

Sally Newton-Chandler
P.O Box 111
Bathurst
NSW 2795

Attention: Sally

Re:
Elgin Energy Pty Limited – Solar Proposal,
No. 4823 Great Western Highway, Glanmire.



Dear Sally,

Thank you for your request in reference to the bushfire risk from the proposed Elgin Solar Proposal at No. 4823 Great Western Highway, Glanmire.

I understand from our discussion that the proposal is for a 60MW solar and Battery Energy Storage System to be constructed on land adjoining your property.

I understand that there are also two additional neighbours who adjoin the proposed development and that you undertake cropping and grazing on the land.

I have examined the location of your property in relation to the proposed development and confirm that the development site is not recorded on the Bathurst Regional Council Bushfire Prone Land Map.

The fact that the development site is not recorded on the Bushfire Prone Land Map does not preclude the site from being impacted by bush/grass and crop fires.

Fire has the potential to commence on the land surrounding the site on which approval is being sought to construct the Glanmire Solar Farm. Ignition sources include farm machinery, welding, cutting, grinding, vehicles, cigarettes and lightning.

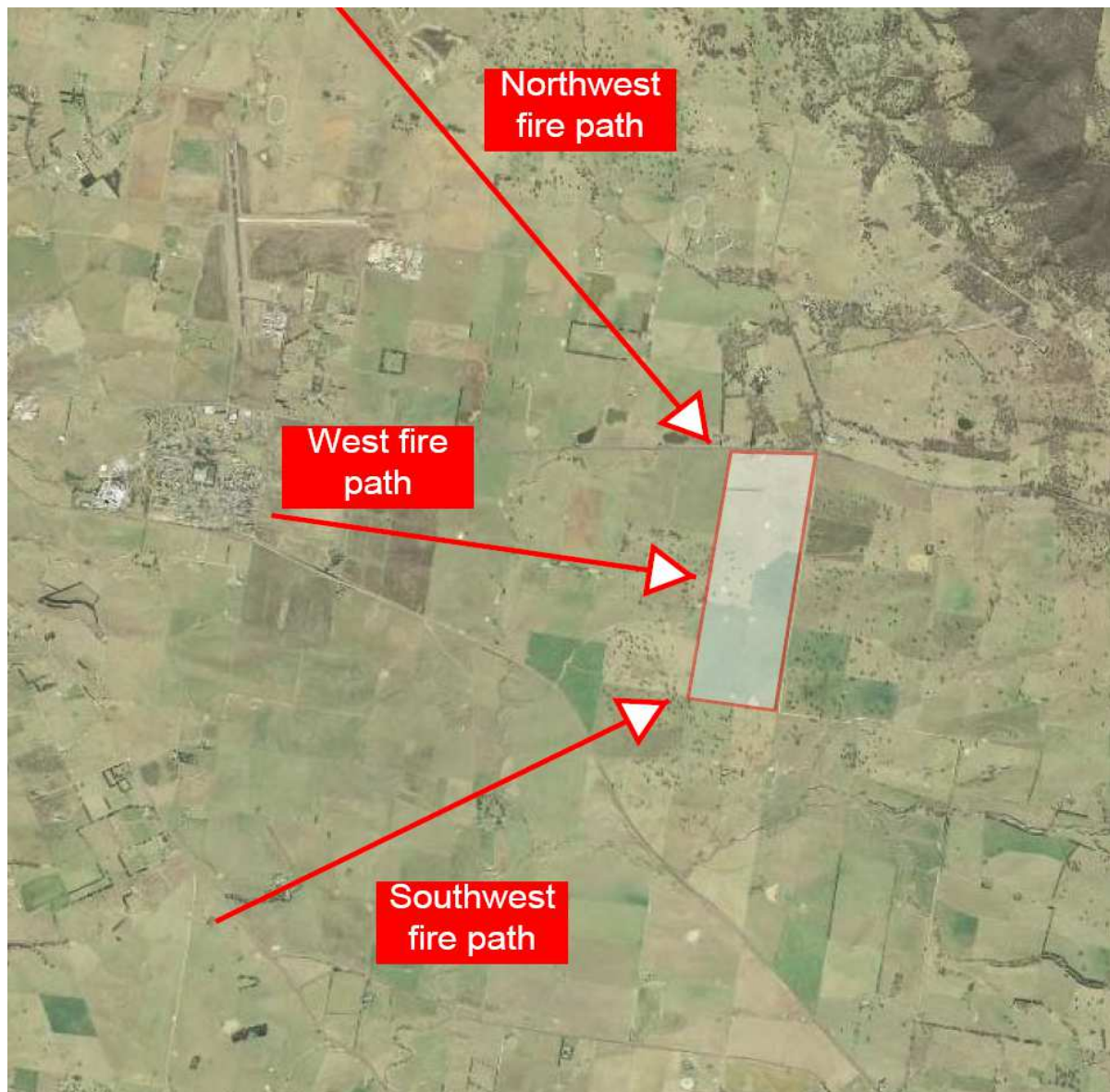
Catastrophic fire events can result in large scale bush/grassland fires (including standing crops) spreading across the landscape for many kilometres.

