

Fire Safety Services Design Standard



MACQUARIE
University

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1. DESIGN AND DOCUMENTATION

1.1. AUSTRALIAN STANDARDS & STATUTORY REQUIREMENTS

Design and documentation utilizing these guidelines is to incorporate the requirements of the current NCC standards along with all current referenced Australian Standards. Below is a list of standards which may apply but is not an all-inclusive list.

- AS 1221 Fire Hose Reels
- AS 1603.1 Automatic fire detection and alarm systems – Heat detectors
- AS 1668.1 Fire and smoke control in multi compartment buildings
- AS 1682 part 2- Fire Damper Installation
- AS 1670.1 Fire detection, warning, control and intercom systems - System
- AS 1851 – 2012, amdt 2016 - maintenance of fire protection systems and equipment
- AS 1905.1 Fire resistant door sets
- AS 1905.2 Fire resistant roller shutters
- AS 1940 The storage and handling of flammable and combustible liquids
- AS 2118.1 Automatic fire sprinkler systems - General system
- AS 2243 Safety in laboratories - Planning and operational aspects
- AS 2243.8 Safety in laboratories – fume cupboards
- AS 2293.1 Emergency escape lighting and exit signs for buildings
- AS 2419.1 Fire Hydrant installations.
- AS 2441 Installation of fire hose reels
- AS 2444 Portable fire extinguishers and fire blankets – Selection and location.
- AS 2941 Fixed fire protection installations – Pump set systems
- AS 3000 Electrical installations
- AS 3013 Electrical installations- classification of the fire and mechanical performance of wiring system elements
- AS 3500 National plumbing and drainage code
- AS 3786 Smoke alarms.
- AS 4072 Components for the protection of openings in fire-resistant separating elements - Service penetrations and control joints
- AS 4214 Gaseous Fire Extinguishing systems
- AS 4254 Ductwork for Air handling Systems in Buildings
- AS 5007 Powered doors for pedestrian access and egress
- AS 6905 Smoke doors
- Current NCC volumes
- National Code of Practice for the Safe Removal of Asbestos (NOHSC: 2002 - 1988)

The above standards are not an exhaustive list of the relevant requirements. The consultant team is required to incorporate all relevant and current standards into project specific design and documentation.



1.2. DEFINITION OF ESSENTIAL FIRE SAFETY MEASURES

Design and installation of essential fire safety measures shall include all subjects / ASPECTS pertaining, but not restricted to the following:

- Fire Management System (FMS)
- Access panels, doors & hoppers to fire resisting shafts
- Automatic fail-safe devices
- Automatic fire detection and alarm systems
- Automatic fire sprinkler systems
- Emergency lifts (refer to electrical services section) – Location to be advised
- Emergency lighting (refer to electrical services section)
- Emergency warning and intercommunication systems (EWIS)/Occupant Warning System (OWS)
- Emergency evacuation plans
- Exit signs (refer to electrical services section)
- Fire dampers (refer to mechanical services section) – Location to be advised
- Fire doors
- Fire hose reel systems
- Fire hydrant systems
- Fire seals protecting openings in fire resisting components
- Fire shutters
- Gaseous fire suppression systems
- Lightweight fire rated construction (refer to architectural) – Location to be advised
- Mechanical air handling system shutdown
- Portable fire extinguishers & fire blankets
- Pressurizing systems (refer to mechanical services section)
- Required power operated exit doors
- Smoke and heat vents (refer to mechanical services section)
- Smoke and heat alarm systems
- Smoke dampers (refer to mechanical services section)
- Smoke doors
- Standby power systems (refer to electrical services section)
- Wall wetting sprinkler and drencher systems
- Warning and operational signs
- Alternate fire solutions buildings
- Service penetrations (refer to architectural)

1.3. INTRODUCTION

Most University buildings are classified as Class 9b buildings, i.e., 'an assembly building, including a trade workshop, laboratory, or the like in a primary school or secondary school', as defined by the Building Code of Australia (NCC). This Class 9b classification generally applies to all teaching spaces, computer rooms, laboratories, workshops, office areas and the like, but does not apply to other specialized buildings such as student accommodation (and other premises containing areas for sleeping occupants), carparks, farm buildings and the like.



Additionally, some buildings may contain areas which are required to be designed to suit entertainment requirements.

As the essential fire safety measures proposed to be installed within a building are determined by the classification of the building, details regarding the building classification, together with any special Entertainment requirements, shall be submitted by the Consultant Team during initial design development, for approval by Macquarie University Property Department (MQP).

Many University buildings contain health and fire hazards far in excess of those normally found in typical Class 9b assembly buildings. Moreover, the University's commitment to Work Health & Safety requires in many cases a higher degree of life safety provision than that provided by the building regulations, example, Alternate Fire Solution buildings or buildings used for revenue.

The University's minimum requirements for fire protection systems are stated below.

These requirements are in addition to, but not a substitution for legislative requirements.

1.4. NEW BUILDINGS

As a minimum, the essential fire safety measures provided in University buildings shall be designed and installed in accordance with the minimum legislative requirements incorporating all current Statutory Regulations, Australian Standards, Local Council, NSW Fire Brigades, Work Health Safety and Workcover requirements.

Each building shall be provided with the appropriate fire suppression, detection, emergency warning and egress provisions, all designed and installed in accordance with the requirements of the "Deemed-to-Satisfy Provisions" of the NCC.

Additional measures may also be required, as stated in these guidelines, to meet specific building hazards and/or University Insurers requirements. These measures should be included in the project brief by the consultant for review by the University.

Where it is proposed that the "Performance Requirements" of the NCC will be adopted to develop an "Alternative Solution" in lieu of complying with the "Deemed-to-Satisfy (DtS) Provisions" of the NCC, the Consultant Team shall consult and seek approval for all proposed non-complying NCC DtS provisions with MQP, during initial design development and any relevant authorities.

The Consultant Team is also required to consult with MQP, University Risk Management, University WHS Group and User Groups, to discuss any additional essential fire safety measures which may be required to be included in the design, in order to suit the proposed occupancy, associated hazards and the overall fire exposure risk.

The additional measures shall be determined in consultation with MQP incorporating details and issues relating to the fire safety of the building, including consequence of loss and likelihood of loss.

1.5. EXISTING BUILDINGS

The policy for the refurbishment of existing essential fire safety measures within existing buildings shall generally be as for new buildings. However, as current building regulations are generally aimed at new buildings being constructed today, there are few buildings in the University that have been constructed under current regulations.

Whilst every endeavor is made to comply with regulations during refurbishments and upgrades, it is unlikely that the full extent of the building regulations can always be met.

Therefore, in many cases involving existing building refurbishment, "Alternative Solutions" in lieu of complying with the "Deemed-to-Satisfy (DtS) Provisions" of the NCC may need to be developed.

For all existing essential fire safety measures within a building proposed for refurbishment, the existing Standard of Performance/ Annual Fire Safety Statement shall be reviewed by the Consultant Team for compliance with the current NCC and current Australian Standard requirements. The final Fire Safety Certificate (FSC) shall be in the template provided by the Department of Planning and Environment developed by the NSW government. This FSC should include the existing Fire Safety measures as well as any modified or new fire safety measures.

The details of this review and the proposed upgrade strategy for the existing essential fire safety measures within the refurbishment area shall be submitted to MQP during the initial design development for review



and comment.

These details will assist in the determination of the extent of modification and upgrade of existing essential fire safety measures required to be incorporated into the refurbishment works.

2. FIRE MANAGEMENT SYSTEM (FMS)

The FMS consists of building fire indicator panels (FIP's), fire sprinkler systems, sprinkler control valves, fire pumps and other equipment related to the fire system installed throughout various University Buildings and connected to the main campus FIP via the **Simplex Fire Alarm** network located in Security Building Y4A, 4 Link Road. This network also includes a Simplex TrueSite Workstation installed on a computer in the Fire Control Room located at Y4A, 4 Link Road.

When a new Simplex Fire system is installed or upgraded in any building, the graphics for the Fire system must be installed in the TrueSite Workstation. The graphics should have a description of each individual smoke detector along with the floor plan layout. Appendix B Provides the information that is to be provided to the programmer to enable this to happen. In addition, the Control windows which will enable security to isolate each zone must be installed as part of this upgrade or install.

New fire equipment must be connected to the Fire network via Fibre Optic Cable. This Fiber optic cable must be a multimode, graded index, 6 core Fire resistant cable. There should be separate incoming and outgoing pathways/conduits to each FIP. The incumbent fire contractor must be contacted to identify the correct Type of Fibre Cable to be used on campus. In addition, each building FIP shall be interfaced with the Security system (Cardex) to indicate any fire alarms.

If the existing connections between the FIP's are copper, they must be replaced with Fibre Optic Cables.

The Consultant Team shall fully consult with MQP during the initial design development stage for each project, to determine the extent off modification required to the FMS when modifying existing or incorporating new FIP's, sprinkler systems and fire pumps into the project works.

