



Victorian Bushfires Surveying Taskforce

Surveying Response to the Victorian Bushfires of February 2009

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Introduction

- ❖ The State of Victoria is situated in the south-east corner of the Australian mainland and has a variety of vegetation that ranges from open grasslands through to tall eucalypt forests







Introduction

- ❖ In February 2009, following 12 years of drought and a period of heatwave conditions in late January, Victoria was in extreme danger of bushfires



Black Saturday

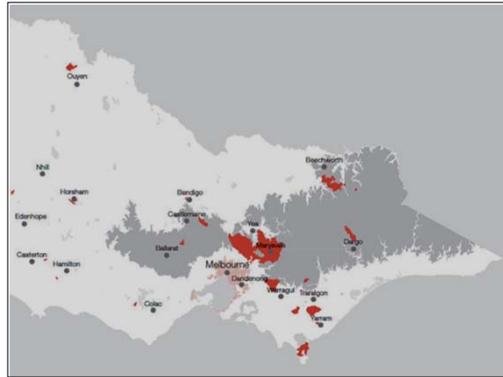
- ❖ On Saturday 7 February 2009, strong gale-force north-westerly winds hit the state accompanied by temperatures in the mid 40°C and relative humidity below 10 per cent
- ❖ The winds fanned many fires that ignited or were burning across the state, which were to become the most destructive and tragic in Australia's history and have since been referred to as the 'Black Saturday' bushfires





February 2009 Fires

- ❖ Once extinguished, the fires had:
 - ❖ Burnt approximately 430,000 hectares of land
 - ❖ Destroyed about 3500 structures
 - ❖ Destroyed over 2000 properties
 - ❖ Claimed the lives of 173 people



Victorian Bushfires Surveying Taskforce

- ❖ Over 120 offers of volunteer work were received from the surveying and spatial science community throughout Victoria and Australia – 65 firms/250 individuals donating services and equipment
- ❖ The Victorian Bushfires Surveying Taskforce (VBST) was established to coordinate the land surveying response to the bushfires
- ❖ Taskforce membership consisted of representatives from Government (DSE), professional industry bodies (ACSV, SSSI, ISV and SIBA) and academia (RMIT)
- ❖ Initial step was to develop a project plan that would be most beneficial to the recovery works and would make best use of the volunteer offers
- ❖ Decided to concentrate on the recovery and referencing of surviving survey marks and monuments





Survey Marks

- ❖ The re-definition or re-establishment of property boundaries in Victoria is generally based on using survey marks, monuments and occupation as evidence to retrace original surveys
- ❖ The types of survey marks considered important to locate and preserve in the fire areas were:
 - ❖ Permanent Marks
 - ❖ Reference Marks
 - ❖ Boundary Marks
 - ❖ Remains of fencing



Permanent Marks





Reference Marks



Boundary Marks





Project Plan

- ❖ Establish a single volunteer register
- ❖ Provide Map Grid of Australia 1994 (MGA94) Survey Control
 - ❖ Network of coordinated permanent marks
 - ❖ GNSS reference stations
- ❖ Prepare Survey Guidelines
- ❖ Identify areas requiring survey marks and monuments to be recovered and referenced
- ❖ Collate survey information and allocate areas to volunteers



Map Grid of Australia 1994 (MGA94) Survey Control

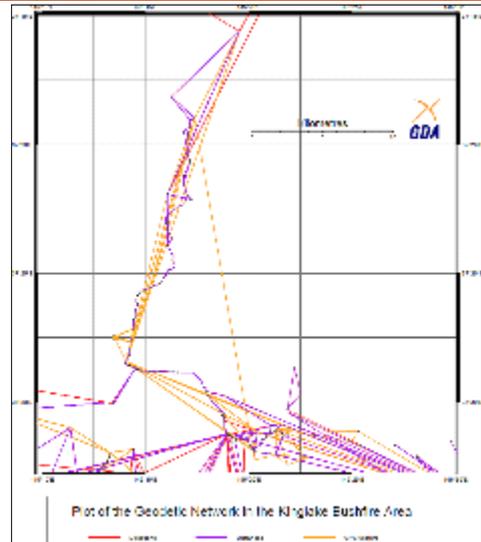
- ❖ System of rectangular coordinates based on a UTM projection of geographical coordinates on the Geocentric Datum of Australia 1994
- ❖ In Victoria, MGA94 survey control is provided by a network of coordinated permanent marks and GNSS reference stations maintained by the Department of Sustainability and Environment
- ❖ Following the fires, the MGA94 survey control was assessed in the Kinglake and Marysville regions to ensure it was sufficient for volunteer surveyors and other users





