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# **QE90 Emergency Warning and Intercommunication System Engineer's Specification**

*A modular EWIS to AS 2220: 1989 suitable for a wide range of applications.*

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### 0. ADVICE TO ENGINEERS ON SYSTEM CONSTRUCTION

This specification describes the QE90 Emergency Warning and Intercommunication System. The QE90 is designed to meet the requirements of AS 2220 Parts 1 and 2 and is a very versatile system. Its modular construction achieves flexibility while maintaining reliability. This allows it to be easily tailored to suit a variety of applications not only for emergency warning, but also for any area requiring sound distribution and communication.

Because of the modular nature of the system, not every part of this specification will be applicable to every application. Optional details have therefore been bracketed and tagged with an asterisk, and should be included or deleted as required.

## 1. GENERAL REQUIREMENTS

### 1.1 SCOPE - EMERGENCY WARNING AND INTERCOMMUNICATION

An Emergency Warning and Intercommunication System (EWIS) shall be installed throughout (ADD NAME OF PREMISES)\* in full compliance with all applicable codes and standards.

The contractor shall provide, install, test and commission the EWIS as specified herein and as shown on the tender drawings. The system shall include all required hardware, interconnecting wiring and software to accomplish the requirements of this specification and the tender drawings, whether itemised or not.

### 1.2 MATERIALS & SERVICES

The system shall include, but not be limited to, the following elements:

- (One or more)\* Master Emergency Control Panel (MECP).
- (Secondary Emergency Control Panel(s) (SECP).)\*
- (Remote Equipment Racks)\*
- (Computer based colour graphics system)\*
- Amplifier(s) for each evacuation zone.
- Loudspeakers.
- Intercommunication system including warden intercommunication points.
- Power supplies, battery chargers and batteries.
- Software and hardware as required to provide a complete functioning system.
- Equipment enclosures.
- Wiring and enclosures.
- Installation, testing, commissioning and completion of installer's statement as required by AS 2220.2.
- (Interface to the fire alarm indicator panel to signal a fire condition in the appropriate EWIS zone.)\*

### 1.3 APPROVALS

All emergency warning and intercommunication control equipment shall have a certificate of compliance to AS 2220.1 and shall be listed by SSL (Scientific Services Laboratory).

### 1.4 INSTALLER'S QUALIFICATIONS

The installation of the system shall be carried out by trained personnel employed by the supplier of the system.

A technician employed by the supplier of the system shall approve all design drawings and be on hand to supervise the total installation. The technician shall supervise software documentation, adjustment, preliminary testing and final testing of the system and shall provide training and instruction on system operation and maintenance to the owner's personnel.

All equipment furnished shall be new products of a manufacturer engaged in the manufacturing of emergency warning systems for over ten years. The manufacturer shall have an installed base of emergency warning systems as a reference. The manufacturer or an authorised distributor shall confirm that within reasonable distance of the job site there is an established agency which stocks a full complement of spare parts and offers 24 hour service on all equipment to be furnished.

**1.5 APPROVAL OF EQUIPMENT**

The contractor shall include the following information with the equipment details to be submitted for approval.

- Power calculations.  
Battery capacity calculations.  
Standby and alarm power requirements for all equipment.  
  
Justification showing the power requirements of the system power supplies and voltage drop calculations in the worst case condition.  
  
Complete manufacturer's catalogue data including physical dimensions, finish and mounting requirements. Submit panel configuration and interconnection of modules and all other data as required to make an informed judgement regarding product suitability.

As a minimum, data shall be submitted on the following:

- Master emergency control panel.  
(Secondary emergency control panels.)\*  
(Colour graphics system hardware and software.)\*  
Software and hardware as required to provide a complete functioning system.  
Amplifiers.  
Warden Intercommunication Points.  
Power supply and batteries.  
Equipment enclosures.  
(Visual alarm devices.)\*  
(Printer.)\*

Data describing more than one type of item shall be clearly marked to indicate the type the contractor intends to provide for a given application. All submitted material shall be complete. Partial submittal will not be accepted. The contractor shall submit copies of the SSL listing for the EWIS control equipment being provided.

**1.6 STANDARDS - EMERGENCY WARNING**

The following standards are referred to in this Specification:

AS 2220	Emergency warning and intercommunication systems in buildings. Part 1: Equipment design and manufacture. Part 2: System design, installation and commissioning.
AS 1851	Maintenance of fire protection equipment. Part 10: Emergency Warning and Intercommunication Systems.
AS 3000	SAA Wiring Rules.
AS 3013	Electrical installations- Wiring systems for specific applications.
SITE COPY	Keep on the site a copy of AS 2220.2: 1989.

**1.7 INSTALLER'S STATEMENT - EWIS**

REQUIREMENT: Before practical completion provide an installer's statement and certificate in the form set out in AS 2220.2: 1989, Appendix F.