Due to the complex nature of the FMS, it is required that an approved University contractor performs all project related alteration works associated with the installation and connection of devices connected to the FMS, including any required programming and modification to existing FMS equipment. These works shall be allowed to be provided as part of the overall project works and include all modifications to the following equipment:

- Main Campus FMS FIP
- Subsequent Fire Indicator Panels

2.1. Passive Fire and Smoke Systems

All Passive and fire smoke systems which include but not limited to fire doors, fire shutters, service penetrations, control joints shall be:

- a. Equal to the FRL of the Fire compartment in which they are installed in (refer to architectural specifications/drawings).
- b. Provided with identification labelling in accordance with the requirements of AS4072.1 Appendix B and AS1851-2012
- c. Detailed on a building essential fire safety measure asset register and as built drawings or on an unlocked excel spreadsheet that will be handed over at the end of DLP. Details should be as provided in AS4072.1 Appendix B. The register should include numbered photographic evidence of the labels and penetrations and must correspond to the numbers mentioned on the asset register.

2.2. AUTOMATIC FAIL-SAFE DEVICES

Automatic fail-safe devices include magnetic door holders and fire trips to security door interfaces (electric strikes, electric mortise locks, drop bolts, magnetic locks etc.) that are required to activate when a fire/smoke condition is sensed via the building fire sprinkler or fire detection system. These devices shall be normally energized with 24v DC to enable the devices to return to the fail-safe position when power to the device is lost in accordance with the requirements of NCC D2.21



2.2.1. MAGNETIC DOOR HOLDERS

The consultant team shall fully liaise with MQP and the Project User Group to determine requirements and locations of fire and/or smoke rated doors required to be normally held open by low voltage magnetic door holders. Magnetic door holders shall be mounted at the top of fire doors with a wall mounted metal base, PVC bases are not permitted. Each magnet shall be fitted with a local release button/or switch and where more than one door panel is fitted to a single opening, then one switch shall release all magnetic door holders. Both parts of the magnet shall be secured rigidly.

Fire & Smoke doors that are not locked by the security system shall have the magnetic door holders installed on a separate control loops with individual isolation facilities for each loop located at the FIP.

2.2.2. FIRE TRIP TO SECURITY DOOR INTERFACES

The consultant team shall fully liaise with MQP, Security Services and the Project User Group to determine the locations of security door interfaces installed on required egress doors which are proposed to be normally locked by the electronic security system and are required to automatically unlock in the event of fire alarm activation.

To ensure that security door interfaces can be classified as fail safe devices, fire trip cabling shall run from the FIP and connect directly to the door interface and not via any electronic security system controller.

Fire trips to security door interfaces shall be installed on a separate control loop to magnetic door holders and air conditioning fire trip cabling with individual isolation facilities for each loop located at the FIP.

MQP shall advise if any smoke doors are to be controlled by the security system and closed on fire trip.

All doors provided with a fire trip to a security door interface shall also be provided with a green Break Glass Unit labelled "door release" and fixed to the wall adjacent to the door handle. This UNIVERSITY requirement is to ensure egress through the door is available in the event of all types of emergencies.

A4 signage shall also be mounted on the door at eye level. The signage shall be green and carry white lettering indicating:

"EMERGENCY EXIT ONLY"

Include "DOOR ALARMED" if applicable.

All egress doors provided with security screamers shall be arranged so that the security screamer device is deactivated on a fire trip signal.

The details of all fire trips to security interfaces devices shall be included on the building essential fire safety measure asset register and the associated drawings

2.3. AUTOMATIC FIRE DETECTION AND ALARM SYSTEM

The University currently has a variety of existing fire detection and alarm systems and FIP's installed throughout its buildings, including older type single wire series circuit systems (Reichel type) and more traditional conventional and addressable fire systems.

Unless instructed otherwise the fire system is to be upgraded to an addressable system, the existing FIP shall be upgraded to Simplex 4100-ESi or the latest and the new FIP shall be fully partitioned to allow the new area to be addressable and the non-affected area to be conventional detectors with addressable modules.

Each addressable loop circuit shall not exceed 80% of the design capacity recommended by the manufacturer.

When upgrading or extending part of an existing fire alarm system, should the installation work be carried out by an alternate contractor to the current essential services maintenance contractor, **the current essential services maintenance contractor** shall inspect the new work at Practical Completion and be satisfied that the new work is fully operational to sign off and satisfies the system requirements. The cost of this inspection is to be included in the installation tender sum for the Project.

On Practical Completion the design team/consultant along with the Facilities maintenance team shall inspect the work and commissioning test sheets to be satisfied that the new work is fully operational and satisfies the system requirements.

2.3.1. FIRE INDICATOR PANEL (FIP)

- a. New FIP's shall be fully addressable **Simplex 4100-ESi (or newer)**



- b. New FIP's proposed to be installed as part of a building refurbishment or within a new building shall be analogue addressable type. FIP's shall be sized to adequately serve the entire building in which it is located with a minimum of 20% spare capacity on all control loops/lines
- c. FIP's shall be located at the building entrance designated as the entrance most accessible to the NSW Fire Brigade, ie, the entrance accessible to a fire appliance
- d. The FIP shall be placed in a position that allows for both audible and visual fault monitoring by the building occupants. Under no circumstances are FIP's to be in storerooms or offices or other "out of the way" places
- e. Separate isolating facilities for each group of equipment interfaces shall be provided at the FIP for EWIS, occupant warning system, magnetic door holders, security interface devices, air conditioning trips, sprinkler system interfaces and main fire bell/strobe
- f. Manual call points (MCP) shall be connected directly to the EWIS and not to the FIP, except for the one red MCP required to be provided at the FIP with proper labelling. Handwritten labels will not be accepted and will be defected during DLP.
- g. Individual LED indications must be provided for the following signals:
 - Fire Sprinkler & Hydrant System Valve Monitor Switches or Tamper Switches.
 - Fire Sprinkler Alarm
 - Fire sprinkler pre-action systems - low air pressure alarm
 - Fire Sprinkler Flow Switch alarms – Indicator/Flow switch.
- h. VESDA status indication - airflow fault, alert alarm, action alarm, fire 1 alarm, fire 2 alarm

Where existing FIP's require modification of existing programs and/or software to incorporate changes due to refurbishment works, these modification works shall be

- a. Carried out by an approved University contractor. The cost of these works is to be fully included in the tender sum for the Project.
- b. A suitably sized framed and covered block plan shall be installed adjacent to the FIP, showing the extent of alarm zones and addressable detector numbering for each level and area of the building controlled by the FIP. Each zone shall be colored for easy identification and a CAD dwg supplied to MQP. The Block plan shall identify each detector with the corresponding address and zone.
- c. Where existing fire detection and alarm systems are refurbished, any existing block plans shall be altered to suit the works performed as part of the refurbishment. A system interface diagram/matrix shall also be included as part of the block plan information, in accordance with the requirements of AS1851.
- d. The identification of the zones on the block plan should match the information on the FIP
- e. A drill switch shall be installed on all FIP's, and on activation shall not call the NSWFB or shut down A/C units but activate the EWIS/OWS and unlock all fire/smoke & Security doors.

2.3.2. DETECTORS

- a. If it is a sprinklered building, install a sprinkler head approximately 1m in front of the face of the fume cupboard. Refer to Clause 2.3.1 in AS 2243.8-2014. If it is a non-sprinklered building, the university requires that an addressable smoke or thermal detector (depending on the rest of the building and application) be installed as close to the fume cupboard. Refer to AS 2243.8 for spacing as well as AS 1670.1 regarding spacing of detectors.
- b. Detectors shall be suitably selected for each location in accordance with AS1670
- c. AS1670 Appendix A - Guidance for the Selection of Detectors. Where smoke detectors are indicated as the suggested detection device, addressable photoelectric smoke detectors shall generally be installed
- d. Where detectors are in concealed spaces such as ceiling spaces, cupboards, sole occupancy units, air handling systems and the like, remote indicators shall be provided.
- e. Remote indicators are required to be provided for both conventional and fully addressable type detectors.
- f. All detectors shall be fully accessible for maintenance. Accessibility to concealed spaces shall be achieved via ceiling access panels or accessible walkways. Where accessibility to detectors is difficult, the use of VESDA shall be considered.
- g. Photoelectric smoke detectors shall be provided in all electrical distribution board, cupboards, telecommunications cupboards, electrical switch rooms and lift motor rooms.
- h. For sleeping areas, sole occupancy units and paths of travel to exits, photoelectric smoke detectors are recommended to be installed. Where it is deemed inappropriate to install these detectors due to the possibility of unwanted alarms, combined CO & heat multisensory detectors may be considered.



