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**SECTION E.3.3 SPECIAL SYSTEMS – SCHEDULE OF CHANGES – REVISION 5**

As a guide only, attention is drawn to changes that have been made in the following clauses since the last revision

Revision	Clause	Date
	General revision	
3	The latest relevant Australian Standards now used	September 2004
4	E.3.3.3.1 and E.3.3.4.1	September 2004
4.1	E.3.3.3 and E.3.3.4	September 2005
4.2	E.3.3.3.2 amended	December 2006
		December 2006
5	E3.3.3 , E3.3.4 and E3.3.5 amended	December 2018

**E.3.3. SPECIAL SYSTEMS**

**E.3.3.1. Power factor correction design**

**E.3.3.1.1. General**

The power factor correction switchboard shall contain the following:

- Isolating switch with busbar tags for incoming cabling. (no main circuit breaker or fuses).
- Circuit breaker for each step busbar connected to the isolating switch. Inrush current limiting reactors comprising number of cable turns. Contactors rated for capacitor duty.
- Harmonic blocking reactors.
- One 12 step power factor control relay with integral digital power factor indicator. All necessary control fuses, wiring, relays and associated equipment for correct functioning of the power factor correction equipment. All necessary devices to prevent interference with frequency injection systems if required by Supply Authority.

**E.3.3.1.2. Power factor correction panel**

All requirements of Main Switchboard specified in this document (from E4.1.6 to E 4.1.16 included) are applicable to the Power Factor Correction Switchboard. Provide all work, materials and plant required for the execution of the works.

In addition to the requirements stated in section E.4.1.6 to E 4.1.16 included, construction shall be as follows:

- a) Metal cubicle type. floor mounted. free standing. front access and top cable entry.
- b) Hinged lockable door access to Subcontractor and controls section. removable front panel access to capacitors.
- c) Design fault level 35 kA for 1 second.
- d) Well ventilated and insect and vermin proof.
- e) Top non ferrous gland plate for main incoming cable entries.
- f) Fully insulated and colour coded busbars as specified in Part 4.

#### **E.3.3.1.3. Capacitor**

Capacitors shall comply with AS/NZS 3000:2000, AS 1013 and the Supply Authority requirements.

Each capacitor unit shall:

- a) be rated for connection to a nominal 480V, 50 Hz system supply, with harmonic reactors fitted
- b) be three phase:
- c) be low loss type. Maximum loss 0.5W/kVar.
- d) be fitted with permanently connected discharge resistors.
- e) not be fitted with internal element fuses.
- f) be suitable for operation in surrounding ambient temperature range of 0 to
- g) 50°C or better.
- h) if required by Supply Authority, be fitted with devices to prevent interference with Supply Authority frequency injection systems.
- i) be housed in a container of adequate strength to successfully contain an
- j) internal electrical disturbance for the specified conditions.
- k) connections between capacitors shall be designed to minimise the transfer of
- l) short circuit forces on the insulator bushings.
- m) have a design life of 15 years minimum under continuous operation.

#### **E.3.3.1.4. Power factor control relay**

The switchboard shall be fitted with an automatic power factor control relay. The relay shall include the following features:

- suitable for connection to a 415V, 50 Hz, 3 phase, 4 wire supply.
- suitable for connection to a 5A secondary, 10VA, class 1, current transformer installed in the Main Switchboard.
- minimum twelve stage switching.
- output contact rating: 5A, AC-11 minimum.
- adjustable power factor setting. Range 0.8 to 1.0 inductive or higher.  
adjustable starting current.
- automatic, instantaneous under voltage and phase failure  
release. time delay for switching between stages.
- time delay after restoration of power supply to switching in of first stage.  
Minimum one minute.
- protected by suitably rated fuses.
- capable of reliable operation in temperature range of 0 to 50°C or better.  
selection facility for 'man/off/auto' operation.
- flush mounted on door of switch gear  
compartment. indication for energisation of  
each capacitor stage. programmable,  
automatic step sequencing.
- integral digital power factor  
display. output alarm contact.
- harmonic lock out function with alarm.
- data output RS 485.

The power factor control relay shall be capable of being set to provide stable operation in the selected power factor range.