An example is the fire that started on a property on Sir Ivan Doherty Drive, Leadville, to the east of Dunedoo. This fire spread more than 50 kilometres under north-westerly and westerly towards Merriwa and Gulgong, causing significant property damage.

There is no reason that a similar fire event will not occur in the landscape surrounding the solar farm and cause damage to the solar arrays and associated equipment.

The predominant fire paths likely to impact the solar farm site is from the northwest, west and southwest – refer to Figure 1.

Figure 1 – Diagrammatic Plan of likely fire paths.



The speed at which fires spread is determined by the type of the structure of the fuels, topography of the land and the speed of the wind.

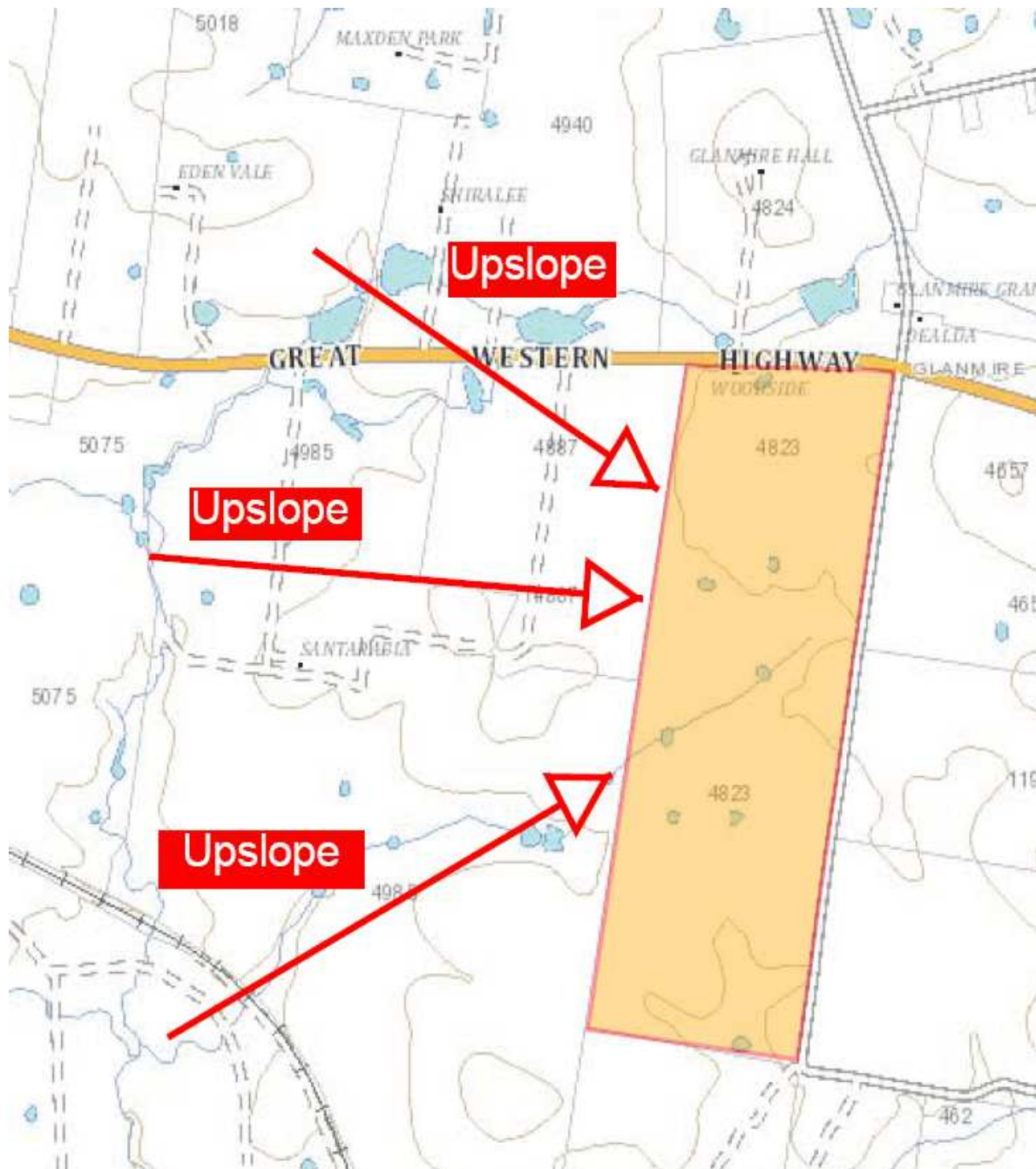
Fires that spread across open grass/crop land travel at a faster rate than fire that spread through forest vegetation.