## **2. SYSTEM REQUIREMENTS**

### **2.1 GENERAL**

The requirements of "Conditions Of The Contract" apply to this work. This specification describes an "on premises" emergency warning and intercommunication system. All reference to model numbers and other pertinent information herein is intended to establish minimum standards of performance, quality and construction, and is based upon the Vigilant QE90 Emergency Warning and Intercommunication System. It is not the intent of these specifications to eliminate competitive equipment. Any equipment proposed as equal to that specified herein shall conform to the standards herein, and the manufacturer must supply proof of having produced similar equipment now giving satisfactory service. Where alternative equipment is proposed, the manufacturer's name, model numbers, and three copies of working drawings and engineering data sheets shall be submitted for approval. Included in the submittal shall be a written statement from the manufacturer of the substituted equipment that it does in fact equal the features, functions, and performance of the specified equipment.

Systems which do not meet the performance criteria of this specification will not be accepted.

The system as described shall be installed, tested and delivered to the owner in first class condition. The system shall include all required hardware, interconnecting wiring and software to meet the requirements of this specification and to meet the requirements of the contract drawings, whether itemised or not. The configuration of the system, and its operation and annunciation of alarms shall be as described in this specification and as shown on the drawings.

The system shall be modular in construction, readily enabling the number of evacuation zones, amplifiers, visual alarm devices, WIPs and control panels to be increased while fully utilising the existing equipment. Comprehensive off-site programming facilities shall be provided to enable complex evacuation sequences to be programmed if necessary and changes to be readily made to the sequence in the future as necessary.

The EWIS equipment shall be housed in (MECP,)\* (SECP)\* (and remote)\* 19 inch rack cabinet(s) (distributed around the premises)\* as shown on the drawings. Rack cabinets shall be no more than 400 mm deep and 2000 mm high to ensure that all equipment is reasonably accessible for servicing.

### **2.2 EVACUATION ZONING**

The building shall be divided into evacuation zones as indicated on the drawings.

### **2.3 SYSTEM OPERATION**

The operation of the emergency warning system shall be as specified in AS 2220.1 section 2.5.2 and operation of the intercommunication system shall be as specified in AS 2220.1 section 3.2.

### **2.4 SYSTEM COMMUNICATIONS**

All field wiring (that is wiring outside the equipment control panel(s)) shall be arranged so that failure (open circuit or short circuit) of any cable pair shall disable no more than 1 zone. All wiring between the MECP(s)\* and any SECPs or any other equipment that is critical to the correct operation of more than one zone shall be by duplicated cable paths. Failure of

\*Optional: Include/delete as required

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one cable path (open or short circuit on any wire in the cable) shall indicate a fault condition at the MECP and at any connected SECP, but shall not inhibit full EWIS operation.

### **2.5 MICROPROCESSORS**

All microprocessors used in the system shall be supervised by watchdog circuitry furnishing automatic restart after loss of activity, and shall turn on the local audible indicator in all cases of processor failure. No manual input shall be required to re-start the processor in the event of a complete power down condition. Upon power restoration, the processor shall automatically return the system to the fully operating on-line state, performing all programmed functions. Non-volatile memory shall be provided for storage of the system data base, logic and operating system.

### **2.6 POWER SUPPLIES**

All MECPs, SECPs and equipment racks shall have separate power supplies unless they are mounted within the same cabinet (or within immediately adjacent cabinets). Each power supply shall consist of a power supply unit to supply the system quiescent load, a battery charger and battery in accordance with AS 2220. The power supply shall be obtained from the mains supply in accordance with AS 3000 and AS 2220.

Sealed electrolyte batteries shall be provided for the EWIS system. The battery design shall meet the requirements of AS 2220.2 Appendix C and the battery capacity shall be calculated to meet the requirements of AS 2220.2 clause 4.3.2.

Battery calculations shall be submitted to justify the battery size chosen. Where possible, the batteries shall be housed within the equipment cabinet(s)\*.

The battery charger shall be rated to ensure that the system meets the recharge time requirements of AS 2220. The charger shall be a constant voltage type, automatically maintaining the batteries in the fully charged state under standby conditions. The terminal voltage shall be temperature compensated in accordance with the battery manufacturer's published data. The battery charging facilities shall be suitable for the battery type used.

### **2.7 AMPLIFIERS**

At least one amplifier shall be provided for each zone, to drive the EWIS loudspeakers. All amplifiers shall be of solid state design and shall be available in the following range of output powers: 10 watts, 25 watts, 50 watts, 100 watts, 200 watts. The output level shall be fully adjustable from pre-set controls on each circuit board. All amplifier outputs shall be transformer coupled, 100 volt line. The power supply connection for each amplifier card shall be separately fused on each card.

The amplifiers shall be on cards that plug into a 19 inch card rack for easy set-up and servicing. Each amplifier card may contain up to four amplifiers, but a card rack shall contain no more than 5 amplifier cards. Each amplifier card rack shall be controlled by its own microprocessor located on a separate card in the rack. This card shall also contain digital tone generators and stored verbal message(s) dedicated to the amplifiers in the rack.

Each amplifier shall be supervised for fault conditions and failure of any amplifier shall cause a fault indication for the affected zone on the MECP ( and SECPs if fitted)\*.

(A redundant amplifier shall be provided incorporating automatic changeover facilities that shall automatically isolate and replace a faulty amplifier in the system.)\*

Each amplifier shall have a separate auxiliary input for non-emergency use. This input shall be accessible from a connector on the amplifier card and shall be in addition to the three

non-emergency inputs specified in section 10.2. A link on each amplifier card shall determine whether this "local" non-emergency input, or one of the common non-emergency inputs is selected under non-emergency conditions.