#### **E.3.3.1.5. Testing**

In addition to switchboard testing specified in Part 3 herein, the following additional tests are required:

Capacitance and DC dielectric tests performed in accordance with AS 1013. Capacitor unit routine test reports shall be supplied prior to works testing.

simulation test of operation of power factor correction equipment.

#### **E.3.3.1.6. Commissioning and adjustments after commissioning**

Power Factor Switchboard Manufacturer shall attend site and set the switchboard for optimum operation at the time of Commissioning and shall return to site and readjust for optimum setting and operation after 6 months of being in service.

### **E.3.3.1.7. Information to be provided**

#### **E.3.3.1.7.1. Shop Drawings**

Within two (2) weeks of the date of acceptance, provide the University Representative with one transparent copy of relevant drawings showing full details of the design for the manufacture of the switchboard.

Drawings to be submitted shall include for each switchboard, the following:

- General arrangement and sections of the switchboard. The arrangement drawings shall show full construction details, principal dimensions, cable entry facilities, entry positions for consumer's mains, size and method of supporting busbars, busbar supports, transport units, construction materials, finish, lifting facilities and equipment in their relative panel positions.
- A schedule of equipment showing maker's name, catalogue number I and ratings of all equipment.
- A schedule of labelling.
- Control circuit diagrams and instrument wiring.
- Any other drawings required to fully describe the works.

All drawings shall be competently drafted on B1 size tracing sheets. Shop drawings may be manually drafted however as installed drawings shall be submitted on disk in CAD. Refer [Appendix 4](#)

All drawings shall have a title block showing the name of the project, relevant drawing title and drawing number.

Arrangement and construction drawings shall be drawn to a scale suitable for showing clearly the information depicted.

Circuit diagrams shall show all equipment identification. wire numbering, terminal numbering. protective device rating, contact arrangements of all switching devices, colour of indicating lights and any other information required to fully describe the circuit for construction and maintenance purposes.

All drawings shall be supplied in sufficient time to allow the University Representative two (2) weeks to examine the drawings for compliance with requirements, allow for amendment, and re-submittal if required, in order that the overall programme is achieved. When satisfactory, one (1) copy of each drawing will be returned with permission for use.

**E.3.3.1.7.2. As Installed Drawings**

Within two (2) weeks of final works testing provide the University Representative with one (1) transparency and one (1) CAD disk of each shop drawing giving details of switchboards as installed for review.

**E.3.3.1.7.3. Operation and Maintenance Manuals**

Within two (2) weeks of final works testing, provide the University Representative with one (1) draft copy of a comprehensive operation and maintenance manual for each switchboard.

Within two (2) weeks of approval submit three final copies of manuals to the University Representative.

The manuals shall include the following:

One print and one CAD disk copy of each as installed drawings. Schedule of catalogue numbers for all components installed in the switchboard.

One (1) original copy of technical leaflets provided in the packaging for each type of component.

Recommendations for the periodic maintenance of equipment. (where applicable).

A schedule of equipment suppliers listing full details for the purchase of replacement components, including, addresses, facsimile and telephone numbers.

Any other information necessary to describe the equipment for maintenance and operation purposes.

Signed copies of Type Test and Routine Test Certificates.

The manuals shall be bound in a hard plastic cover, minimum three (3) ring binder, of adequate size and thickness. Drawings shall be inserted in separate clear plastic envelopes at the rear of the manual.

Provide one (1) draft set of the Operation and Maintenance Manuals in sufficient time to allow the University Representative two (2) weeks to examine the manual to confirm compliance.

Submit a draft copy to the University Representative for review well in advance of the anticipated date of Practical Completion. Practical completion will not be granted until documentation has been lodged in acceptable format and content.

### **E.3.3.2. Variable Speed Drive Controllers (VSDs)**

All new PV installations shall comply with the requirements of the UNSW Design and Construction Specifications, Section E3.5 – Photovoltaic Systems.

#### **E.3.3.2.1. General**

The VSD Controllers shall be to AS / NZS 3947.4.2. (Low Voltage switchgear and control gear Part 4.2:- A.C Semiconductor motor controllers and starters), suitable for controlling speed induction motors.