This is because grassland/crops are open to the effects of wind whilst the forest structure is dense, reducing the speed of the wind through the denser vegetation.

The topography of the land also has an impact on the spread of fire. Over short distance the effect of slope is very pronounced.

The rate of forward spread will double up a 10 degrees slope.

Figure 2 – Plan of fire path gradients.



The predominant vegetation on the land to the northwest, west and southwest of the site is grassland/crops. The intensity of a fire and its difficulty of control is affected by the quantity of grass and the pasture. Heavy pastures burn faster and with a greater intensity than lighter pastures.

For grassland/crops at 70% cured and a temperature of 40 degrees Celsius with 10% humidity and a Fire Danger Index of 80 the rate of spread is calculated as 10.5 km/h.

The fire spread will be 170 hectares in 30 minutes, increasing to 1000 hectares in one hour, 4000 hectares in two hours. Flame height in average pasture vegetation is 6.0 metres and 11.0 metres for heavy pasture.

The perimeter of a grassfire increases by 2.5 times the forward spread of the fire i.e. if the forward spread is 10 km/h, the perimeter spread will be 25 km/h.

The spotting distance ahead of a fire front depends on the structure of the vegetation (grassland/crops or forest), dryness of the vegetation, wind speed and flame height.

Grassland/crop fire produce fast moving, hot fires that give off burning embers that can travel kilometres ahead of the fire front. The spotting distance depends on wind speed.

Spot fires will penetrate the solar farm, igniting the grassland vegetation and equipment.

A catastrophic fire event has the potential to 'out-run' fire-fighting efforts with reliance mainly being on aerial water bombing being the safest method of control.

The Sir Ivan's fire spread with the changing wind direction and burnt for many days, out-running fire crews.

A similar potential exists in the landscape surrounding the proposed solar farm with no defined point at which the fire can be controlled.

The construction of the proposed solar farm and BESS will increase the responsibility on the adjoining landowners to manage their land to mitigate the potential risk on the proposed asset – also increasing the duty of the adjoining landowners to prevent the spread of fire within their property.

