FIRE CONTRACTORS GUIDE BOOK

ELECTRICAL

CONTENTS

Date	Revision	Comments
May 2011	Rev 0	Initial document
May 27 2011	1.1	Grant Hamon
May 31 2011	1.2	For review by KB
Aug 24 2011	2	Sect 17, 18 & aerial info added
Apr 20 2013	3	Full redacted document for V3 only
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1. PREFACE

This information is for fire technicians and electricians working on Class 2 to 9 buildings and relates to the installed fire equipment of an electrical nature (AS1670.1) with the main with the focus on NTFAST connected buildings but does not address AS/NZS1668.1, AS2118, AS2419.1 & AS2941 electrical requirements.

This documentation outlines the function of NTFRS Community Safety Command and NTFAST technicians' role in building compliance. This document refers to NTFAST V3.

This documentation is Northern Territory system (NTFAST) specific.

USED TERM

Legacy site – site that was originally connected via the former Torrens system, has miri unit in an NTFAST box external to FIP with 13.8 volt PSU/charger and battery.

ACRONYMS

ACMA	Australian Communication & Media Authority
AFA	Automatic Fire Alarm
ASE	Alarm Signalling Equipment (Miri AD2000 /AD2006)
ASP	Alice Springs
BOWS	Building occupant warning systems
BCA	Building Code of Australia (of late NCC National Construction Code)
CPR	Cabling Provider Rules
DIN	Digital Input
DOT	Digital Output
ECP	Emergency Call Point (white coloured MCP)
ERA	Emergency Response Area
EWIS	Emergency warning & intercommunication system
FIP	Fire indicator panel
JAB	Jabiru
JESCC	Joint Emergency Services Communications Centre
KTH	Katherine
MCP	Manual Call Point (red break glass alarm)
NHU	Nhulunbuy
NTES	Northern Territory Emergency Services
NTFAST	Northern Territory Fire Alarm System Transmission
PFES	Police, Fire & Emergency Services
RSSI	Received Signal Strength Indicator
RTU	Radio Telemetry Unit
SOU	Sole occupancy unit
SPL	Sound Pressure Level
TCK	Tennant Creek
V3	Version 3 Software
WAN	Wide Area Network
WIP	Warden Intercom Point
YUL	Yulara

2. REGULATORY ENVIRONMENT OF FIRE EQUIPMENT

AS1670 fire systems, AS/NZS 3000 section 7.2 "Safety Services" and other fire related requirements like AS2293.1 "Emergency escape lighting and exit signs for buildings" are covered by the following NT legislation:

NT Building Act
NT Fire and Emergency Act
NT Fire and Emergency Regulations
Building Code Australia
Australian Standard (that's applicable to type of equipment)

NTFRS Community Safety Command must first receive an application for Fire Safety Report from an NT licenced Building Certifier. A report is compiled on fire equipment/safety requirements for class 2 to 9 base building constructions, subsequent fit outs. This report is usually written during the design phase and returned to the NT licenced Building Certifier

NTFRS Community Safety Officers inspect buildings at a time arranged through the Building Certifier via a Request for Inspection. If fire safety issues and equipment are checked and found satisfactory, the report can be signed off by the inspecting officer and forwarded to the Certifier.

NT licenced Building Certifiers are the Authority Having Jurisdiction in the NT. The Building Certifier will be responsible for issuing the Permit to Occupy.

NTFAST Technicians' role is two-fold. The primary role is to maintain NTFAST infrastructure and facilitate connection of new sites. Secondly is to provide technical support to the NTFRS Community Safety Officers.

Fire Technicians shall install fire safety systems to AS1670.1 & 4 and BCA requirements where it over rules AS1670 (see section 18 item 10). It would be beneficial for technicians working on systems installations to have a copy of the standards at hand.

Installers of fire systems are required to be *OPEN* category registered with one of the 5 Cabling Provider Rules Registrars, or directly supervise all others working under his registration. This includes the holders of *RESTRICTED* category registration. Cabling Provider Rules (CPRs) are issued by the Australian Communication & Media Authority (ACMA) as covered by the Telecommunications Act 1997.

The Installing technician is required to complete an Installers Statement as per AS1670.1 normative Appendix F document. "A '*normative*' Appendix is an integral part of the Standard,"
The statement's item 11 is where the installing technician certifies that:

(a) installation is complete and tested thoroughly
(b) is installed to current requirements of AS 1670.1 or
(c) is installed to attached design specification
Except in regard to the following details……..

(c) Should only be selected for systems installed as part of a fire engineering solution design. This means far greater requirements then that of AS1670.1 or systems such as those installed in sprinkled buildings. The design is not meant to be equal to AS1670.1 but is installed to give occupants earlier warning.

The "Except in regard to the following details…." this is an important part to fill out. You are to nominate all items that do not comply with AS1670.1.
You'll find that on a lot of jobs, the supplied drawings do not comply with AS1670.1. On some occasions, no matter how much you tell the builder they will insist that you install it to the drawings.

The best advice is to fill out this section in detail and make the Building Certifier and Community Safety Officer aware at the time of inspection or earlier if possible. You will have covered yourself. The Building Certifier and Community Safety Officer will be very unlikely to sign off on the system with anything nominated as not to the Standards. This will probably result in you receiving a work order very promptly to rectify non compliant issues.

3. AUSTRALIAN STANDARDS ON FIRE EQUIPMENT

DETECTION – Fire contractors should be mindful AS1670.1 clause 3.25 …requires that detection be provided throughout all areas of the building; however, where systems are installed to meet the requirements of the BCA, detectors may only be required in certain nominated areas.

Should be equally mindful of Clause 3.26 …"*Detectors are not required in the following locations*:" as listed (a) to (i)

Specific detection arrangements as well as nominated areas are covered in clause 4 and 5 of Spec E2.2a of the BCA. For example Class 2 may have AS1670.1 detection only *"in public corridors and other internal public spaces."*

Full protection AS1670.1 via clause 3.25.1 and NTFAST conditions of connection 11 c) "partially protected buildings will not be accepted for connection", except as above the BCA requires detection in only certain nominated areas or specific detection arrangements.

ELECTRICAL – Electrical contractor should be fully aware of the requirements of AS/NZS 3000 clauses 1.5.2, 1.5.12 and section 7 2 Safety Services in particular at switchboard design phase. This will save a lot of issues at time of fire inspections.

The following are some of the more salient points of applicable clauses for most typical installations.

AS/NZS 3000 clause 1.5.2 Control and isolation
"*….control of safety services shall be arranged so that the control devices are separate from the control of other equipment and are not unintentionally interrupted by the operation of the other equipment."*

1.5.12 Protection against the spread of fire
"Protection shall be provided against fire initiated or propagated by components of the electrical installation." This applies particularly to egress and the sterile fire environment required in fire isolate stairwells, ramps and passageways

Section 7.2 Safety Services which include:
7.2.1.2 Fire- and smoke-control equipment
"(a) Fire hydrant booster pumps."
"(b) Pumps for auto sprinkler systems, water spray or deluge systems "etc.
"(c) Pumps for fire-hose reels, where they are sole means of fire protection…."
"(d) Fire detection and alarm systems."
"(e) Air-handling systems intended to exhaust and control the spread of fire and smoke."

7.2.1.3 Evacuation equipment
"(a) Sound systems and intercom system for emergency purposes."
"(b) Central emergency evacuation lighting systems comply with the AS2293 series."

7.2.1.4 Lifts

7.2.4 Arrangement
Requires that *"Main switches for safety services shall–*
(a) Be connected on the supply side of all general electrical installation main switches, and ….."
Exception
"(c)(iii) Automatic fire detection, alarm and intercom systems or sound and intercom systems for emergency purposes that are–
(A) supplied from the supply side of a distribution board not more than one removed from the main switchboard; and….."

<u>EMERGENCY LIGHTING AND EXIT SIGNS</u> – Electrical contractors installing this equipment should familiarise themselves with AS2293.1 and the requirements for the most common single point systems.
Clause 2.3.3.2, 4.3 and figure C1 should be fully understood at the time of designing and installing required general and emergency lighting circuit for small installations. This especially applies for the multiple circuits in larger installations and the interrelationships that are required by these clauses.
Understanding the requirements of the above clauses along with clause 2.4 'Labelling', clause 2.2.1 that initial commissioning tests be of 2 hours duration and be enter in the required clause 8.3 completed logbook should also be addressed.

4. NTFRS OPERATIONAL REQUIREMENTS

ONE STOP SHOP – NTFRS is a relatively small fire service. First response is generally one pumper and four fire fighters. For that reason Community Safety Command has input at the design phase of new buildings to achieve a one stop shop for fire safety equipment.

This means the location of the hydrant/sprinkler booster and sprinkler control valve are in close proximity and visible to the FIP/Building access. The one stop shop design will allow first arriving crews an ability to access all installed fire safety systems. One stop shop operation is not possible on legacy sites which have Sub FIPs.

SUB FIP (conventional) – Installation of new building that connect sub FIP to an existing building is prohibited. This is listed under condition of connection to NTFAST 11 b). This is to prevent instances where the pumper (appliance) first stops at the NTFAST connected FIP and then is required to relocate to a secondary location.

NETWORK FIP – Networked FIP on large sites can only be used if the infrastructure for a one stop shop is provided i.e. appropriately located fire hydrant booster with attack hydrant coverage to all networked buildings.

Community Safety advice should be sort prior to expansions, major changes and upgrades of existing NTFAST sites. Above works will require Building Certification.

5. NTFAST OVERVIEW / HISTORY

NTFAST is an acronym for "Northern Territory Fire Alarm System Transmission" and came about as a result of the building of a new fire station in Alice Springs at the same time as Torrens the former system used by the NTFRS become obsolete and the company's closure.

NTFRS decided to invest in technology that could cope with the Territory's extremes in particular the wet season and lightning storms without the involvement of a third party on NTFRS mission critical system. The first system in Alice Springs was based on AD1000 Miri radio telemetry units (RTU's - analogue). The rest of the Territory utilises the AD2000 RTU's - analogue which were set up so that both the NTFAST and Torrens unit were operational during the rollout period of version 1.73 software now referred to as "Old".

In 2006 the version 3 (V3) upgrade started, enabling the receipt of more inputs than the original 4 Alarm, Standby, Isolate, Test and RSSI. Now inputs for minor alarms - sprinkler pump running, zone isolate, MCP, door tamper, valve tamper and mains fail are monitored. Feedback is also given to the tester of successful and unsuccessful tests via the V3 brigade switch (also DOT 2). Late 2011 the upgraded was completed.

In 2015 through to 2017 all FIP RTU's will be replaced with AD2006 RTU's with a digital radio modem for NTFAST to remain effective into the future.

NTFAST monitoring for alarms and dispatching is all automatic via the RTU's (ASEs) in FIPs to a repeater site and back to the Master AD2006 RTU at the fire stations and can operate stand alone during communication outages. Darwin, Alice Springs and the 5 other Track stations are also monitored via the PFES Wide Area Network (WAN) at Joint Emergency Services Communication Centre (JESCC) by Fire Comms officers (Police Auxiliaries).

6. NTFAST ALICE SPRINGS AND TRACK STATIONS

The systems in these locations are based on single repeater sites each mapped for up to 100 sites with ASP having 2 co-located repeaters.
The repeaters locations:
ASP – atop West gap
JAB – Fire Station mast
KTH – Fire Station mast
NHU – atop Mount Saunders
TCK – atop Two Tank hill
YUL – NTES yard mast

7. NTFAST DARWIN

Sites within Darwin region are divided into ERA's (Emergency Response Area). ERA's are designed to ensure Fire Service respond within an appropriate time to emergencies. Each site, depending on its location will fall into one of the following ERA's, Receive it's prefix from the ERA it is located within.

Darwin ERA's and station locations:

DWN ERA - No1 Station, 32 Iliffe St Woolner
CAS ERA - No2 Station, 25 Abala Rd Marrara
BER ERA - No11 Station, 265 Berrimah Rd Wishart
PLM ERA - No3 Station, 46 Emery Ave Woodroffe
HDO ERA - No 10 Station, 8 Skewes St Humpty Doo

Humpty Doo Station provides daytime cover for its ERA. No3 provides coverage outside these hours for site in the HDO ERA.

These 5 ERAs are to be covered by 10 Miri Masters AD2006's. 7 are in DWN No1 Station. 3 are in BER No11 Station. Masters are named for the location of repeater or tower that it's associated with and mapped for up to 200 sites.