## **2.8 TONE GENERATORS**

Separate tone generators shall be provided for each amplifier card rack. The tone generators shall be digital, with the Evacuate and Alert tones synthesised by digital electronics controlled by the microprocessor for the card rack. The tones shall comply with the requirements of AS 2220.1 clause 2.5.3.

## **2.9 AUTOMATIC SPEECH MESSAGE**

### **2.9.1 (Alert Signal Message)\***

During the Alert signal (in Auto mode)\* the wording of the digitised speech message shall be:

("Warning. The fire alarm system has operated. Standby for further instructions".)\*

*(or other message as appropriate.)\**

### **2.9.2 Evacuate Signal Message**

During the Evacuate Signal (in Auto mode)\* the wording of the digitised speech message shall be:

("Evacuate as directed. Evacuate as directed".)\*

*(or "Evacuate the building using the nearest fire exit.")\**

*(or "Please evacuate the building immediately via the nearest fire exit. Do not use the lifts.")\**

*(or other message as appropriate.)\**

## **2.10 SYSTEM PROGRAMMING**

### **2.10.1 General**

Programming of the major system configuration parameters including the building evacuation sequence, number of zones, fire indicator panel inputs, break glass alarm inputs, number of WIPs per zone, and the assignment of equipment to zones shall be stored in non-volatile memory. To prevent casual and undocumented changes to the system operation, these major parameters shall only be programmable off-site.

The following minor parameters shall be able to be configured on-site, either from the MECP front panel or from a laptop computer connected to a serial port.

- Timing of the evacuation sequence in the Auto mode of operation. This shall include the selection of separate times for:
  - (a) the "Delay Before Action", i.e. the time delay between the initiating signal and the Initial Alert signal,
  - (b) the "Initial Alert Time", i.e. the duration of the Initial Alert signal (ref. AS 2220.2 clause 2.3.2),
  - (c) the "Subsequent Alert/Evacuate Time", i.e. the duration of the subsequent Alert/Evacuate signals.

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All times shall be adjustable in the range 0 seconds to 10 minutes in steps of no greater than 10 seconds.

- Setting of time and date (where a printer is used.).
- Selection of zones that respond to operation of the Group controls.
- Selection of zones for non-emergency paging (where a separate paging console is not used).
- Selection of zones for background music.

### 2.10.2 Automatic Sequential Evacuation

The evacuation sequence in Auto mode shall operate as detailed below.

#### (Either:

The initiating signal shall cause the local sounder to operate and a red "FIP" (or "BGA")\* alarm zone LED on the MECP and any SECPs to turn on to indicate the location of the alarm. The EWIS system shall remain in this state for a time period set by the "Delay Before Action" (ref. 2.10.1). After the expiry of this delay, the Alert signal shall sound in the alarm zone for the "Initial Alert Time", after which the EWIS shall automatically switch the Evacuate signal to the alarm zone and apply the Alert signal to two zones (floors) above the alarm zone and one zone (floor) below the alarm zone. Thereafter the Evacuate signal shall step on to the zones already receiving the Alert signal and the Alert signal shall step on to 2 zones above and one zone below those previously alerted. The sequence shall continue until the whole building is receiving the Evacuate signal or until the EWIS is switched out of the Auto mode. The time between each step shall be as set by the field programmable "Subsequent Alert/Evacuate Time" (ref. 2.10.1).

If an alarm occurs in another zone during an Auto mode evacuation, the evacuation sequence shall also proceed from the zone with the new alarm as well as retaining the existing sequence.

If the sequence is stopped by switching the system to Manual mode, all signals shall remain as applied automatically, until manually modified or cancelled. In Manual mode the Evacuate signal shall (not)\* include the automatic speech message.)\*

#### (Or:

The initiating signal shall cause the local sounder to operate and a red "FIP" (or "BGA")\* alarm zone LED on the MECP to turn on to indicate the location of the alarm. The EWIS system shall remain in this state for the time period set by the "Delay Before Action" (ref. 2.10.1). Upon the expiry this delay, the Alert signal shall automatically switch to all zones for the "Initial Alert Time". After the Initial Alert, the EWIS shall switch the Evacuate signal to the alarm zone and also to two zones (floors) above and one zone (floor) below the alarm zone. Thereafter the evacuation shall proceed one zone at a time, firstly upwards to the top of the building, then downwards to the bottom of the building. The time taken for the system to step between zones shall be set by the field programmable "Subsequent Alert/Evacuate Time" (ref. 2.10.1). The sequence shall continue until the whole building is receiving the Evacuate signal or until the EWIS is switched out of the Auto mode.

If an alarm occurs in another zone during an Auto mode evacuation, the evacuation sequence shall also proceed immediately from the zone with the new alarm as well as retaining the existing sequence.

If the sequence is stopped by switching the system to Manual mode, all signals shall remain as applied automatically, until manually modified or cancelled. In Manual mode the Evacuate signal shall (not)\* include the automatic speech message.)\*

#### (Or:

\*Optional: Include/delete as required.

*Other evacuation sequence as required. A diagram may be helpful to specify any complex requirements)\**

### **2.11 INTERFACE TO THE FIP**

Cables between the FIP and the EWIS shall be supplied, installed and terminated under this contract.