In *Hargrave v Goldman* (1963) 110 CLR 40, Windeyer J (on the High Court of Australia) said:

“In my opinion a man has a duty to exercise reasonable care when there is a fire upon his land (although not started or continued by him or for him), of which he knows or ought to know, if by the exercise of reasonable care it can be rendered harmless or its danger to his neighbours diminished”.

The duty that a landowner has to prevent the spread of a fire is a duty to take reasonable care.

As Phil Cheney states in *The Green Inferno* (The Politics of Bushfire and Conservation) (The Stretton Group, Melbourne, 25th November 2004) – **‘if you own the fuel, you own the fire’**.

'If you own the fuel you own the fire' means that the adjoining landowners have a legal responsibility to do works on their land to mitigate the spread of fire onto the solar farm precinct.

ABPP has undertaken consultancies on solar farms where the solar farm precinct is located on leased land within a larger rural landholding where the Asset Protection Zone to the Solar Farm equipment is 20 metres with an additional 300 metre wide fuel reduced buffer zone managed by the property owner (farmer).

This situation is not the case with the proposed Elgin Glanmire Solar Farm and BESS, placing an increased level of responsibility on the adjoining landowner to provide protection to a high value asset. An asset higher in value than grassland vegetation or crop.



Graham Swain
Managing Director,
Australian Bushfire Protection Planners Pty Limited.
12.12.2022

Graham Swain



Bushfire Planning & Protection Consultant
2020



Fire Control Officer,
Wyong Shire NSW 1994

“Graham’s assessments and mitigation measures put forward to protect against the impacts of bushfire have been undertaken, over 17 years with me, in a professional manner and with the full cooperation and support of the ACT Emergency Services Agency, the Fire Management Unit of EPSDD, the Suburban Land Management Agency. He is dedicated to understanding fire behaviour & applying lessons learnt & new research to the protection of life and property.” **Dave Richardson, Snr Development Director, Dept. of Planning, ACT Government.**

“I have worked extensively with Graham Swain on a wide variety of projects for over 20 years and emphatically recommend him as a leading bushfire expert in eastern Australia.

He is a very effective communicator and, when working on a team with

Graham Swain is a deeply experienced, respected and skilled Australian bushfire planning professional collaborating with Australia’s environmental leaders and planners to achieve the best people protection against fires in Australian building developments.

His career progression began with 20 years as an architect and commercial-residential builder being introduced to the bushfire sector by joining his local volunteer brigade on NSW Central Coast in 1975. His first professional bushfire role commenced in 1985 as Fire Control Officer for Wyong Shire and then briefly reporting to the NSW Commissioner in 1994-96 before transitioning into Bushfire Consulting employment and finally establishing his own company - Australian Bushfire Protection Planners Pty. Ltd. in 2004.

Graham has been responsible for managing over 10,000 incidents, 20 major bushfires and three emergency bushfires when he was Fire Control Officer, protecting 120,000 people on the NSW Central Coast.

He has experienced first-hand the responsibility of leading 14 brigades, 900 volunteers, equipment and supervising police, army and other support agencies during the 1994 emergency bushfires.

“Ahead of his time” reported by retired Commissioner Phil Koperberg, Graham developed an unprecedented volunteer Executive Brigade Management System that included a Senior Executive Group with ancillary groups covering Communications, Canteen, Welfare and Public Relations, Training.

He introduced an overlay paging system resulting in 24 hour 4 min brigade turnout time. He developed the current NSW RFS Label dress badge and the new name of ‘Wyong Rural Fire Service (RFS)’. He also introduced the 2 piece bushfire fighting PPE, structural firefighting PPE for Wyong Rural Fire Service, unprecedented (within the RFS) full breathing apparatus capability for all Wyong brigades plus a GPS tracking of fire appliances in 1994 when the RFS has only just began roll-out of the same system 25 years later in 2019!