The repeater locations:

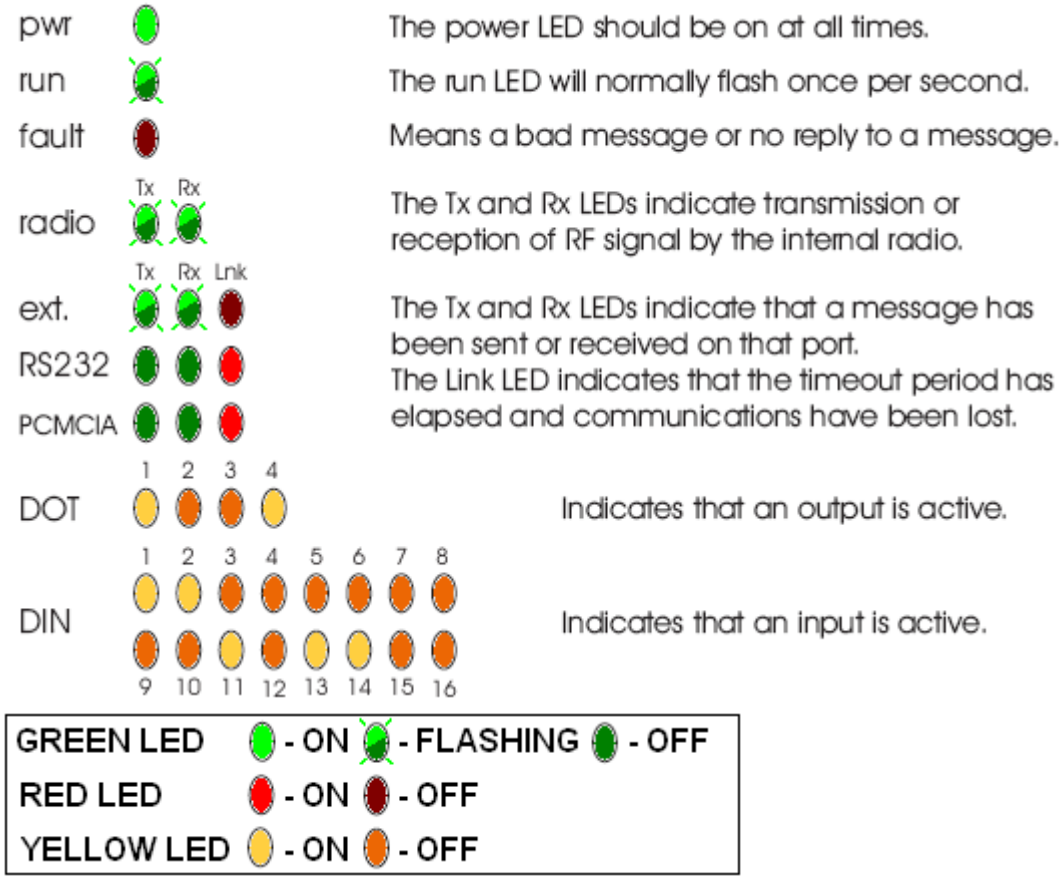
NT House – atop building
Marrakai 1 – atop building
Marrakai 2 – atop building
Marrara – Stadium lighting tower
Casuarina – Police station tower
RDH – atop building
Karama – atop water tank
Berrimah – atop PMC building
Palmerston – NTES yard tower
Humpty Doo – atop water tank

8. NTFAST ASE (MIRI AD2000)

The AD2000 shall be installed in all new and replacement FIPs. Its power is supplied from the FIP's primary power source via a 24 volt to 12 volt converter (rated at 2 amps). This is backed up by the FIP secondary power source (batteries) that comply

with requirements of AS1670.1 clauses 3.16.3 & 4 for rating and capacity respectively.
The AD2000 shall be installed as per NTFAST RTU wiring diagram (see section 15 of this doc). Each of the minor inputs DIN 9 to 14 shall be independent of one another i.e. the door switch shall only have effect on DIN 12. The door switch input is not to be included in the program string of any other minor inputs.
AD2000 is designed to utilise 2 different analogue radio modems. Older units use Trio. New units use JSLM². Each cause the radio rx LED to function slightly differently.

A correctly functioning AD2000 powered up with the aerial connected will have the following LED pattern with FIP/Brigade switch in NORMAL and door open.



For an NTFAST Miri unit the outputs (DOT) and inputs (DIN) functions are :

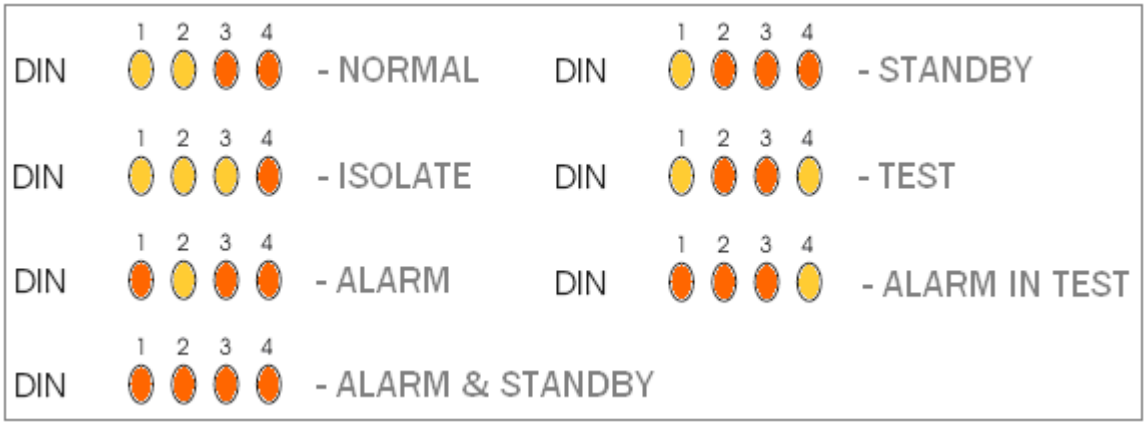
DOT 1 is battery fail output (only used on legacy sites)
DOT 2 is test output
DOT 4 is link OK output (receiving polling signal from the master only)

DOT 1 and 4 – will normally be ON for legacy sites
NOTE: *DOT 1 to 1A is a contact that when the miri power is sensed voltage ≥13 volts the contact closes to charge the battery of legacy site miri. Therefore DOT 1 may be off where the FIP has an integrated miri unit and should not be wired in as there is no back up battery. DOT 4 is the LINK OK output which will be on when the miri unit receives valid polling request.*

DIN 1 is alarm input (on = normal – off = fire alarm)
DIN 2 is standby (fault) input (on = normal – off = fault/s)

DIN 3 is isolate input (brigade switch isolated forces DIN 1 & 2 on overriding their true status – DIN 1, 2 & 3 on site isolated)
DIN 4 is test input (on site in test for 300 seconds)
DIN 9 is sprinkler pump running input (on = pump running)
DIN 10 is FIP zone isolate input (on = zone isolated)
DIN 11 is MCP input (off = MCP alarm active)
DIN 12 is FIP door switch input (off = door open)
DIN 13 is sprinkler valve tamper input (off = valve closed)
DIN 14 is FIP AC power fail input (off = mains failed)

DIN 1, 2, 11, 13 &14 – will normally be ON with the door open and FIP in normal as represented in the above diagram.



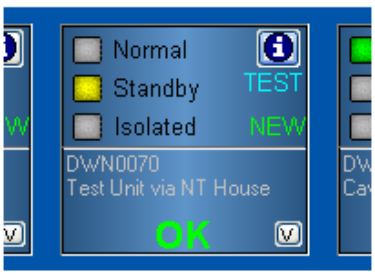
Above are the Major Inputs and how to read their statuses

9. TESTING & WORKING ON SITE

TESTING – A new V3 brigade test regime and time of 300 seconds has been set Territory wide on all sites. All references to the old 7 to 10 second test regime switching times are no longer relevant. Testers need only follow the below sequence with the knowledge that they have a full 5 minutes to complete a successful test.

BRIGADE TEST – V3 software RTU
1 brigade switch to test – DIN 1 and 4 both on
2 zone/device in alarm – DIN 4 on only
3 reset alarm zone/device – DIN 1 and 4 both on
4 brigade switch to normal
NOTE: *V3 provides feedback. Switching time is of less importance unless you are trying to switch to quickly. When turning the brigade switch to test it may take up to 3.5 seconds for NTFAST to acknowledge the switch change.*
See below site blocks.

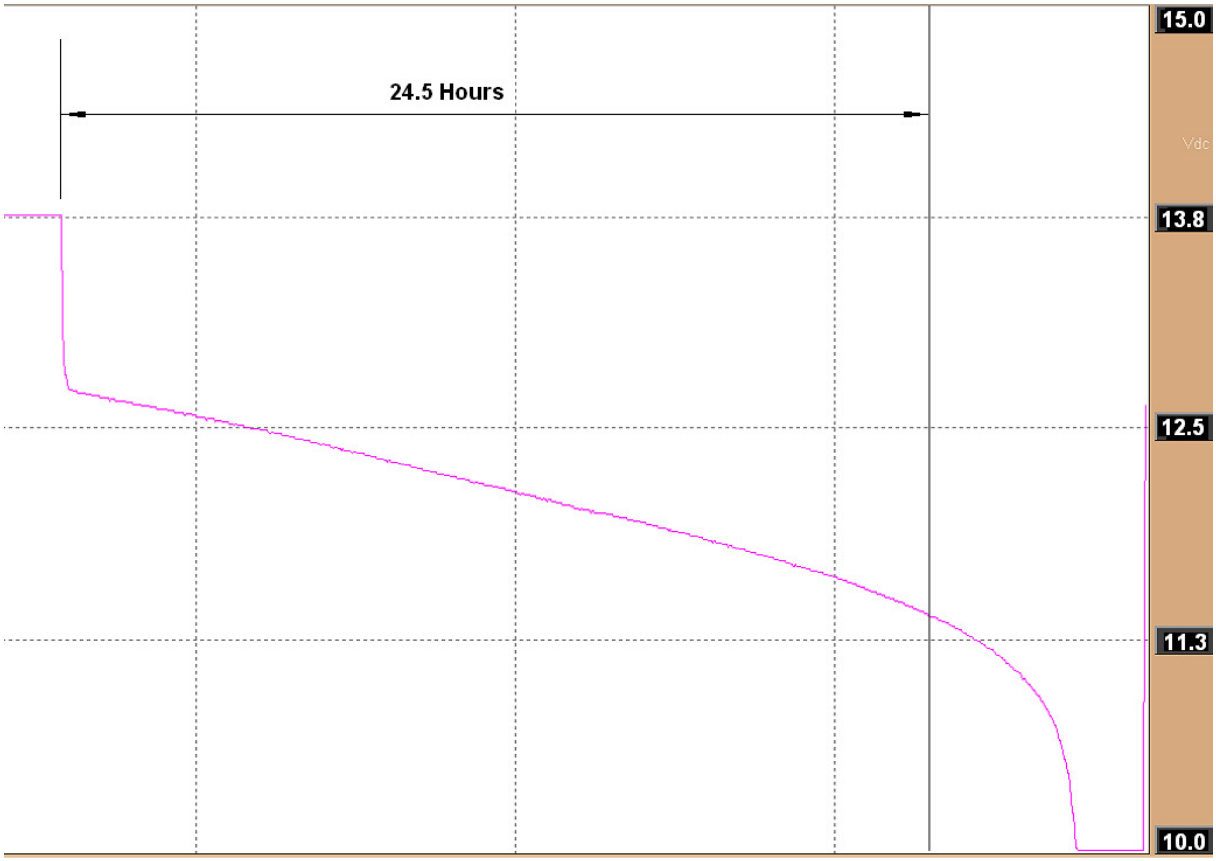
Site in NORMAL



test sequence at 1 & 3 above

test sequence at 2 above

NTFAST Technicians provide system familiarisation/test training to technicians and testers.
To meet the requirements of AS1851– 2012. Testers are reminded that legacy site and early transition FIPs that have an NTFAST battery must also be tested/checked. This is done by:
1 -visually check the battery for swelling, cracked terminal seals and terminal corrosion.
2 -check charge voltage/PSU output is 13.8 volts. Ensure the battery knife fuse is disconnected.
3 -disconnect the 240 volt knife fuse so that the miri is running off battery. Recheck battery voltage is above nominal value(12 volts). After 1 minute, (see graph below for reference) if voltage drops to 12 volts or below within this time it should be immediately failed and replaced as soon as possible.
4 -note the final battery voltage reading in the logbook as proof of testing. A trend on the health of the battery can then be monitored with each monthly test.
5 -once testing has been complete ensure that knife fuses are reinstated
"Warning": 240 volts exist within legacy NTFAST box and caution should be taken at all times.



DISCHARGE TEST OF NEW FULLY CHARGE 7AH 12VOLT BATTERY
The graph above shows NTFAST 'trend log' for a new 7ah battery with the battery cut-off contacts bypassed (DOT 1 to DOT 1A see section 15). This is included for reference when undertaking the above 1 minute test – a good battery should be of a value well above nominal after 1 minute.
NOTE: *Contact between DOT 1 and 1A is closed when the miri input power is sensed to be greater than 13 volts for 1 minute*
NOTE: *Unserviceable NTFAST batteries are often reason for sites having multiple daily link failures, as the PSU struggles to provide the miri transmit power and charge the flat/unserviceable battery. This causes the voltage to briefly drop to the miri CPU reboot value.*

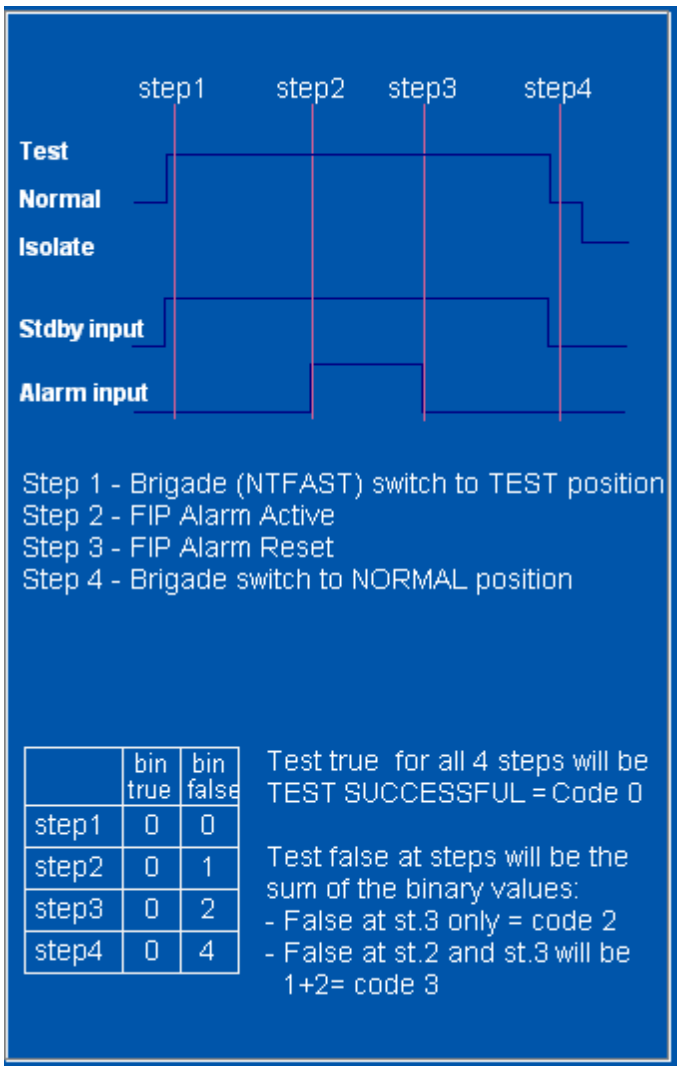
DAILY REPORTS

All contractors should be receiving reports that are generated automatically from the system with the following email address pfes.backup@pfes.nt.gov.au. This will cover any activity since the previous report, for all the sites that they are the nominated contractor. Top of the report includes historical unresolved input changes.
The following is how they are set out and the terms used in those reports.