The VSD Controllers shall carry a C-Tick Regulatory Compliance Mark to AS/NZS 4417.1 Part 1, 2 and 3 – (Marking of Electrical Products to Indicate Compliance With Regulations).

The VSD Controllers shall be of a state of the art design containing all the control, protection and alarm features of such a design.

Consideration shall be taken of the load duty and the environment in selecting the appropriate characteristics (e.g. degree of protection, operating temperature, load characteristic, etc.)

#### **E.3.3.2.2. Display**

The VSD Controllers shall have an alphanumeric local display panel with a scroll through facility. The panel shall display all the indication, control and protection functions consistent with the state of the art design.

Illuminated indicators shall be used to show the statuses of critical functions such as power on and fault condition.

Each fault condition shall be capable of being displayed on the panel. For remote monitoring purposes a common alarm output shall be provided. Additional requirements shall be assessed to suit specific client requirements .

#### **E.3.3.2.3. Installation of VSD**

The harmonic current emissions shall be maintained as low as practically possible by using, but not limiting to, the following methods:

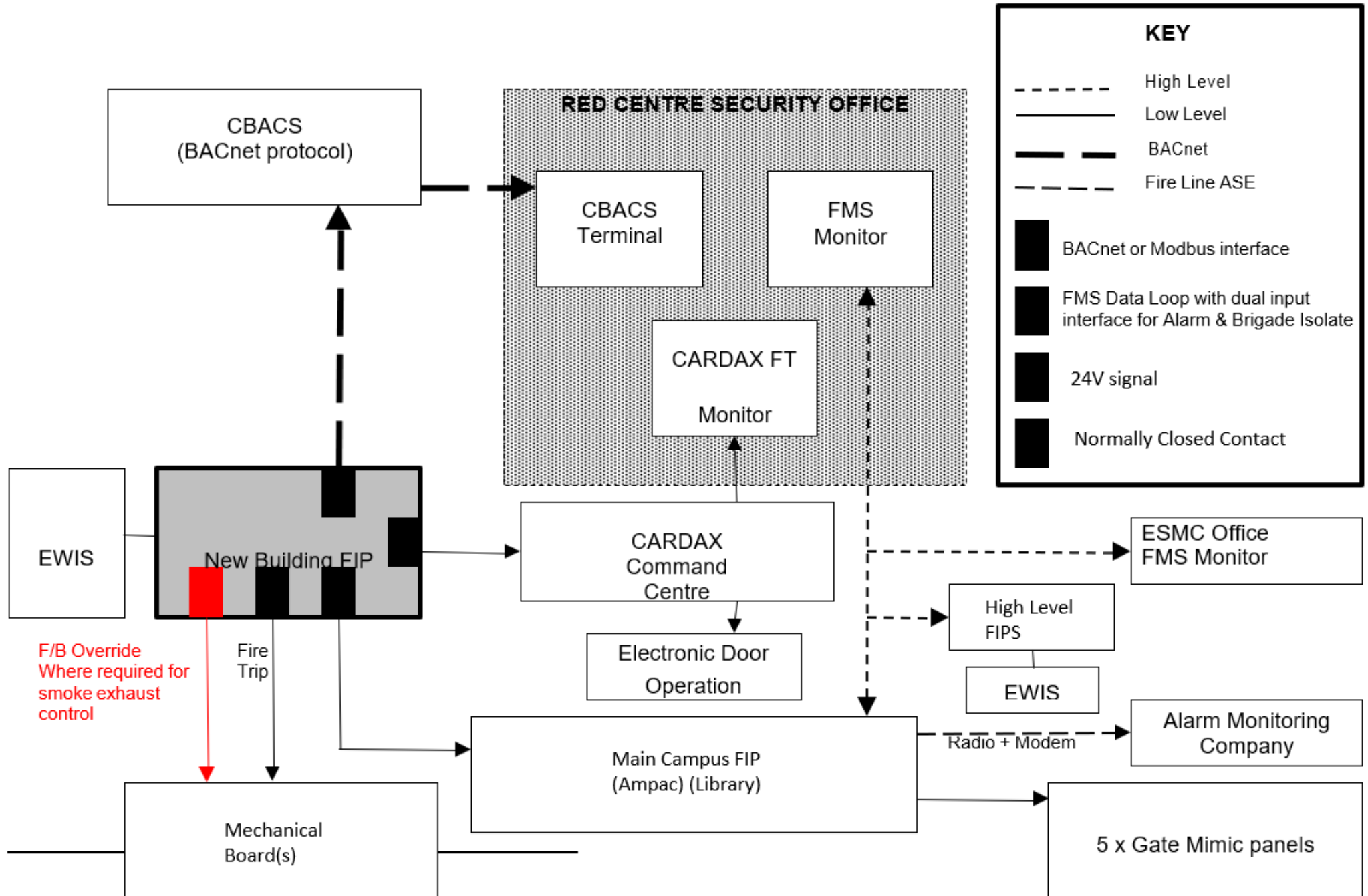
1. Controllers shall not be located near High Voltage equipment.
2. Where necessary install the VSD Controllers as close as possible to the motor it drives.
3. Install filters as required as close as possible to the input and /or output terminals of the VSD Controllers. This requirement will depend on system parameters (e.g. fault level, source impedance, cable lengths and