- i. Heat detectors connected to the FIP shall be provided within all fume cupboard exhaust flues, as required by AS2243.8. Remote indicators shall be provided in these cases.
- j. Care shall be taken to ensure that heaters, air conditioning registers, ceiling fans and light fittings are not located within the minimum required distance from heat and smoke detectors.

2.3.3. ASPIRATED SMOKE DETECTION SYSTEM (VESDA OR SIMILAR)

- a. The use of VESDA shall be considered for high risk/high insurance areas. VESDA or comparable aspirating smoke detectors shall be used in areas of sensitivity e.g. heritage, archival, valuable assets or the like, after consultation with MQP as to the suitability.
- b. VESDA systems shall operate independently of other detection/suppression systems, however they shall be connected to the building FIP and to the FMS to provide indication of all alarm levels and to allow early response by Security Patrol.
- c. All VESDA alert and action alarms must not call the brigade. The Fire 1 or the Fire 2 alarm shall not be configured to call the fire brigade
- d. Xtralis, the manufacturer of VESDA, shall be consulted as to the optimum design for the installation. Only VESDA accredited installers shall install a VESDA system
- e. If the VESDA controller is to be located remote of the area being protected a mimic panel providing aural and visual indication of alert, action, Fire 1 and Fire 2 alarm and system faults is to be in the protected area.

2.3.4. OCCUPANT WARNING SYSTEMS (OWS)

- a. Where buildings are not provided with EWIS, an OWS shall form part of the fire detection and alarm system
- b. New OWS shall consist of an amplified sound system producing the evacuation signal in accordance with the requirements of ISO 8201. New sounder or bell type OWS shall not be installed without University approval.
- c. Sound pressure levels shall be provided in accordance with the requirements of AS1670.1.
- d. New systems shall be provided with a microphone and appropriate key switching at the FIP to allow PA functions
- e. Occupant warning speakers shall be provided in accordance with the requirements for EWIS
- f. When new OWS are installed, the amplifier capacity shall be selected to provide sufficient sound levels throughout the entire building
- g. Existing OWS, such as internal fire alarm sounders and bells, requiring modifications due to building refurbishment, shall be modified within the refurbishment area to achieve the evacuation signal tone and sound pressure level requirements of AS1670.1
- h. Commissioning details indicating measured sound pressure levels shall be provided on the as built drawings and within the O&M manual, for all new and refurbishment works.

2.4. AUTOMATIC SPRINKLER SYSTEMS

2.4.1. GENERAL

- a. The Consultant Team in conjunction with MQP shall consider the use of sprinklers in buildings. This consideration should examine the overall benefits such as insurance rebates, reduced long term maintenance costs and fire engineering justification. Consideration shall be given to the possible economic impact of loss of teaching and research facilities in the event of a building loss due to extensive fire damage or due to loss of pressure because of a sprinkler activation.
- b. Automatic sprinkler system signals shall be connected to the FMS, with the following signals required to be provided, ie, sprinkler alarm, sprinkler isolate, sprinkler pump, running, sprinkler pump fault, sprinkler pump low fuel level, sprinkler stop valve closed. Where a FIP is installed within the building these signals shall also be connected to the FIP and provided with individual LED indicators
- c. The system shall be designed to allow omission of weekly testing of the sprinkler system and associated sprinkler pumps, in accordance with the requirements of AS1851. Additionally, all on site documentation and equipment required by AS2118.1 and AS1851 shall be revised and/or provided to suit all system refurbishments and new works. This includes but is not limited to the provision of block plans, fire system interface diagram/matrix, pressure gauge schedules, water supply information, spare sprinklers and spanners
- d. The sprinkler control valves shall be in a position accessible to responding Brigade appliances. Clear directions to the sprinkler control valve location shall be posted adjacent the FIP. A location plate indicating the position of the sprinkler control valves shall be installed on the outside of an external wall.



- e. All new Sprinkler works should have quick response sprinklers installed with a response time of minimum 50(ms)^{1/2}

2.4.2. WATER SUPPLIES

- a. When designing and installing new fire sprinkler systems, or upgrading existing systems, advice regarding the existing water supply pressure/flow details shall be sought from MQP and/or the relevant water supply authority
- b. It is imperative that the building hydrant demand is allowed in addition to the building sprinkler demand to ensure that both systems can operate simultaneously from the water supply provided to the building
- c. Where practical, all fire services test water shall recycle back into the fire system or alternatively to water retention tanks, to enable reuse of the test water
- d. Test drains and sumps shall be provided to enable water flow testing.

2.4.3. HAZARD CLASSIFICATIONS

- a. For all new sprinkler system installations and refurbishments, the minimum level of hazard classifications shall be specified in accordance with AS2118.1 University buildings the minimum hazard classifications shall be:
 - i. Ordinary Hazard Group 1 - offices, lecture rooms, lecture theatres
 - ii. Ordinary Hazard Group 3 - libraries, laboratories, museums

2.5. EMERGENCY WARNING AND INTERCOMMUNICATION SYSTEM (EWIS)

- a. EWIS shall be designed and installed in all University buildings having a rise in stories of 3 or more and in University assembly buildings containing lecture theatres, seminar rooms, libraries, museums, student computer facilities, teaching laboratories/workshops, and the like, with a total building floor area greater than 1000m²
- b. In University buildings where the above policy does not require EWIS to be designed and installed, an Occupant Warning System is required to be designed and installed, as indicated in the Automatic Fire Detection and Alarm System section of this document. A PA system shall be incorporated within the panel to allow for announcements of pending tests.
- c. EWIS shall be activated on activation of the FIP, fire sprinkler installation, or a manual call point. To supplement the audible warning system, visual warning devices shall be provided at strategic locations (generally in corridors and/or public spaces), on all floors and in areas with high ambient noise levels
- d. In sound sensitive areas such as animal houses, consideration shall be given to the provision of visual warning devices only in lieu of installing the audible warning system
- e. However, advice is to be sought from MQP and the animal house staff before the proposed alarm type is selected.

2.5.1. EMERGENCY CONTROL PANEL (ECP)

- a. The ECP shall generally be in an accessible location adjacent to the building FIP. The ECP fascia layout and operational characteristics shall be QE90 type EWIS panel.
- b. Where the ECP is proposed to be designed and installed flush into wall spaces, include ventilation space for heat dissipation from the EWIS cabinet as EWIS amplifiers generate considerable heat.
- c. ECP's shall be installed with separate evacuation zones provided for each level and a minimum of 20% spare capacity for additional evacuation zones.
- d. All amplifiers shall be provided with 30% spare capacity to allow for additional future speakers to be installed within each zone.
- e. A suitably sized block plan shall be installed adjacent to the ECP showing each floor of the building, the evacuation zones and position of all WIP's installed.

2.5.2. EMERGENCY WARNING SYSTEM OPERATION

Unless otherwise directed all EWIS shall be arranged for the following automatic sequence of operations:

- a. No delay from receipt of fire system activation to operation of ALERT signal throughout entire building
- b. ALERT signal shall sound for **180** seconds throughout the entire building then automatically change to EVAC signal throughout the entire building
- c. No cascading, ie, signals to be provided throughout all areas of the building simultaneously



- d. Standard voice recorded messages shall be provided with the EVAC signal
- e. ALERT and EVAC signal types shall meet the requirements of AS1670.4
- f. Commissioning details indicating measured sound pressure levels and speech intelligibility shall be provided for all areas and rooms within the building. These details shall be provided on the as built drawings and within the O&M manual, for all new and refurbishment works.

2.5.3. MANUAL CALL POINTS (MCP) AND WARDEN INTERCOMMUNICATION PHONES (WIP)

- a. MCP's and WIP's shall be provided within each evacuation zone. Where fire hose reel cupboards are in the vicinity of fire egress stairs, WIP's shall be provided within each fire hose reel cupboard and MCP's shall be installed in visible positions immediately adjacent to each fire hose reel cupboard
- b. All MCP's connected to the EWIS shall be white and activate the emergency sound system without automatically calling the fire brigade
- c. Each WIP shall be provided with labelling which corresponds to the associated labelling on the ECP.



2.6. EMERGENCY EVACUATION PLANS

- a. For new buildings, new emergency evacuation plans shall be designed and installed as part of the project scope of works in accordance with the standard University format which can be obtained from MQP. Locations of emergency evacuation plans shall be discussed with MQP prior to installation but should generally be in public areas on each level in the vicinity of each fire stair and adjacent to the FIP/ECP
- b. For existing buildings undergoing refurbishment, the existing emergency evacuation plans (copies of which can be obtained from MQP) shall be updated with the revised floor layouts and evacuation paths for each level of the refurbishment works. This will require all emergency evacuation plans located on each level of the refurbishment project to be upgraded as part of the project works
- c. Details of all emergency evacuation plans shall be included on the building essential fire safety measure asset register and the associated AS BUILT drawings

2.7. FIRE/EGRESS DOORS

Several existing fire doors located within the university are old and may contain an asbestos core. Any doors that may contain asbestos are to be identified as part of the consultant TEAM inspection and ANALYSED / tested by a suitably qualified CONSULTANT / contractor. As such, if any doors located in a proposed refurbishment area are observed or thought to contain asbestos, removal to Workcover asbestos removal requirements and replacement with new FIRE DOORS shall occur as part of the refurbishment works. Any asbestos removal should be carried out by a suitably qualified CONTRACTOR in accordance with The National Work Health & Safety Commission's Code of Practice for the Safe Removal of Asbestos AND ANY RELEVANT CURRENT AUSTRALIAN / UNIVERSITY STANDARDS.