Date – Time(ON) – Site Nº – Site Name – Input Descriptor – 'ON' or 'OFF (with date/time stamp)' or Code #

Input Descriptors are as follows for MAJOR ALARM STATUSES
Full Code AFA – the site generated an Automatic Fire Alarm
Standby – the site has an FIP fault (Standby a carryover from the Torrens system)
Brigade Isolate – the site has had the NTFAST switch in isolate
Test Successful – the tester has conducted a successful brigade signal test. Code 0
Test Unsuccessful – the tester has conducted an unsuccessful brigade signal test followed by one of the following codes 2, 3, 4, 6, 7 (refer figure below)
Link Failure – the RTU has stop working or missed responding to a number of consecutive polls from the Master RTU.

Test code # produce from below parameters



Code 2 test unsuccessful
Can happen with no AFA resulting & with an AFA resulting
Code 2 & No AFA - Test position - alarm active - Normal position then alarm reset <1 sec apart. (i.e. < 1 to 1.5 second depending where in the polling sequence the system is, and data is sent in the same data packet)
Code 2 & an AFA - Test position - alarm active - Normal position (alarm sent) - alarm reset

Code 3 test unsuccessful
Test position - Not alarm active or a non brigade call zone /device selected - Normal position

Code 4 test unsuccessful
Test position - alarm active - alarm reset - Isolate position (No Normal position)

Code 6 test unsuccessful always results in an AFA
Test position - alarm active - Normal position (alarm sent) - Isolate position or back in Test position - alarm reset (alarm reset while the Brigade switch is in Isolate or back to Test and then reset)
Or - Test position - alarm active - (after 300 sec test timer runs out - alarm sent)

Code 7 test unsuccessful
Test position - Not alarm active or a non brigade call zone /device selected – Isolate position.

Code 0 test successful to NTFRS /NTFAST
Test position (+10 sec) - alarm active (+10 sec) - alarm reset (+10 sec) - Normal position (test result LED should indicate in 8 to 15 seconds)

Input descriptors for MINOR ALARM STATUSES
Sprinkler pump running
FIP Zone isolate
MCP activated
FIP Door Tamper
Door 2 Tamper (actually valve tampers)
FIP Power Failure

WORKING ON SITE/TESTING/SYSTEM IMPAIRMENTS/FIP REPLACEMENTS

Best practise - for testers: After opening the FIP door the first action shall be Brigade (NTFAST) switch to Test position. This is followed by the above alarm steps. To ensure successful test the Brigade switch needs to be placed in normal position for a minimum of 10 seconds. A test LED result shall be indicated.
At all times while the FIP door is open, the tester should have the Brigade switch in the Isolate position.

Testers TIP:
During testing of sprinkler systems and the like where there is no FIP, where you believe you may be going to exceed the 300 seconds (5 min) before you can achieve the required pressure that returns the site to normal (DIN 1 on) under test.
1st remove power to the miri (ASE)
2nd normalise the site (continue pumping up until require pressure is reached)
3rd apply power to miri and look for DIN 1 (no DIN 1 remove power instantly you only have a second or 2 before radio starts and attempts to transmit)
4th leave in Test for 10 seconds
5th brigade switch to Normal from the Test position.
Result may be a successful or failed test dependent on where in the polling cycle it was when the power was removed and re applied, or if it was registered as in link failure on NTFAST in the down time. This procedure will not activate an AFA. Rectification works to jacking pump etc will be needed, before testing again. Test offline the timing required to pressurise the system prior to resuming live testing of the site.

Best practise – for fire contractor working on any FIP, ensure the brigade switch is in isolate. – When working remotely from the FIP (especially large sites) the Brigade (NTFAST) switch shall be in the Normal position with only isolation of zone/s in the area of works.
Should a contractor be working physically within an FIP, The NTFRS position is that the contractor **shall** take the ASE (miri) off line.
To take a site off line: contractor shall first switch site to isolate. Remove the aerial or 12volt power to miri unit. Both are best but if you are working on the ASE (miri) input function 12 volt power will need to remain on.
Prior to bringing a site on line it is very important to CYCLE THE POWER off and on. To negate any alarms (DIN 1 off) were created with the miri RTU off line by removal of its aerial, but still powered-up, this will clear the flash memory of any alarms prior to reconnecting aerial.

NOTE: *Helps to have the NTFAST switch in normal before reinstating the aerial connection as the alarm (DIN1) and fault (DIN2) are not masked by the isolating of the Brigade switch.*

Off line for short periods: up to 15 to 30 min. When reconnecting the contractor should prove that link is re-established by turning the Brigade switch to TEST. Wait at least 10 to15 sec and then return to NORMAL (a failed test will occur - flashing test LED. – This is proof of the link working). Alternatively a full Brigade test - test LED solid for 20 seconds also proof of the link working.

Off line for extended periods: of an hour or more. Contractor shall contact Fire Comms (89221533) to create a job regarding the site will be in link failure - giving the company name; their name; NTFAST site No/ Name; reason for off line; when expecting to have the site back online - ring Fire Comms back when finished to confirm link is OK and close the job off.

Off line site job created with Fire Comms: only covers the site for being off line (in link failure) and dispatching/advising an NTFAST technician to attend the site. The fire contractor is responsible for unwanted alarms transmitted due to poor work practises. Fire Comms officers have no ability to stop alarms. The system automatically dispatches the local fire station and the Fire crew are required turn out to site. Thorough testing of wiring work done on miri inputs (especially Major inputs) loose connections etc is the responsibility of the fire contractor prior to reconnecting the aerial refer to "*Major inputs and how to read their statuses*" in section 8 NEVER reconnect an aerial with DIN 1 not illuminated. This is best performed with the brigade switch in the Normal position as Isolate masks DIN 1 & 2 true statuses. The above work practices will reduce NTFRS work load of attending unwanted Alarms created by contractors substantially.

10. NEW CONNECTION TO NTFAST

Connection to NTFAST and allocation of a site number can not be arranged until the receipt of a completed current "NTFAST application for connection" (form is accessible at www.fire.nt.gov.au via NTFAST link) and payment of the application fee.

a) Payment direct to NTFAST Administrator – cash, cheque or credit card - Level 4/71 Smith St (NAB House) Darwin. (Visa or MasterCard only and by phone)
b) Payment to RTM – in person or by phone 89991606
Quote 16FDC001 131145 and send copy of receipt to the NTFAST Administrator (Diane Wemyss 89955401 fax 89419597 diane.wemyss@nt.gov.au)

The NTFAST application should be arranged as early as possible in your project as last minute application may hold NTFRS signing off the Building Report.

AD2000 and V3 Brigade switch along with aerials can be purchased from

Miri Technologies
30 Buckingham drive
Wangara 6065 WA
PH (61) 89409 8998 FAX (61) 89409 2992 Web: www.miri.com.au

You should allow 1 month as minimum after receipt of a paid application and site or block plan, for NTFAST connection. This enables sufficient time for back end software changes, site information and a site to be actioned ready to go online. Only a new AD2006 Rev 8 will be accepted for new sites, the AD2000 can be

programmed with an NTFAST map once the site number is allocated, either onsite at the time of final inspection or prior by dropping it off at NTFRS Community Safety located at: Level 4/71 Smith St (NAB House), Darwin.

In Alice Springs, the AD2006 can be taken to the fire station and can be programmed remotely by NTFAST techs. Contact John Oliver on 89516664 to make arrangements.

No site will be placed online until site keys are delivered to the responding fire station and receipted into the key safe of the station.

Darwin No1 Station (DWN) 32 Iliffe St Woolner
Casuarina No2 Station (CAS) 25 Abala Rd Marrara
Palmerston No3 Station (PLM) 46 Emery Ave Woodroffe
Berrimah No11 Station (BER) 265 Berrimah Rd Wishart
Humpty Doo No10 Station (HDO) 8 Skewes St Humpty Doo
(HDO sites will requires 2 sets of keys for both HDO and PLM)

11. REPLACEMENT OF FIPS

NTFAST connected building fire systems come under numerous categories the most basic being the following three.
1. Required systems – (installed as required by the BCA.)
2. Non-required systems – (installed in excess of a BCA requirement.)
3. NT Government building – (self insured buildings both required and non-required)

When replacing an NTFAST connected FIP of a 'Required system, Non required system or Government building' for any reason, then a Building Certifier MUST be engaged as part of the process as per condition of connection item 7.

Replacing an NTFAST connected FIP needs to involve the following stakeholders. NT registered building Certifier, Fire Safety officer from Community Safety and NTFAST tech. During the site inspection, the contractor will arrange a demonstration/ testing of all FIP and NTFAST V3 inputs to ensure they function and are wired correctly as per RTU wiring diagram (for wire colours see section 15). Provision of all the AS1670.1 documentation as required by Section 7, and set out Appendix C, D, E & F for inclusion on the building file and copies for the FIP as per AS1670.1 requirements is needed.
Replacement Fire Panels shall be treated the same as new panels fitted with a V3 brigade switch and all V3 inputs functional, miri unit mounted within it and powered off the panels PSU via 24v to 12v converter card with backup from FIP batteries (see section 15).

Zone Block Plans are an integral part of an FIP and are required to be updated /provided at the time of all major changes and FIP replacement. Many sites totally lack one or are of a substandard quality (refer section 14 for requirement detail).

Detection items 1 to 11 and electrical items 31 & 32 of section 12 inspection checklist shall be checked for current compliance for FIP replacements. Item 11 Strobe will depend on whether replacement of the existing bell would be detrimental to the existing occupant warning.

12. INSPECTION CHECKLIST

DETECTION SYSTEM
Installation of fire detection and BOWS shall be to the current AS1670.1, EWIS to AS1670.4 and both to AS/ACIF S009. The inspections will involve the Building Certifier, Community Safety Officers and possibly NTFAST Techs. Checking of the installation is looking to ensure the system complies with the above standards and/or any fire engineering requirements.

The following is a general list of items that NTFRS would ask the contractor to demonstrate, be looked at or checked:

1. All AS1670.1 clause 7.2 and AS1670.4 clause 6.4 Documentation shall be provided and copies left in the FIP or its document box.

   FIP clause 7.2
   - ☐ *'As-installed' drawings [refer Appendix D examples]*
   - ☐ *CIE documentation – operators and installation/ commissioning manuals*
   - ☐ *Commissioning report [refer Appendix E example]*
   - ☐ *Installer's statement [on Appendix F form]*
   - ☐ *Logs/Logbooks – [refer clause 1.16.1 to 3 AS1851-2012]*
   - ☐ *Aspirating system – calculations*

   EWIS clause 6.4
   - ☐ *'As-installed' drawings*
   - ☐ *CIE Documentation – operators and installation/ commissioning manuals*
   - ☐ *Logs/Logbooks – (with all required information entered, refer clause 6.4.2)*

2. FIP as per clause 3.9 – designated entry point and mounting height to clause 3.9.1 – covering doors labelled 'FIRE PANEL' and not be lockable to clause 3.9.2 – clearances to clause 3.9.4 or pre approval from Community Safety for lesser clearance spacing.

3. Zone Block Plan – shall be done to AS1670.1 clause 3.10,(see section 14 of this doc for NTFRS specifications) and be forward to Community Safety/NTFAST electronically for approval prior to inspection as per conditions of connection 10.a)

4. The LCD descriptors match up with zone block plan and the onsite door/room labels or area names (addressable devices) or just single area names (conventional zones)
5. Warn sys isolate - button functions on any amplified sound system or electronic sounder Stopping sound output

6. All NTFAST requirements met.
   - ☐ Application for connection completed and fee paid.
   - ☐ Site keys deliver to appropriate fire station and signed into key safe.
   - ☐ FIP to be compliant with either AS4428.1 CIE with Fire Fighter Facility or AS7240.2 with built in or separate AS4428.3 Fire Brigade Panel.

   Inputs function correctly wired see section 15 (wiring diagram) of this doc.

MAJOR INPUTS

- □ DIN 1 ALARM (white)
- □ DIN 2 STDBY (yellow)
- □ DIN 3 ISOLATE (blue)
- □ DIN 4 TEST (green)

MINOR INPUTS

- □ DIN 9 Sprinkler Pump Running (white)
- □ DIN 10 Zone Isolate (yellow)
- □ DIN 11 MCP (blue)
- □ DIN 12 Door Tamper (green)
- □ DIN 13 Valve Tamper (purple)
- □ DIN 14 Mains Fail (brown)

MIRI POWER

- □ 12volts x 2 amps off FIP Bat, wires Red to +ve & Black to –ve and all wire colours as per RTU wiring diagram.
- □ FIP Mains power in panel mains cabling - refer item 33
- □ RSSI – to required level (replacement FIP equal to or better than existing value)
- □ Amalgamating tape on external aerial connector

7. Spot checking of detectors – smoke or thermal testing initiates an alarm and descriptors should make sense with reference to detector location refer 4 above and zone number
   - □ Smoke detectors with AVF (can also be on rate of rise thermal – A & C type but not B type).
   - □ VESDA detectors – sensitivity and transit times.
   - □ Multisense detectors shall <u>not</u> be installed where photoelectric are specified in all exits, passageways, corridors, hallways, or the like, that are part of a path of travel to an exit & sleeping areas.
   - □ Concealed detection and access [refer clause 3.25.4.1].