Graham was appointed by Commissioner Koperberg the Incident Controller for 3 bushfire emergencies in 1991-94 covering 800,000 hectares on the central coast and hinterland, including the Gunderman, Mogo Creek, Denman and Rylstone bushfires. He supervised the emergency management team including visiting CFA brigades, police, ambulance, NSW Fire Brigade, National Parks & Wildlife Service & Forestry, Central Coast Volunteer Rescue Squad and support agencies. He participated in aerial reconnaissance twice daily, on call 16 hrs /day for 15 days.

*This resulted in preventing catastrophic fire impingement into the central coast with **nil injuries, deaths or loss of properties.***

him, I am always impressed by his depth of experience, general knowledge and his steadfast drive to provide the best possible consultancy advice for bushfire mitigation.”

Dr. David Robertson,
Managing Director,
Cumberland Ecology.

“Graham is professional, knowledgeable, diligent and uncompromising on matters of bushfire safety and protection – he is recognised as a leader in the field.”

Michael Staunton, Barrister,
Martin Place Chambers

“Graham’s style is direct, practical and knowledgeable, and in my years with dealing with him, without peer.”

Stephen Conroy,
Surveyor, Springwood.

A very dedicated professional who is steeped in his knowledge of planning for bushfire protection. **Stephanie Vatala, Lawyer**

“His huge experience in the field is unrivalled.”

Azar Kassis, Builder
Developer.

Over the last 20 years Graham has been providing high-level advisory, reporting and attending Land & Environment Court as an expert witness for developments including schools, nursing homes, new residential suburbs and commercial areas, Solar and Wind Farms with projects covering NSW, ACT, Victoria, Western Australia and Queensland.

He liaises with government planners, ecologists, developers, architects, builders and lawyers. Graham has high-level expertise in delivering premium results to protect the lives of people from bushfires. He has developed an extensive level of cooperation with many professional consultants in the planning sector.

Graham is passionately motivated to make a difference in the protection of the Australian community from the impact of bushfires in the urban environment which is now being aggravated by changes in fire behaviour linked to climate change.

CURRICULUM VITAE

GRAHAM SWAIN

PRESENT POSITION

Managing Director, Australian Bushfire Protection Planners Pty. Limited.

QUALIFICATIONS

- Architectural Drafting Certificate - *Sydney Technical College*
- Licensed Builder/ Project Manager.
- Hazardous Materials Incidence Management - *Country Fire Authority, Victoria*
- Basic Rural Fire-fighter Course - *NSW Rural Fire Service*
- Crew Leader Course - *NSW Rural Fire Service*
- Regional Bushfire School - *NSW Rural Fire Service*
- Instructional Techniques Course - *NSW Rural Fire Service*
- 41A (Bushfire Emergency) Planning Course - *NSW Rural Fire Service*
- Hazard Analysis - *NSW Rural Fire Service*
- Crew Leader Course - *Australian Fire Protection Association*
- Instructional in Fire Protection for Fire Control Officers - *Australian Fire Protection Association*
- Disaster Management - *State Emergency Management*
- Local Emergency Management - *Australian Counter Disaster College*
- AIIMS Incident Management Course - *Australian Fire Authorities Council*
- Introduction to Critical Incident Debriefing - *Department of Community Services*
- O.H & S - *Workcover Authority of NSW*
- Accounts Management - *Housing Industry Association*
- Staff Management - *Housing Industry Association*

FIELDS OF BUSHFIRE EXPERTISE

- Bushfire Management and Suppression
- Bushfire Planning and Mitigation
- Bushfire Risk Assessment & Risk Management
- Bushfire Behaviour
- Fire control and Operational Management
- Evacuation Planning, Management & Training
- Assessment of risk to Life & Property from potential bushfire threat
- Assessment of design & construction of buildings
- Disaster Management
- Incident Control
- Hazardous Materials Management
- Occupational Health & Safety for Bushfire Fighters

