

07 February 2016

Ian Worthington
Development Manager
Lennium Group

By E-mail: ian@lenniumgroup.com.au

Dear Ian

RE: BUSHFIRE HAZARD AND ATTACK LEVEL ASSESSMENT FOR EMERALD HILLS ESTATE - STAGE 14B

1.0 Introduction

As requested we have conducted a Bushfire Hazard and Attack Level analysis for the approved residential subdivision of the Emerald Hills Estate (Estate), specifically Stage 14B, referred to herein as 'the Site'. I have over 12 years' experience as an ecological and environmental consultant conducting vegetation and bushfire analysis. Further, I have over 7 years' experience as a volunteer fire fighter in the NSW Rural Fire Service, achieving many accreditations in Rural and Village Fire Fighting. My CV is provided in **Attachment 1**.

The context of the locality, Estate and Site is shown in **Plate 1 & 2**. The approved Plan of Development (PoD) layout for the Estate and the Site is shown in **Attachment 2**.

The Estate is bound:

- To the east by developed stages of the greater Emerald Hills Estate. Heritage Drive further creates cleared esplanade road on this boundary;
- To the south by a small component of the Emerald Hills Estate and other similar Low Density Residential Estates. Heritage Drive and Ipswich-Warrego Hwy Connection Road form cleared sealed buffers to this boundary;
- To the west by three smaller vegetated parcels of land (each approximately 1ha in size). These parcels are bound to their west by Ipswich-Warrego Hwy Connection Road forming a cleared and sealed buffer; and
- To the North by the Warrego Highway and its associated thin, partially vegetation road reserve. These areas of vegetation vary between 10 and 80m width. It is noted, much of the vegetated areas to the north of the Estate have been recently resumed by the Department of Main Roads and Transport (DTMR) for future road widening purposes.

The areas to the west of the Site support non-remnant¹ open forest. Much of the canopy within these properties has been historically cleared or thinned. The understorey within these properties has been subject to broad scale clearing and now supports landscaped gardens with regular maintenance (e.g. lawns). The canopy vegetation supported within these properties is analogous to Regional Ecosystem 12.9.10.2 - *Corymbia*

¹ This vegetation has not been included on State Government Regulated Vegetation Management Mapping.

citriodora subsp. variegata +/- *Eucalyptus crebra* open forest on sedimentary rocks. All vegetation supported within these properties occurs uphill or is level in height with the Estate and Site. Some areas of the Estate are sited up to 10m lower than this vegetation. As such these lower lying, cleared areas within the Estate have a significantly reduce threat of bushfire hazard from vegetation supported within these properties. It is noted, the areas supporting vegetation to the north of the Estate has been recently resumed by the Department of Transport and Main Roads (DTMR) for road widening purposes. As such these areas are likely to be subject to broad scale land clearing. This however, cannot be relied upon for the current assessment of bushfire hazard as this may not happen for some time, if at all. It is recommended that any dwellings constructed after clearing of this vegetation has occurred not be subject to any bushfire hazard assessment as no credible fire threat will exist.

The State Planning Policy (SPP) Bushfire Hazard Area mapping indicates the majority of the Estate and Site are mapped as supporting:

- High Potential Bushfire Intensity;
- Medium Potential Bushfire Intensity; or
- Potential Impact Buffer.

This Bushfire Hazard Area mapping is shown in **Attachment 3**.

It is clearly illustrated within **Plates 1 & 2** the majority of the approved development areas have already been subject to broad scale land clearing and bulk earthworks. As such the majority of the Bushfire Hazard Area mapping reflected within **Attachment 2** is no longer applicable. Further clearing of vegetation to establish other stages of the Estate has been approved and will further reduce the bushfire hazards within the general locality in the near future. The only remaining areas of credible bushfire threat arise from: the small vegetated blocks immediately to the west of the Estate and Site; and the thin road reserves bounding the Warrego Highway. It is noted much of the vegetation occurring within the Warrego Highway road reserve fails to meet the criteria for vegetation considered as a bushfire threat under the Australian Standard 3959². Although these areas of vegetation remain small and fragmented from other larger areas of vegetation, the adjoining proposed developments have not opposed the mapping credentials during the application stage and subsequently development adjoining these areas of mapped bushfire hazard potential need to be assess their Bushfire Attack Level (BAL) to provide a determination of the construction requirements under the *Australian Standard 3959 – Construction of buildings in bushfire-prone areas* (AS3959).

² Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of a structure or each other, or other areas of vegetation being classified are excluded from assessment as Bushfire Hazard Areas within the Bushfire Attack Level calculator.



Plate 1: Emerald Hills Estate (Stages 13A, 13B, 14A, 14B, 15 & 17)



Plate 2: view looking up-slope to the west over Stages, 13A, 13B, 14A, 14B (rear left of plate) 15 and 17.

2.0 Stage 14B Bushfire Hazard Assessment

2.1 Stage 14B Overview

Stage 14B is sited in the central areas of the Estate and is bound to the north and east by other similar residential development within the Estate. This Stage has a newly formed east-west access road through the central areas (**Plate 2**). The Site will be serviced by reticulated water and supplied with adequate fire-fighting hydrant access.

This sub-division will not materially increase the number of premises exposed to an unacceptable risk during bushfire events (noting that we consider it unlikely that an unacceptable risk will arise at all from the small areas of vegetation sited to the west and up-slope of Stage 14B), and will cause only a very minor increase in the number of residents in the this locality. The minor increase in vehicle movements expected to occur during a bushfire event, will not create significant additional congestion on the roads such that: (i) there will be an inability for existing residents to evacuate from the area; or (ii) there will be an inability for firefighting appliances to enter the area.

We note that lots which adjoin vegetation supported on vegetated properties to the west are not buffered from vegetation from this vegetation. It is possible to achieve a 13m minimum set back from any vegetation should dwellings be sited appropriately. The use pools, courtyards and other forms of non-flammable infrastructure could be established in these areas without increasing bushfire hazard. Achieving a minimum 13m set-back will reduce the bushfire attack level to 19 (from 29) or less. This BAL is considered generally acceptable for building costs in developments of this nature (e.g. brick, cement rendered buildings but specifically limited these). This BAL is considered generally acceptable for building costs in developments of this nature (e.g. brick, cement rendered buildings but specifically limited these). Should dwellings not be sited greater than 13m from this vegetation areas within BAL 29 will need to be constructed to a higher BAL threat level as per the AS3959.

2.2 Bushfire Hazard and Attack Level

Although the thin areas of vegetation supported to the west of the Site are not considered to be medium or long term bushfire hazards given either planning designation and likely future use for residential development; it is still a requirement to assess the Bushfire Attack Level (BAL) of all dwellings within proximity of mapped potential bushfire hazard areas to comply with AS3959. A number of areas directly to the west of the development do not meet the requirements to be considered a bushfire hazard and as such have not been included within this assessment.

To complete this assessment it is necessary to utilise the BAL calculation found within the AS3959. This calculation takes into account the following:

- Geographical Region (*Queensland*);
- Vegetation Type (*Open woodland*³);
- Slope (*Uphill/Flat*); and
- Distance (*Dependant on Dwelling*).

Based on the above inputs, the BAL results for Stage 14B are as follows:

³ Vegetation supported on within the Road Reserve areas have been historically cleared and/or thinned. Canopy foliage averages less than 30%.

- BAL 40 for any dwelling within 6m of the adjoining open forest vegetation (but greater than 6m⁴);
- BAL 29 for any dwelling within 13m of the adjoining open forest vegetation (but greater than 9m)⁵;
- BAL 19 for any dwelling within 19m of the adjoining open forest vegetation (but greater than 13m); and
- BAL 12.5 for any dwelling within 100m of the adjoining open forest vegetation (but greater than 28m).
- All dwellings greater than 100m from the adjoining vegetation are considered to have a BAL Low.

