



FIRU NEWSLETTER

Issue 4, 18th December 2017



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QUARTERLY SNAPSHOT

OCT—DEC '17

Incidents attended: 54

K9 deployments: 35

RPAS deployments: 7

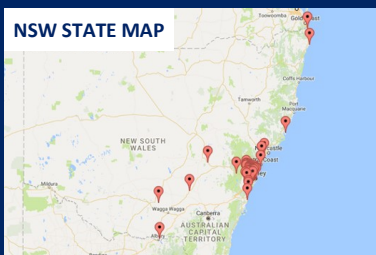
Fatalities attended: 5

Determinations:

Accidental 24.1 %

Incendiary 31.5 %

Undetermined 44.4 %



Welcome

Welcome to the final edition of the FIRU Newsletter for 2017.

It is at this time of the year that we tend to look back at what we have achieved and the lessons that we have learned over the past 12 months. It is a good exercise to do because sometimes it's not until we sit down and reflect on the past year that we realise how far we have come. It has been a very big year for FIRU, with many highlights including the successful completion of our Residential Sprinkler Research and the celebration of our 30th Anniversary. Recently, FIRU sadly farewelled one of our Fire Investigators, with Wayne Schweickle heading back to Operations to further his career. Thank you for your service Wayne. We also welcomed Tara Burton, who has already proven a great asset to our Fire Investigation Team.

In this addition of the FIRU Newsletter, you will hear about the research work that is being carried out in relation to Firefighter Exposure Risks, an interesting case study from a fire at the Mekong Club in Cabramatta, a day in the life of one of our K9s and his handler, as well as many more interesting stories. Not to mention some puzzles to keep you busy!

Don't forget, if you have any questions, comments or suggestions, please feel free to contact us on firu@fire.nsw.gov.au.

On behalf of all the team at FIRU, I would like to wish you and your families a very safe and happy Christmas. We look forward to the opportunities that 2018 will bring.

Superintendent Graham Kingsland—Manager FIRU



K9 Ellie—Christmas 2005

FIRU NEWS

QF ENGELSMAN A FINALIST IN 2017 COMMISSIONER'S SAFETY AWARDS

31st October: QF Michelle Engelsman, was a finalist in this year's Commissioner's Safety Awards for Best Solution to an Identified Workplace Health & Safety Issue. Michelle was recognised for her efforts in improving occupational hygiene at Headquarters with the repositioning of laundry facilities. Pheo Duong, FIRU Research Assistant, was also nominated for the award.



K9 VIKING AND PHIL IN "DOGS WITH JOBS"

27th November: Viking and LSO Phillip Etienne appeared in the recently published book, *Dogs with Jobs: Inspirational Tales of the World's Hardest Working Dogs* by Laura Greaves (Penguin Random House November 27, 2017).



STAFF CHANGES IN FIRU

October: FIRU farewelled one of our valued Fire Investigators, LSO Wayne Schweickle, who left the unit to gain wider organisational exposure as a relieving officer for MS2. Wayne joined the FIRU team in 2014 and quickly became one of our most diligent and knowledgeable investigators. His skills and attention to detail were vital in the determination of over 240 investigations, including 12 fatal fires. In addition, Wayne's skills in construction have been invaluable in the conduct of FIRU's "Build It - Burn It" research program. He also pioneered FRNSW's use of remotely piloted aircraft systems (RPAS) in fire investigation, which has added a new dimension to our capabilities and improved safety for our officers.

FIRU also welcomed QF Tara Burton from City of Sydney station to the team in October as our new fire investigator on H Platoon. Tara brings her warmth and enthusiasm as well as a wealth of experience, not only as a permanent firefighter and rescue operator, but also from her years in our retained ranks at Jindabyne fire station, in which she rose to the rank of Deputy Captain. Welcome Tara!