characteristics, etc.).

The incoming and out going communications and control cabling shall be screened cable and appropriately spaced from power cables. The screen shall be earthed at both ends and shall be continuous along the full length of the cable.

Cable ladder or ducts shall be of conductive magnetic material such as galvanised steel. All sections shall be bonded together at every join and earthed at both ends and at any other convenient location.



E.3.3.3. FIP CONNECTIONS FOR NEW NON-PROPRIETARY PANELS – GENERAL SCHEMATIC -20/07/2016

### E.3.3.4. Warning Systems (SSISEP)

#### E.3.3.4.1. General

The section outlines the UNSW's minimum requirements for the design and installation of a Sound System and Intercom System for Emergency Purposes (SSISEP) for any existing or new buildings. SSISEP were previously referred to as Emergency Warning Intercommunication Systems (EWIS) prior to the introduction of AS 1670.4 – 2004.

The requirements also apply to occupancy warning systems (OWS) that may be installed in lieu of SSISEP due to a lesser compliancy requirement of the Building Code of Australia.

#### E.3.3.4.2. Standards

All system design and installation work undertaken on behalf of UNSW will meet the following standards. When a conflict exists between various standards or fire engineered solutions, the standard or solution that produces the highest level of protection will apply. Any specific design and construct requirements that exceed the minimum standard are then to be applied as the minimum standard for the project.

- Meet requirements of AS 1670.4 – 2004.
- Non proprietary equipment, QE 90 or equivalent
- Configure OWS to meet the sound level performance requirements of SSISEP.

For system clarity UNSW has adopted a colour code strategy for the sheath colour of communications, data and control cabling. The convention is as follows:

FUNCTION	COLOUR	ALTERNATE COLOUR 1	ALTERNATE COLOUR 2
Telephone	Black (outdoor)	Beige (indoor)	Grey (no longer used)
Fibre	Royal Blue	Yellow	Black (no longer used)
UTP	Royal Blue	Black (outdoor)	Grey (no longer used)
Security	Pink		
CBACS (Campus BMS)	Purple	NB Earlier installations used Blue	
Fire	Red		
Lighting Control (Dynalite)	Orange		

Metering	Grey		
FAMCO	Yellow		

### E.3.3.4.3. System Requirements

To maximise the effectiveness of the warning system in an emergency situation a degree of consistency needs to be maintained between the architecture and functionality of all OWS and SSISEP that are installed within the UNSW.

All equipment and material installed on each project must be new. Approval must be obtained from UNSW Facilities Management Engineering before reconditioning or reuse of any warning system equipment.

### E.3.3.4.4. Performance and Functionality

Incorporate the following requirements within specification documentation:

#### E.3.3.4.4.1. Panel Architecture and Alarm Annunciation Indication

- Amplifiers to have 25% excess capacity for future expansion
- Speaker and Visual Alarms.
- Set all horn speakers to 2.5 watts.
- Set all ceiling speakers to 0.5 watts.
- Provide visual alarms in plant room areas.
- Provide visual alarms in areas occupied by hearing impaired persons.