2.3 BAL Assessment per Lot

BAL Rating	Allotment	Allotment likely spread over two or more BALs
BAL FLAME ZONE (less than 6m)	361	361
BAL 40 (6-9m distance)	361	361
BAL 29 (9-13m distance)	361 – 364	361 – 364
BAL 19 (13-19m distance)	361 – 364	361 – 364
BAL 12.5 (19-100m distance)	All except 305	All except 305
BAL Low	305	305

It is our opinion, bushfire risk remains relatively low across much of the Estate and Site given: the small nature of the fire threat; the fact it is sited above the Site and Estate; the significant amount of vehicular access surrounding the fire threat; and the fact all properties are serviced by reticulated water. Those dwellings which are sited away from the noted vegetation (i.e. have other dwellings and/or formed roads between the vegetation) should be considered in the BAL Low category. Notwithstanding this, the AS3959 requires all dwellings between 19 and 100m from open woodland vegetation occurring upslope of the Site to be constructed to a BAL 12.5 standard. This rating is not considered to be onerous for builders or home owners.

If you have any questions or would like further clarification on any issues please don't hesitate to contact myself on the below details.

Regards,



Mitch Taylor

Senior Environmental Consultant, 28 South Environmental

P: 0488 204 523

E: Mitch@28south.com.au

⁴ Dwellings closer than 6m will be sighted within BAL - FLAME ZONE.

⁵ It should be noted, only the exterior areas facing the fire threat which fall within a particular BAL buffer are to comply within the particular requirements of the AS3959.



ATTACHMENT 1 – Mitch Taylor CV



Mitchell Taylor (Senior Environmental Consultant)

Professional Summary

Mitchell is a senior environmental consultant with over ten years consulting experience in Queensland and New South Wales. He has worked on a range of projects across many industry sectors including mining and extractive industries, coal seam gas, eco-tourism, rail, road and water infrastructure, strategic, industrial and urban development for a private and government clients. The scale of these has ranged from small single lot developments through to the country's most significant mining, industrial and residential developments.

Mitchell has managed teams undertaking broad and specific ecological assessments for the mining sector, authoring ecological impact assessment reports and liaising directly with Commonwealth, State and Local government agencies on a range of projects. Mitchell has undertaken many applications under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) as well as the various principal Queensland environmental legislations and approval requirements.

Mitchell has provided a wide range of services to clients covering many aspects of ecological and environmental management. Through his experience Mitchell understands the practical application of ecology and environmental planning. Mitchell has a deep appreciation for the need to identify and liaise directly with clients to achieve a sound scientific outcome whilst incorporating the ultimate goal of the project.

Mitchell currently holds a personal Queensland Wildlife Rehabilitation Permit and is the principal holder of 28 South's Animal Ethics, Scientific Purposes and Wildlife Rehabilitation Permits.

Education

Bachelor of Environmental Science, Australian Catholic University, North Sydney, Australia.

Memberships/affiliations

NSW Fire Service.

Queensland Environmental Law Association.

Employment history

2015 to present | 28 South Environmental | Senior Environmental Consultant.

2011 to 2015 | Amec Foster Wheeler | Senior Ecologist / Fauna Management Team Leader.

2007 to 2011 | PLACE Design Group | Senior Ecologist / Environmental Scientist.

2005 to 2007 | Cumberland Ecology | Ecologist.

Recent representative projects

Mitchell is a Senior Environmental Consultant with 28 South Environmental. In this role he is responsible for project management, as well as coordinating applied ecological and environmental studies servicing Commonwealth, State and Local Government Regulatory Approvals for the energy, mineral, infrastructure, industrial and urban development sectors.

Woolgoolga to Ballina Pacific Highway Upgrade Project – Species Management Plan

Roads and Maritime Services, New South Wales 2014 – 2015

Mitchell was part of a small team of ecology and environmental planning experts charged remodeling all of fauna, flora and aquatic species; threatened community; and invertebrate management plans as well as the biodiversity framework for one of New South Wales largest road infrastructure projects. This project consisted of managing the final targeted survey reporting and data inputs for inclusion in the management plans as well as the strategic incorporation of subject matter expert and regulator comments regarding management measures.

Moranbah Gas Project - Ecological and Environmental Approval Surveys and Reporting

Arrow Energy, Queensland, Australia 2013-2014

Mitchell conducting ecological and environmental approval surveys over the four tenements which are being focused on during this project. He conducted these assessments with a focus on their two and three dimension seismic surveys and pilot wells. Further, Mitch has looked at all legacy wells on these four development areas as well as all other arrow sites in the Bowen basin except their Baralaba site.