All fire/egress doors located in a proposed refurbishment area within an existing building shall be upgraded as part of the refurbishment works to comply with current NCC and Australian Standards and are to be provided with:

- a. Statutory signage in accordance with the requirements of the NCC and the Environmental Planning & Assessment regulation 2000-part 9 division 7. Note that signage shall be fixed to fire door sets with devices that will not penetrate the skin of the door or frame
- b. New door hardware, including lever handles and latches and locks compliant with the requirements of the NCC and the Environmental Planning and Assessment Regulation AS WELL AS THE RELEVANT CURRENT AUSTRALIAN STANDARDS
- c. A compliant door swing, in the direction of egress, in accordance with the requirements of the NCC
- d. The hinges for fire/egress doors shall be screwed to the door frame and not welded. All fire doors and associated frames shall be tagged with a test certification label.
- e. If magnetic door holders are required to be installed, they shall be installed at the top of the door in a position that allows easy access to the release button
- f. Where the opening of a fire/egress door may cause injury to persons on the other side, consideration shall be given for the door to be installed complete with an approved and tested viewing panel
- g. Any alterations to existing fire door sets shall be provided with full certification from the fire door manufacturer indicating that the alterations are consistent with the tested prototype which has been submitted to the standard fire test procedures
- h. Details of all fire/egress doors and associated drawings shall be included on the building essential fire safety register
- i. All Fire doors should be identified on the architectural drawings/specifications and in line with the fire compartments.

2.8. FIRE HOSE REEL SYSTEMS

- a. Water supplies for fire hose reel systems shall be taken from the metered domestic water supply
- b. When designing and installing new fire hose reels or upgrading existing systems, advice regarding the existing water supply pressure/flow details shall be sought from MQP
- c. Where fire hose reel booster pumps are required to be installed to satisfy the pressure and flow requirements for fire hose reel systems, the pump set shall be provided in accordance with the requirements of AS2941. Note that this may require separate pumps for the fire hose reel and domestic



water supply system

- d. All fire hose reels shall be 3 ply rubber hose provided with 36m hose length x 25mm diameter with brass nozzles attached. All installed fire hose reels shall have the instructions for operation in graphic rather than written instructions
- e. For existing building refurbishments, the location and coverage of the existing fire hose reels shall be reviewed and upgraded where required to provide compliance with any changes to the new floor layout
- f. Where fire hose reels are in enclosures or cupboards, signage is required to be provided in accordance with requirements of the Australian Standard AS 2441 – 2005 Installation of fire hose reels
- g. Fire hose reel pipe work shall be marked using adhesive pipe markers with water flow direction arrows.
- h. A weatherproof cover shall be fitted to all external fire hose reels.

2.9. FIRE HYDRANT SYSTEMS

- a. Water supplies for existing fire hydrant systems vary throughout the University, due to the differing ages of the systems and the original standard of performance design and installation of each of the systems. The university has a Towns main feeding most of the hydrant systems installed on campus.
- b. When installing new fire hydrants, or upgrading existing systems, advice regarding the existing water supply pressure/flow details shall be sought from MQP.
- c. For existing building refurbishments, in cases where the existing fire hydrant system is not installed to the current regulations and would require substantial upgrading, extensive consultation with MQP and the NSW Fire Brigade is required.
- d. Hydrant coverage for all University buildings is preferred to be achieved by hydrants located external to the building, where possible.
- e. Hydrant booster pumps are required to be connected to the building FIP and the FMS to allow monitoring and alarms to be provided for pump run, pump fault (includes electrical mains failure and low fuel level status).
- f. The provision of these items shall also satisfy the requirements to allow the omission of weekly pump testing, as per AS1851-2012.
- g. Additionally, means for performing system flow testing at the booster pump (or the booster connection where no pumps are installed) shall be provided, including a pressure gauge schedule indicating the flow required at the test location to satisfy the requirements at the most remote hydrant(s), and any other documentation and equipment required to satisfactorily maintain the fire hydrant system and pump in accordance with AS1851-2012
- h. Fire brigade booster connections shall be in a position where a fire appliance has access. Block plans located at each fire brigade booster connection point shall be upgraded to suit changes occurring as part of any building refurbishment works. A soft copy of the Block plans in pdf and .dwg format should be submitted to MQP at the end of the project.
- i. Signage shall be provided at each fire brigade booster connection to easily identify the building/area served by the booster.
- j. External fire hydrants shall be provided with painted dual hydrant landing valves, the valve assembly and stem painted signal red.
- k. Appropriate labelling shall be provided to all external fire hydrants to indicate if they are or are not connected to a fire brigade booster connection
- l. Where fire hydrants are in enclosures or cupboards, signage is required to be provided as per AS 2419.
- m. All internal fire hydrant pipe work shall be painted and marked using adhesive pipe markers with water flow direction arrows.
- n. All fire hydrants and valve sets shall be numbered, and block plan shall be supplied with corresponding numbers

2.10. FIRE SEALS PROTECTING OPENINGS IN FIRE RESISTING COMPONENTS

All fire seals protecting openings in fire resisting components of each building shall be:

- a. Designed and installed to the requirements of Specification C3.15 of the NCC
- b. Provided with identification labelling in accordance with the requirements of AS4072.1 Appendix B and AS1851-2012
- c. Detailed on the building essential fire safety measure asset register and drawings which comprise all fire stopped penetrations for all services on one single drawing for each level of the building.

2.11. FIRE SHUTTERS

All fire shutters installed shall be:



- a. Designed and installed to the requirements of Specification C3.4 of the NCC to achieve the required FRL
- b. Provided with identification labelling in accordance with the requirements of AS1902.2
- c. Held open with a magnet connected to the building fire detection/fire sprinkler system, which allows the fire shutter to automatically close in fire mode. Adequate access to the magnet shall be provided
- d. Provided with fully accessible equipment to provide easy resetting of the fire shutter to its normal position after operation has occurred
- e. Provided with an audible warning device, flashing warning light and signage and operate fully in accordance with the requirements for sliding fire doors as per Clause C3.6 of the NCC.

2.12. GASEOUS FIRE SUPPRESSION SYSTEMS

- a. Before any gaseous fire suppression system is recommended, consultation with MQP and university risk management shall be conducted by the Consultant Team
- b. Generally, the University is not in favor of gaseous fire suppression systems, except in cases where every other avenue of protection has been scrutinized and/or rejected for a valid reason
- c. Carbon dioxide systems shall not be considered under any circumstances
- d. Installation will be determined in consultation with MQP and the University Insurers and shall be in accordance with AS 4214.-2018 Gaseous Fire Extinguishing systems
- e. The amount of sealing required for room integrity and suitability shall be determined by the consultant prior to selecting gaseous protection against the established risk.
- f. Adequate ventilation for post discharge extraction must also be considered by the consultant
- g. Pressure relief of the protected enclosure shall be reviewed when considering the suppression agent
- h. The control panel for any Gaseous Suppression System shall be in a position that allows visual fault monitoring. However, local elsewhere is acceptable only if the panel is mimicked at a suitable monitoring position.
- i. Each risk protected by this means shall have a status unit located at each entrance to the risk to denote Automatic/Off/Manual. Provide a key activated lock to change the system state from automatic to 'off' or 'manual operation'.

2.13. LIGHTWEIGHT FIRE RATED CONSTRUCTION

All lightweight fire rated construction shall be:

- a. DESIGNED AND installed to the requirements of Specification C1.8 of the NCC to achieve the required FRL.
- b. The asset register should include numbered photographic evidence of the labels and penetrations and must correspond to the numbers mentioned on the asset register.

Provided with identification labelling in accordance with the requirements of AS4072.1 Appendix B and AS1851-2012 detailed on the building essential fire safety measure asset register and drawings.