#### E.3.3.4.4.2. System Operation from an Alarm

- All call points to be addressable, red in colour and connected to an SIP. Program the SIP so that operation of the manual call point starts a 180 second alarm acknowledgement facility (Refer AS 1670.1 – 2004 Section 3.2).
- SIP inputs to be provided for each evacuation zone.
- Override any local level controls.
- Any fault condition to be annunciated at the SIP.

#### E.3.3.4.4.3. Power Supplies

- Provide power supply and battery backup capability calculated for maximum amplifier and device loads. For example, if a panel has 4 amplifier cards with a capacity of 100 watts per amplifier, battery capacity will be based on 4 x 100 amplifiers plus the standard requirements.

- Provide a separate housing for all batteries.
- Do not place batteries in an enclosure that contains electronic equipment.

### **E.3.3.5. Mass Notification System (MNS)**

#### **E.3.3.5.1. Existing System Description**

The existing MNS is a highly secure command and control system that is fully networked via the communications network and linked back to the Main Security room located on the Lower Ground level of the Red Centre Building and the Facilities Management Room on Level 3 of the Mathews Building. UNSW has provided the communications network link from the Main Security room and Facilities Management room to the local buildings communications cupboard and in turn the network link to each SSISEP (formerly EWIS) or OWS fire panel for each building in the form of a suitable Cat 6 rated 3 port Ethernet connection.

Dedicated MNS site wide graphics displays are provided at the the Main Security room located on the Lower Ground level of the Red Centre Building and the Facilities Management Room on Level 3 of the Mathews Building. The following monitoring points have been provided for the MNS; Alert/Evac (tones currently sounding), Fault (any system fault on MECP, PA (in use), Isolate (from keyswitch).

The MNS graphics displays are in the form of a campus map layout with individual icons for all monitoring signals and MNS controls specified.

Each MNS graphics display incorporates a PA control device for carrying out emergency announcements.

The PA is arranged so that announcements can be made to single buildings, precincts (5 off), campus wide and remote campus wide. Different announcement zones within buildings have not been provided. The function is mouse controllable to allow different buildings, precincts and campuses to be selected.

If the SSISEP (formerly EWIS) or OWS is activated within a building it overrides any MNS PA announcements that are being carried out within that particular building. The MNS PA announcements continue for those buildings who's SSISEP (formerly EWIS) or OWS has not activated.

#### **E.3.3.5.2. MNS Requirements for New or Existing Buildings.**

A new SSISEP or OWS must be fully compatible with the existing MNS. An existing SSISEP (formerly EWIS) or OWS must be upgraded so that it is fully compatible with the existing MNS.

The Contractor shall allow for all works required to achieve the current functionality outlined in the Existing Description Above, including but not limited to;

- Install new icons on MNS SmartGraphics PC's at both the Main Security room and Facilities Management room.
- Install Digital Voice Command (DVC), Digital Amps (DAA-2) & IP

- Gateway units in or adjacent to the SSISEP or OWS panels (FIP).
- Reprogram SSISEP and OWS panels (FIP) to accept Back Ground Music inputs from DVC.
- Connect DVC and IP Gateway to UNSW LAN system. UNSW shall provide the communications network link and programme the data network to accept the DVC communication across the UNSW.
- Programming of MNS computer graphics software to provide visual indication of building SSISEP and OWS panels (FIP) panel status and allow PA control of individual and groups of buildings,

#### **E.3.3.5.3. Project Documentation**

To provide consistency in the documentation that is supplied to UNSW at project handover, incorporate the following requirements in the specification:

##### **E.3.3.5.3.1. As Installed Documentation**

- Accurately reflect the system installation.
- Indicate all cabling runs.
- Indicate system zoning.
- Indicate results of sound level testing.
- Meet the requirements of AS 1670.4 – 2004 Section 6.4 Documentation.
- Provided in hard and soft copy format with all sections related to system configuration data completed. Three complete sets.
- Ensure that the latest floor layouts drawings ( UNSW Space codes ) are used for the above documentation.