Mt Isa Open Pit – Ecological Gap Analysis

Xstrata Mt Isa Mines, Queensland, Australia 2012

Mitchell oversaw the development of a detailed ecological gap analysis for Xstrata MIM which provided an overview of the effort and adequacy of historical ecological surveys completed within Site (ML5058). This analysis was undertaken with a view to identifying potential long-lead ecological surveys that may be required for the Environmental Impact Statement (EIS) for the MIOP Project and provide advice on the most appropriate direction forward to achieve an approval through the EIS process from an ecological perspective.

Mt Margret Mine – Purple-Necked Rock Wallaby offset

Xstrata Copper, Queensland, Australia 2012-2013

Mitchell undertook detail ecological equivalence surveys to identify suitable habitats for the purple-necked rock wallaby within ML5058 and other adjacent MLs to the north. Data obtained from these surveys was spatially reviewed and synthesised into preferential habitat mapping for the purple-necked rock wallaby and subsequently into an approved offsets program.

Selwyn Mining Leases Ecological Impact Assessments

Ivanhoe Cloncurry Mines, Queensland, Australia, 2010 - 2011

Established and proposed underground/open cut gold and copper mining activities in the Selwyn Ranges, North Western Queensland (southern extent of the Mt Isa Inlier/Northern extent of Mitchell Grass Downs bioregions). Mitchell oversaw detailed flora and fauna surveys of all Ivanhoe Cloncurry Mines mining leases. These investigations provided the client with detailed mapping of all vegetation and habitat types present within each mining lease. Mitchell managed a number of ecological teams as well as leading the detailed fauna assessment and habitat mapping of 20 mining leases. This work provided Ivanhoe Cloncurry Mines with a detailed and geo-referenced constraint mapping tool to implement

within their Environmental Management Plan going forward.

Selwyn Mining Lease Microbat Management

Ivanhoe Cloncurry Mines, Queensland, Australia, May 2011

Proposed re-engagement of discontinued mining declines within the Selwyn mining lease. During previous surveys Mitchell identified that significant population of microbat species were inhabiting mining declines which are proposed for re-engagement works, including threatened species. Together with Ivanhoe Cloncurry Mines staff Mitchell co-authored a microbat management plan to allow the re-engagement works to be conducted after the passive relocation of the microbat populations inhabiting the mining declines. This included the tracking of 12 individual microbats to observe the movement and confirm the re-location roost sites.

Surat and Bowen gas fields

APLNG/Origin, Queensland, Australia, 2011 - Present

Mitchell carried out pre-clearance and ecological surveys for Origin Energy. These surveys involved surveying and reporting on a broad range of environmental constraints for the APLNG Project. Areas covered include identification and locations of Threatened Ecological Communities (TEC); Ecologically Sensitive Areas; Endangered, Vulnerable and Near Threatened flora species and likely habitats; Essential Habitat features for flora and fauna; field verification of High Value Regrowth for TECs, waterways and wetlands; weeds and pests; wildlife corridors and regional ecosystems. All field information has been collected using Trimble GeoExplorers with corrected capabilities.

Surat Basin gas fields

QGC, Queensland, Australia, 2011 - Present

Mitchell undertook various gas pipeline projects, extensive flora and fauna surveys within the Surat and Bowen Basins gas fields. These flora and fauna surveys included identification of species listed in both the *Nature Conservation Act* (NC Act) and *Environment Protection and Biodiversity Act* 1999 (EPBC Act) (2011-2012).

Byerwen Coal Mine EIS

QCOAL, Queensland, Australia, April – November 2011

Proposed open cut and underground coal mining activity located in the Bowen basin south of Collinsville, Queensland. Mitchell conducted detailed fauna assessments utilizing a wide variety of trapping and habitat assessment techniques which provided field data for the EIS process as well as authoring the terrestrial fauna component of the report.