8. Spot checking of detectors – removal of detector initiates fault and descriptors are as with 7 above.

9. MCP in main entry. In most cases the FIP MCP will cover this requirement

10. Ancillary output function as required for the site – Fire door holders, security door releases. Non mandatory in AS1670.1 advisory shutdown of gas and ducted air conditioning. Required AS1668.1 functions FFCP - stair pressure, smoke spill, etc

11. Strobe – functions, is labelled and is visible from main approach.

12. Detection is in all required areas and is of an appropriate type for the area

13. Separate alarm zones as required by clauses 3.12, 3.13, 3.25.3 & 3.25.8 - Suppression systems and associated flow and pressure switches, Air Handling systems and restricted fire service access - lift shafts, electrical switch rooms, comms cupboard and the like.

14. Alarm zone size shall be < 2000m² and ≤ 40 devices maximum for both addressable and conventional zones as per clause 2.4, addressable circuits shall have isolator bases/units on loops so that an open or short circuit shall not disable more than 40 devices and in any case not more than one building as per clause 2.5.

15. Detector spacing and clearances as per clauses 3.25.1 (a)&(b), 3.25.5, section 4 & 5 of AS1670.

BOWS (BUILDING OCCUPANT WARNING SYSTEM)

BCA Spec E2.2a clause 6 - AS1670.1 C3.22 Occupant warning system shall be one of the following:

- A sound system in accordance with AS1670.4
- Electronic sounders or amplified sound system producing the evacuation signal. The evacuation signal shall operate simultaneously throughout the building.

SPL requirements:

- Exceed by a minimum of 10dB(A) the ambient SPL, not < 65dB(A) and not > 105dB(A)
- If intended to arouse sleeping occupants, the SPL shall be 75dB(A) at the bed head, with the doors closed

16. Initiates by the fire detection system and produces evacuation signal only

17. All required area throughout building achieves the required SPL (see above)

18. Spot check sounders (conventional) and speakers are connected to supervised output for open and short circuit that initiates a fault signal at the FIP. Refer clause 3.22

SSISEP (SOUND SYSTEMS and INTERCOM SYSTEMS for EMERGENCY PURPOSES [formerly EWIS]) BCA E4.9 - shall comply with AS1670.4

SPEAKERS

19. Indicator Panel shall meet the requirements of section 2.1

20. Initiates by the fire detection system or ECP and produces alert signal to all area and cascades in an evacuation sequence appropriate to the site/building

21. ECP (Emergency Call Point) shall be installed adjacent to each WIP and as per clause 4.3.2. An MCP installed at these locations shall meet this requirement.

22. All required area throughout building achieves the required SPL (see above)

23. Spot check speaker lines are connected to monitored output that initiates a fault signal that also brings up fault at the FIP for open and short circuit. Refer to clause 4.3.8 and Table 4.2

24. All speaker cabling that are required to have protection set out in Table 4.1 & Figure 4.1 shall have a minimum rating of WS51W (120min fire and appropriate mechanical rating)

INTERCOM

25. Each WIP location shall not adversely effect ability of warden to communicate with indicator panel clauses 5.3.1 &.5.3.2

26. Each WIP shall be in appropriately located as listed in clause 5.3.3. and is mounted not < 1200mm and not >1800mm.

27. Each WIP aural call signal shall not < 80 db(A) at 1m distance even when mounted within security enclosure. Refer clause 5.3.7.

28. Each WIP operates as per label / location.

29. Spot check intercom lines are connected to monitored output for open and short circuit at the intercom CIE.

30. All intercom cabling required to have protection shall have a minimum rating of WS51W (120min fire - refer Table 5.1 & Figure 5.1.)

ELECTRICAL SYSTEM to AS/NZS 3000

31. All Safety Services Main Switches arranged so that feed is from supply side of general Main Switch refer AS/NZS3000 clause 7.2.4

32. All Safety Services have labels as required by AS/NZS3000 clause 7.2.6. – e.g. "MAIN SWITCH FIP" and "IN THE EVENT OF FIRE, DO NOT SWITCH OFF"

33. Mains power cable and terminations within the FIP maintains basic protection required AS/NZS 3000 clause 1.5.4 and 3.10.1.1.

EMERGENCY LIGHTING AND EXIT SIGNS to AS2293.1

34. Discharge test facility/switch and labelled as per AS2293.1 clause 4.3

35. Sensing of supply failure as required by AS2293.1 clause 2.3.3

36. Labelling of all required circuit breakers as per AS2293.1 clause 2.4 – e.g. "WARNING: INTERRUPTING SUPPLY WILL DISCHARGE EMERGENCY LIGHTING BATTERIES."

37. Meet required specific locations of emergency lighting refer clause 5.4.1

38. Emergency lights shall be spaced to suit their classification refer clause 5.4.2

39. Required Operating and Maintenance manual refer clause 8.2 especially applicable to any of the automated systems and self testing fittings

40. Completed hard-bound logbook with the installers commissioning discharge test for 2 hours duration also entered

41. All exit signs shall be mounted not less than 2 m and not more than 2.7 m refer clause 6.8.1

13. AERIAL REQUIREMENTS

NTFAST technician's advice should be sort prior to you installing any aerial. This may involve an aerial/RSSI (Received Signal Strength Indicator) survey to determine which size yagi aerial and what repeater to align aerial. Refer section 7 for repeater locations.

Your site aerial installation will need to achieve the lowest possible RSSI and at least match the results of any survey conducted by NTFAST technicians. No site can be signed off with RSSI worse than -85db to a new Miri unit (ASE) at an extend range from its repeater. Close in sites should achieve far better than this and should be around -65db or better.

The installed aerial system shall have a RF power meter reading of less than 0.1watt reflective with forward power generally in the range of 4 watts. High reflective power readings will generally result from using wrong cable like RG59 (75Ω), poorly terminated connectors and whip aerial, crushing with cable ties or tight bends/kinks of the coaxial cabling.
The coaxial shall be RG58 (50Ω) via SMA104 connector at the Miri unit (ASE) to a maximum cable length of 10 metres to the yagi aerial.

All coaxial cable runs shall be kept as short as possible. Coaxial cable runs of greater than 10 metres and up to 60 metres will have to use RG213(50Ω) with short 0.5m RG58 fly leads at the miri end. Only one RG58 fly lead at Miri unit is needed when connecting RG213 to a yagi aerial as a yagi has its own fly lead. Coaxial cable runs greater than 60 metres and up to 171 metres will have to use LDF 4/50 and their specialty fittings.

CABLE TYPE	***LOSS RELATIVE TO DISTANCE***			
	1 dB	***3 dB***	***6 dB***	***9 dB***
	450MHz	**450MHz**	**450MHz**	**450MHz**
RG58C/U	2.3m	7m	14m	20m
RG223/U	3.1m	9m	18m	28m
RG213/U	6.1m	18m	37m	55m
LDF4-50A	19m	57m	114m	171m
LDF5-50A	38m	114m	229m	343m

ANTENNA PLACEMENT

Antenna placement is of paramount importance and plays a big part of the antennas and in turn systems performance.

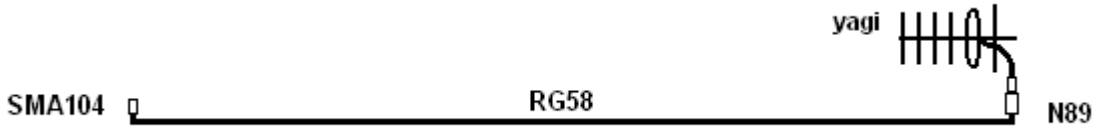
When choosing antenna locations the aim is to find the largest path of unobstructed space and locate the antennas within that space. It is important to locate antennas as high as possible and definitely clear of any moving obstructions.

Where possible it is important to avoid mounting antennas:

1. Against or adjacent to steel structures.
2. In an area which will have constant intermittent obstructions - people walking past, vehicles driving past etc. That is, mount antennas well above such moving obstructions.
3. Near any electrical equipment.
4. Near metal beams, structures etc.
5. Inside any metal enclosures, tin sheds / warehouses etc. - Note meshed wire fences act like a "brick wall" to RF transmissions.
6. Away from guard rails or support beams.
7. Above any pipe work or corrugated iron roofs.

Aerials shall be mounted on a J pole or bracket clear of a wall by 150 to 200 mm where clear line of sight can be established. Both whip and yagi aerials need to be mounted as high as possible. Where there is no clear line of sight, the aerial shall be mounted clear of roof by at least 1m or at the height as determined by NTFAST technician. All external coaxial connector junctions shall be sealed from the weather with electrical amalgamating tape.
New FIPs have earth fault sensing and will require insulating of the aerial from the mounting pole to avoid earth fault when the aerial is connected. This can be best achieved by splitting 150 mm of 25 mm conduit and placing over mounting pole prior to aerial clamping bracket.

COAXIAL CONNECTOR AERIAL ARRANGEMENTS
LESS THAN 10METRES



Aerial system components less than 10 m

SMA104 – RG58 – N89 – YAGI
or
N15

COAXIAL CONNECTOR AERIAL ARRANGEMENTS GREATER THAN 10METRES

Aerial system components greater than 10 m

SMA104 – RG58 – N30 – N07 – RG213 – N07 – YAGI

or or or

N98 N114 N114

Use the following web page for N Series connector data sheets.

http://pulseconnector.com.au/products/n-series.htm

14. ZONE BLOCK PLANS

Zone block plans are where the responding Fire Service first interfaces with the locations' installed fire systems. All zone block plans are an integral part of the FIP for which they are compiled (this applies equally to all replacement/ upgrades of an FIP). They need to be a clear concise sign that directs where assets need to be deployed in the event of a fire. As the name indicates, it shall be a diagram of the installation. That is clearly divided into its distinct areas/zones, for both addressable and conventional detection. Zone limits are set out in clause 2.4 and all other separate alarm zone requirements of AS1670.1 see clauses 3.12, 3.13, 3.25.3 & 3.25.8.

All NTFAST connected FIPs require, under AS1670.1 clause 3.10 and condition of connection 11a). That states "A block diagram of the building shall be provided to the satisfaction of the NTFRS."

Main points for a workable ZBP and the order of the NTFRS reviewing process
1 - Orientation - Fire fighter standing at the FIP the ZBP matches the building when rotated from the horizontal to vertical plain.
2 - FIP location - clearly defined (YOU ARE HERE or the like)
3 - Zone Areas and Labels - shall be clearly defined and legible for fire fighter looking at it through a BA mask and using a torch (flashlight)
4 - Working info - at the very least stair locations - major access doors and corridors/passageways can also be useful for Fire Fighters to navigate within more complex buildings.
5 - First responders Notice in full
All other items that are required to be consistent are helpful info that is useful to fire fighters after the initial response. They also serve in the house keeping of these documents and site history

The zone block plan shall be mounted on the FIP or within the clearance space either side provide for in clause 3.9.4 or above.

As per AS1670.1 Clause 3.10 ZONE BLOCK PLAN
"*A block plan of the installation, with the position of the FIP clearly indicated,…*"

- To meet the above, NTFRS expect to see the words 'YOU ARE HERE' or the like with an arrow pointing to the FIP, FBP, Mimic, RP as appropriate, in a text size large enough to draw attention quickly. Contrasting colour/s can also be helpful (red is often used that works well)

"*…shall be securely mounted adjacent to the FIP, mimic panel, repeater panel and fire brigade panel.*"

- This statement is self evident but to make it clear, blutac and sticky tape doesn't count as securely. To meet the above, NTFRS expect the use of screws in all four corners or a quality double sided tape running along all four sides of the diagram.

"*The block plan shall be in the form of a permanent diagram that is water resistant and fade resistant, and shall include-*"

- NTFRS obvious preference are the Zone Block Plans done by sign-writers either etched, engraved or the printed vinyl laminated directly to acrylic/Perspex. NTFRS understands the convenience of paper printing, especially prior to final inspection were items may be found that would require changes to be done. To comply with above and due to the number of ZBPs that were to go to sign-writers for making up and avoid the site having the temporary ZBP still in situ weeks/months later. NTFRS will be looking to see that as a minimum - A paper printed block plan thermally laminated and mounted behind protective cover (Perspex etc) or in a frame screwed to the wall is the minimum to cover the above requirements.

"*(a) the layout of the building in which the fire alarm system is installed;*"

- Minimum of a ground floor plan view for multistorey buildings where the upper floors are covered by only one or two zones of area detection with tower arrangement to show upper storey zones see *high rise example 1 &2*. Low rise with larger floor areas that vary greatly between storeys (split level etc) may need a plan view for each floor.

"*(b) the area covered by each zone;"*

- To meet the above NTFRS expects plan view/s or plan and tower view dissected into the various zones. By the use of thick border lines*(fig 1)*, or dissecting lines*(fig 3)* or by using colours*(fig 2)* or varying crosshatching/patterns*(fig 4)* to define zone boundaries. Each zone shall have label and numbered as appropriate i.e. "ZONE # or ZN # or Z #". A minimum of 3mm text written on the zone with only 1 icon for each device type that make up the zone adjacent to or under the label. Individual icon for each device will tend to become illegible and just be added clutter. Dual risk areas would therefore have 2 zone labels per area each with their appropriate icons.