FIRE FIGHTING/EMERGENCY MANAGEMENT POSITIONS HELD

- Deputy Regional Co-ordinator - Department Bushfire Services
- Fire Control Officer - Wyong Shire
- Primary Nominee - Wyong Shire
- Executive Officer - Wyong District Fire Committee
- Executive Officer - Wyong Industrial Emergency Action Committee
- Training Officer - Central Coast Petroleum Industry Response Group
- Member - Wyong Local Emergency Management Committee
- Member - Wyong Local Emergency Management Committee Rescue Sub-Committee
- Member - Central Coast Disaster Recovery Committee
- Member - Hunter Region Fire Committee
- Executive Officer - Hunter Region Rural Fire Service Training Committee
- Department of Bushfire Services representative on the following Bushfire Committees:
Lake Macquarie, Maitland, Port Stephens, Cessnock, Singleton, Muswellbrook, Scone, Rylstone, Great Lakes, Dungog, Gloucester, Taree & Hastings.

FIRE FIGHTING EXPERIENCE

Graham joined the Bays Bushfire Brigade, Gosford City, in 1974 and under-took training to become an active volunteer member and attended bushfire and other emergencies in the Gosford area. Appointed to the position of Captain of the brigade in 1977 and retained that position until 1985 when he was appointed to the full-time position of Fire Control Officer for the Wyong Shire until September 1994.

As Fire Control Officer, Graham managed fourteen brigades with approximately 1100 volunteer service members dealing with emergencies ranging from local bushfires, structure fires and road accidents, chemical spills to bushfire emergencies on the Central Coast and Hornsby.

Graham's involvement with the Bays Bush Fire Brigade provided operational management experience of fires in the local Bays area and other areas within Gosford City. His appointment as Fire Control Officer, Wyong Shire, in 1985 provided further experience in identifying bushfire hazards and risks, mitigation measures and fire management at a professional level.

In this role he provided Wyong Council with bush fire planning advice in the preparation of Local Environmental Plan & Development Control Plan documentation and individual development / building applications. Graham also represented Council on bushfire matters in the Land and Environment Court, with the first matter being heard in 1985.

Operationally, his term as Fire Control Officer allowed him to hone his fire fighting management skills dealing with bushfires in such diverse vegetation types as Hawkesbury Sandstone Dry Sclerophyll Forest to Coastal Heath, whilst becoming involved in emergency management at a broader scale. In December 1990 and October 1991 Wyong experienced major bush fires which resulted in the declaration of 41F Emergencies under the Bush Fires Act 1949 and Graham was appointed to the position of Emergency Controller during both emergencies.

During the January 1994 bushfire he was appointed Emergency Appointee (Incident Controller) for the fires in Wyong and the Deputy Appointee for the fires in Gosford City, in charge of local

and interstate fire fighting resources combating fires on the Central Coast and within Cessnock Shire.

As Executive Officer of the Wyong District Bush Fire Management Committee he gained experience in the preparation of Local Emergency & Bushfire Management Plans.

Graham was a member of the Wyong Local Emergency Management Committee; member of the Wyong Local Emergency Management Committee Rescue Sub-Committee the Executive Officer of the Wyong Bushfire Management Committee; Executive Officer of the Wyong Industrial Emergency Action Committee; Training Officer – Central Coast Petroleum Industry Response Group; Member of the Central Coast Disaster Recovery Committee; Member of the Hunter Region Fire Committee and Executive Officer of the Hunter Regional Rural Fire Service Training Committee.

In September 1994 he commenced duties with the Department of Bushfire Services (Rural Fire Service) as Deputy Regional Co-ordinator, Hunter Region, responsible for the management of operations, emergency planning and training in the Hunter Region.

As Deputy Regional Co-ordinator with the Department of Bush Fire Services, Graham provided assistance to Local Governments in the preparation of 41A Emergency and Fuel Management Plans and Standards of Fire Cover.