(Supervised inputs shall be provided at the EWIS for each evacuation zone. These inputs shall be wired to voltage free contacts for each evacuation zone at the FIP and the wiring shall be fault monitored by the EWIS as required by AS 2220.2. A fault on this wiring shall be indicated by FIP Zone Fault LEDs on the ECP(s). The EWIS programming shall allow more than one set of input contacts from the FIP to be mapped to the same evacuation zone (ref. 2.10.1).)\*

#### **(OR)\***

(A high level serial interface shall be provided between the FIP and the EWIS. This shall provide the EWIS with alarm signals for each evacuation zone. The high level interface wiring shall be supervised by the EWIS for fault conditions as required by AS 2220.2. A fault on the interface wiring shall be indicated by FIP zone fault LEDs on the ECP(s). Where the FIP is not adjacent to the EWIS panel, the high level interface wiring shall be duplicated so that a wiring fault will not inhibit communication between the FIP and the EWIS, but shall nevertheless cause a FIP zone fault indication at the ECPs. EWIS programming shall allow more than one zone from the FIP to map to the same evacuation zone.)\*

### **3. MASTER EMERGENCY CONTROL PANEL**

#### **3.1 GENERAL**

The MECP(s)\* shall be mounted in the position(s)\* indicated on the drawings. Each MECP shall be modular in construction and shall be microprocessor controlled. It shall include, but not be limited to, the hardware, software and firmware needed to fulfil the major system requirements that are described below.

#### **3.2 ECP ENCLOSURE**

The enclosure of an MECP shall be a wall or floor mounted, 19 inch rack steel cabinet with viewing window, hinged door and cylinder lock. It shall be factory finished in baked epoxy powdercoat Cream Wrinkle BFF998CW. An MECP cabinet shall be no more than 400 mm deep and no more than 2000 mm high to ensure that all equipment is reasonably accessible for servicing.

#### **3.3 CONTROLS & INDICATIONS**

The MECP operating panel shall be located behind a viewing window in the front door of the MECP cabinet. It shall be a discrete switch type panel as described in AS 2220 clause 2.4.3. Numeric, key-pad type panels will not be acceptable.

Switches on the panel used to control the operation of evacuation zones and WIPs shall provide visual, tactile and audible feedback of operation. Switches controlling the emergency warning system shall be grouped on the left side of the control panel, switches controlling the intercommunication system shall be grouped on the right hand side.

Space between the two groups of switches shall be available for zone labels. The minimum label space for each zone shall be 70 mm x 16 mm. Zone labels shall be typed or laser printed card which shall be inset into the control panel and protected by a transparent, polycarbonate membrane.

The switches shall be positioned in a rectangular array. The rows of switches shall represent evacuation zones, and shall contain all the emergency warning and intercommunication switches required for the zone. The columns shall represent control panel functions (e.g. Alert, Evacuate, P.A., WIP Select). All switches in each column shall be labelled and coloured as required for the function of the column. Each function shall toggle on or off with each successive press of the associated switch.

The functions of the switches shall be as follows (proceeding from the left): Alert (coloured yellow), Evacuate (coloured red), Public Address (coloured blue), WIP1 (coloured red), WIP2 (coloured red), WIP3 (coloured red), Zone Manned (coloured yellow), Zone Cleared (coloured green). Each switch shall have an associated LED indicator to show when the function controlled by the switch is active. The indicator on switches controlling WIPs shall flash to show WIP calling and go steady when a WIP is selected. The indicators shall be coloured as required by Table 2.1 of AS 2220.1: 1989.

(A WIP control shall be allocated on each ECP for inter-ECP calls. Operating this control on any ECP shall cause the Master WIP on every other ECP to ring until the call is answered at an ECP.)\*

(On-site programming at the ECP shall enable calls to the Master WIP to be redirected to ring and be answered at any other WIP connected to the ECP.)\*

The Zone Cleared controls shall function as memory buttons only, bringing on the associated green indicator when the control is pressed.

The Zone Manned controls and their associated green indicators shall function as memory buttons activated by the EWIS House Warden (and as indicators activated remotely by zone wardens at the WIPs (ref. 9.4))\*.

On the control panel beneath the zone controls, two rows of similar switches and indicators shall be provided to allow all zones and a pre-programmed group of zones to be selected.

Other controls on the panel shall include an Auto/Manual/Isolate key-switch, an audible indicator silence switch, lamp test switch and switches for on-site configuration.

At least three separate yellow fault indicators shall be provided for each zone. These shall indicate an amplifier, speaker wiring or visual alarm wiring fault; a break glass alarm or FIP input wiring fault; and a WIP wiring fault. Where more than one WIP line is provided for a zone, separate fault indicators shall be provided for each line.

The control panel shall include other indicators as follows.

- Auto, Manual and Isolate LEDs to confirm the position of the key switch.
- Separate green "Operating" and yellow "Fault" LEDs for the Emergency Warning System and the Intercommunication System. The "Operating" LEDs shall flash to indicate that the systems are operating normally. The "Fault" LED shall turn on if there is a fault condition anywhere in the emergency warning or intercommunication system equipment.
- Green "Mains On" LED.
- Green "Battery OK" LED.
- Yellow "Charger Fail" LED.
- Yellow "Battery Low" LED.