  Small zones may need to have zone label and icons in suitable location with an arrow to the zone. Single device zones for example in-duct detectors, pressure and flow switches (re clauses 3.12, 3.13, 3.25.3 & 3.25.8). The icon shall be located on the plan view in its actual location or with an arrow to actual location. The zone labelled and zone named for the area of coverage on the FIP or in the program. It and can be also added the ZBP were it doesn't add to making the overall ZBP cluttered (see ZONE 23 in example diagrams on following pages).

  An "as installed drawing" (which is required to be supply in the FIP) or the full detection design drawing doesn't comply as a zone block plan. Any diagram with every input device shown just adds clutter, doesn't always provide a clearly defined zone and on larger sites invariably becomes illegible. Extremely large sites may opt for a zone table of detection icons to reduce the clutter. The actual zones will tend to be smaller for extremely large sites.

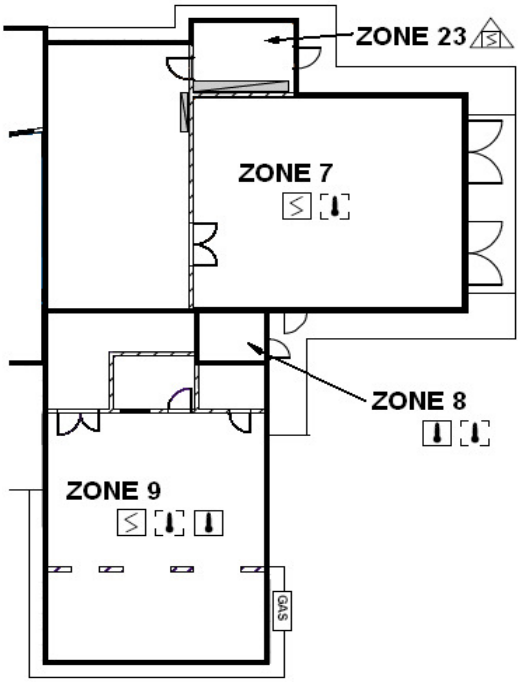
  High rise buildings need only a ground floor plan that shows at least the fire stairs, a block tower/table of zones and the icons for each level/floor. Most high rise buildings only have one or two zones per level (examples on following pages).

"*(c) fire brigade panel;*"

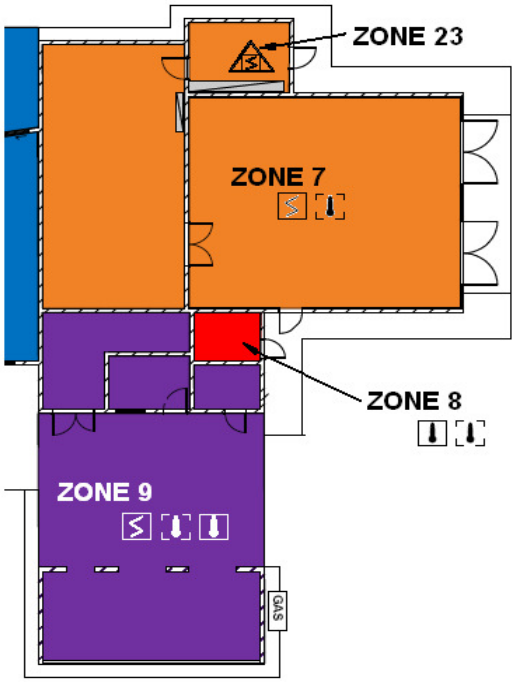
- Can be omitted for FIP to AS4428.1 with a Fire Fighter Facility. For AS7240 (international standard) panels a Fire Brigade Panel shall be compliant with AS4428.3 as part of the FIP or in a separate location and shown on the Zone Block Plans as required. See above.

"*(d) the location of the FIP and all SIP, mimics and repeater panels;*"

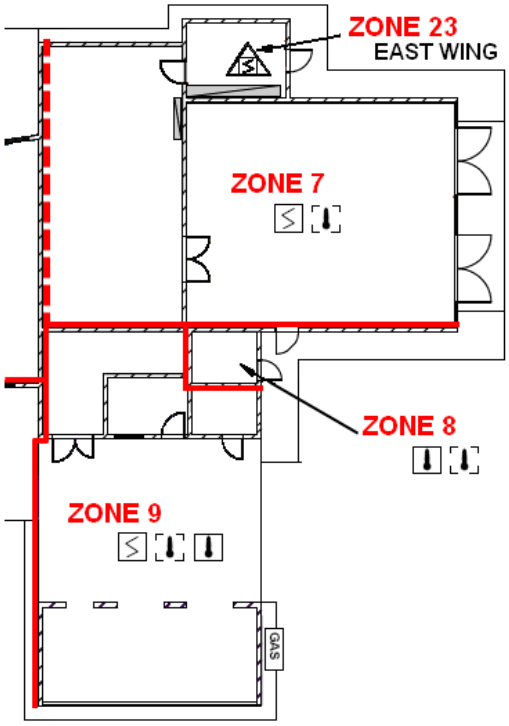
- This subclause is self evident.



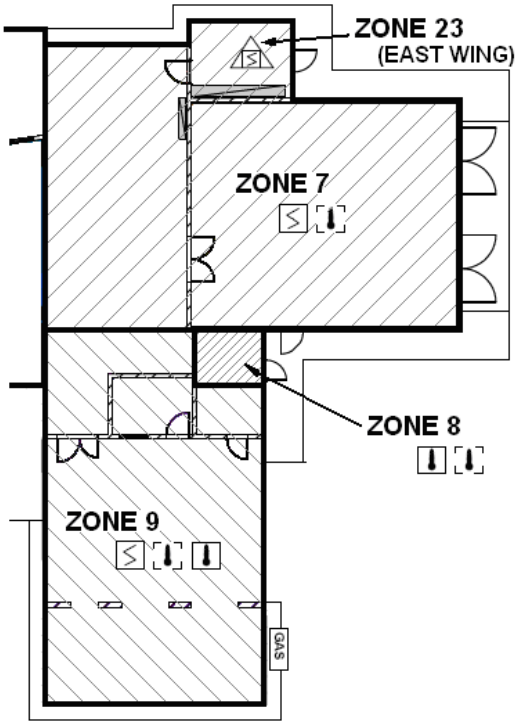
Bordered zones *(fig 1)*



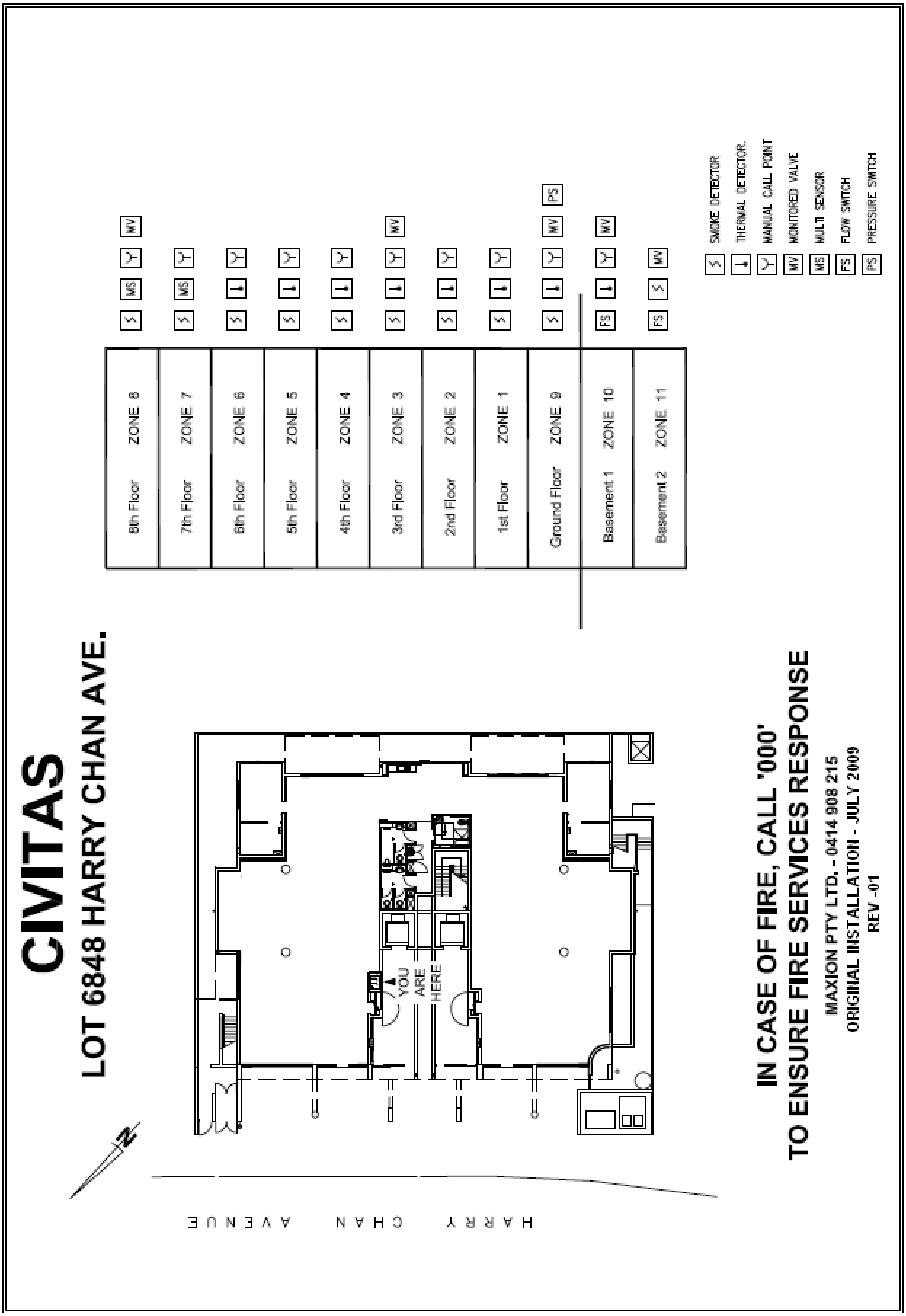
Coloured zones *(fig 2)*



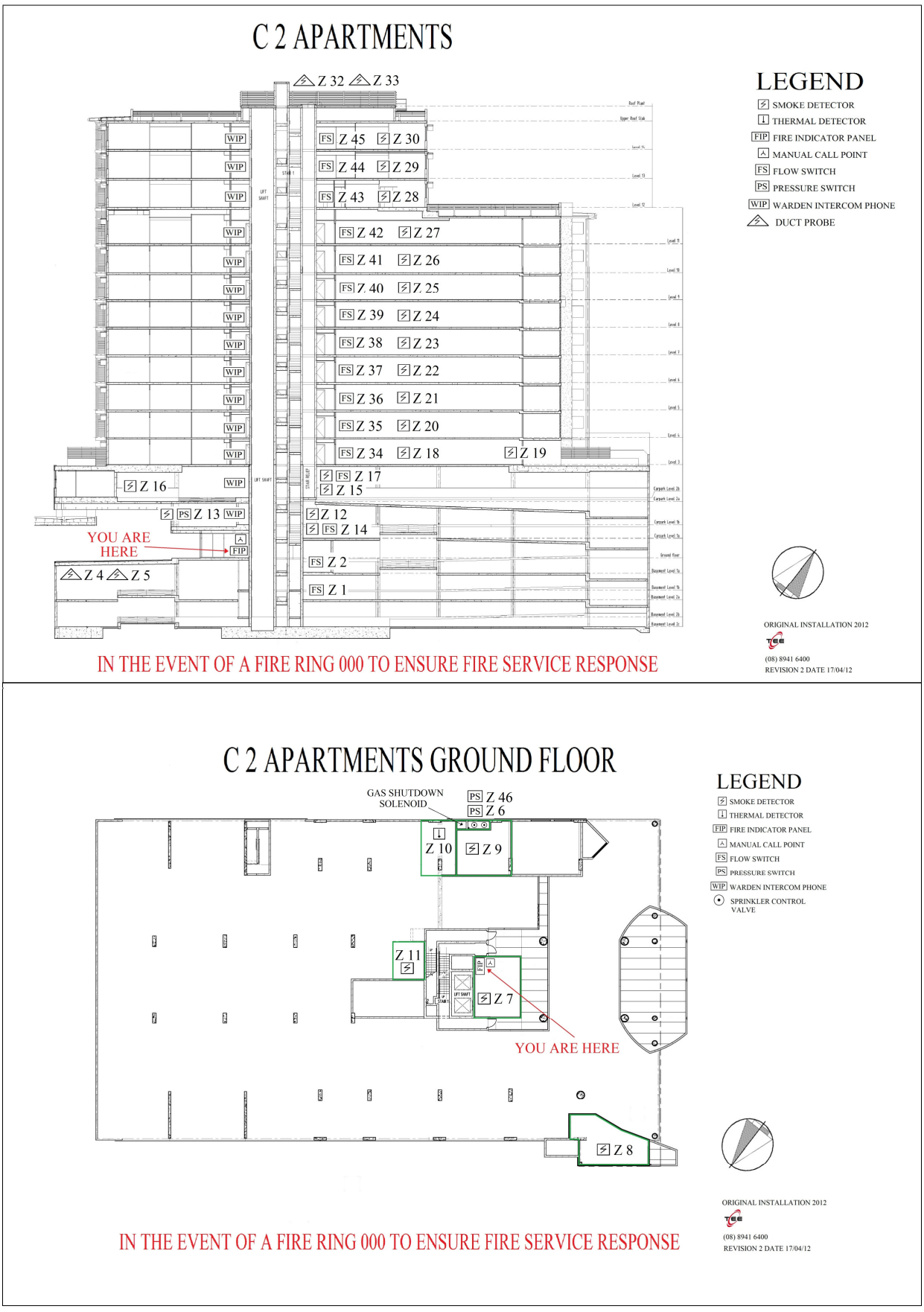
Dissected zones *(fig 3)*



Patterned zones *(fig 4)*



High rise example 1



High rise example 2

The above examples show 2 Zone Block Plans to represent tower buildings were most levels are the same and only have one detection and one wet zone.