Curragh Coal Mine - Blackwater Creek Diversion Project

Westfarmers, Queensland, Australia, 2009

Established open cut coal mine near Blackwater Queensland, 10 kilometer diversion of Blackwater Creek. Mitchell was responsible for assisting in background research and co-authoring the Blackwater Creek Diversion Rehabilitation Management Plan to allow the expansion of the current mining operations. He was involved in ongoing monitoring of the rehabilitation works and compliance with the approved Rehabilitation Management Plan.

Wandoan Coal Project EIS

Xstrata, Queensland, Australia, 2007

Proposed open cut coal mining activity located in the area surround the township of Wandoan, Queensland. Mitchell conducted detailed fauna assessments utilizing a wide variety trapping and habitat

assessment techniques which provided field data for the EIS process.

Mullumbimby Sub-Station Re-commissioning and Re-construction

APA Group, New South Wales, Australia 2015

Mitchell worked with a small team including environmental planners, sediment, erosion and contamination experts to assess the impacts to the receiving environment through the re-commissioning and re-construction of the Mullumbimby sub-station. This project included mapping of vegetation communities surrounding the sub-station, assessing the faunal habitat present in areas surrounding the sub-station and providing strategic advice on the most appropriate location of services to avoid impacts to the environment.

Trinity Drive Residential Development – Ecological Impact Assessment, Environmental Approvals and Threatened Species Assessment

Trinity Catholic Church, Lismore, New South Wales, Australia 2008-2010

Mitchell was a part of the field team who undertook detailed botanical and fauna assessments over a large greenfield residential development site in Goonellabah. Mitchell was responsible for overseeing detailed fauna surveys including targeted Atlas Rainforest Ground Beetle and Koala surveys. Mitchell also assisted with the detailed mapping of the Vulnerable flora species *Desmodium acanthocladum* (thorny pea) within the project area and along local riparian systems. Mitchell co-authored the supporting ecological reports for the initial development application and subsequent information requests from the Commonwealth, State and Lismore City Council.

Ballina Surf Club Re-Development – Ecological Impact Assessment, Environmental Approvals

Ballina Surf Club, New South Wales, Australia 2009-2010

Mitchell was a part of the environmental planning and ecology team preparing development applications and response to information requests for the re-location and re-development of the Ballina Surf Club. This project involved the detailed mapping of coastal ecosystems and impact assessments as well as long term climate change impacts of potential sea level change. Further, Mitchell assisted in the development of rehabilitation plans to support the approval process.



ATTACHMENT 2 – Plan of Development

CLIENT

LENNIUM GROUP
PTY. LTD.

PROJECT

PROPOSED
RECONFIGURATION
AT EMERALD HILLS ESTATE
STAGES 13A, 13B, 14A, 14B,
15 & 17

LOCAL AUTHORITY

IPSWICH CITY COUNCIL

NOTES

(i) This plan was prepared for the purpose and exclusive use of LENNIUM GROUP PTY. LTD. to accompany an application to IPSWICH CITY COUNCIL for approval to reconfigure the land described in this plan and is not to be used for any other purpose or by any other person or corporation. Landpartners accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this plan in contravention of the terms of this clause or clauses (ii), (iii) or (iv) hereof.

(ii) The contours shown in this plan are suitable only for the purposes of this application. The accuracy of the contours has not been verified and no reliance should be placed upon such contours for any other purpose other than the purpose of this application for reconfiguration.

(iii) The dimensions, areas, number of lots, size and location of improvements & flood information (if shown) are approximate only and may vary.

(iv) This plan may not be copied unless these notes are included.

STAGE	No OF LOTS	LENGTH OF NEW ROAD		AREA ROAD	TOTAL AREA
		17m	15m		
13A	29	77m	360m	0.6692ha	6.783ha
13B	17	83m	305m	0.6262ha	1.931ha
14A	22	-	535m	0.7975ha	2.5ha
14B	12	98m	155m	0.3745ha	1.2ha
15	36	-	441m	0.6783ha	3.087ha
17	26	-	200m	0.3316ha	3.799ha

TOTAL 142 258m 1996m 3.4773ha 19.3ha

SCALE BAR

0 20 60 100m
SCALE 1:1500 (A1)
SCALE 1:3000 (A3)