2.14. MECHANICAL AIR HANDLING SYSTEM SHUTDOWN

- a. For all University buildings less than 25m in effective height at the time of construction or refurbishment, all mechanical air handling systems (with the exception of non-ducted individual room A/C units and fume cupboards), shall be provided with a fire trip signal to shut down the air handling system on activation of the building fire detection and/or fire sprinkler system as per AS 1668 or as per the fire matrix provided by the consultant/fire engineer. A Building which has a fire engineered solution requires a different operation of the mechanical systems in fire mode. This operation should be documented in the O & M Manual of the Mechanical contractor.
- b. Once the fire detection and/or fire sprinkler alarm has been reset the mechanical air handling system is also required to be automatically reset to the correct operating status. This should have a minimum 10-minute delay prior to starting up the mechanical plant to prevent any stop/starting due to the fire trip relay dropping in & out.
- c. Generally, fire trips to mechanical air handling systems shall be normally energized with 24V DC.
- d. Fire trip cabling which allows shutdown of mechanical air handling systems shall be installed on a separate control loop to magnetic door holders and fire trips to security door interfaces and, with individual isolation facilities for each loop located at the FIP
- e. Details of all fire trip signals and connections provided to shutdown mechanical air handling systems shall be included on the building essential fire safety measure asset register and the associated drawings/Matrix.



- f. Shutdown of the Mechanical system because of a fire alarm should be displayed on the BMS.

2.15. PORTABLE FIRE EXTINGUISHERS & FIRE BLANKETS

- a. Fire extinguisher types and locations shall be selected to comply with the coverage and spacing requirements of AS 2444, AS1940 and AS2243.8
- b. Generally, Dry Chemical AB(E) fire extinguishers shall be installed due to the suitability with a variety of different class fires
- c. Where a clean fire extinguishant is required to protect against electrical fire hazards (Class E), such as lift motor rooms, main electrical switch rooms, main computer server rooms and communications rooms, carbon dioxide extinguishers shall be installed
- d. Water extinguishers shall be installed in all buildings which are not protected with a fire hose reel system.
- e. Water extinguishers are generally not required to be installed in buildings containing a fire hose reel system
- f. Where possible, fire extinguishers shall be located within fire hose reel cupboards
- g. Fire extinguishers shall be installed in all University buildings. Extinguishers are to be mounted 1200 mm off the floor
- h. Where refurbishments alter or add a risk, the existing fire extinguishers shall be replaced or supplemented to cover the new circumstances created. This requirement is to extend to passageways and corridors and extinguisher points serving the refurbished area
- i. Where refurbishments require some demolition or area clearance, the existing fire extinguishers shall remain in the area and shall be recorded, reconciled and reinstated by the principal contractor.
- j. Fire blankets shall be selected for use for small fires involving cooking oils and fats, selection and location shall be in accordance with AS2444, consultation shall be carried out with the MQP for specific requirements on a project basis.

In addition to the above listed requirements, the following portable fire equipment shall be installed inside all wet labs adjacent to the main entry/egress door to the space:

- a. 1 off 3.5kg CO2 extinguisher, minimum 5B(E) rating
- b. 1 off 1200x1200 fire blanket
- c. For larger and higher risk labs additional extinguishers may be required to be installed within the space. The recommended extinguishers in these circumstances are a 4.5kg AB(E) type dry powder extinguishers installed adjacent to the above listed fire equipment.

Location of fire extinguishers adjacent fume cupboards shall be as per code.

2.16. REQUIRED POWER OPERATED EXIT DOORS

- a. Required power operated exit doors include automatic sliding doors and powered operated door openers/closers which are required to activate when a fire/smoke condition is sensed via the building fire sprinkler or fire detection system in accordance with AS 5007 Powered doors for pedestrian access and egress
- b. These devices shall be normally energized to enable the devices to return to the fail-safe position when power to the device is lost
- c. Consultation shall be carried out by the consultant team with MQP, Security Services to determine the locations of required power operated exit doors installed in required paths of egress which are required to automatically open in the event of fire alarm activation
- d. To ensure that power operated exit doors are able to be classified as fail-safe devices, fire trip cabling shall run from the FIP and connect directly to the door interface and not via any electronic security system controllers
- e. Fire trips to power operated exit doors may be installed on the same control loop as security door interfaces which shall be a separate control loop to magnetic door holders and air conditioning fire trip cabling, with individual isolation facilities for each loop located at the FIP
- f. All power operated exit doors provided with a fire trip shall also be provided with a push button "door release" fixed to the wall adjacent to the door. This requirement is to ensure egress through the door is available in the event of all types of emergencies
- g. The details of all fire trips to power operated exit doors shall be included on the building essential fire safety measure asset register and the associated drawings.



2.17. SMOKE & HEAT ALARMSYSTEMS

- a. Smoke and heat alarms shall be installed in University buildings where the building is not protected or not proposed to be protected with fire detection and alarm system or a fire sprinkler system. Additionally, smoke alarms shall be installed to suit the requirements of the Environmental Planning & Assessment Amendment (Smoke Alarms) Regulation 2006
- b. Where smoke and heat alarms are installed, they shall be interconnected throughout the building, have LED indicators, have a single test/silencing/hush facility and be 240V mains powered connected to their own dedicated power circuit
- c. Where smoke alarms are installed in residential and shared accommodation buildings the smoke alarm shall be a photoelectric type and where required, shall be provided with an approved relay output facility to activate lighting to assist evacuation in accordance with the requirements of NCC Volume 2 Clause 3.7.2.5.

2.18. SMOKE DOORS

Smoke doors shall be constructed so that smoke will not pass from one side of the doorway to another, in accordance with the requirements of NCC Specification C3.4. This includes doorways located in smoke walls and doors suitably sealed against smoke spreading from enclosures located in exits and paths of travel which contain electrical and communication distribution boards/equipment

All smoke doors shall:

- a. Be provided with statutory signage in accordance with the NCC Clause D2.23
- b. Swing in the direction of egress, or in both directions
- c. Fitted with smoke seals capable of resisting smoke to the required temperature/time Requirements of AS6905- 2007
- d. If magnetic door holders are required to be installed, they shall be installed at the top of the door in a position that allows easy access to the release button. Where the opening of a smoke door may cause injury to persons on the other side, consideration shall be given for the door to be installed complete with an approved and tested viewing panel
- e. Any alterations to existing smoke door sets shall be provided with full certification from the door manufacturer indicating that the alterations are consistent with the tested prototype which has been submitted to the standard fire test procedures. Any alteration to the fire/smoke doors should not reduce the FRL of the existing wall.
- f. Details of all smoke doors shall be included on the building essential fire safety measure asset register and the associated AS BUILT drawings.

2.19. WALL WETTING SPRINKLER & DRENCHER SYSTEMS

- a. Wall wetting sprinkler and drencher systems shall be installed in accordance with the NCC to provide protection over windows, openings or walls of non-fire-resistant construction
- b. Water supplies for existing wall wetting sprinkler and drencher systems vary throughout the University, due to the differing ages of the systems and the original standard of performance for each of the systems
- c. These include connections to building fire sprinkler systems, individual systems complete with dedicated sprinkler valve sets and pumps, systems connected to fire hydrant/fire hose reel system pipework and systems connected to domestic water supplies
- d. When designing and installing new wall wetting sprinklers, or upgrading existing systems, consultation with MQP regarding the proposed water supply and the pressure/flow requirements shall occur
- e. Where dedicated sprinkler valve sets are installed for wall wetting sprinkler & drencher systems, the system shall be connected to operate automatic fire brigade call facilities, building evacuation systems and other interfaced systems in accordance with a standard fire sprinkler system
- f. External wall wetting sprinklers shall be provided to protect against fire exposure to/from adjacent buildings and internal wall wetting sprinklers shall be provided to protect required paths of egress
- g. Where wall wetting sprinklers are installed to protect windows, the windows shall be permanently fixed in the closed position.

2.20. WARNING & OPERATIONAL SIGNS



- a. Warning and operational signs include fire safety notices indicating “Offence Relating to Fire Exits” as per the Environmental Planning & Assessment Regulation and signage warning against the use of lifts in fire as per NCC Clause E3.3
- b. Fire stairs and exits that require the installation of fire safety notices indicating “Offence Relating to Fire Exits” shall have the notice displayed in a conspicuous position adjacent to the doorway providing access to the exit, but not within the exit
- c. Signage warning against the use of lifts in fire shall be displayed adjacent to every lift call button throughout the building.
- d. Statutory signage in accordance with the requirements of the NCC and the Environmental Planning & Assessment regulation 2000-part 9 division 7.

2.21. MATERIALS AND EQUIPMENT SELECTION

2.21.1. MATERIALS

- a. Only new materials, equipment and components shall be specified, and these shall be of good quality, fit for purpose and selected for a reasonable service life
- b. Do not design for products or materials that are obsolete, discontinued or about to be discontinued, whether for fiscal or legislative reasons
- c. Uniformity of the type of materials shall be consistent throughout all individual installations and shall equal the existing equipment.

2.21.2. EQUIPMENT

- a. All fire protection equipment shall be designed and manufactured to the relevant Australian Standard and be listed in the Active Fire Register of Fire Protection Equipment.
- b. Details of all major items of fire equipment proposed to be installed during new or refurbishment projects shall be submitted to MQP for approval prior to installation
- c. This shall include but not be limited to FIP's, ECP's, fire pumps, gaseous fire extinguishing systems and the like
- d. Identification of a proprietary item of equipment shall not necessarily imply exclusive preference for the item so identified but indicates a deemed to comply item.