"*(e) the year of original installation and the date of the latest revision to the block plan;*"

- The year of original installation, followed by the date/year of modification, the additions of any zones, FIP upgrades etc you are installing and should read like "4/2011 FIP replaced" or "4/2011 zone # added", as this is original installation date for that part of the installation. Often the original installation can be taken as the year of built date on the original FIP. Most buildings will have a dedication plaque with the date the building was opened. The date of latest revision to the block plan for each update or change as submitted for NTFRS approval.
  For first submission to NTFRS Community Safety shall have a distinct identifier:– e.g. "Revision/Version 0" or "1 - 30/5/11."
  If change/s are required the resubmitted plan's identifier shall increase numerically:– e.g. "Rev. 1 - 4/6/11" or "Ver. 2 - 4/6/11."

"*(f) the location of any other CIE, including sound systems and intercom systems for emergency purposes;*"

"*(g) the location of the fire fan control panel;*"

- Both these subclauses should be only needed when the equipment is not located within or adjacent to the FIP. In all other cases the icon/symbol for the FIP can be seen as having met these requirements.

"*(h) the location of any fire suppression system controls;*"

- Sprinkler and clean agent (gaseous extinguishants) control valve locations.

"*(i) notice advising, 'In the event of a fire ring* '000' *to ensure fire service response'*

- This subclause is self evident. Shall be as quoted and the "*to ensure fire service response"* not be dropped as is commonly done. The whole reason for the notice on monitored sites is to ensure brigade response. Unmonitored sites will need it as an "instruction if there is a fire".

"*The block plan shall be displayed in correct orientation of the building.*"

- This subclause should be self-evident, though is the most common mistake made when block plans are produced. You must start with the mounting location. This should generally be on the same wall as the FIP and in the space that clause 3.9.4 and Figure 3.1 require. Drawing shall be so that standing in front of the FIP walls and items above the FIP will be in front of you, walls and items below the FIP are behind you, left of FIP is to your left, the right of FIP is to your right.

NTFRS requires Zone block plans to include site name/location this may include 'Fire or Zone Block Plan' and the address.

NTFRS requires Zone block plans to also include NORTH arrow/symbol. This can be to show actual North or aligned with a project North end of the site and any direction descriptors associated with the FIP LCDisplay.
NTFRS requires Zone block plans to also include a LEGEND of actuating device icons used in the diagram. The Normative FIRE ALARM SYMBOLS in Appendix D should be the basis of symbols to be used in your legend.

ZONE BLOCK PLAN CHECKLIST

A completed copy of this checklist is to be submitted with Zone Block Plan via email, checking off items with reference to Section 14 for more detail.

They need to be submitted as early as possible in your project, while we will endeavour to turn around approval/changes via email as soon as possible, it may take up to a month or more(refer to Section 10 New Connection to NTFAST). Leaving submission to the day of inspection and expecting a turn around and instant approval will only see review added to the end of the existing queue once received electronically. An initial review by the installer/tester for accuracy should raise chances of early approval.

This checklist and ZBP shall be sent to all: davidm.williams@nt.gov.au; steve.vitnell@nt.gov.au; fire.safety@pfes.nt.gov.au;

(Version of ZBP for Mimic panel/s, repeater panel/s and separate FBP as per clause 3.10 shall also be produced)

☐. Zone Block Plan has been reviewed by installer/annual tester for accuracy.

☐. Plan view/s orientated to mounting position.

☐. Zone areas clearly defined and meet all requirements of clause 2.4 and single device zones clauses 3.12; 3.13; 3.25.3; 3.25.8.

☐. Zone labelled at ≥3mm text size.

☐. Device icons adjacent to zone labels – one per detection type that make up zone.

☐. FIP location clearly defined (YOU ARE HERE or the like)

☐. Building features. - At the very least stair locations and access ; – Major access doors, corridors/passageways within the more complex buildings.

☐. First responders Notice in full - *'IN THE EVENT OF A FIRE RING '000' TO ENSURE FIRE SERVICE RESPONSE'.*

☐. Original installation date(year), along with chronology of major changes and additions.

☐. Revision number on drawing (incrementing for each resubmission)

NTFRS specific requirements

☐. Site Name/Location

☐. North symbol

☐. Legend of symbols used in this block plan.

When installed items

☐. The location of any SIP, DGP, FBP, repeater and Mimic panels

☐. The location of other CIE e.g. - EWIS, FFCP & VESDA control panels etc when remote from the FIP

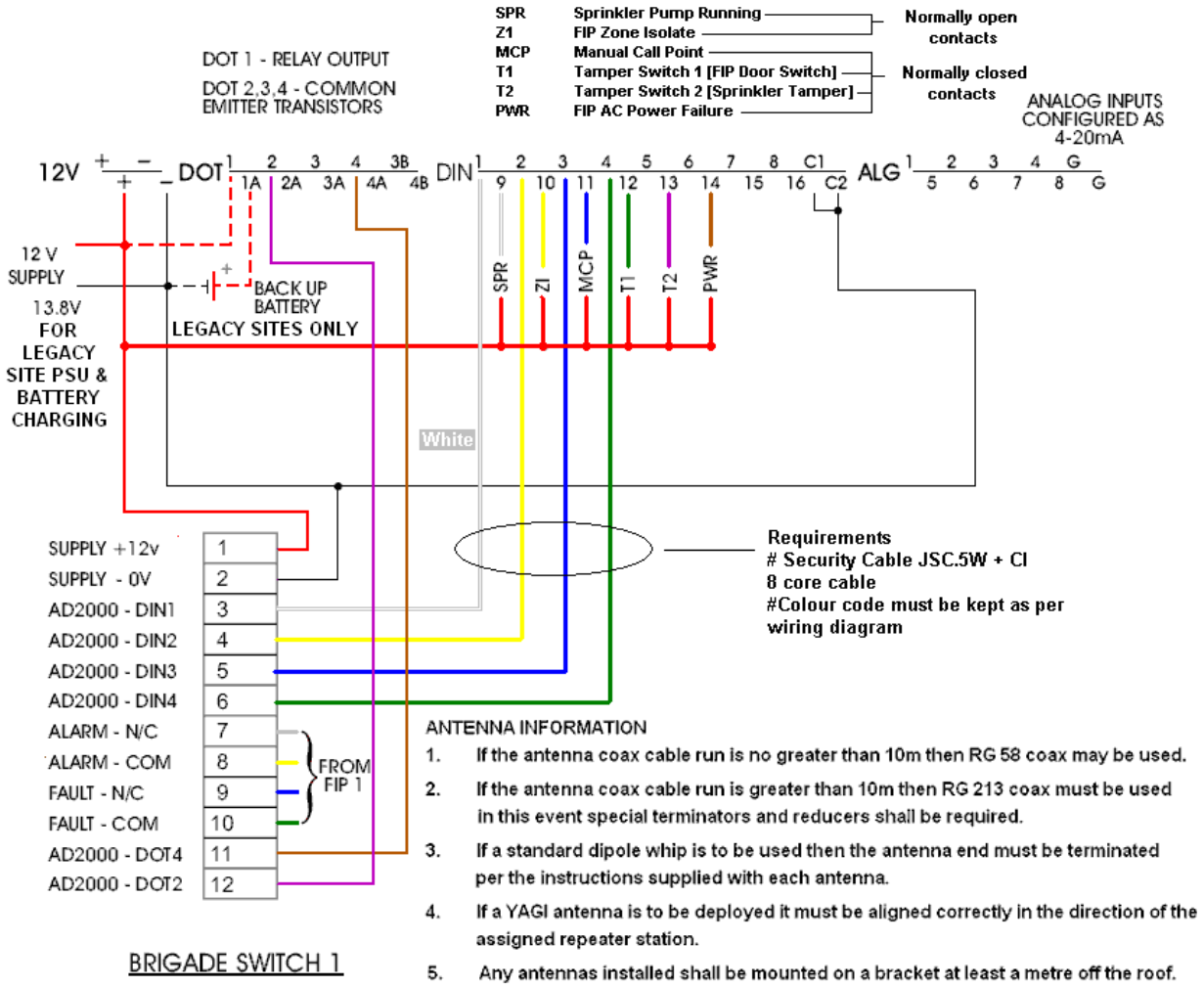
☐. The location of fire suppression controls – Sprinkler or Gas systems

NOTES:

NTFAST

RTU Wiring Diagram

AD2000 TELEMETRY MODULE



BRIGADE TEST PROCEDURE – V3 software RTU

Ensure that the "LINK OK" LED is on.

1 Turn the Brigade switch to "TEST' position – DIN 1 and 4 both on.
2 Activate a zone/device into alarm on the FIP – DIN 4 on only.
3 Reset the alarm zone/device – DIN 1 and 4 both on.
4 Return the brigade switch to "NORMAL" position.

Observe the "TEST" LED.

TEST SUCCESSFUL – "TEST" LED will be on solid for 20 seconds.

TEST FAILURE - "TEST" LED will flash at approximately 1Hz for 20 seconds.

NOTE: Test timers are now 300 seconds Territory wide there is no limit to the time spend at each step 1 to 4 just that the test needs to be completed within 5 minute window and not move to quickly through the steps see section 9 for more information.

DIN RTU Inputs		Description	Normal State
1	A	FIP Fire Alarm	ON
2	S	FIP Standby Warning	ON
3	I	FIP General Isolation	OFF
4	T	FIP Station Test	OFF
5	A	FIP2 Fire Alarm	ON
6	S	FIP2 Standby Warning	ON
7	I	FIP2 General Isolation	OFF
8	T	FIP2 Station Test	OFF
9	SPR	Sprinkler Pump Running	OFF
10	ZI	FIP Zone Isolate	OFF
11	MCP	Manual Call Point	ON
12	T1	Tamper 1 (Fire Indicator Panel door)	ON
13	T2	Tamper 2 (Sprinkler Tamper Valves if installed)	ON
14	PWR	FIP AC Power Failure	ON
15		NC	undefined
16		NC	undefined

DOT RTU Outputs		Description	
1			
2		Alarm 1 Test successful	
3		Alarm 2 Test Successful	
4		Polling/Enabled	

ANTENNA INFORMATION

1. **If the antenna coax cable run is no greater than 10m then RG 58 coax may be used.**
2. **If the antenna coax cable run is greater than 10m then RG 213 coax must be used in this event special terminators and reducers shall be required.**
3. **If a standard dipole whip is to be used then the antenna end must be terminated per the instructions supplied with each antenna.**
4. **If a YAGI antenna is to be deployed it must be aligned correctly in the direction of the assigned repeater station.**
5. **Any antennas installed shall be mounted on a bracket at least a metre off the roof.**

16. NTFAST CONDITIONS OF CONNECTION

As set out on the application for connection to NTFAST

1. Any sprinkler/alarm system monitored by the Northern Territory Fire and Rescue Service (NTFRS) must comply with the Australian Standard in force at the time of connection, which relates to the particular system.

2. The client shall provide the NTFRS with a report in the form of a completion certificate or installer's statement for all relevant system/s issued by the contractor and maintain the system/s in good working order in accordance with the provisions of the Building Code of Australia (BCA) and relevant Australian Standards.

3. The client shall, in the first year pay a connection fee of $### plus GST ($##) totalling $### and the remaining portion of the annual monitoring fee within time frames set after receipt of a bill. Thereafter, an annual monitoring fee of $#### plus GST ($###) totalling $#### is a debt due and payable on the first day of July in each and every year during which the connection is maintained. These fees are subject to periodic increases as applied to the *Revenue Units Act*.(check website for current $ figures or application form as they change 1st July annually)

4. The client shall pay all fees levied for attendances at unwanted alarm activations, where either a waiver application has not been submitted within the required 30 days from date of invoice or a waiver application has been declined by NTFRS.

5. On payment of the connection fee, the NTFRS will ensure connection of the sprinkler/alarm system to the monitoring equipment and maintain connection between the site monitored and the monitoring system.

6. The client shall arrange with the NTFRS for the provision of keys to the monitored site to be held at the relevant fire station that would normally respond to the monitored site, the client will ensure current keys are provided to the NTFRS upon any key changes occurring. This condition may be waived in cases where the NTFRS is guaranteed free access at all times in the event of an alarm.

7. **The client agrees to notify the NTFRS prior to any alteration or addition to the alarm system, or if the use, occupancy or maintenance contractor of the building changes. Any replacement/refurbishment of Fire Indicator Panels will require the involvement of a registered NT Building Certifier.**

8. **The client agrees that they will not tamper with, activate or de-activate any signalling device connected with the fire alarm monitoring system including the isolation of any part of the system and understand that they may be subject of an on the spot fine under the NTFRS *Fire and Emergency Act* .**

9. **The client agrees that the fire sprinkler/alarm system WILL be maintained in accordance with Australian Standards and may be subject to disconnection from the monitoring system and understands that the Insurance Council of Australia may be notified along with the occupants of the building should the system be found to be in a state of disrepair. The NTFRS reserves the right to enter any premises monitored to inspect the premises for compliance.**

10. The client agrees to ensure that a recognised Fire Alarm Contractor is engaged to ensure appropriate response to system faults on a 24 hour basis when notified by the NTFRS either verbally or by NTFAST automated email reports.

11. The client shall comply with special conditions as detailed below -;

a) A block diagram of the building shall be provided to the satisfaction of the NTFRS.

b) Each building on a site must be separately connected to the alarm monitoring system via individual NTFAST Telemetry modules.

c) Partially protected buildings will not be accepted for connection.

d) 12 volt DC supply for NTFAST shall be connected though the battery backup side of the Fire Indicator Panel via a 24V D/C to 12V D/C regulator. This shall be installed inside the Fire Indicator Panel with a 2 Amp rating.