##### **E.3.3.5.3.2. Indicative Format for Manuals**

List of Contents

- Contractor details.
- Statement of compliance.
- System site specific configuration data.
- Hard copy printout of program.
- Commissioning test report forms.
- Operators manual.
- Product data sheets.
- As installed drawings and block plans:
  - Scaled and sized on A0, A1 or B1. Also include A3 size copies in manual.
  - Soft copies - AutoCAD and PDF. (PDF to be scaled and sized to A0, A1 or B1).

#### **E.3.3.5.4. Requirements to be verified with UNSW**

UNSW Facilities Management Engineering aim to assist third parties that are developing specifications for projects. Whilst developing documentation, the specifier will require detail and feedback on a range of issues including but not limited to:

- Approval of panel choice.
- Approval of evacuation tone and voice message.
- System cascade sequence.
- Location of visual alarms to be matched to type of occupancy of area. For example, hearing impaired occupants or high noise areas.
- For existing buildings with OWS via floor bells, sounders or local bells full replacement of OWS with a system that is fully compatible with the Mass Notification System.

### **E.3.3.6. Electronic Fire Alarm System**

#### **E.3.3.6.1. General**

This section outlines the UNSW's minimum requirements for the design and installation of fire alarm systems throughout its premises. The existing Fire Management System is an Ampac FireFinder System. which is used to monitor fire system signals for all Automatic Fire Detection and Alarm Systems, Automatic Fire Sprinkler Systems and Fire pumps installed across the Kensington Campus. Some of the existing fire alarm systems are based on MXL and other non-compatible products. However, with the introduction of AS 1670.1 - 2004 MXL and other non-compatible products are no longer compliant. All fire alarm system panels, detectors, field devices and wiring that are not fully compatible with the Ampac FireFinder Fire Management System will be gradually replaced by new compliant fully compatible equipment so that the Ampac FireFinder Fire Management System will provide high level monitoring and controls of the fire alarm systems throughout the UNSW campuses

During the initial design development stage for each project, the consultant/contractor must consult and obtain approval from FM Engineering for the extent of modifications required to the Campus FMS network. These modifications must incorporate changes to the existing fire systems or installation of new FIP's, sprinkler systems and fire pumps into the project works.

Modification of the site communications network using an approved UNSW IT Contractor to accommodate new FMS network signal connections must be included in the scope of all new buildings.

New FIP's, fire sprinkler systems, control valves and fire pumps, must be connected to the FMS to provide high and low level interface signals required to provide control and monitoring of the fire equipment for alarm, fault and isolate conditions.

Due to the complex nature of the FMS Network, it is required that an approved University FMS Contractor must perform all project related alteration works associated with any programming and modification to existing FMS equipment.

#### **E.3.3.6.2. Standards**

All system design and installation work undertaken on behalf of UNSW will meet the following standards. When a conflict exists between various standards or fire engineered solutions, the



standard or solution that produces the highest level of protection will apply. Any specific design and construct requirements that exceed the minimum standard are then to be applied as the minimum standard for the project.

- AS 1670.1 - 2004 for the fire detection and alarm systems.
- Install Ampac FireFinder control equipment to AS 4428.1 - 1998. The manufacturer of the control equipment must supply a statement of intent to provide forward compatibility of their products in meeting AS7240.2 requirements. The statement of intent is to be provided with other project design deliverables.
- AS 1668.1 - 1998 for fire and smoke control.
- AS 2118.1 - 1999 for interfacing relating to the sprinkler systems.

#### **E.3.3.6.3. System Requirements**

The following system requirements may be interpreted as above the minimum standards. Complying with the system requirements does not relieve a project specifier from the responsibility of producing a descriptive tender document that ensures effective delivery of a compliant, correctly programmed, documented and commissioned system.

All equipment and material installed on each project must be new. Approval must be obtained from UNSW Facilities Management Engineering before reconditioning or reuse of any equipment.