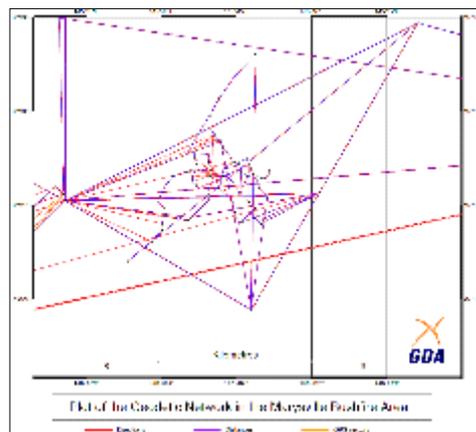
Kinglake Network

- ❖ Maximum Error Ellipses in the order of $\pm 0.3\text{m}$
- ❖ 50 permanent marks recovered
- ❖ 15 Not Found/Destroyed
- ❖ Further permanent marks established and additional GPS measurements observed to densify and strengthen the network
- ❖ Uncertainties improved to better than 0.08m



Marysville Network

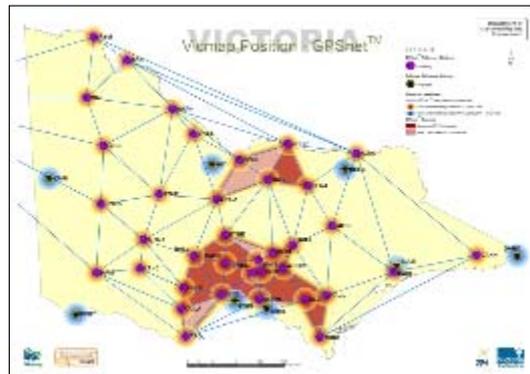
- ❖ Maximum Error Ellipse of 0.05m
- ❖ Majority of Error Ellipses in the order of $\pm 0.02\text{m}$
- ❖ 44 out of 61 coordinated permanent marks found surviving
- ❖ No further work necessary to strengthen or densify the network





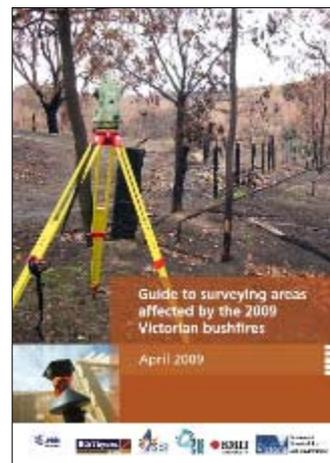
GNSS Reference Stations

- ❖ Two temporary GNSS reference stations established at Kinglake and Buxton
- ❖ Hardware donated and installed by Ultimate Positioning and C.R. Kennedy
- ❖ Incorporated into *GPSnet*™ to provide networked real-time kinematic position solutions



Survey Guidelines

- ❖ Guidelines prepared to provide instructions on the tasks to be performed and how to document the results. Included sections on:
 - ❖ Site clearance and clean-up activities
 - ❖ Dealing with people affected by the fires
 - ❖ Volunteer identification
 - ❖ Resident Information Sheet
 - ❖ Occupational Health & Safety Issues
 - ❖ Job Safety Analysis
 - ❖ Volunteer Safety Kit
 - ❖ Area Managers
 - ❖ Insurance for volunteers