2.22. INTERRUPTION TO ESSENTIAL FIRE SAFETY MEASURES

- a. Where any new, refurbishment or maintenance works require interruption or isolation of essential fire safety measures to prevent false alarms from occurring or to allow work to be performed on the system, approval from MQP shall be required prior to the works occurring.
- b. A ‘Fire Isolation Permit’ application shall be submitted to MQP for approval, at least 48 hours prior to any proposed interruption. Permit applications can be obtained from MQP.
- c. Generally where refurbishment works are occurring within a portion of a building, fire safety measures will not be permitted to be interrupted or isolated for extensive periods of time including outside of normal working hours where the measures serve occupied areas of the building outside of the refurbishment area.
- d. Therefore, where this situation occurs, the installation contractor is required to isolate and de-isolate the system daily to ensure that the building has adequate fire safety measures available outside of normal working hours.
- e. Prior to refurbishment works commencing within buildings proposed to remain occupied during the course of the refurbishment works, the contractor shall consult with MQP the proposed strategy and methodology relating to interruption of essential fire safety measures within the building for the duration of the project works and provide appropriate safe work method statements.
- f. All interruption and isolation of essential fire safety measures required for new and refurbishment projects shall be performed by the Universities Security Service.
- g. Where refurbishment works are occurring within a portion of a building, the existing smoke detectors shall be removed, and new detectors shall be installed on completion of works.
- h. Should there be a need for a fire isolation to exceed eight (8) hours duration the insurance company is to be notified and there will be a provision for effected surrounding areas to be maintained.

2.23. MAINTENANCE AND TESTING

- a. Regular statutory maintenance and testing of all essential fire safety measures installed as part of



refurbishment project or within a new building shall be carried out by the installing contractor during the defects liability period.

- b. Prior to the end of DLP, the University Essential Services contractor will carry out an annual test of the installed systems and provide a defect report. This report will be handed over to the installing contractor to fix any defects. This will require the installation contractor to provide a comprehensive handover
- c. Inspection of all essential fire safety measures to with MQP will need to be carried out prior to Practical Completion being granted.

In addition to the handover inspection, the documentation listed in the section below must also be provided in both electronic and hard copy formats AND shall also be provided prior to Practical Completion being granted.

- a. Maintenance and testing during the defect's liability period will be provided in accordance with AS 1851 Standards for all fire safety measures.
- b. The installation contractor shall be responsible for all defect's rectification works identified by either MQP or the maintenance contractor during the defects liability period
- c. Any other details which will affect the future maintenance of the new or upgraded equipment shall be supplied to MQP on completion of the installation works and subsequent commissioning tests
- d. Towards the end of the defects liability period, a final inspection of the installed systems shall be carried out by MQP and the incumbent University essential services maintenance contractor, to reconcile the performance of the equipment and produce a final list of project defects, which will require rectification by the installation contractor.

3. COMPLETION DOCUMENTATION

At the completion of all projects the following documentation shall be provided for each essential fire safety measures installed, relocated or altered as part of the project works:

Manuals are to be provided in the format as shown in **Appendix A** of this document which includes

- O&M manuals
- As built drawings (including block plans) in CAD & pdf formats
- Asset schedules
- Commissioning test results
- Copies of FIP & ECP programs
- Licensed versions of FIP and ECP software required to program panels
- Details of all user names and passwords required to access FIP's & ECP's.
- Final Fire Safety Certification (indicating NCC clauses & Australian Standards year/amendment) as per the template provided by the NSW Dept of Planning.

This documentation shall be provided by the installation contractor in both electronic and hard copy formats and approved by the University prior to Practical Completion being granted as required by the contract documents or occupation certificate being issued.

- Asset schedules shall be provided for all essential fire safety measures located within a refurbishment area and/or installed in a new building
- Assets are to be bar coded and recorded in the asset register
- The asset register shall contain all required information for the device, including but not limited to - make, model, location, Australian Standards details, installation date, etc.
- The electronic format of the asset register for each fire safety measure shall be obtained from MQP
- All as built drawings shall indicate the relevant asset number label installed on site which also corresponds to the asset number contained in the asset register.

APPENDIX A

3.2. OPERATION AND MAINTENANCE MANUAL FORMAT

Macquarie University Operations and Maintenance Manual Template

1. Introduction & Guide
2. Table of contents
3. How to use guide
4. Emergency Information (contacts list)
5. Contractual and Legal information

Operation and Maintenance Manual

1. Architectural
2. Civil
3. Structural
4. Electrical
5. Security
6. Communications
7. Audio visual
8. Mechanical
9. Hydraulic
10. Fire Wet services
11. Fire Dry services
12. Lifts
13. BMS
14. FF&E
15. Landscaping
16. Other

10. Fire Wet Services

- 10.1. General Description of Project
 - 10.1.1. System Operation
 - 10.1.2. Design parameters
- 10.2. Operating Procedures
 - 10.2.1. General
 - 10.2.2. Automatic/Manual Operation
 - 10.2.3. Routine Inspection and reporting templates
 - 10.2.4. Emergency Procedures
 - 10.2.5. Fault finding information
- 10.3. Maintenance schedules
 - 10.3.1. Plant and equipment schedules
 - 10.3.2. Spare parts list
 - 10.3.3. Manufacturers contact details
- 10.4. Maintenance procedures
 - 10.4.1. Maintenance procedures for equipment
 - 10.4.2. Manufacturers recommendation
 - 10.4.3. Templates and matrix tasks for all items applicable to AS 1851
- 10.5. Manufacturers Literature
- 10.6. Health and Safety (refer to appendix 1 for guidance)
- 10.7. Commissioning data
 - 10.7.1. Commissioning documentation



- 10.8. Certification data
 - 10.8.1. Certification data
- 10.9. Asset register (excel format) with hyperlinks to Sections 10.2, 10.3, 10.4, 10.5, 10.7, 10.8
- 10.10. Drawings
 - 10.10.1. PDF
 - 10.10.2. DWG

11. Fire Dry Services

- 11.1. General Description of Project
 - 11.1.1. System Operation
 - 11.1.2. Design parameters
- 11.2. Operating Procedures
 - 11.2.1. General
 - 11.2.2. Automatic/Manual Operation
 - 11.2.3. Routine Inspection and reporting templates
 - 11.2.4. Emergency Procedures
 - 11.2.5. Fault finding information
- 11.3. Maintenance schedules
 - 11.3.1. Plant and equipment schedules
 - 11.3.2. Spare parts list
 - 11.3.3. Manufacturers contact details
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- 11.8. Certification data
 - 11.8.1. Certification data
- 11.9. Asset register (excel format) with hyperlinks to Sections 11.2, 11.3, 11.4, 11.5, 11.7, 11.8
- 11.10. Drawings
 - 11.10.1. PDF
 - 11.10.2. DWG

APPENDIX B



TrueSite™ Workstation, Guidelines for: Order Writing and Graphic Screen AutoCAD Submittals

Overview

These guidelines describe the AutoCAD drawing compatibility and order entry requirements for True Site Workstation (TSW) graphic screens. Following these guidelines is required to provide the Applications Engineering Department with the information necessary to properly complete the customer order.

Note: This publication **does not include** Easel based: Color Graphic+ systems (2190 or 4190), Information Management Systems (IMS), or Graphic Command Centers (GCC).

Contents

Topic	See Page #
Screen Ordering Checklist	2
Network File Backup	3
AutoCAD DWG Files	4
Hard Copy Drawings	7
Symbol Legend	8
Default Conventions and Operations	9
Sample Screens	10

Screen Ordering Checklist

**Over
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It is possible to book an order for TSW screens without specifications. However, **no order will be processed** until all the following information is received by Applications Engineering. The five items below are each described in detail within this publication.

1. A **full** Network backup from the field.
2. One AutoCAD (DWG) file for each TSW screen ordered. The AutoCAD file is in the format of AutoCAD R9, 10, 11-12, 13, 14, 2000-2002, 2004- 2006, 2007- 2011 DWG or R14 and 2000 DFX.
3. One hard copy drawing for each TSW screen ordered.
4. One hard copy symbol legend drawing showing the icons used on the TSW screens.
5. A system operation sheet is necessary if the operation is other than default or special control functions are required.

Network File Backup

Existing Systems Files

When submitting an order to headquarters, please include a full network backup. The latest field changes are needed to link point information to the TSW node(s).

NOTE: Two network files cannot be merged. Any necessary changes must be made at Headquarters when the screens are programmed. If changes are made in the field, they must be forwarded to headquarters. If not, the field will be required to make the changes again, after the headquarters screen and network download is done.