FIRE PLANNING EXPERIENCE

Graham commenced providing bushfire protection advice on development proposals in 1985 in his position as Fire Control Officer, Wyong Shire and pioneered the introduction of the many construction standards that are relevant to present building construction.

He commenced private consulting in bushfire planning in April 2000 and has prepared bushfire protection assessments for subdivisions, special protection developments, and master plans, residential, industrial and commercial developments including the preparation of numerous bushfire evacuation plans.

Graham has prepared bushfire risk assessment reports for the Australian Capital Territory Government on the reconstruction of the rural villages of Stromlo, Pierces Creek and Uriarra, following their destruction during the January 2003 bushfires.

He has advised the ACT Government on the bushfire protection planning requirements for the ACT Emergency Services Headquarters and undertaken bushfire risk assessments for more than 42 new urban release areas in the Australian Capital Territory and was instrumental in the introduction of urban edge treatments for all new development in the territory.

Graham advised the Department of Defence in the preparation of the Fire Management Plan for Majura Field Firing Range (ACT) and works within Campbell Barracks, Perth (Western Australia).

Graham has extensive experience in the provision of advice on bushfire hazard and risk, fire behaviour, preparation of bushfire risk and Bushfire Attack Level (BAL) assessments, fuel management plans, fire management plans, evacuation plans local environment plans and development control plans.

EXPERT WITNESS EXPERIENCE

Graham's first involvement in providing assistance to the Court was in August 1985 when he was employed by Wyong Shire Council as Fire Control Officer for the Wyong Shire. Continuing involvement in the provision of expert advice occurred during the ten year period following the initial hearing in 1985 with more frequent appearances before the Court occurring since he commenced private consulting in 2000.

In the past eighteen years Graham has provided expert advice to the Court on more than fifty (50) occasions.

The following are some of those cases:

- Land & Environment Court Proceedings No 10416 of 2000, Landcom ats Sutherland Shire Council;
- Land & Environment Court Proceedings No 10269 of 2001, John Bourke ats Great Lakes Council;
- Land & Environment Court Proceedings No 40018 of 2001, Mrs. Susan Maul ats Liporoni and Anor;
- Land & Environment Court Proceedings No 10210 of 2002, Wyong Shire Council ats Filmtide Pty Limited;
- Land & Environment Court Proceedings No 10262 of 2002;
- Ku-ring-gai Council ats Masterbuilt Pty Ltd;
- Land & Environment Court Proceedings No 10634 of 2002, Ku-ring-gai Council ats M & R Civil;
- Land & Environment Court Proceedings No 10635 of 2002, Ku-ring-gai Council ats M & R Civil;
- Land & Environment Court Proceedings No 10636 of 2002, Ku-ring-gai Council ats M & R Civil;
- Land & Environment Court Proceedings No 10973 of 2002, Rosecorp Pty Ltd ats Ku-ring-gai Council;
- Land & Environment Court Proceedings No 10722 of 2002, Ku-ring-gai Council ats Flower & Samios;
- Land & Environment Court Proceedings No 10263 of 2003, Great Lakes Council ats DCR Property Consultants;
- Land & Environment Court Proceedings No 11353 of 2003, Cessnock Council ats Synergy Environmental Planning;
- Land & Environment Court Proceedings No 11260 of 2004, Ku-ring-gai Council ats Chella Holdings Pty Ltd;
- Land & Environment Court Proceedings No 11544-11548 of 2004, Avondale Properties Ltd ats Ku-ring-gai Council;
- Land & Environment Court Proceedings No. 11366 of 2004, Ku-ring-gai Council ats Mark Shaynd;
- Land & Environment Court Proceedings No. 11626 of 2004 Providence Projects Pty Limited ats Gosford Council;
- Land & Environment Court Proceedings No. 10470 of 2005, Pepperwood Ridge Pty Ltd ats Newcastle City Council;
- Land & Environment Court Proceedings No. 11029 & 11030 of 2005, Ku-ring-gai Council ats Ray Fitzgibbon Architects Pty Ltd – Court Appointed Expert;
- Land & Environment Court Proceedings No. 10055 of 2005, CBD Prestige Property Holdings Pty Ltd ats Hornsby Shire Council;
- Land & Environment Court Proceedings No. 10059 of 2006, Pittwater Council ats Jenkins;
- Land & Environment Court Proceedings No. 10292 of 2006, Pittwater Council ats Ute Rossi;