FIRU OFFICERS RECOGNISED FOR MERITORIOUS SERVICE

23rd November: Two of our fire investigators received Commissioner's Individual Commendations for Meritorious Service from Deputy Commissioner Jim Hamilton during a ceremony held at Headquarters. LSO Michael Forbes received the award for assisting a NSW Police Force investigation after a serious convenience store fire at Rozelle. SF Bernard Daly received the award for his actions while off-duty at a BBQ explosion in the Belanglo State Forest on 26 March 2017 [Commissioner's Orders 2017/21].



FIRU STUDY WILDFIRE INVESTIGATION TECHNIQUES WITH NSW RFS

28th-30th November: FIRU officers attended a wildfire investigation training course held by NSW Rural Fire Services at the Kenthurst Control Centre. Over the three days, FIRU Officers along with FRNSW bushfire officers and officers from the NSW National Parks and Wildlife Service learnt to recognise the indicators that lead to origin and cause in wildfires. The course included a practical component where the group witnessed a live burn, revisited the site to look for the physical indicators, and a course assessment where students investigated prior burn sites in groups. The course was an eye-opener and was thoroughly enjoyed by all.



RELIEVING OFFICERS LEND A HELPING HAND

October-November: SO Jonathan "Jock" Gilmore from 15 station Burwood and SO Chris Hughes (73 station Yennora) joined FIRU during a period when we were short staffed and busy.

These experienced officers have worked within FIRU as investigators over the years and were able to slide right back into the roles with ease, and giving us the benefit of their varied experiences in the field. Thanks to both for their efforts — hope to have you back next time.

FIRE RESEARCH

Study into Firefighter Exposure Risks

Firefighter health has been gaining increasing attention around the world in recent years. Contemporary studies have emerged surrounding fire station contamination due to the products of combustion and diesel fumes.

FRNSW is currently supporting a University of Queensland PhD research study into firefighter exposure risks and subsequent reproductive effects. The study is evaluating both acute and chronic exposure risks, meaning your exposure at the job, exposure in the vehicle cabin, exposure at the fire station, etc.

15 fire stations have been selected for monitoring over a five year period: Silverwater, Parramatta, Merrylands, Seven Hills, Blacktown, Smithfield, Yennora, Cabramatta, Kogarah, Mortdale, Ropes Crossing, Campbelltown, Riverstone, Lidcombe and Busby. Stations have been selected based on station layout, location of PPE (turn-outs), age of station, and fire calls per annum.

The first step (now completed) involves dust, wipe and air monitoring, with an air monitor that must stay undisturbed in position for 2-3 months. The next step will involve Safe-Work NSW visiting each of these stations over the coming months to undergo 8-10 hour air monitoring, and to take wipe samples from around the fire station.

During this period an anonymous firefighter survey will also be released. Firefighters are requested to participate as this will give vital information surrounding firefighter and fire station health, hygiene and reproduction. The survey requests firefighters to take part in a further step by contributing a human bio sample (blood, urine, breast milk or semen). The purpose of this is to gain insight into whether there is increased chemical load in firefighters' systems. All participation by firefighters is entirely voluntary, and anonymity and confidentiality has been protected through a rigorous University of Queensland ethics process.

FRNSW and individuals are able to receive bulk, aggregate results, though please be aware that the timeframe for this will be years due to the sheer volume of data being collected to support our health and safety as firefighters.

For more information about the study, please contact QF Michelle Engelsman by email at Michelle.Engelsman@fire.nsw.gov.au



Research Wrap Up

It has been another busy year for the research team with 11 completed projects and 33 days of live burns. We've had a number of achievements along the way, most notably with the Residential Smoke Alarm and Sprinkler Research, supporting important proposed changes to the National Construction Code in 2019. The Fire Research Team has also contributed to a Coroner's Inquiry, which resulted in a recommendation for the mandatory installation of carbon monoxide alarms in boats, caravans and recreational vehicles with sealable cabins. Recently, Pheo and Kim joined in on a Home Fire Safety Checks deployment in Lakemba and found the experience most satisfying, being able to apply the findings from our smoke alarm research. The team also recently hosted a site visit to the Londonderry Research Facility by students from the Canberra Institute of Technology. Students completing the Advanced Diploma of Public Safety (Fire Investigation) and the Bachelor of Forensic Science (Crime Scene Examination) were given practical experience processing a fire scene set up by SF David O'Brien and the team.