#### **E.3.3.6.4. Cardax**

The Fire Indicator Panel shall interface with the Security (Cardax) System via normally closed voltage free contacts (see Appendix 6 – Security Systems – “System Operation Overview”)

#### **E.3.3.6.5. BACnet Interface**

The UNSW monitors all fire alarm system information via BACnet interfaces from each SIP to the maintenance control point within the building. Each BACnet interface requires the following functionality:

- Conform to the ANSI/ASHRAE Standard 135: BACnet Standard as currently amended.
- Respond to requests for information from the SIP whenever interrogated over the BACnet interface.
- Maintenance free from the SIP side. SIP changes such as addition of zones must be relayed through the interface without any interface programming requirement.
- Hybrid or ‘one off’ custom solutions will not be accepted. The interface manufacturer is to provide details of other applications in which the interface is currently operational.
- Include the manufacturer’s BACnet Protocol Implementation Conformance Statements (PICS) with tender submissions for all proposed interface devices.

System designers are advised to refer to the University's BACnet systems design specification (available from the UNSW Web Site) for further information on the Campus Building Automation & Control System (CBACS).

Information to be transmitted to the CBACS via the interface to include but not be limited to:

- Alarm messages to indicate:
  - Pre-alarm states
  - Alarm states
  - Fire trip
  - Zone isolated
  - Zone fault
  - Detector fault (if not included in Zone fault messages)
  - SIP status
- Response to remote interrogation requests for status information.

Transmit alarm messages on a real time basis. The system shall not wait to be interrogated by the CBACS before reporting these conditions.

It must be possible to disable reporting of alarms, either individually or by category. For example, if maintenance work is being carried out in a particular zone then alarms from that zone should be disabled otherwise the CBACS may be inundated with "nuisance" alarms.

#### **E.3.3.6.6. Fire Trip Control**

Fire trip control requirements vary between different types of buildings. For example, certain buildings may represent specific hazards such as chemicals from fume cupboards, whilst other areas may have specific smoke control sequences to meet the requirements of a fire engineered solution. The project specifier must educate themselves as to the building's fire trip control requirements before specification documentation is produced. Areas that will require investigation and specific control requirements incorporated within the SIP include:

- Specific fire trip and air conditioning plant restart requirements.
- Provision of individual isolation ability on the SIP by toggle switch or pushbutton for:
  - Air conditioning shutdown.
  - Magnetic door holder release.
  - Any other fire trips specific to the building.
- Provide an indication on the SIP to indicate when the building is in a fire trip mode.

Transmit all fire trip control signals by low-level means (i.e. electro-mechanical interlocks).

#### **E.3.3.6.7. Remote Mimic Panel and Block Plans**

To maximise the effectiveness of the fire alarm system in an emergency situation a degree of consistency needs to be maintained between all mimic panels and system block plans. Specific requirements that need to be incorporated include:

- A minimum scale size of 1:20 for all graphical representations.
- Approval of the custom graphic layout is required from a UNSW Facilities Management Engineering representative before fabrication.
- LED indicators located within reversed engraved paint filled perspex panel coloured to UNSW's approval.
- LED test circuitry with push button activation.
- A fire alarm system general fault LED indicator, a fault buzzer and push button fault buzzer silence switch.
- Annunciator housed in an architectural grey, extruded aluminum frame.
- Correctly orientate the plan to match the final installation point and provide reference points such as nearest street, street corner and 'You Are Here'.
- Include the name of the installing fire contractor and the date of installation.

#### **E.3.3.6.8. Fire Panel Construction**

To maximise the effectiveness of the fire alarm system in an emergency situation a degree of consistency needs to be maintained between the architecture and functionality of all fire panels that are installed within the UNSW.

##### **E.3.3.6.8.1. Panel Architecture and Alarm Reporting**

- Provide a maximum number of devices on each fire detection loop that does not exceed 70% of the maximum device capacity of the fire detection loop.
- Do not cover more than 42 floors of a building with a single fire detection loop.
- Provide isolator devices on addressable loops between floors that are separate fire compartments.

- Provide individual LED indication on the panel for:
  - Pump run.
  - Flow switch.
  - Sprinkler valve set operated.
  - Any alarm that has activated on a per floor basis.
  - A detector in maintenance fault.