Numbers for New Systems at Headquarters

If the order is for a new network which is currently being processed at headquarters, please specify the order number which contains the 4190-8122 TSW screen addition. The order number of the 4190-8800 Network must also be submitted.

AutoCAD DWG Files

AutoCAD DWG File Details

It is strongly recommended that all AutoCAD files for TSW screens go through the Westminster Engineering Center of Excellence (ECO). This will ensure that Application Engineering gets the drawings in the correct format and has usable files with the first pass.

IMPORTANT:

- In all cases, AutoCAD drawings must be created and submitted in accordance with the specifications and instructions in this document for compatibility with TSW.
- Be advised that Applications Engineering does not have the capability to create or modify AutoCAD drawings. If submitted AutoCAD drawings are not compatible with the TSW, Applications Engineering will not be able to process the customer order until compatible drawings are resubmitted.
- District offices that do not have proficiency with the AutoCAD requirements contained in this document are strongly encouraged to use the Westminster ECOE group for creating AutoCAD drawings compatible for importing into TSW.

Compatible AutoCAD Format

All TSW screens for new systems can be submitted in **AutoCAD R9, 10, 11-12, 13, 14, 2000-2002, 2004-2006, 2007- 2011 DWG or R14 and 2000 DFX**

formats. The DWG files must be broken down into one graphic screen per building floor (exception: site plans where buildings are touch sensitive travel keys to a respective building). These graphics screens will be broken down into optimal, similarly sized coverage zones by Application Engineering based on the density, quantity, and size of the screen and its active icons.

The screen title will appear in TSW Runtime and will be the forty character description from the TSW editor. The title will be displayed above the screen drawing area and will be visible while viewing all coverage zones and at any zoom level on that screen.

NOTE: For AutoCAD R12 and earlier version drawings, UCS must be set as "orthographics/top view".

Maximum AutoCAD Drawing Entities

There is no limit on the quantity of entities on each AutoCAD drawing being imported into TSW. However, a large number of entities will affect the performance.

Application Notes:

1. Reducing the number of entities on imported AutoCAD drawings by grouping as a single entity per layer WILL increase Pan & Zoom performance.

Continued next page

AutoCAD DWG Files, *Continued*

Maximum AutoCAD Drawing Entities

2. The count can be reduced by:
 - Deleting extraneous details in drawings (e.g., door swings, extensive window details, restroom fixtures, any symbols not relevant to fire alarm, etc.
 - Logically grouping multiple entities into single entities on separate logical layers (e.g., text layer, wall layer, etc.) that can be turned on or off if desired.
 - Deleting any layer that is off or frozen or not in use.
3. Single entities MUST be edited in AutoCAD. The TSW Configurator does NOT support editing of single entities.

Additional TSW Configurator Notes:

1. The TSW Configurator can draw over an existing single entity layer. However, the TSW Configurator cannot edit or modify a single entity layer itself with the exception of being able to turn the layer completely on or off if desired.
2. The TSW Configurator is capable of exporting the TSW graphic in AutoCAD 2000 DWG/DXF format for more extensive editing, in AutoCAD 2000 or later.

Editable AutoCAD Entities

The following AutoCAD entities are editable in the TSW Configurator:

LINE
POLYLINE
CIRCLE
ELLIPSE
ARC
SOLID
LWPLINE
TEXT
MTEXT - if not rotated
INSERT - if all entities in the block are supported
IMAGE – if originated from bitmap

If one or more entities inside an INSERT are unsupported, the INSERT will be imported as a “Partially-Editable/View Only” object to the TSW Configurator. Partially-Editable/View Only objects can only be selected and deleted. They cannot not be copied or pasted.

Non-Editable AutoCAD Entities

The following are AutoCAD Entities Not Editable in the TSW Configurator:

1. All other entities not listed above will be imported as “Non-Editable/View Only” objects (i.e.; cannot be cut, paste, copied or deleted).
 2. “Non-Editable/View Only” entities should be located on separate layers (e.g., text layer, wall layer, etc.) that can be turned on or off if desired.
-

AutoCAD DWG Files, *Continued*

Xrefs, Attribute Blocks, and Hatches

Xrefs (external references) are to be inserted into the drawing and burst.

Attribute blocks are to be burst with correct entity.

Hatches – solid hatches must be converted to line hatches at high density to simulate a solid hatch.

AutoCAD Settings

Observe the following AutoCAD settings:

1. **Units** must be set to decimal with zero places to the right of the decimal.
2. **Limits** must be set to 0, 0 by 1280, 850 for TSW screens.
3. **LT scale** to be appropriate to drawing scale.

NOTE: The smallest icon size is 0.2 inches. This will depend on the zoom level of the status icon, travel key, or control key

4. **Screen Resolution:** The default TSW screen resolution is 1280 x 1024.
-

Optional Initial Graphic Screen Bitmap

It is optional to provide a bitmap file (.BMP) for the customer logo. The customer logo bitmap file can be used as the initial screen. However, bitmap files are not to be used as background graphical screens.

Hard Copy Drawings

Require me nts

One hard copy drawing must be submitted for each TSW screen ordered. Hard copies must show the screen's walls (background and text) as well as the status icons with the appropriate addresses next to each status icon. In addition, write the screen DWG file name on the hard copy drawing.

NOTE: Hard copy drawings must be large enough to show details. Please select print size accordingly.

Symbol Legend

Requirements

Each order must have a symbol legend attached indicating the symbols used on that order. This file is available in AutoCAD DWG file format and **TSWLEGEND.DWG** on the Sales Engineering FTP site, under the “AutoCAD Drawings” sub directory.

NOTE: TSW Graphics editor issues are addressed in the *TrueSite Workstation Configurator Reference Manual*, document 579-844.

Default Conventions and Operations

Operations

By default, Global acknowledge will be used for the entire network. A status indicator box at the top of the screen flashes when an alarm is received by the TSW. It indicates the type of alarm (Fire, Priority 2, Supervisory, or Trouble).

Touching the status box takes the operator directly to the coverage zone acknowledge window by touching the icon in alarm, or by touching the status box again.

If the point in alarm is not linked to an icon on any screen, then the operator is automatically brought to the list menu for that type of alarm where the point can be acknowledged.

Logical Layers

It is recommended that AutoCAD drawings for import into TSW be created with logical layers which can be controlled (turned on and off) if desired.

Examples:

Layer 0 Border Title and basic information

Layer 1 Background

Layer 2 Device

Layer 3 Address

Layer 4 Room Name

Layer 5 Travel_Keys

Layer 6 Cover_Zones

Etc.

Colors and Text Font

The following Colors and Text Font are recommended to provide an optimum and comfortable viewing experience with crisp, sharp, text and images

Recommended AutoCAD Colors:

0 = color 7 (white/black)

BACKGROUND = color 9 (grey)

ADDRESS = color 2 (yellow)

DEVICE = color 3 (green)

ROOM_NAME = color 4 (cyan)

MISC LAYER (Smoke zones, internal boundaries, etc.) = color 1 (red)

Recommended AutoCAD Text Font:

ARIAL BOLD

Sample Screens

Drawing Border

Each drawing should include a border sized to 1280 x 850 that encompasses the entire viewable screen area for the floor.