The work that our small team has achieved could not have been carried out without the support and assistance of the larger FIRU team including our interns, the firefighter training team, some very knowledgeable people from Fire Safety, Community Engagement and the Community Safety Directorate, and our partners at CSIRO, UNSW, UTS, and WSU. 2018 looks to be an exciting year ahead with a number of interesting projects already underway.



FIRE INVESTIGATION

Mekong Club Gaming Room Fire

Overview

Time of call:	1937 hrs
Resources:	CP31, HP85, P55, RP101, RP8, LP27, P49, P73, CP41, H85, P64
FIRU Investigators:	LSO Michael Forbes
Building Class:	Class 6—Shop or supply service
Construction:	Brick construction
Detection/suppression:	Smoke detectors
Evacuations:	100
Fatalities/Injuries:	None
Cause & Origin:	Electrical: Overheated power supply component impacting on housing and timber base of gaming machine.
Determination:	Accidental

Description

In January 2017, a fire occurred in the outdoor area of a club in Cabramatta, spreading to the inside area. Smoke was first observed coming from the base of a poker machine in the outdoor section. Footage from a CCTV camera at the northern end of the outdoor area showed a male playing the second poker machine from the door. The footage showed the male discarding a cigarette that was thought to have started the fire. After further investigation it was observed that the cigarette butt had landed on the buttons of the first poker machine and not behind the machine.

At 19:14:52 smoke appeared in the air above the machines, and continued to fill the room, causing the patron in the room to exit. A staff member entered the room and turned off the air conditioners, then closed the doors to the empty room at 19:20:20.

At 19:27:27 a glow of light appeared at the top of the screen (Figure 1), and it appeared that the flame was coming from the rear of the machine.

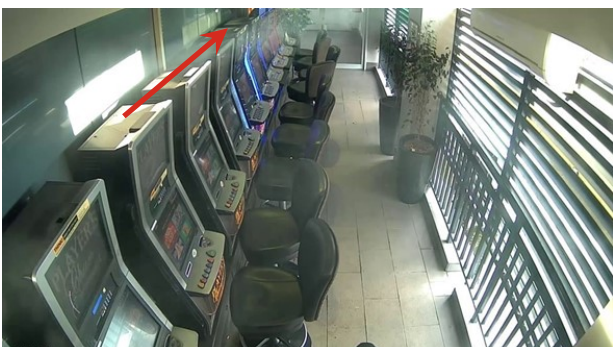


Figure 1 Snapshot of the CCTV footage at 19:27:27. Note the flash of fire at the top of the screen.

Physical Indicators

There was extensive fire damage to the poker machines on the western wall of the building on level 1. The glass wall separating the inside and outside poker machine areas was destroyed by the fire. A few machines in the inside area showed oxidation to the rear of the machines. In the outside area, the five poker machines numbered 1-5 from the entrance door to the northern end sustained minimal to moderate damage. The front of machine 3 had sustained moderate fire damage, but the rear of the machine had sustained oxidation to most of its surface. The front of machine 4 had only sustained minimal fire damage, but the rear had sustained oxidation to half of its surface, with the southern half showing more damage. An inverted 'V' pattern of oxidation was observed at the base of the machine (refer to Figure 2).



Figure 2 (right) Photo showing the left side of machine 4. Note no oxidation on this side, and the inverted "V" pattern of oxidation on the rear of the machine.