### **3.4 INPUT/OUTPUT CAPABILITIES**

The MECP shall provide Master PA Speech and Master WIP audio outputs. If these outputs are wired external to the MECP cabinet they shall be supervised to indicate a fault condition and the connection shall be duplicated to maintain operation of the system under wiring fault conditions.

Communication between the MECP and the rest of the EWIS equipment shall be via a duplicated, two-wire communications bus in addition to the PA Speech and WIP audio circuits. These connections shall all be protected against fault conditions as specified in section 2.4 of this specification.

### **3.5 (MECP ILLUMINATION)\***

Under mains fail conditions, a built-in fluorescent lamp shall automatically illuminate the MECP, when the MECP is switched to the "Manual" operating mode . The lamp shall be powered by the EWIS battery.

### **3.6 (PRINTER)\***

Install a printer in or adjacent to the MECP in the position shown on the drawings. The printer shall produce a printed record of time, date, event type and location of each event occurring on the system. The printer shall be a type supplied and approved for use with the system by the EWIS manufacturer. The printer shall be capable of operation under mains fail conditions for the same length of time as the EWIS can operate under mains fail conditions.

## **4. (SECONDARY EMERGENCY CONTROL PANELS)\***

### **4.1 GENERAL**

Each secondary emergency control panel (SECP) shall be located in the position shown on the drawings. The SECP shall be the same internal design and control panel design as the MECP.

### **4.2 SECP POWER SUPPLY**

The SECP shall contain a built-in power supply and batteries meeting the requirements of AS 2220 and Section 2.6 of this specification.

### **4.3 (SECP ILLUMINATION)\***

Under mains fail conditions, a built-in fluorescent lamp shall automatically illuminate the SECP, when the SECP is switched to the "Manual" operating mode . The lamp shall be powered by the EWIS battery.

### **4.4 (PRINTER)\***

Install a printer adjacent to the SECP in the position shown on the drawings. The printer shall produce a printed record of time, date, event type and location of each event occurring on the system. The printer shall be a type supplied and approved for use with the system by the EWIS manufacturer. The printer shall be capable of operation under mains fail conditions for the same length of time as the EWIS can operate under mains fail conditions.

## **5. (REMOTE EQUIPMENT RACKS)\***

Each remote equipment rack shall be located in the position shown on the drawings. The racks shall be of the same general internal design as the MECP, but without the ECP. Remote equipment rack enclosures and equipment shall meet the relevant requirements of Sections 2 and 3 of this specification.

## **6. (REMOTE WIP CONTROL STATION)\***

A Remote WIP Control Station shall be located in the position shown on the drawings. The station shall consist of a control console with push-button switches to select WIPs, and indicators to indicate WIPs calling and connected. Operation of the console shall be similar to the operation of the WIP controls at an ECP, and the controls and operation on the console shall be in parallel with those on the MECP. A WIP shall be situated at the console to call and answer the WIPs selected or indicated on it. (WIPs programmed to be able to be called and answered from the Remote WIP Control Station are indicated by note on the drawings.)\* (All WIPs shall be able to be called and answered from the Remote WIP Control Station.)\*

## **7. (NETWORKING)\***

### **7.1 GENERAL**

The Emergency Warning & Intercommunication system shall be configured as a multi-master, peer to peer network. Each node on the network shall be an ECP or Remote Equipment Rack which shall be able to operate in stand-alone mode in the event of network failure or partial implementation of the system.

### **7.2 ZONE MAPPING**

The indications and controls for each zone on a networked ECP shall be able to be mapped by software to any amplifier outputs, strobe outputs, WIP Terminations and FIP/BGA inputs of any other zone at any node on the network.

Amplifier outputs, strobe outputs, and WIPs shall be able to be programmed to be controlled by one or more ECPs on the network.

### **7.3 SEQUENTIAL EVACUATION OPTIONS**

The network shall provide flexible sequential evacuation program options for alert and evacuate tones so that a particular sequence can be spread across various nodes of the network or unique sequences can be allocated for each node.

### **7.4 ALLOCATION OF MANUAL CONTROL**

The WIP keys for a zone shall be always active on any ECP to which they are mapped and they shall effectively work in parallel.

The evacuation keys for a zone shall be only active at one node at a time (or inactive at all nodes if all mapped zones are switched to AUTO).

Zones shall be grouped for the purpose of assigning manual control to various ECPs. Each group shall be assigned its own priority amongst the ECPs. For each group, manual control shall be able to be allocated to the highest priority ECP which is switched to MANUAL or ISOLATE.

### **7.5 SUB-ECPS**

The network shall be able to be split up into a number of sub-ECPs. A sub-ECP shall have control of all amplifier outputs, strobe outputs, WIPs and FIP/BGA inputs at its node, but shall also be able to be controlled by other remote ECPs over the network. Control priority for PA facilities at a sub-ECP shall be according to the group priority assigned to it in the system software. Where a sub-ECP has higher priority than a remote ECP, local PA facilities shall be able to function independently of the network PA, allowing simultaneous use with the same or different audio signals.

### **7.6 DUAL OPERATION WIP AND PA SPEECH**

It shall be possible to configure the system to have the WIP/PA audio split into at least two sections across the system so that one ECP may control some nodes and another ECP some other nodes, with the option of yet another ECP controlling all nodes. The WIP and

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PA audio facilities in the two sections shall be independent, allowing simultaneous use in each section with the same or different audio signals.

