one exit road from the catchment area.

Existing Catchment			
Number Exits	Number Dwellings	Recommended Maximum Dwellings	Number Over Recommended
1 Stanhope Road	Lourdes**: <ul style="list-style-type: none"> • 108 - Independent Living Units • 49 - Serviced Apartments • 83 Bed Residential Aged Care Facility* Other Stanhope Road Properties: <ul style="list-style-type: none"> • 16 Total = 256	50	206
Proposed Catchment – permissible under Planning Proposal			
Number Exits	Number Dwellings	Recommended Maximum Dwellings	Number Over Recommended
1 Stanhope Road	Lourdes**: <ul style="list-style-type: none"> • 281 - Independent Living Units (207 new + 74 existing) • 59 - Serviced Apartments • 130 - Residential Aged Care Facility* Other Stanhope Road Properties: <ul style="list-style-type: none"> • 16 Total = 486	50	436
<p>*For the purposes of this assessment each bed in the Residential Aged Care Facility is counted as a dwelling.</p> <p>**The existing and proposed numbers for Lourdes Retirement Village are referenced from the Urban Design Study prepared by Architectus January 2018.</p>			

Table 3 – Existing and Proposed Catchment Assessment – Cova (2005)

Exit Capacity Criteria - Cova (2005)

The Cova research paper also proposes assessment criteria based the exit capacity of the key access roads for an area of interest.

For this analysis, an evacuation time of 0.5 hours (30 minutes) is the target, based on the categorisation of the area as a “high+ wildfire hazard” as per the Cova (2005) categories of low, medium or high+ wildfire hazard. The categorisation of the area as high+ wildfire hazard for the purposes of the Cova (2005) exit road capacity assessment is consistent with the categorisation of much of the site as BAL29 – High Risk (Bushfire Attack Level (BAL)) or higher within the *Independent Review of Bushfire Impact* undertaken by Australian Bushfire Protection Planners.

The results of the analysis is tabulated below:

Scenario	Key Roads	No. Exits	No. Dwellings with 2 vehicles	No. Dwellings with 1 vehicles (RACF)	hh:mm estimated evacuation time for ILU, serviced apts and surrounding residential (excluding staff) *	hh:mm estimated evacuation time for RACF (excluding staff) **	hh:mm Estimated total evacuation time (Target - 30 mins)
Existing	Stanhope Road	1	173	83	0:25	0:06	0:31
Proposed	Stanhope Road	1	356	130	0:53	0:09	1:02

* based on average vehicle ownership of 2 vehicles per household leaving the area, and interrupted roadway capacity of 800vph per lane

** based on 1 vehicle per bed leaving the area, and interrupted roadway capacity of 800vph per lane)

Table 4 – Exit road capacity assessment

From this assessment, Stanhope Road currently has just enough capacity to evacuate the area in 0.5hr, but under the proposal it would take over 1 hour to evacuate the area. The proposal would therefore not meet the exit capacity criteria in the Cova (2005) research paper.

CONCLUSION

The existing catchment area has a total of 256 dwellings, exceeding the recommended maximum 50 dwellings for the one exit road (Stanhope Road) by 206 dwellings (as shown in Table 3). The amendments sought by the Planning Proposal would result in a total of 486 dwellings within the catchment area, exceeding the recommended maximum 50 dwellings for the one exit road (Stanhope Road) by 436 dwellings.

Within the catchment area, the current number of dwellings and the increased number of dwellings which would be permissible under the Planning Proposal both exceed the recommended number of dwellings for the one (1) exit road as set out by the Cova (2005) criteria. This suggests that the egress from this catchment area is inadequate in the event of evacuation from bushfire event. Currently, Stanhope Road has just enough capacity to evacuate the existing catchment within 30mins, however with the increase in population permitted under the Planning Proposal; the time taken to evacuate the catchment will increase to over 60mins (as shown in Table 4). The increase in population under the Planning Proposal exceeds the exit road capacity criteria set by Cova (2005) by 32mins.

The amendments sought by the Planning Proposal would result in almost doubling the number dwellings within the Lourdes Retirement Village. The substantial intensification of a use being a special fire protection purpose under the *Rural Fires Act* within an area that already exceeds the recommended number dwellings for the one exit road is of concern, as increasing the number of residents will only make evacuation more difficult in the event of a bushfire.

It is also of concern that the additional increase in dwellings will be occupied by residents who are highly vulnerable to the effects of bushfire, are difficult to evacuate and are more susceptible to smoke impacts, resulting in additional demands on emergency services, particularly if evacuation is required.

References

Cova, T, 2005, *Public Safety in the Urban-Wildland Interface: Should Fire-Prone Communities Have a Maximum Occupancy?*, Natural Hazards Review, vol.6, No.3, pp.99-108

Ku-ring-gai Council, 2012, *Managing Bushfire Risk, Now and Into the Future, Ku-ring-gai Principal LEP Background Study*

Appendix A – Bushfire Evacuation Risk Assessment – Deferred Areas Methodology

BACKGROUND

Background Study - Managing Bushfire Risk, Now and Into the Future

As part of the preparation of the *Ku-ring-gai Local Environmental Plan 2015*, Council prepared a background study – *Managing Bushfire Risk, Now and Into the Future* (March 2012). One of the aims of this background study was to better understand the future risk of bushfire in the Ku-ring-gai local government area.