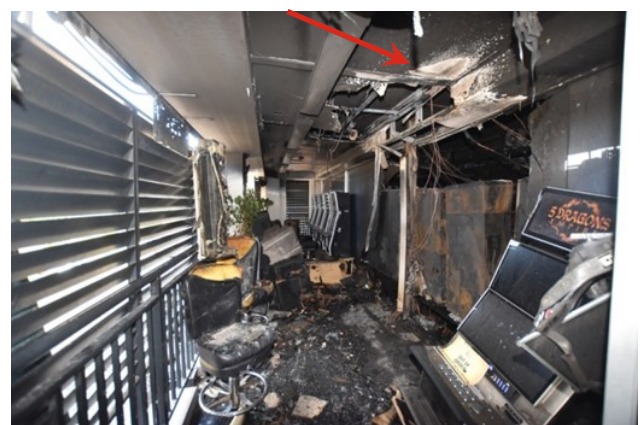


Figure 3 Photo showing the outdoor gaming area. Note the clean burn to the ceiling.

Inspection of the machines revealed that the damage originated from the power supply box which powered machines 1 to 3.



Figure 4 (left) Photo showing the discarded cigarettes and rubbish found behind the gaming machines

Conclusion

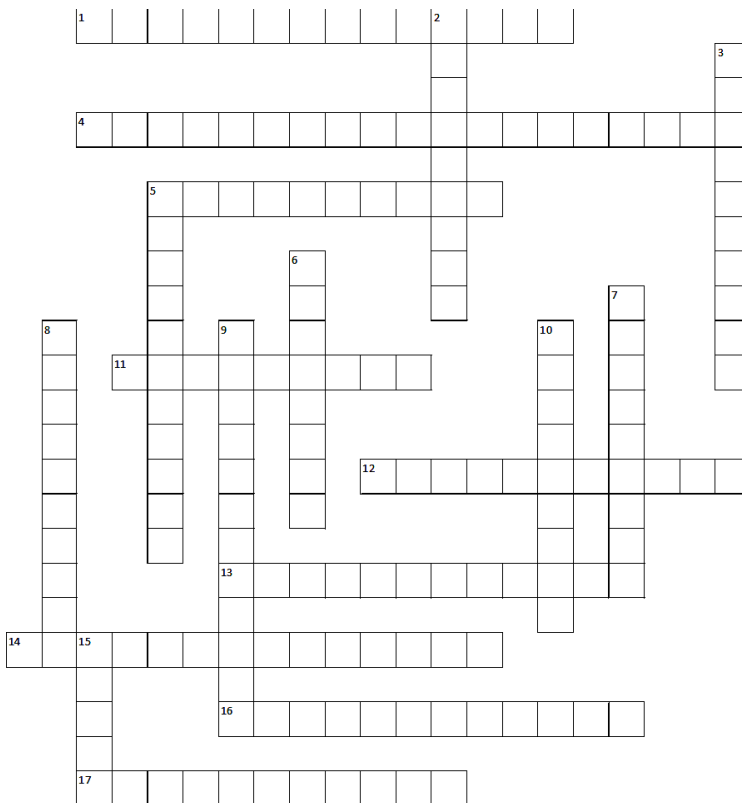
The fire originated from the timber base of either poker machine 3 or 4 in the outdoor gaming area. The point of origin was the toroid transformer inside the aluminium power supply box that powered machines 1 to 3. The heat was produced inside the partially destroyed box, burning a hole in the housing and releasing heat, which impacted the timber box base beneath the poker machines, causing the fire.

If you would like further information regarding this incident, please contact [FIRU](#).