### **7.7 NETWORK EVENT LOGGING AND DIAGNOSTICS**

A serial communications port shall be available at each node of the network to make diagnostic and configuration data available to the user. This port shall make the following information available as a minimum:

- Factory configuration of the node.
- Network set-up and diagnostic information.
- Log of any fault conditions on any equipment on the node (amplifier cards, speaker lines, strobe lines, WIP control cards, WIP lines).
- Log of FIP alarms and operation of the evacuation sequence.
- Setting of evacuation sequence time delays if applicable.

### **7.8 (REMOTE CONNECTION)\***

A modem shall be provided at the network nodes designated on the drawings. Whenever a FIP alarm occurs, the system shall dial out to a remote computer or printer and display or print alarms and, if configured to do so, shall also log the evacuation sequence. The call shall automatically disconnect after a period of inactivity.

Facilities shall also be provided to allow the user to dial in and access system diagnostic functions.

## 8. (COLOUR GRAPHICS)\*

### 8.1 GENERAL

A PC-based full Colour Graphics user interface for the EWIS system shall be readily available. The Colour Graphics system shall be connected (directly to the EWIS ECP)\* (to the EWIS network as a stand alone node)\* (directly to a network node that has no ECP)\*.

The Colour Graphics shall function as an ECP by providing the following functions...

- Display and acknowledgment of FIP and BGA alarms.
- Display and acknowledgment of faults.
- Display and control of the Alert, Evacuate and PA states of each zone.
- Optional display and control of the background music and/or non-emergency paging for each zone.
- Answering and initiation of WIP calls.
- Selection of Auto/Manual/Isolate states.

In addition to these basic functions the Colour Graphics shall provide the following features...

- High resolution computer screen colour graphics (minimum 800 x 600 pixels, 256 colours) showing the layout of evacuation zones in a complex, together with on-screen controls for those zones.
- Logging of all alarms, faults and zone audio states to a printer and/or disk file.
- Grouping any number of zones together to form a single zone for operator display and control purposes.
- Different password and access rights for each user.
- Logging of operator actions to a printer and/or disk file.
- (Playing of audio WAV files to selected zones.)\*
- (Sharing of data with other Windows programs (e.g. spreadsheet, word processor, database).)\*
- (Add-on real time video display on the same screen.)\*

### 8.2 CONFIGURATION FEATURES

The general *look and feel* of the Colour Graphics system shall be able to be tailored to individual requirements and preferences including how the data is to be displayed, how it is to be laid out, how it is controlled and who has access to it.

The configuration data for each Colour Graphics system shall consist of a database file containing all of the zone and group records, and a set of graphical display files. The graphical objects that make up the displays shall be linked to a database for the particular system and the attributes of the various linked objects shall be updated as the database is updated. These attributes shall include background, foreground and edge colours, visibility, size and position.

Zones shall be shown on a graphical representation of the protected areas with background colours indicating their Alert/Evacuate/PA status, the zone where the alarm occurred, and

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relevant on-screen operator zone controls. These controls shall allow the operator to easily step through the zones of the system, and to take manual control (if allowed).

### **8.3 COLOUR GRAPHICS SOFTWARE**

The colour graphics software shall include an on-line drawing package for creating custom graphical drawings. A comprehensive selection of display templates and drawing object libraries shall be available and shall be able to be combined with imported PCX and DXF format file images.

The Colour Graphics software shall comprise of several applications, each with configurable security access. The applications shall include: Event Annunciation and Control (i.e. normal operation of the colour graphics system, Operator Maintenance (i.e. operator administrative functions such as viewing event logs, backing up of data), and System Configuration (i.e. functions required to configure and set up the system).

### **8.4 (COLOUR GRAPHICS NETWORK INTERFACE)\***

An interface shall be available allowing a Colour Graphics system to operate as an independent ECP network node.

The Interface shall be housed in a cream wrinkle steel cabinet measuring 495mm wide by 450mm high by 80mm deep with key lock. It shall contain an independent power supply complying with AS 2220, a communications module for communicating on the network and facilities for connecting a PA microphone and WIP Master handset. The microphone and WIP shall be able to be mounted remotely (up to 15m) from the interface box.

## 9. GENERAL INSTALLATION

### 9.1 LOUDSPEAKERS

The contractor shall ensure that the installation of speakers and horns complies with AS 2220.1 and AS 2220.2 and will provide the sound coverage required by AS 2220. The quantity and power rating of the loudspeakers allowed for in each evacuation zone shall be submitted at the time of tender.

The loudspeakers shall comply with the following requirements.

Ceiling mounted speakers shall:

- Be 100 mm (minimum) diameter.
- Have a frequency response of at least 100 Hz to 12 kHz.
- Have a minimum power rating of 5 watts r.m.s.
- Be fitted with a tapped transformer to enable various power ratings ranging from approximately 0.25 watts r.m.s. to 5 watts r.m.s. to be drawn from a 100V line by a simple re-arrangement of tapping. Speaker transformers shall be attached to the speakers and shall be fitted with approved terminals for termination of cables.
- Have adequate acoustic baffling fitted behind to prevent the travel of sound to other areas.
- Be complete with a perforated ceiling grille, finished to the Contract Administrator's requirements.
- Be of a design that is suitable for the environment in which they are installed.