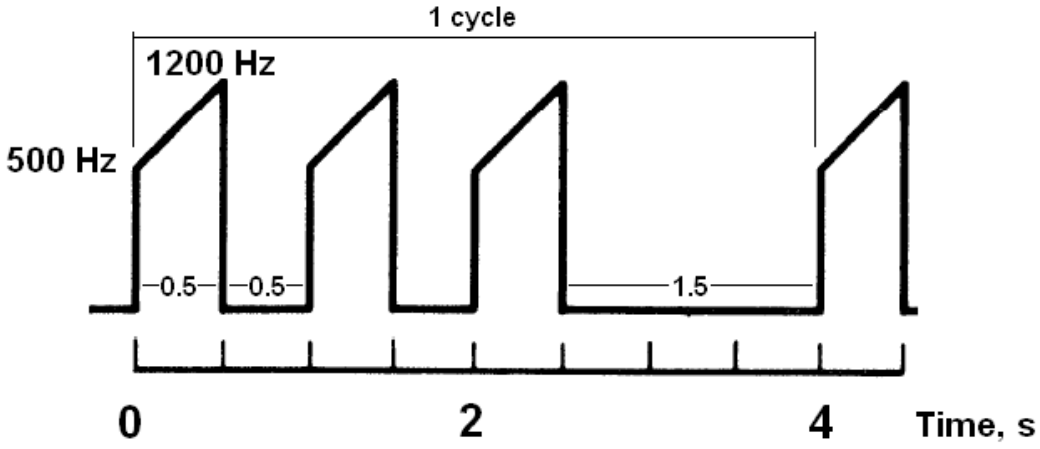
12. The client understands the NTFRS will not be held liable for any loss, cost of damage, incurred by the client or any person claiming through him, as might arise from the operation or failure of the monitoring system, whether that loss, cost or damage arises from the negligence of the NTFRS or for any other reason. The client shall wholly indemnify the NTFRS for all claims as may be made by other persons claiming loss as a consequence of the operation or failure of the monitoring system connected to the clients premises.

13. The client has read and will comply with the information as provided at – www.fire.nt.gov.au click on NTFAST.

14. ***THE NORTHERN TERRITORY FIRE AND RESCUE SERVICE RESERVES THE RIGHT TO REFUSE AN APPLICATION FOR CONNECTION AND ALSO RESERVES THE RIGHT TO TERMINATE OR DISCONNECT ANY SITE MONITORED SHOULD THE CONDITIONS OF THIS AGREEMENT NOT BE COMPLIED WITH.***

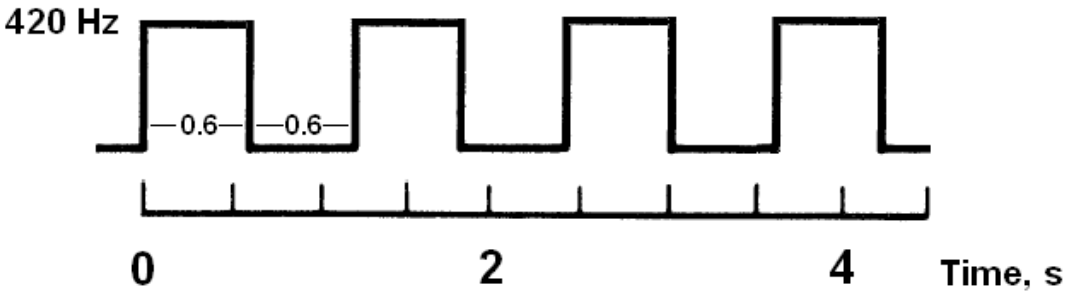
17. OCCUPANT WARNING TONES

For all systems installed to comply with AS1670.1, clause 3.22 specifies that amplifier tone generator or sounder/sounder bases are set to output evacuation tone only as specified in ISO 8201 on alarm activation. The evacuation signal shall consist of the temporal pattern as shown below, with the frequencies that are the default in Australia. Other signals may be more appropriate for use where the ambient noise will mask the signal.



Evacuation tone - ISO 8201

For all systems installed to comply with AS1670.4, Section 4 shall be programmed to produce Alert tone as specified in ISO 7731 throughout the installation on alarm activation (subject AS1670.4 C4.3.3). It shall be replaced by the evacuation tone at the prescribed time from initiation in a logical cascade sequence as set by a building emergency management plan (AS3745) or fire engineering. In a tower building this will nearly always be the alarm floor in evacuation after the prescribed time. Two floors above and one below shall go into evacuation at the end of 2 x prescribed time, with the 2 up 1 down sequence continuing with each multiple of prescribed time period elapsing.
This sequence is important because it is tied up with the buildings fire stairwell pressurisation design capacity to maintain the required environment within the fire stairwell.

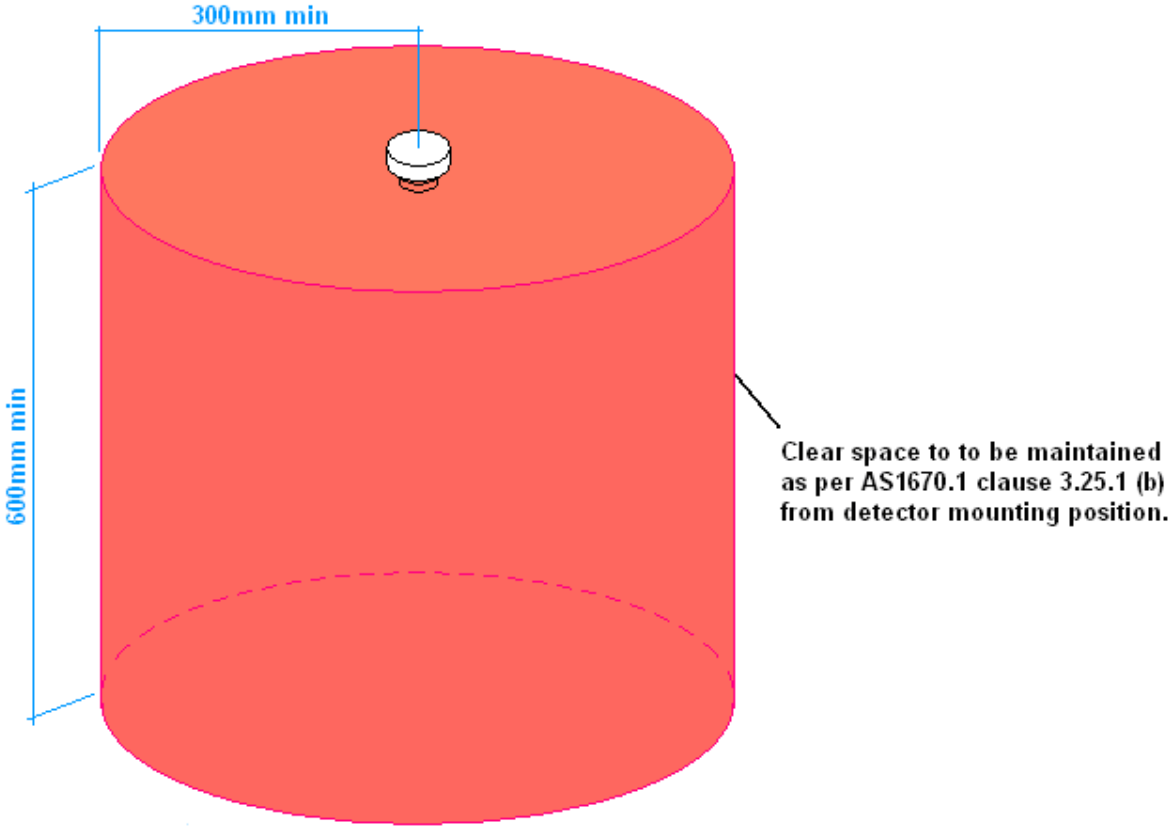


Alert tone - ISO 7731

18. FAQs & COMMON ISSUES

1 – <u>NTFRS position on AVF.</u> NTFRS Policy № 1 states all NTFAST connected systems shall have all smoke detectors set to AVF. You need to beware of the requirements AS1670.1, clause 3.3. This clause doesn't allow certain listed device types to be set to AVF this can become an issue when installing smoke detectors and non AVF equipment / devices (MCPs) on conventional zones.

2 – <u>Detector minimum clear space.</u> All detectors are to be mounted so that a clear space of 300 mm radius, to 600 mm deep <u>is</u> maintained from each detector. This requirement is only exempted for detectors installed to meet clauses 3.25.5 Cupboards and 3.25.12 Vertical shafts and openings.



3 – <u>NTFRS position on concealed and roof space detection.</u> The guidance of Appendix A clause A2, heat detectors should be used as they reduce unwanted alarms and have a greater resistance to adverse environmental conditions which are found in these spaces. The suggested detection devices from A2:
"(g) Roof spaces – aspirating or heat with high temperature duty and rate of rise operation."
"(h) Concealed spaces – aspirating or heat with normal temperature duty and rate of rise operation."

Aspirating detection is also an option in adverse environmental conditions as these detection systems incorporate sophisticated filters and /or electronic dust rejection. Cost is sometimes a limiting factor.

It should be noted the unwanted alarms that result from installing point type smoke detector in these areas will be borne by building owners often 12 to 18 months from installation completion, as resulting in multiple unwanted alarms, each charged @

$854 (2015). There is also the potential extra risk to the NT Community and the NTFRS assets having unnecessary movements at high speed.

4 – Changes to installed fire system. In line with section 11, installed fire systems fall under 2 categories. All 'required systems' will require a Building Certifiers approval of changes and appropriate documentation.

Changes to 'Non-required systems' connected to NTFAST need to comply with AS1670.1 as a condition of connection to NTFAST and the appropriate documentation.

As an example changing detectors from smoke to thermal would need Certifier approval and sound reasons, *like location is near kitchen or kitchenette.*

The following issues also need to be taken into consideration.

- Maximum spacing between thermals are closer than for smoke detectors see sections 4 & 5 AS1670.1
- Photoelectric smoke detectors "…shall be installed in all sleeping areas." refer clause 3.25.1 AS1670.1
- Photoelectric smoke detectors "…shall be installed in all exits, passageways , corridors, hallways or the like" refer clause 3.25.1 AS1670.1
- It is BCA or Fire Engineering required smoke detector between sleeping areas and the rest of an SOU/hotel room (this is a real problem in studio apartments and hotel rooms with kitchenettes that do not have cooking exhaust extraction systems)

5 – NTFRS position on Alterations to existing installations. Consistent with AS1670.1 and 3.4 is the clause that needs to be applied. It requires that "*alterations to existing installations shall be thoroughly designed, installed and tested,*…..". Any thoroughly designed installation shall be to AS1670.1. Clause 3.25.1 is the starting point for detector selection /location. Clause 3.25.1 requires that detection be provided throughout all areas of the building except where the BCA deems otherwise. This same clause specifies photoelectric smoke detectors "……*shall be installed in all sleeping areas*." Also "……*shall be installed in all exits, passageways, corridors, hallways, or the like, that are part of a path of travel to an exit*."

Appendix. A - GUIDANCE FOR THE SELECTION OF DETECTORS
States "The fire detection and alarm system should operate before the escape routes become smoke-logged to such an extent that occupants will have difficulty finding their way out of the building". It gives recommendations of the selection of detectors and list typical areas, including suggested detection devices.

6 – The two different warning systems: BOWS and EWIS. Both are installed along with, or as part of an AS1670.1: Fire
BOWS – Building Occupant Warning System is the standard warning system of AS1670.1 and is covered by clause 3.22. This type of warning shall go straight into evacuation tone only (see section 17). Installation maybe electronic sounders, or amplified sound system (with or without verbal message).
EWIS – Emergency Warning & Intercommunication System is the warning system / equipment installed in buildings over 25m and other BCA required classes of

buildings as covered in AS1670.4: Section 4 Sound systems and Section 5 Intercom systems.
The EWIS can be identified by the Warden Intercom Point (WIP) handsets (red phones). This type of occupant warning system involves a sequence of escalating stages. Upon alarm activation the system goes through alert tone first (from 0 up to 10 min see AS1670.4 C4.3.3) throughout the whole building. The alert is the signal for fire / floor wardens to man their WIPs. The alert will activate for period usually around 2 min. The systems sequence and times may be specifically designed by a Fire Engineer or the Buildings Emergency Management Plan.

The Cascading sequences are based around the required stairwell pressurisations ability to maintain the required positive pressure within the stairwell allowing for three levels with open doors. The following is the most common sequence:
Fire alarm initiates alert tone to all floors/areas (allowing wardens to man their WIPs)
After the first prescribed time period, the system escalates so that the alarm floor goes into evacuation. After a further period of time it shall escalate again so that 2 floors above and 1 below the fire floor go into evacuation. This should continue 2 up 1 down after each further time periods until all floors are in evacuation.
EWIS allows for trained chief warden to take control of the evacuation and even stop it should a warden investigation find that a false alarm has occurred - they just can't touch the FIP or FIP section of a combined panel.

7 – <u>Wiring of BOWS circuits</u> are all required to be monitored 3.22 "(a)….. *The fire alarm system shall monitor the sound system for fault signals required by AS 1670.4*." "*The signal path to electronic sounders or speakers shall be supervised for open and short circuit conditions.*"
Where new additions of sounders or speakers are installed fault monitoring will be witnessed at the inspection (see section 12). For new works connected to an old FIP (non-monitored output), wiring shall be done so that monitoring could be achieved when the FIP is upgraded i.e. a daisy chain is maintained, or circuit runs all the way back to the FIP (no star connections in field wiring). The required "as installed" drawing shall show the sounder/s or speaker/s to which new additions are connected

8 – <u>Maintenance and testing</u> for fire detection systems in the NT are to AS1851 – 2012.