Figure 5 (right) the damaged toroid transformer

FIRE INVESTIGATION CROSSWORD



Across

1. A fire for which the proven cause does not involve an intentional human act to ignite or spread fire into an area where it should not be (10,4)
4. Initiation of combustion of a material by an internal chemical or biological reaction that has produced sufficient heat to ignite the material (11,8)
5. A chemical process of oxidation that occurs at a rate fast enough to produce heat and usually light in the form of either a glow or flame (10)
11. Loss of temper in metal caused by heating (9)
12. Circulation of air in any space by natural wind or convection or by fans blowing air into or exhausting air out of a building; a fire-fighting operation of removing smoke and heat from the structure by opening windows and doors or making holes in the roof (11)
13. Initiation of combustion by heat but without a spark or flame (12)
14. A fire that is intentionally ignited in an area or under circumstances where and when there should not be a fire (10,4)
16. The interface of hot and cool gas layers at an opening (7,5)
17. The process of air or gases being drawn into a fire, plume, or jet (11)

Down

2. A transition phase in the development of a compartment fire in which surfaces exposed to thermal radiation reach ignition temperature more or less simultaneously and fire spreads rapidly throughout the space, resulting in full room involvement (9)
3. Heat transfer by circulation within a medium such as a gas or a liquid (10)
5. A fire effect realised in gypsum products, including wallboard, as a result of exposure to heat that drives off free and chemically bound water (11)
6. Chipping or pitting of concrete or masonry surfaces during exposure to high heat (8)
7. The combination of oxygen with substances such as metals, rock, or soil that is brought about by high temperatures (9)
8. Heat transfer to another body or within a body by direct contact (10)
9. Propagation of a combustion zone at a velocity that is less than the speed of sound in the unreacted medium (12)
10. A process in which material is decomposed into simpler molecular compounds by the effects of heat alone (9)
15. The appearance of fine cracks usually produced when fire suppression water spray strikes a heated smooth, glassy surface. Is characterised by a complex pattern of partial-thickness fractures and concave pitting (5)

ACCELERANT DETECTION CANINES

K9s look forward to the Year of the Dog

2017 has been another jam-packed year for our accelerant detection canines and their handlers with 167 deployments to date, court appearances, lectures and demonstrations to various internal and external stakeholders across NSW, media events and conferences. The canines were also involved in a joint study with the Canberra Institute of Technology in relation to *the examination of the effect of PVA glue application on ignitable liquid detection by canine*. The canines proved their ability to detect their target odours even with the glue applied.

For K9 Team Leader LSO Phillip Etienne, the year included 82 deployments across NSW including locations such as Cootamundra and Thurgoona, and has culminated in his successful completion of the Leading Station Officer's program. Well done Phil!

For SF Joel Walton and Opal, 2017 took them to 40 incidents across NSW, including locations such as Leeton and Woolgoolga. From units to factories and everything in between, Opal has been performing well and getting good results from the laboratory to back up her indications. Opal's skills continue to grow through training and education for both canine and handler and the team is looking forward to 2018.

For QF Tim Garrett and Earl, it has been an eventful year, with the team adjusting well to Earl's epilepsy diagnosis and subsequent medication. Fortunately, the condition has not at all hindered Earl's performance with 45 deployments across NSW including locations such as Dubbo and Buckajo. Tim writes:

There is always an element of uncertainty in what the working day will bring us. For Earl and I, this was highlighted on a Monday in December, which started off as usual with an early morning training session with the hounds, after which it was to be another day on the road for Earl.

The first job, unfortunately, was a fatality at Morisset with FIRU. After no indication in the fire scene he indicated near the boundary fence underneath a tree, which was expected as the retained firefighters had already told me that it was where they had refuelled their generator. Nonetheless Earl was justly rewarded for his performance—he had done his job by indicating on ignitable liquid.

Next was straight to a house fire in Telarah near Maitland to assist the Police Forensic Services Group. Unlike the previous scene which was completely destroyed, firefighters had been notified early and able to arrive in time to contain the fire so that most of the structure was intact. Earl searched through the scene yet it wasn't until he found a lawnmower under the house that he was rewarded by indicating on the carburettor.