Reflex horn loudspeakers shall:

- Have a minimum power rating of 10 watts r.m.s.
- Be fitted with a tapped transformer to enable various power ratings ranging from approximately 1 watt r.m.s. to 10 watts r.m.s. to be drawn from a 100V line. The transformers shall be enclosed either as an integral part of the horn or shall be mounted immediately adjacent to the horn within a dust proof enclosure.
- Be of a design that is suitable for the environment in which they are installed.

### 9.2 VISUAL ALARMS

In the high noise level areas shown on the drawings where the audio system will not provide adequate warning, supplementary visual strobe warning shall be provided. The quantity, position and specifications of the visual alarms allowed for in each evacuation zone shall be submitted at the time of tender. The contractor shall ensure that the installation of visual alarms complies with AS 2220.1 and AS 2220.2.

### 9.3 WARDEN INTERCOMMUNICATION PHONES (WIPs)

Warden Intercommunication Phones (WIPs) shall be provided for every evacuation zone and/or floor level in accordance with AS 2220. They shall be located as indicated on the drawings. WIPs shall be wall mounted in purpose made cabinets at no greater height than 1525 mm above finished floor level. The WIPs shall be recess mounted except in carparks, stairwells and plantrooms. The WIP telephone hand-sets shall be red in colour, SSL approved and documented by the EWIS manufacturer as a compatible type.

\*Optional: Include/delete as required

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Where a WIP is to be mounted in a fire hose reel cupboard it shall be located in a readily accessible position so as not to cause obstruction to, or be obstructed in its use by use of the hose reel.

If mounted on a door, the WIP shall be connected to the permanent wiring via a securely fastened terminal block and length of multistrand, flexible, retractable cord. Approval shall be sought for any proposed door mounted WIPs.

The words "Emergency Intercom" or other equal approved by the local Authority in 6 mm high lettering, white filled on a red background, shall be prominently displayed on, or adjacent to, each WIP. Where the WIP is located in a cupboard or other enclosure, a second label of similar appearance but reading "Emergency Intercom Inside" shall be affixed to the front of the enclosure. (A red LED indicator shall be mounted on the front of the enclosure. This shall be connected to the WIP inside the enclosure to give visual indication when the WIP rings.)\*

Simplified operating instructions, as agreed with the superintendent, shall be engraved on red traffolyte and mounted in close proximity to each WIP hand-set. The notice shall be secured by at least two screws. Where WIPs are exposed, these operating instructions may be incorporated on the same notice as the "Emergency Intercom" identification label above but in smaller text.

### **9.4 (ZONE MANNED SWITCH)\***

A momentary-action pushbutton switch shall be located adjacent to each WIP. Operation of the switch shall turn on the "Zone Manned" LED for the corresponding zone at the MECPP (and at any SECPs) in order to inform the House Warden that a Zone Warden is present at the WIP. Once activated, the LED on the ECP shall be able to be cancelled from the ECP only.

### **9.5 (BREAK-GLASS ALARMS (BGAs))\***

Emergency break-glass alarms (BGAs) shall be provided for every evacuation zone and/or floor level in accordance with AS 2220.1 clause 2.6.3 and AS2220.2 clause 2.3.1. They shall be located (immediately adjacent to each WIP and at the ECP)\* (as indicated on the drawings)\*.

### **9.6 CABLING**

Cabling shall be in accordance with AS 2220 and AS 3000 particularly with respect to segregation, protection, fire rating and monitoring requirements. Speaker cabling shall be PVC/PVC type except where fire rated cabling is required. All wiring shall be segregated from other services and all 100V speaker line cabling shall be separated from all other communications cabling.

Cables to each ceiling mounted speaker shall be 1000 mm longer than is required, with the excess length coiled and bound adjacent to the speaker.

## 10. (NON-EMERGENCY SERVICES)\*

### 10.1 GENERAL

Emergency functions of the EWIS shall over-ride all non-emergency services. External volume controls that are used to control the sound level of speakers during non-emergency operation shall automatically restore to the full sound level on emergency operation. The EWIS equipment shall provide an output for each evacuation zone to switch local level controls out of the speaker circuit for emergency operation. These outputs shall be normally energised and shall be de-energised when the associated evacuation zone operates under emergency conditions.

Power supplies and batteries shall be selected to ensure that during non-emergency use the required power supply current and battery capacity is always available for emergency use.

### 10.2 NON-EMERGENCY AUDIO INPUTS

Three non-emergency audio inputs shall be provided at the main equipment. Each input shall be balanced and able to accept audio input signals with level between 250 mV r.m.s. and 1.0 V r.m.s. The signal level resulting from each input shall be separately adjustable by means of pre-set controls. Selection of these inputs shall be controlled by the EWIS.

### 10.3 (NON-EMERGENCY PUBLIC ADDRESS)\*

A non-emergency public address system shall be provided, utilising one of the non-emergency audio inputs noted in section 10.2.