- Land & Environment Court Proceedings No. 10222 of 2006, Waterview St Properties ats Gosford City Council – Court Appointed Expert;
- Land & Environment Court Proceedings No. 30826 of 2006, Langford & Jordon ats The Minister for Planning;
- Land & Environment Court Proceedings No. 10770 of 2006, Carr ats Lane Cove Council;
- Land & Environment Court Proceedings No. 31229 of 2006, Statewide Property Venture Pty Ltd ats Valuer General;
- Land & Environment Court Proceedings No. 31198 of 2006, Graham Trilby Pty Ltd ats Valuer General;
- Land & Environment Court Proceedings No. 31243 of 2006, Beach Court Pty Limited ats RTA;
- Land & Environment Court Proceedings No. 40480 of 2006, Olastand Pty Limited ats RTA;
- Land & Environment Court Proceedings No. 30502 of 2007, Beryl June Smith ats RTA;
- Land & Environment Court Proceedings No. 41114 of 2007, Cliff Vierter ats Rodney Andrews;
- Land & Environment Court Proceedings No. 10012 of 2007, Charly Tannous ats Port Stephens Shire Council;
- Land & Environment Court Proceedings No. 11243 of 2008, Ralph Douglas Williams ats Blue Mountains City Council;
- Land & Environment Court Proceedings No. 31077 of 2008, Diane Kay Hally ats The Minister Administering the EP&A Act;
- Land & Environment Court Proceedings No. 10700 of 2008, Pope Shenouda Coptic Christian Church ats Campbell City Council;
- Land & Environment Court Proceedings No. 30362 of 2010, Paul & Sandra Nicholls ats RTA;
- Land & Environment Court Proceedings No. 11049 of 2010, Eco Villages Australia Pty Ltd ats Pittwater Council;
- Land & Environment Court Proceedings No. 1070 of 2010, Luke Tappouras ats Lake Macquarie City Council;
- Land & Environment Court Proceedings No. 11053 of 2010, Trustees of The Sisters of the Good Samaritan ats Warringah Shire Council;
- Land & Environment Court Proceedings No. 10008 of 2011, Jonathan ats Kyogle Council;
- Land & Environment Court Proceedings of 2012, ARTZ 2 Design Pty Ltd ats Warringah Shire Council;
- Land & Environment Court Proceedings No. 10591 of 2014, Funfour ats Ku-ring-gai Council;
- Land & Environment Court Proceedings No. 11113 of 2015, Fotios Monovasis ats Great Lakes Council;
- Land & Environment Court Proceedings No. 00151186 of 2016, Statewide Planning Pty Ltd ats Northern Beaches Council;
- Land & Environment Court Proceedings No. 310397 of 2016, Connie Saffioti ats Kiama Municipal Council;
- Land & Environment Court Proceedings No. 2017/00236706 of 2017, Dukor 24 Pty Ltd ats Northern Beaches Council;
- Land & Environment Court Proceedings No. 2018/00190765, Mehran Oboodi ats Hornsby Shire Council;
- Land & Environment Court Proceedings No. 2018/326045, Palm Lake Works Pty Ltd ats Ballina Shire Council;
- Land & Environment Court Proceedings No. 2018/00352721 Paul Unicombs ats Port Stephens Council;
- Land & Environment Court Proceedings No. 2019/00023960 Giuseppe Calarco Antonetta Calarco ats Liverpool City Council;