After a lunch break we headed back down the M1 to Windsor for another house fire with FIRU. Again at this scene firefighters had been able to contain the fire to the room of origin. On his first deployment through the house, Earl showed some interest in an area in the ROO before making his way outside to the backyard and winning a reward, on this occasion a motorbike's carburettor was the find. Working with the retained firefighters on scene, FIRU soon had most of the room of origin excavated down to floor level. Earl was again deployed through the house and sure enough on this run Earl indicated on some molten ash-coloured debris where he had shown interest previously. He was rewarded and an item of evidence was sampled by police. In all the day again emphasised the value of the ADC program not only to FRNSW but to external agencies such as NSW Police whom we work with daily.



HELP VIKING, OPAL AND EARL "FIND IT!"

L	E	R	T	O	P	E	G	N	E	T	N	I	P	N	O	S	I	N	N	E	J	E	M
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A	G	R	I	T	W	G	A	R	M	E	N	S	H	A	S	P	H	O	R	D	S	F	I
L	E	C	N	A	P	P	Y	S	T	N	H	E	N	D	E	R	S	O	N	N	N	A	C

Ansett	Earl	Indicate	Kova	Mineral turpentine	Sabre	Viking
Accelerant	Ellie	Henderson	Labrador	Nappy	Sheba	Walton
Canines	Etienne	Jennison	McCarthy	Opal	Thinner	Warrant search
Detection	Garrett	Kerosene	Methylated spirits	Petroleum	Training	Winna

OUR PEOPLE — Q & A

SO Morgan Cook



Q. What is your position at FIRU and how long have you been with the Unit?

A. I am the Team Leader Fire Research. I have been with the unit since November 2009.

Q. What are your day-to-day tasks at the Unit?

A. My day to day tasks involve the planning and co-ordination of fire research projects that include both small and large scale “live” fire exercises and demonstrations. This is done for a number of reasons, from product recall to providing assistance with coronial and criminal fire related matters.

Q. What is the best thing about working at FIRU?

A. The best thing about working at FIRU is the range and diversity of work that comes through the door, but most of all it's the Research Team who make the work seem less like work thanks to their dedication and love of what they do.

Q. What is the hardest thing about working at FIRU?

A. The hardest thing about working at FIRU is deciding on which projects get the highest priority, as they all have the ability to have a major impact on social and political fronts.

Q. What has been the most interesting or challenging project that you have worked on at FIRU?

A. The most interesting and challenging project that I have worked on would have to be the Quakers Hill Nursing Home test following the tragic fire back in November 2011. This project led to sprinklers being made mandatory in all residential aged care facilities. That being said though, we've also recently conducted some very high level research into smoke alarms and also residential sprinklers. All of our projects come with huge logistical challenges, but with a good team around you anything can be achieved.

QF Michelle Engelsman

Q. What is your position at FIRU?

A. I'm working within FIRU as a Research Officer

Q. Are you working on a specific project?

A. For about a year and a half now I've been working on a research project specific to firefighter health, safety and reproduction. It is essentially focused around the risks of exposure (acute and chronic) to products of combustion. It's a health study focused on reproduction, an area that is sorely lacking in information for firefighters. It will include station monitoring, surveys

and the collection of bio-samples (blood, urine, breast milk and semen), and will require volunteers to participate (so please get involved!). It's a completely anonymous study and will provide heaps of information to support knowledge of Australian firefighter health and reproduction. I recently presented a [poster at AFAC](#), together with Assistant Commissioner Mark Whybro and Assistant Commissioner Jeremy Fewtrell. Our poster won the People's Choice award, which was really exciting, and certainly demonstrated that the research study is of interest to the greater population within our sector.

Q. What are your day to day tasks at the unit?

A. Predominantly I spend my days reading research papers, trying to understand the nuances of statistics, and writing information. I do a lot of planning for the different stages of the research project and work with many partner organisations and other teams within FRNSW. I also support the greater FIRU team by as-



sisting in other research projects, reading Investigative reports, and any administrative tasks that come my way.