E.3.3.6.8.2. Power Supplies

- Provide power supply and battery backup capability calculated for maximum loop and device loads. For example, if a SIP has 4 loop cards with a capacity of 126 devices per loop, battery capacity will be based on 4 x 126 devices plus the standard requirements.
- Provide a separate housing for all batteries.
- Do not place batteries in an enclosure that contains electronic equipment.

E.3.3.6.8.3. Wiring

- Install wiring that is compatible and recommended by the equipment manufacturer as suitable for the selected equipment type and application.
- Install all fire panel addressable loops in 120 minute fire rated cable.
- Maintain consistent cable sizing and type for all individual wiring runs.
- Do not install MIMS cable for fire panel data loops, use a Radox or Firestop style fire rated cable.

### **E.3.3.6.9. Risk Management Requirements**

The selection of fire detection technologies and the configuration of these products are vital to the stability and effectiveness of the fire detection system. Specification documentation needs to incorporate the following requirements:

#### **E.3.3.6.9.1. Fire Detection Product Choice**

- Install smoke detection within areas designated as higher risk:
  - Switchroom.
  - Storage areas.
  - Additional areas identified by UNSW Facilities Management Engineering.
  
- Install multi sensor detection (photo electric/heat) within all:
  - Roofspaces.
  - Plant rooms.
  - Toilets that are accessed by students and the general public.
  - Non temperature controlled environments that require smoke detection.
  
- Do not install heat detectors in areas that are protected by a sprinkler system.
  
- Install aspirated smoke detection systems in:
  - Inaccessible large open space areas.
  - Computer rooms with airflow velocity of greater than 20 air changes per hour.

#### **E.3.3.6.9.2. Smoke and Multi Sensor Detector Setup**

- Configure alarm verification on all detectors.
- Set all detectors within switchroom, communication and equipment rooms to high sensitivity.
- Set all detectors within plant room, toilet and dirty areas to low sensitivity.
- Set all detectors within office and classroom areas to medium sensitivity.
- Remove covers from all detectors at time of commissioning.
- Do not install smoke detectors in areas where cooking will be undertaken.
- Do not program detectors to set their sensitivity via an auto ranging function.
- Only install fully addressable detectors that are capable of self monitoring and generating maintenance faults.
- Configure detector maintenance fault as a separate non brigade calling zone on the SIP.

### **E.3.3.6.10. Project Documentation**

To provide consistency in the documentation that is supplied to UNSW at project handover, incorporate the following in the specification:

- As Installed Documentation
  - Accurately reflect the system installation.
  - Indicate all cabling runs.
  - Indicate all addressable device identification numbers.
  - Indicate system zoning.
  - Meet the requirements of AS 1670.1 – 2004 Section 7.2 Documentation.
  - Provided in hard and soft copy format with all sections related to system configuration completed.
  - Provide three complete sets.

#### **E.3.3.6.10.1. Indicative Format for Manuals**

##### **List of Contents**

- Contractor details and overview of project:
  - Include a brief description of how the system operates that is relevant to the installation.
  - Include any data related to how the system will work in accordance with 'Fire Engineered Solutions'.
- Statement of compliance.
- Fire alarm system site specific configuration data.
- Hard copy printout of program.
- Soft copy of program in a format that can be uploaded to FIP.
- List all passwords and qualify level of password entry:
  - Level 1 – End user.
  - Level 2 – System tester.
  - Level 3 – Serviceman etc.
- Fire alarm system commissioning test report forms.
- FIP operators manual.
- Product data sheets.
- As installed drawings with space code details and block plans:
  - Scaled and sized on A0, A1 or B1. Also include A3 size copies in manual.
  - Soft copies - AutoCAD and PDF. (PDF to be scaled and sized to A0, A1 or B1).

E.3.3.6.10.2. Requirements to be verified with UNSW

UNSW Facilities Management Engineering aim to assist third parties that are developing specifications for projects. Whilst developing documentation, the specifier will require detail and feedback on a range of issues including but not limited to:

- Nominated sum for modification of the FIP.
  - Approval of mimic or block plan layouts.
  - Approval of fire panel product choices.
  - Approval of fire detection product choices.
  - Approval of fire fan control panel layouts.
- System fire trip matrix for all shutdowns and system outputs upon operation of an alarm condition.