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LEVEL DATUM

LEVEL ORIGIN Aerial Photography

CONTOUR INTERVAL 1.0m

COMPUTER FILE 059713D1

DRAWN ADV DATE 17/06/2013

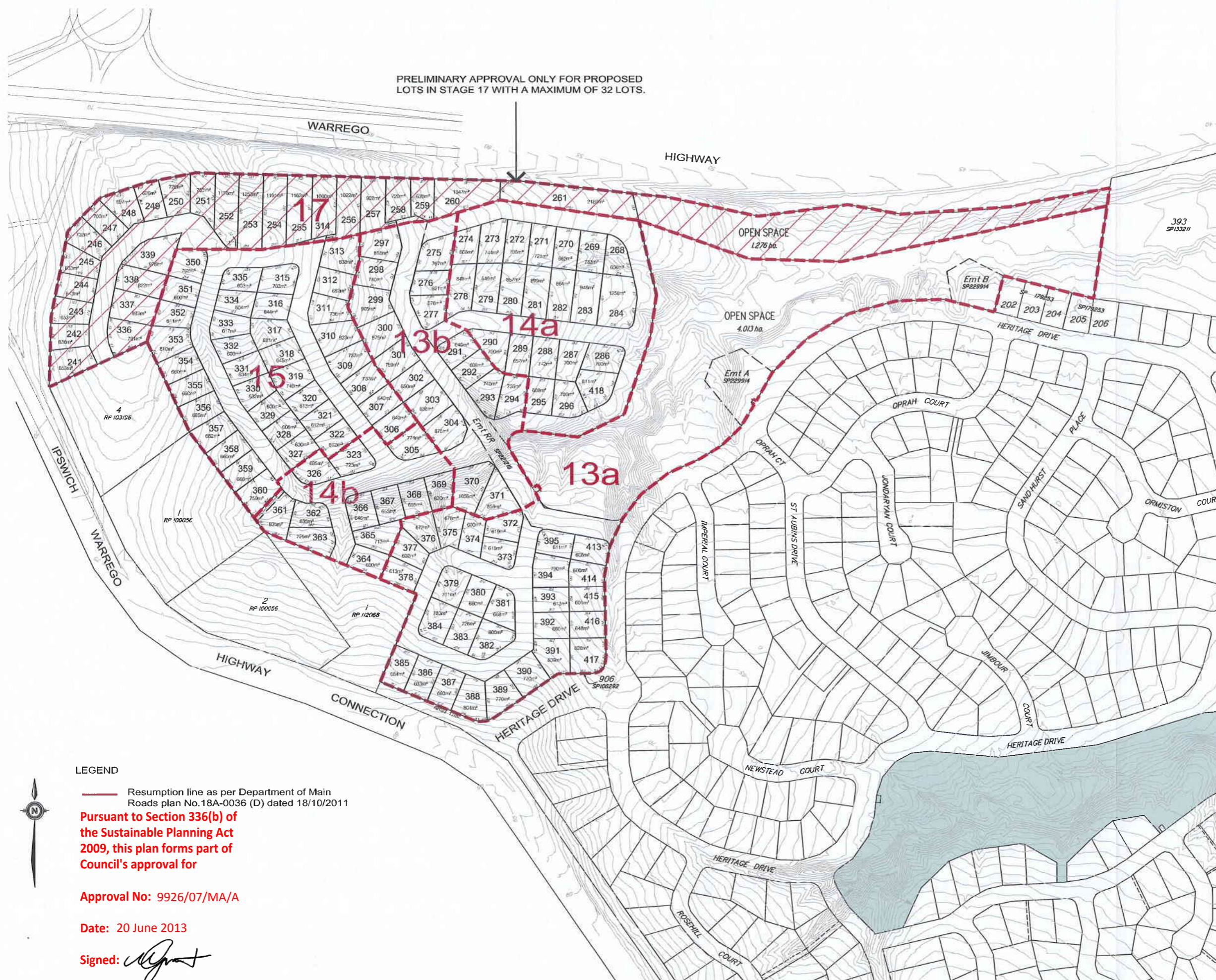
CHECKED DATE

APPROVED DATE

PLAN NUMBER

BRSS0597.013-010

E

PRELIMINARY APPROVAL ONLY FOR PROPOSED
LOTS IN STAGE 17 WITH A MAXIMUM OF 32 LOTS.