9 – <u>Guards on detectors.</u> AS1670.1 clause 3.25.1 requires that the location of a detector be such that (b)"A clear space of at least 300 mm radius, to a depth of 600 mm, shall be maintained from the detector or sampling point." (c) "Indicators shall be visible from the path of normal entry to the area."
The following is advice regarding guards over detectors from CSIRO ActivFire one of the main conformity testing body in Australia for detectors.

1. Currently smoke detectors are evaluated/verified and certified to the conformance requirements of AS 1603.2 or AS 7240.7 (Australian detector standards).
2. The technical requirements and test methods of Australian detector standards differ to those applied by US agencies such as UL (Standard for Safety UL 268).

3. Consequently, with reference to the "Damage Stopper", US evaluations (testing and results) do not correlate with the requirements Australian detector standards.
4. Were certification sought for the "Damage Stopper", each specified smoke detector proposed for fitment with the device would need to be evaluated to the relevant sensitivity test methods of Australian detector standards to verify that the "entry impedance" of the "stopper" did not result in detection of smoke at a level less than the minimum requirements of the standards.

10 – <u>Class of building.</u> AS1670.1 clause 3.25.1 states that the BCA (NCC) over rules it when AS1670.1 when it comes to certain classes of buildings (see Spec E2.2a for full details). The most common is clause 2 allows for smoke alarms or detectors systems or a combination of both.

"4(c) In a Class 2 or 3 building or Class 4 part of a building smoke detectors must be installed—

(i) within each sole-occupancy unit, located in accordance with the requirements for smoke alarms in Clause 3(c)(i) [smoke alarm locations]; and

(ii) in a building not protected with a sprinkler system, in public corridors and other internal public spaces."

11 – <u>Sloping ceiling surfaces & roofs.</u> AS1670.1 clauses 4.1.3 and 5.1.3 covers the requirements for heat and smoke detectors respectively. Both require that "*detectors shall be installed between 500mm and 1500mm from the apex*…"
Planning detection zone layout shall best be achieved by starting with the initial installation at the correct distance from the apex and then spacing appropriately from this row.
Clause 1.4.25 defines Sloping surfaces as "*Any surface, roof or ceiling with a slope greater than 1 in 20."*
Clause 4.1.1 requires that the heat detector sensing element be between 15mm and 100mm from ceiling or roof. Where the roof purlins inhibit free flow of heat, the detector may be installed on underside of purlins, provided the element is less than 350mm below roof.
Clause 5.1.1 requires that the opening to the sensing element for ceiling-mounted point-type detectors shall be not less than 25mm and normally not more than 300mm below the ceiling, roof or apex.

12 – <u>High concealed and roof space detection.</u> The NTFRS position on these detectors, is that full AS1670.1 requirements apply. There is no exemption to the application for this required detection from clause 3.25.1 (b); *A clear space of at least 300mm radius, to a depth of 600m, shall be maintained from the detector or sampling point.* <u>This includes any bracket and cabling</u> (loop, circuit and remote indicator) associated with the detector.
and 4.1.1; *Each detector shall be installed so that no part of the sensing element is less than 15mm or more than 100mm below the ceiling or roof. Where roof purlins inhibit the free flow of heat to the detector, the detector may be installed on the purlin provided the sensing element is no further than 350mm from the roof.* This requires that detectors be mounted on the roof/ceiling (often done by attaching to detector to mesh/chicken wire) or alternatively screwed to the underside of roof purlins.

Below is one bracket arrangement that complies with all AS1670.1 requirements that can be lower to ceiling grid or a required clause 3.25.4.1 *Access for maintenance* point for replacement/servicing works.

Materials used in above photo available from hardware store:

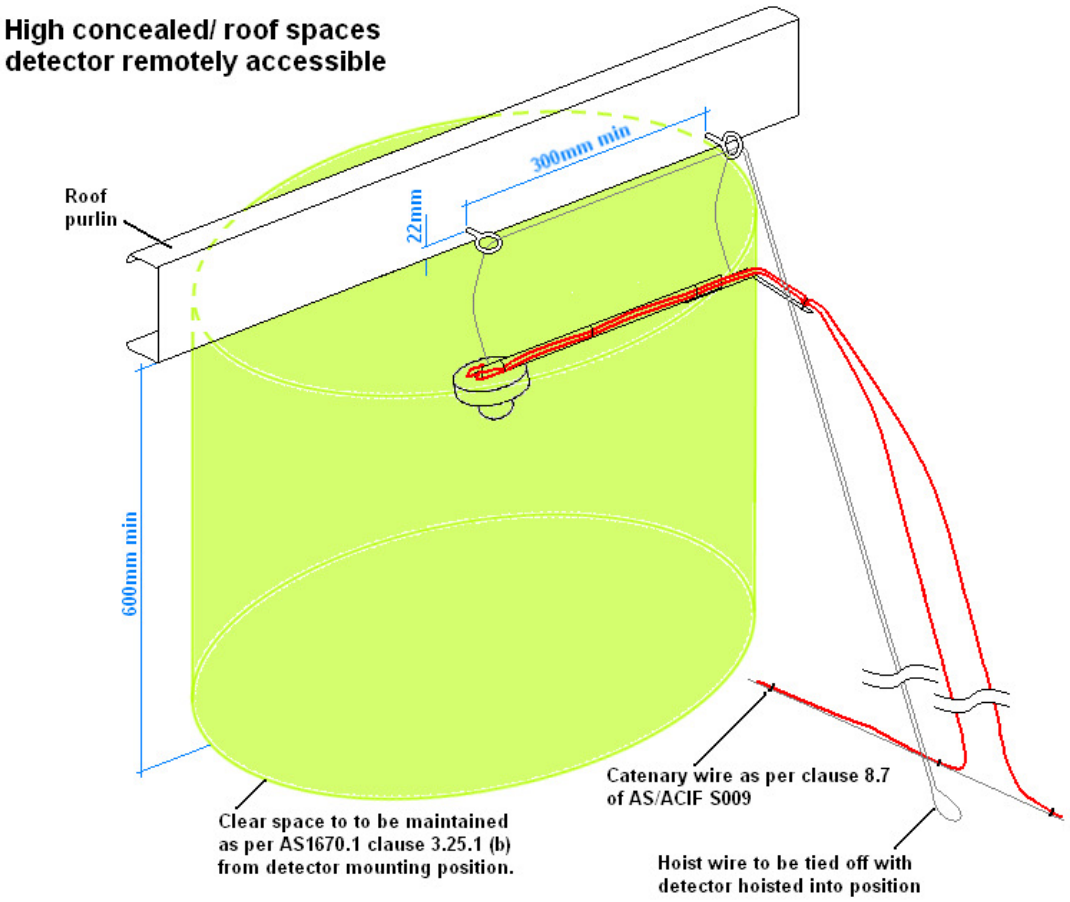
1 – Carinya MABA6221 Make-a-bracket Angle 20x20x600 long (1mm)
(Cut in half 300mm minimum required)

2 – Carinya MA 0019 Make-a-bracket bracket 100x100x20 2mm thick
(straightened to 135˚)

3 – 2 pop rivets 4.8 mm (joining items 1&2 through last 2 holes)

4 – Zenith WLB0420 50mm 14mm diameter eye bolts
(extra nuts and washers)

5 – 2mm wire rope galvanised (laced through holes in brackets and looped through eye bolts as per below diagram)

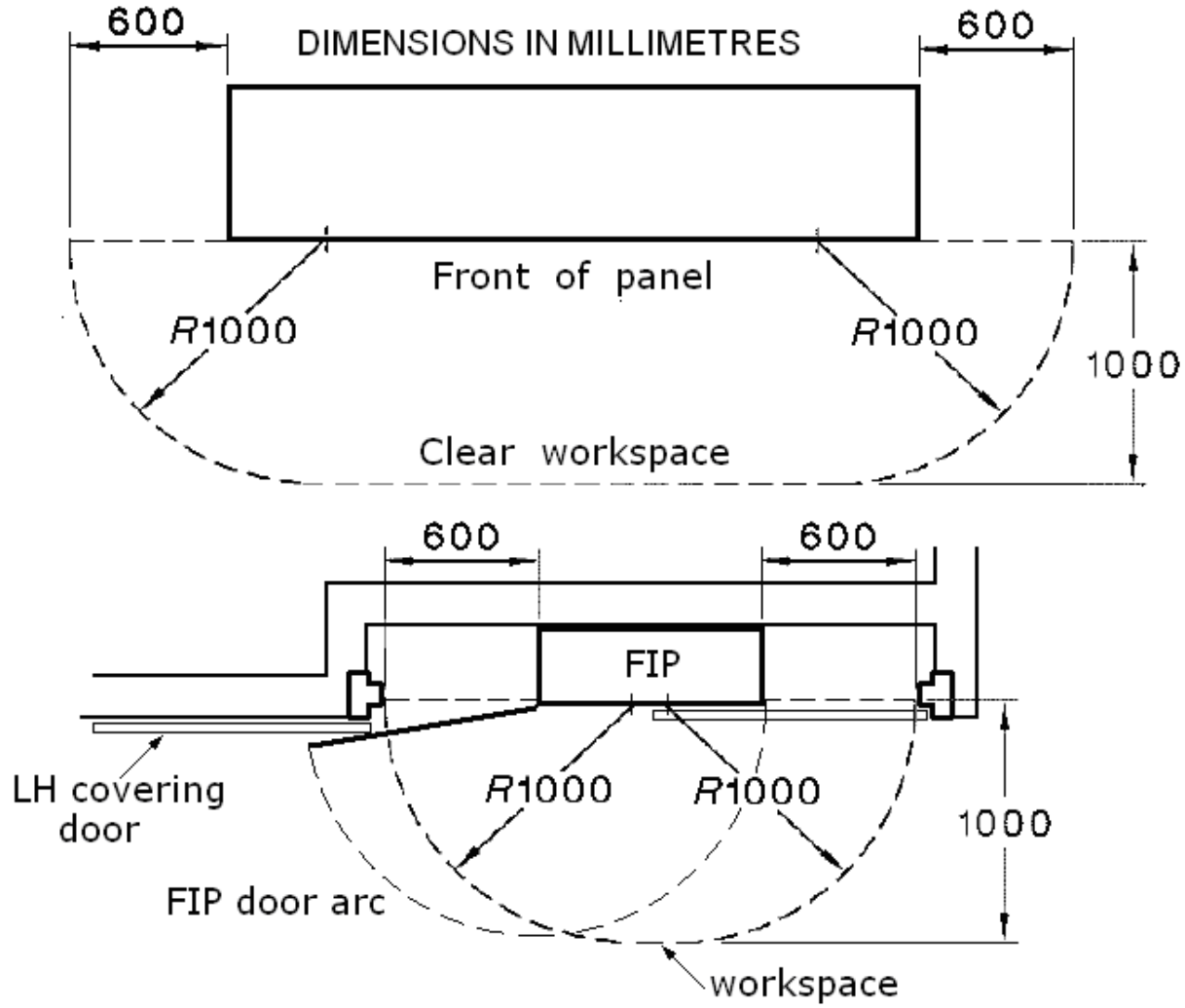


13 – <u>Fire Indicator Panel location</u> shall comply with all the various requirements of Section 3.9 AS1670.1(2004). Some of points you need to be clear on are:

1 – Be within the designated building entry point or fire control room (c 3.9.1 in full). An FIP remote from the designated building entry point shall have a mimic panel, repeater panel or fire brigade panel installed at the designated building entry point (c3.9.3)

2 – Full clearance shall be maintained including covering doors (c 3.9.4 & fig 3.1).

3 – Covering door/s shall have the 'FIRE PANEL' label at 50 mm letter size, a means of overcoming any sound level attenuation by this door/s and not be lockable (c3.9.2)



19. UNWANTED ALARMS

There is a load of information regarding what the subscriber needs to follow for the waiver process on the website www.fire.nt.gov.au. This is the information on what fire contractors can do to help a subscriber with a waiver application.

First and foremost, a fire contractor and tester need to read and understand the section 9 part titled 'WORKING ON SITE /SYSTEM IMPAIRMENTS/FIP REPLACEMENTS'. Following these instructional best practises will ensure that fire contractors themselves never create an unwanted alarm.

Some unwanted alarms will always be a fact of life for the NTFRS, though Fire Contractors can have a large influence in reducing them. Since the introduction of unwanted alarm charges, the NTFRS has seen a substantial reduction in the number of unwanted alarms from sites that have put the effort into reducing them.

All detectors have a limited life which can be greatly influenced by the environmental conditions. Most manufacturer nominate 10 years of in service life as a maximum. Once you have an alarm in an area, NTFRS data shows others alarms often follow. This may be in the range of a few weeks to some months.

What is often overlooked is that AS1851-2012 requires as part of annual testing, a survey of all areas of the building for any condition that may cause a nuisance alarm refer to Table 6.4.1.4 this where aging, dirty and insect infested detectors need to be identified and action before they cause unwanted alarm.

This is where the Fire Contractor can be of value to your client and the NTFRS.

The unwanted alarm waiver process – the waiver committee looks for evidence of a mitigation strategy that your client adopts for reducing future alarms, especially for activation without apparent cause. Especially in the case where the NTFRS knows the activation is due to aged or dirty detectors.

Unwanted Alarm Waivers which base the exemption on the replacement of the one detector that caused the unwanted alarm, with the claim of testing to the required standard will not fly as a mitigation strategy.

Waivers requested with evidence of the fire contractor's attending relatively promptly to replace the offending detector and reinstate the system, followed with replacement of some others in the zone or area of similar age or condition may be looked at favourably. For ant/insect or gecko infestations the application of pest control measures, sealing cable entry holes, etc. (*Ant powder on the back of detector before reseating keeps both ants and geckos at bay.*)

The mitigation works have a 30 day window from receipt of unwanted alarm charges being sent out to submitting a request for waiver.