Q. What is the best thing about working at FIRU?

A. It's a highly motivated team and a really interesting group of people. Everyone is dedicated to their jobs, gives a lot, and shares a lot of information and learning. I feel I've learnt an enormous amount since being within the team, not just on my specific project, but also on investigations, fire dynamics, structural integrity post incident, the interaction of different agencies to support research and investigations, and I have a better understanding of how other operational support sections work and how they contribute to the overall function and success of FRNSW.

Q. What is the hardest thing about working at FIRU?

A. I would say the hardest thing isn't that hard at all, it's simply keeping up with the high output of quality work that is expected of all operational support firefighters. Also, it is tough being removed from station action, but the trade-off benefits are huge.

Q. What has been the most interesting or challenging project that you have worked on at FIRU?

A. I am really enjoying the project I'm working on right now. I've been able to present information at the [Women and Firefighting Australasia Conference in 2016](#), and at AFAC a couple of weeks ago ([via poster](#)). There is a global movement towards improving firefighter health and safety, and I'm really pleased to be contributing towards that end goal.

When to call FIRU

It is the responsibility of the officer in charge to establish the origin and cause for EVERY fire they attend. When the origin and cause cannot be established, then you can call for an Investigator to contact you at the scene.

Do not request FIRU if there is obvious evidence of incendiary or deliberate ignition, criminal activity or if there are suspicious circumstances – please hand the scene over to NSW Police by:

1. Have FireCOM request NSW Police to attend
2. Handing over the scene using the hand-over sheet, and
3. Ensuring all of the information is gathered for your eAIRS report.

FIRU attendance is determined by priority and availability. FIRU may be able to assist by 'walk and talk', or investigations may be deferred to a later time/date. Investigators from FIRU attend fires throughout the State 24/7, particularly those where:

- there has been a loss of life or major injury from fire
- the fire is considered major (property is destroyed or damaged and losses exceed \$500,000)
- the fire is considered unusual
- a known person is suspected of causing the fire or explosion
- the fire or explosion is high profile, special interest or subject to extensive media attention
- the cause is not readily apparent, or where
- the officer in charge requests FIRU attendance.

Please go through FireCOM to ask for the 'on call' Investigator. As the four Investigators at FIRU rotate being 'on call', FireCOM will be able to contact the right person.

CONTACT DETAILS

Fire Investigation & Research Unit is located at:
**Ground Floor Building B,
1 Amarina Ave Greenacre NSW 2190**
Office hours are 0700 to 1730, Monday to Friday

The FIRU Research Testing Facility is located at:
667 The Northern Rd Londonderry NSW 2753
Visits to the site are by appointment only

For general enquiries:

Phone: **02 9742 7395** | Fax: 02 9742 7385 | Email: firu@fire.nsw.gov.au

FIRU staff are available on-call after hours and during weekends.

CONTACT ON CALL FIRE INVESTIGATORS AND K9 HANDLERS THROUGH FireCOM

Mail correspondence:

Fire Investigation & Research Unit
Locked Bag 12, Greenacre NSW 2190

Please mark all FIRU correspondence "PRIVATE & CONFIDENTIAL"

Manager FIRU:	Supt Graham Kingsland
Administration Officer:	Diana Cornish
Fire Investigators:	Insp Colin Eldridge, SF Bernard Daly (G Platoon) LSO Michael Forbes, QF Tara Burton (H Platoon)
K9 Team Leader:	LSO Phillip Etienne (K9 Viking)
K9 Handlers:	SF Joel Walton (K9 Opal, G Platoon), QF Timothy Garrett (K9 Earl, H Platoon)
Team Leader Fire Research:	SO Morgan Cook (H Platoon)
Fire Research Officers:	SF David O'Brien (G Platoon), Kim Thai, QF Michelle Engelsman
Research Assistant:	Pheo Duong