LEGEND

— Resumption line as per Department of Main
Roads plan No. 18A-0036 (D) dated 18/10/2011

Pursuant to Section 336(b) of
the Sustainable Planning Act
2009, this plan forms part of
Council's approval for

Approval No: 9926/07/MA/A

Date: 20 June 2013

Signed:

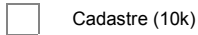
Date: 14 August 2013

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE DEPT. OF NATURAL RESOURCES & MINES.

ATTACHMENT 3 – Bushfire Hazard Area Mapping

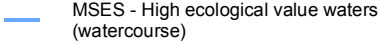
Legend

Cadastre (10k)



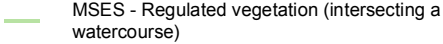
Cadastre (10k)

MSES - High ecological value waters (watercourse)



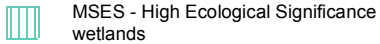
MSES - High ecological value waters (watercourse)

MSES - Regulated vegetation (intersecting a watercourse)



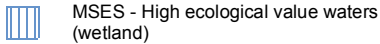
MSES - Regulated vegetation (intersecting a watercourse)

MSES - High Ecological Significance wetlands



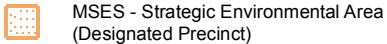
MSES - High Ecological Significance wetlands

MSES - High ecological value waters (wetland)



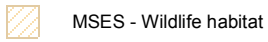
MSES - High ecological value waters (wetland)

MSES - Strategic Environmental Area (Designated Precinct)



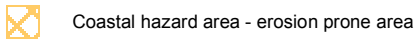
MSES - Strategic Environmental Area (Designated Precinct)

MSES - Wildlife habitat



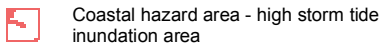
MSES - Wildlife habitat

Coastal hazard area - erosion prone area



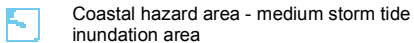
Coastal hazard area - erosion prone area

Coastal hazard area - high storm tide inundation area



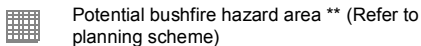
Coastal hazard area - high storm tide inundation area

Coastal hazard area - medium storm tide inundation area



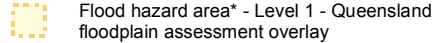
Coastal hazard area - medium storm tide inundation area

Potential bushfire hazard area ** (Refer to planning scheme)



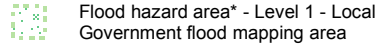
Potential bushfire hazard area ** (Refer to planning scheme)

Flood hazard area* - Level 1 - Queensland floodplain assessment overlay



Flood hazard area* - Level 1 - Queensland floodplain assessment overlay

Flood hazard area* - Level 1 - Local Government flood mapping area



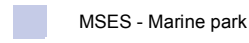
Flood hazard area* - Level 1 - Local Government flood mapping area

MSES - Protected area



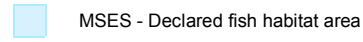
MSES - Protected area

MSES - Marine park



MSES - Marine park

MSES - Declared fish habitat area



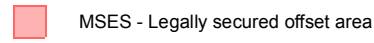
MSES - Declared fish habitat area

MSES - Regulated vegetation



MSES - Regulated vegetation

MSES - Legally secured offset area

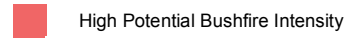


MSES - Legally secured offset area

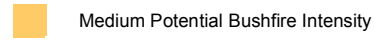
Bushfire hazard area (Bushfire prone area)



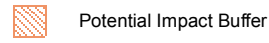
Very High Potential Bushfire Intensity



High Potential Bushfire Intensity



Medium Potential Bushfire Intensity



Potential Impact Buffer



Department of
Infrastructure, Local
Government and Planning

© The State of Queensland 2016.

State Planning Policy

Local government development assessment

Date: 01/03/2016

Disclaimer:

This map has been prepared with due care based on the best available information at the time of publication. The State of Queensland holds no responsibility for any errors, inconsistencies or omissions within this document. Any decisions made by other parties based on this document are solely the responsibility of those parties.