**(Either:**

This shall be controlled by a non-emergency public address console located in the position shown on the drawings. The console shall have push-button area selectors to select any combination of the paging areas shown on the drawings. LED indicators shall show the areas selected. A dynamic microphone shall be provided at the console. (The microphone shall be desk-mounting style, complete with push-to-talk switch.)\* (The microphone shall be goose-neck console-mounting style, controlled by a push-to-talk switch on the console.)\* Cabling between the non-emergency public address console and the main equipment is not required to be fire rated, but any fault (open circuit or short circuit) in this cabling shall not affect the ability of the EWIS to operate as required under emergency conditions.)\* (As well as selecting public address functions, a group of controls on the console shall be used to select and de-select areas for background music (ref. 10.4 below).)\*

**(Or:**

This shall operate from the non-emergency paging microphone located in the position shown on the drawings. The microphone shall be a dynamic, desk mounting type complete with push-to-talk switch e.g. TOA PM600U. The zones to receive non-emergency paging shall be able to be pre-selected from the MECP)\*

### 10.4 BACKGROUND MUSIC

The EWIS system shall be able to distribute background music to any zone or combination of zones in the system. The background music audio source (provided by others) shall be connected to one of the three non-emergency inputs noted in section 10.2. (The areas receiving background music shall be able to be pre-selected from the MECP.)\* (The areas receiving background music shall be able to be selected from a console mounted in the position shown on the drawings.)\*

## 11. COMMISSIONING

### 11.1 COMMISSIONING TESTS

The entire installation shall be tested in accordance with AS 2220.2 Section 6 and witnessed by the engineer. The acceptance inspector shall be notified before the start of the required tests. All items found at variance with the drawings or this specification during testing or inspection by the acceptance inspector, shall be corrected. The commissioning reports as specified in AS 2220.2 Appendices E, F and G shall be delivered to the acceptance inspector when completed. All test equipment, instruments, tools and labour required to conduct the system tests shall be made available by the installing contractor.

In addition to the testing specified to be performed by the installing contractor, the installation shall be subject to test by the acceptance inspector. All EWIS circuits shall be tested for continuity, earth faults and short circuits.

### 11.2 ACCEPTANCE TESTING

A written acceptance test procedure (ATP) for testing the EWIS components and installation will be prepared by the engineer for compliance with this specification. The contractor shall be responsible for the performance of the acceptance test, demonstrating the function of the system and verifying the correct operation of all system components.

In conducting the ATP, the acceptance inspector shall request demonstration of any or all functions. The items tested shall include but not be limited to the following:

System wiring shall be tested to demonstrate correct system response and correct subsequent system operation in the event of:

- Open and shorted speaker lines.
- Open and shorted WIP lines.
- Open and shorted FIP input wiring.  
(Open and shorted visual alarm wiring.)\*
- (Open and shorted BGA inputs.)\*
- (Open and shorted SECP communications circuit.)\*
- (Open and shorted network communications circuit)\*
- Mains power failure at an MECP.

System indications shall be demonstrated as follows:

- Correct indication for each FIP and BGA input at each ECP (and colour graphics)\*.
- Correct control panel function indicated at each ECP (and colour graphics)\* for each control panel operation.
- Correct Alert and Evacuate signals indicated at each ECP (and colour graphics)\* in the Automatic mode of operation.  
(Correct printer logging for all system activity.)\*

Emergency Warning functions shall be demonstrated as follows:

- Correct Alert and Evacuate audible and visual signals received at each evacuation zone under Automatic and Manual operation.
- Sound pressure level of the audible signals in compliance with AS 2220.2 clause 2.2.3.

Battery and battery charger capabilities shall be demonstrated as follows:

- Mains power shall be applied continuously for 24 hours to ensure that the system battery is fully charged. Mains power shall then be disconnected from the complete system for a period of 8 hours. At the end of this period, an alarm condition shall be created and the system shall power the full evacuation load for 1.5 hours. Mains power shall again be restored for twenty

\*Optional: Include/delete as required.

four hours, after which the system charging current shall be at the normal charge rate for a fully charged battery bank. System battery voltages and charging currents shall be checked for each part of the system .

In the event of the system failing to perform as specified during the acceptance test procedure, at the discretion of the acceptance inspector, the test shall be terminated. The installing contractor shall re-test the system, correcting all deficiencies and providing test documentation to the acceptance inspector. The acceptance inspector may elect to require the complete ATP to be performed again if, in the inspector's opinion, modifications to the system hardware or software warrant complete re-testing.

### **11.3 DOCUMENTATION**

System documentation shall be furnished to the owner and shall include but not be limited to the following:

- System as-built drawings and wiring details including one set of reproducible masters.
- System operation, installation and maintenance manuals.
- Commissioning reports required by AS 2220.2 (ref. section 11.1)

### **11.4 SERVICES**

The contractor shall warrant the entire system against mechanical and electrical defects for a period described in the contract general conditions. This period shall begin upon completed certification and test of the system or upon first beneficial use of the system, whichever is earlier. The EWIS subcontractor or manufacturer shall offer for the owner's consideration at the time of system submittal a priced inspection, maintenance, testing and repair contract in full compliance with the requirements of AS 1851.10.

The services offered under this contract shall be performed at no charge during the first year after system acceptance and the owner shall have the option of renewing for single or multiple years upon completion of the warranty period.

The contractor performing the contract services shall be qualified and accredited to maintain ongoing certification of the completed system to the relevant authority having jurisdiction.