In order to reduce the risks to people and property from bushfire, the study made a number of recommendations which focused on land use planning and development controls, such as zoning, lot sizes and lot depths.

In order to assess evacuation risk, the study considered research paper undertaken by Thomas Cova (2005) *Public Safety in the Urban-Wildland Interface: Should Fire-Prone Communities Have a Maximum Occupancy?* The focus of the paper is evacuation egress or accessibility out of an area in an evacuation. The research paper identified a range of factors that affect the capacity to evacuate during bushfire, including the capacity of the road, the type of land use and the number and location of exit roads.

The Cova research paper proposes a minimum number of exit road based on the number of households in a sensitive area:

Number of households	Minimum number of exit roads	Maximum number of households per exit
1-50	1	50
51-300	2	150
300-600	3	200
601+	4	

Table 1 - Cova (2005) Proposed Minimum Exits Table

The Cova research paper states that *'Economic pressure is strongly toward developing fire-prone communities to a density beyond which the egress system can safely handle in an urgent wildfire evacuation'*.

Within Ku-ring-gai, development has occurred in a number of locations where the local community is surrounded by extensive areas of bushfire prone vegetation, often with inadequate road networks to enable safe evacuation. Pressure to increase development in these areas has led to increasing evacuation risk to residents, including a high number of elderly and very young residents.

Land Use and Evacuation Risk

Land uses such as child care centres, schools, retirement villages, housing for seniors or people with a disability, group homes, hotels, motels or other tourist accommodation and hospitals provide for people who are particularly vulnerable during a bushfire, and increase evacuation risks in the event of a bushfire. These uses are identified as a 'special fire protection purpose' under Section 100B of the *Rural Fires Act 1997* and *Planning for Bushfire Protection 2006*. The Rural Fire Service (RFS) has noted that occupants of these types of developments are highly vulnerable to the effects of bushfire, are difficult to evacuate and are more susceptible to smoke impacts, resulting in additional demands on emergency services, particularly if evacuation is required. Section 4.2.3 of *Planning for Bushfire Protection 2006* details the following specific objectives for Special Fire Protection Purpose Developments:

1. Provide for the special characteristics and needs of occupants as they are more likely to be adversely affected by smoke or heat while being evacuated.
2. Provide for safe emergency evacuation procedures

Methodology

The background study *Managing Bushfire Risk Now and Into the Future* identified zoning as a means of managing the risks associated with bushfire and evacuation. The study recommended that environmental zones – E3 Environmental Management and E4 Environmental Living - could be applied to prevent further development of incompatible land uses (such as child care centres) in areas identified as being of high evacuation risk during a bushfire event.

The background study made the recommendation to apply the environmental zoning to sites that were:

- Identified as 'extreme' bushfire risk using the Bushfire Risk Management Plan 2010 (Hornsby and Ku-ring-gai Councils); AND
- Identified within the bushfire evacuation risk area (SEPP 5 Exclusion Zone) on the Bushfire Prone Land Map and Bushfire Evacuation Risk Map; AND
- The area does not meet the exit criteria proposed by Cova (2005).

This methodology was used to identify the areas and properties that were considered to be of high evacuation risk during the event of a bushfire and as such the environmental zoning was applied to these areas that met the methodology criteria within the *Draft Ku-ring-gai Local Environmental Plan 2013*.

Following the exhibition of the *Draft Ku-ring-gai Local Environment Plan 2013* consultation was undertaken with the RFS and Police who advised that in the event of a bushfire, emergency services would be looking at evacuating more than those properties identified as 'extreme' bushfire risk under the Bushfire Risk Management Plan 2010 (Hornsby and Ku-ring-gai).

As a result of this advice, the methodology was revised so that the areas and properties that were identified to be of high evacuation risk and should have the environmental zoning applied were:

- **Land identified as bushfire evacuation risk area (SEPP 5 Seniors Exclusion Zone) on the Bushfire Prone Land and Bushfire Evacuation Risk Map**

- **The area does not meet the exit road criteria proposed by Cova (2005)**

Deferred Areas Planning Proposal

Due to the change to the methodology, the areas that met the revised methodology criteria were deferred from inclusion within the *Ku-ring-gai Local Environmental Plan 2015* in order to allow Council to re-exhibit the proposed changes prior to making a final decision within these areas.

A Planning Proposal to include these 13 deferred areas into the *Ku-ring-gai Local Environmental Plan 2015* was prepared. The 13 areas the subject of the Planning Proposal are all surrounded by large areas bush fire prone land, and with only a single or limited exit roads from the catchment area. Some areas, like North Turramurra also have a high number of retirement village, schools and hospital which are particularly vulnerable and pose additional difficulties in the event of evacuation from bushfire events.

The Planning Proposal utilised the revised methodology in order to identify areas and properties that were of high evacuation risk during the event of bushfire, and as a result applied the E4 zone as a planning control in order to limit further development to incompatible land uses and limit further increases in residential density by limiting further subdivision.

The Planning Proposal involved extensive consultation with the NSW RFS and Police. The Planning Proposal was gazetted by the Department of Planning in January 2018.