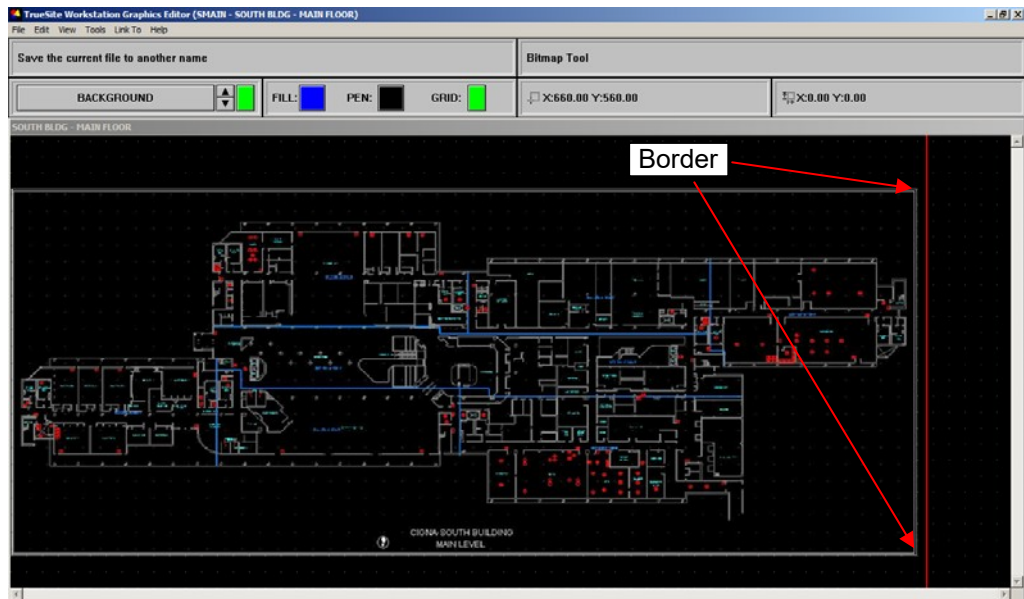


Figure 1. Border Example

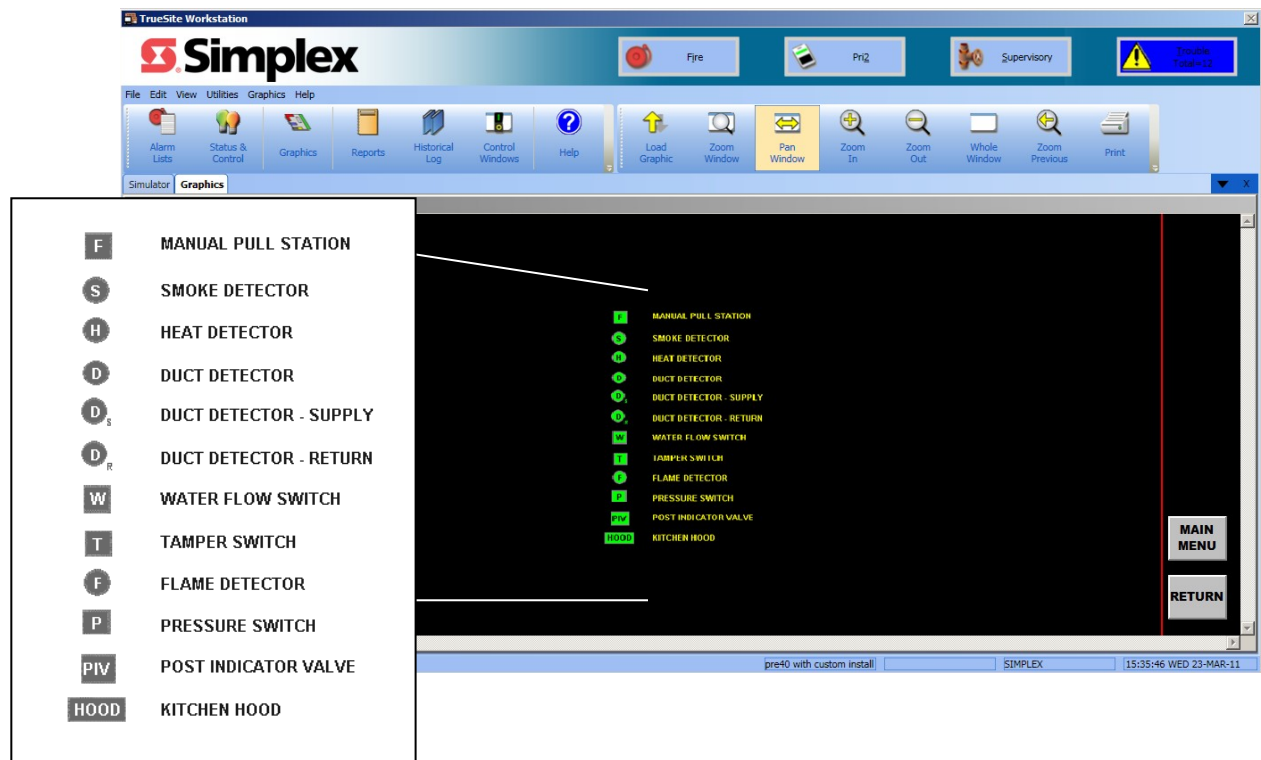
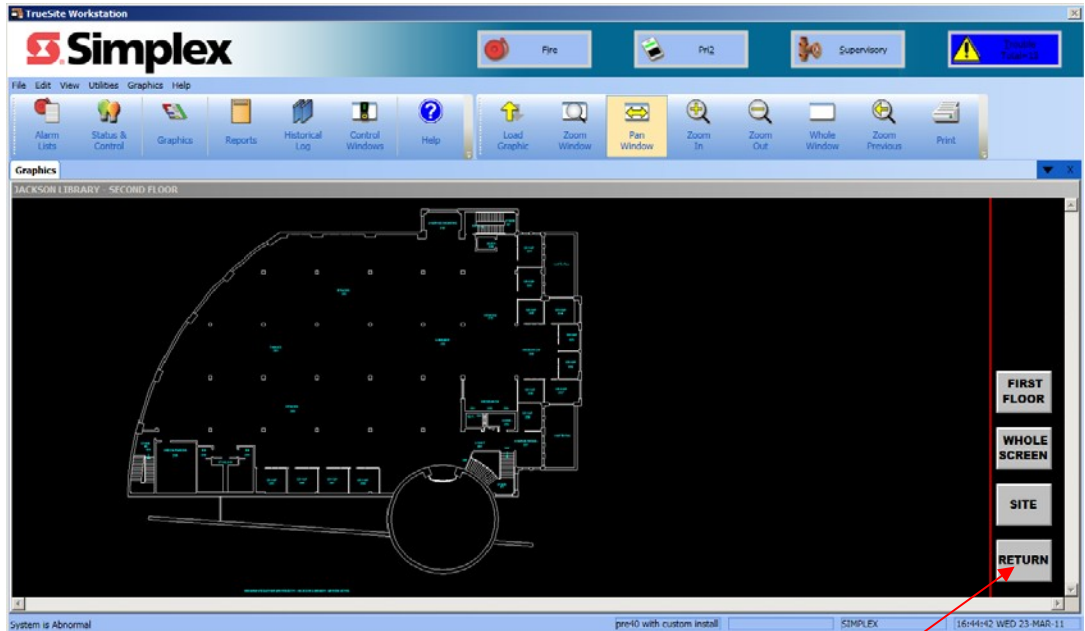


Figure 2. Legend Drawing (with detail enlarged)

Sample Screens, Continued

Pan and Zoom Example

The example below shows how to navigate within a single floor plan can be accomplished using the pan and zoom feature. Navigation to other floors, buildings or a site plan is accomplished using the dedicated Travel keys.



Normal View

Zoomed-in View
(with non-zoomable/fixed size travel key detail enlarged)

Non-Zoomable
Travel keys

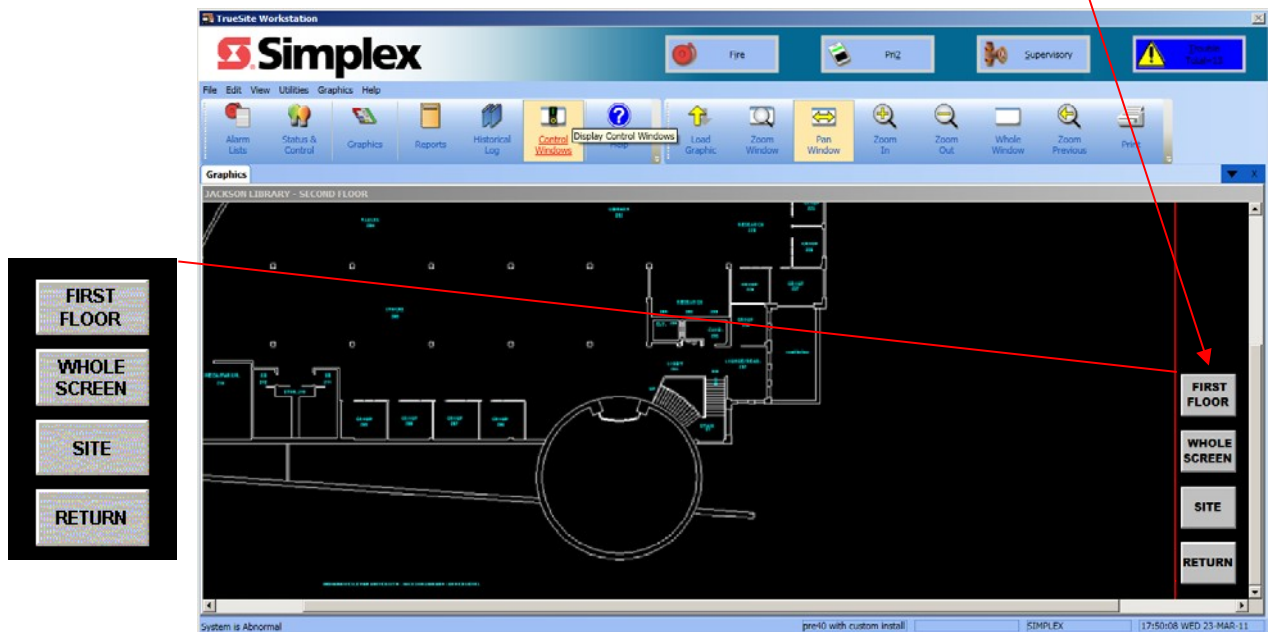


Figure 3. Using the Pan and Zoom Features

Sample Screens, Continued