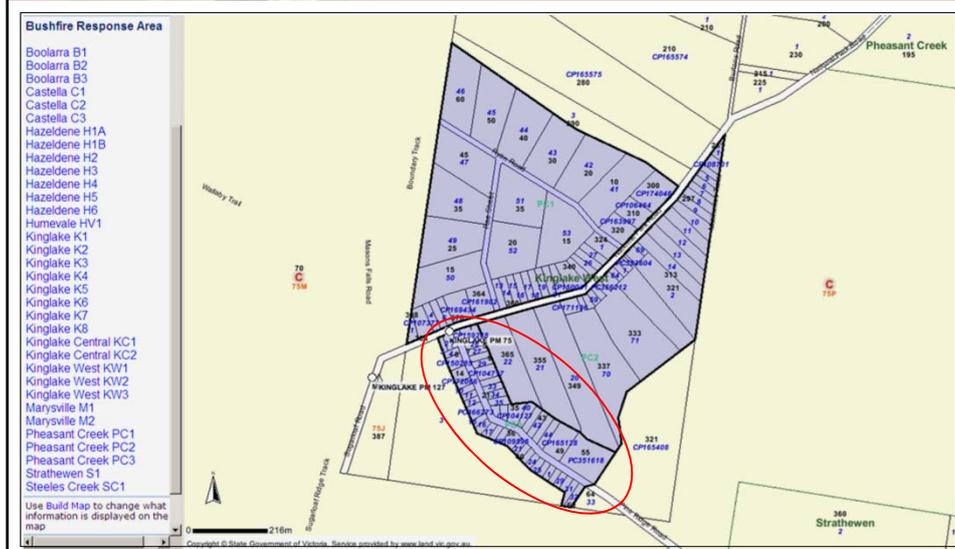


Identification of Areas

- ❖ Areas were identified using post-fire aerial photography overlaid with Victoria's Digital Cadastral Map Base, *Vicmap Property*
- ❖ Selection of areas based on a concentration of damage, particularly to fencing along property boundaries
- ❖ Areas tended to be in the more populated regions and were determined based on:
 - ❖ The extent of existing subdivisions of land
 - ❖ An estimate of 1 – 2 days fieldwork for each area
 - ❖ Field inspections to provide confirmation
- ❖ Kinglake Region was the first to be prepared with 30 areas identified in the localities of:
 - ❖ Kinglake, Kinglake Central, Pheasant Creek, Kinglake West, Hazeldene, Flowerdale, Castella, Steels Creek, Strathewen and Humevale



VBST Areas Pheasant Creek PC1, PC2 & PC3





Pine Ridge Road, Pheasant Creek



Regional Areas and Marysville

- ❖ In regional areas of Victoria, local survey firms performed their own reconnaissance and identified areas close to them that had been impacted by the fires
 - ❖ Areas identified in the vicinities of Horsham, Bendigo, Boolarra, Traralgon South and Callignee
 - ❖ Support provided by the VBST
- ❖ In Marysville, following field inspections and a detailed analysis of the cadastre, it was determined that a program of survey mark recovery and referencing was unnecessary
 - ❖ Legacy of the 'Proclaimed Survey Area' concept





Volunteer Fieldwork



- ❖ Areas allocated to survey firms and relevant information collated and supplied to volunteers for perusal prior to commencing fieldwork



Volunteer Fieldwork



- ❖ Fieldwork commenced in the Kinglake region on 3 April 2009 and concluded on 4 June 2009





Volunteer Fieldwork



- ❖ Volunteers managed from an on-site office established by the VBST in a re-locatable building at Kinglake



Volunteer Fieldwork



- ❖ 30 survey firms and 81 individuals performed the volunteer survey work in the Kinglake region





Volunteer Fieldwork



- ❖ Very good success rate for the survey marks and monuments searched for was reported
- ❖ Safe work practices – no injuries or near misses occurred



Regional and other Volunteer Services

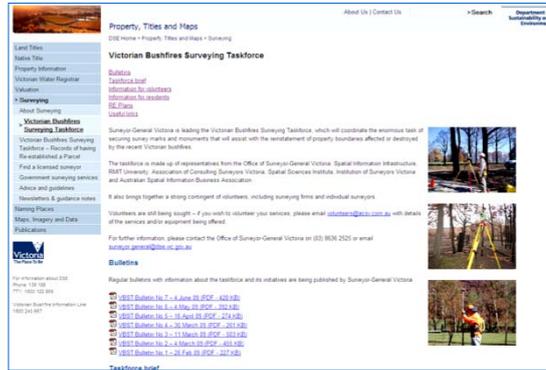
- ❖ A similar high success rate for the recovery of survey marks and monuments was reported in all regional areas
- ❖ In Bendigo, the volunteer survey work developed into another project where funding was made available to re-mark the boundaries of the 75 fire-affected properties in that area
- ❖ Other volunteer services provided included:
 - ❖ Private survey firms undertaking property surveys either free of charge or at a reduced fee
 - ❖ Professional survey advice service established by the Taskforce
 - ❖ At its on-site office in Kinglake
 - ❖ Over the phone





Communication

- ❖ Regular update bulletins
- ❖ Victorian Bushfires Surveying Taskforce website at: www.dse.vic.gov.au/vbst
- ❖ Volunteer Information:
 - ❖ Survey Guidelines
 - ❖ Updated survey control information
- ❖ Resident Information:
 - ❖ Information Sheet
 - ❖ Advice on how to find a land surveyor
 - ❖ Links to regional community websites



Conclusion

- ❖ The work of the volunteer surveyors has enabled property boundary surveys for recovery and re-building after the fires to be performed more efficiently and economically
- ❖ Lessons learnt:
 - ❖ Having insurance available for volunteers when required
 - ❖ Legacy of the 'Proclaimed Survey Area' concept – establishment of coordinated permanent mark networks in high fire threat areas and mandating cadastral surveys to connect to them
 - ❖ Spatially accurate Digital Cadastral Map Base





Thank you

