# INGHAM HEALTH RESEARCH INSTITUTE

ELECTRICAL SERVICES

SCHEMATIC DESIGN REPORT

STEENSEN VARMING

AUSTRALIA DENMARK IRELAND UK

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# 1 INTRODUCTION

The Ingham Health Research Institute (IHRI) will be the core research facility within the South Western Sydney Research Hub and offer state of the art facilities for basic science, clinical, population health and health services research. Funded research undertaken by medical, nursing and allied health clinicians, clinical academics (from the University of NSW and University of Western Sydney), researchers and research students affiliated with Liverpool Hospital and the wider Research Hub will be accommodated at the discretion of the IHRI Board.

New research groups will be added as clinical academic appointments are filled and research programs develop in accordance with strategic plans and investigator initiatives.

The Ingham Health Research Institute will bring together research groups to focus on the following key areas of research:

- ***health services research***, particularly in relation to cancer services, critical care services, trauma services and mental health services;
- ***population health research***, particularly in relation to equity of health status, equity of access to health care and equity of outcomes;
- ***clinical research***, particularly clinical trials; and
- ***biomedical research***, particularly in cancer, inflammation, and pancreatic disease.

Capacity will also be provided for new and emerging groups. The Institute will provide facilities for dry and wet laboratory research and associated corporate and administrative services.

The dry laboratory facilities will accommodate research groups engaged in desk-based clinical, population health and health services research.

Wet laboratory facilities will have the capacity to accommodate the varying needs of research groups engaging in both basic and translational biomedical research with a particular focus on cancer, inflammation, and pancreatic disease. Shared wet lab core facilities will comprise Biological Resources Unit, Tissue Banking and DNA storage, a Radiation Laboratory and Wash-up and Autoclaving.

Corporate and administrative services comprise shared services and facilities including Lobby/Reception, Directorate and Research Office, Interview and Assessment Space, Interaction Space and Support Services.

# 2 ELECTRICAL SERVICES DESIGN BRIEF

## 2.1 GENERAL

The proposed electrical services will generally be designed as to comply with the following codes and standards:

a. Building Code of Australia (BCA)
b. Wiring Rule AS/NZS 3000:2000
c. Selection of Cables AS/NZS 3008:1998
d. Interior Lighting Part 1 AS1680.1
e. Interior Lighting Part 4 AS 1680.4
f. Interior Lighting Part 2.2 AS 1680.2.2
g. Interior Lighting Part 2.5 AS 1680.2.5
h. Control of the Obtrusive Effects of Outdoor Lighting AS 4282:1997
i. Laboratory Design and Construction Part 1: General Requirements AS/NZS 2982.1
j. Safety in Laboratories Part 7: Electrical Aspects AS 2243.7
k. Emergency and Exit Lighting AS/NZS2293
l. Security Intruder Alarm System AS2201
m. AS3080
n. Telecommunication Installations AS/NZS 3084:2003
o. Relevant Australian Standards, regulations and Codes
p. ACA Installation Requirement for Customer Wiring S009
q. Workcover NSW
r. Council DA Requirement

# 3 ELECTRICTY SUPPLY SYSTEM

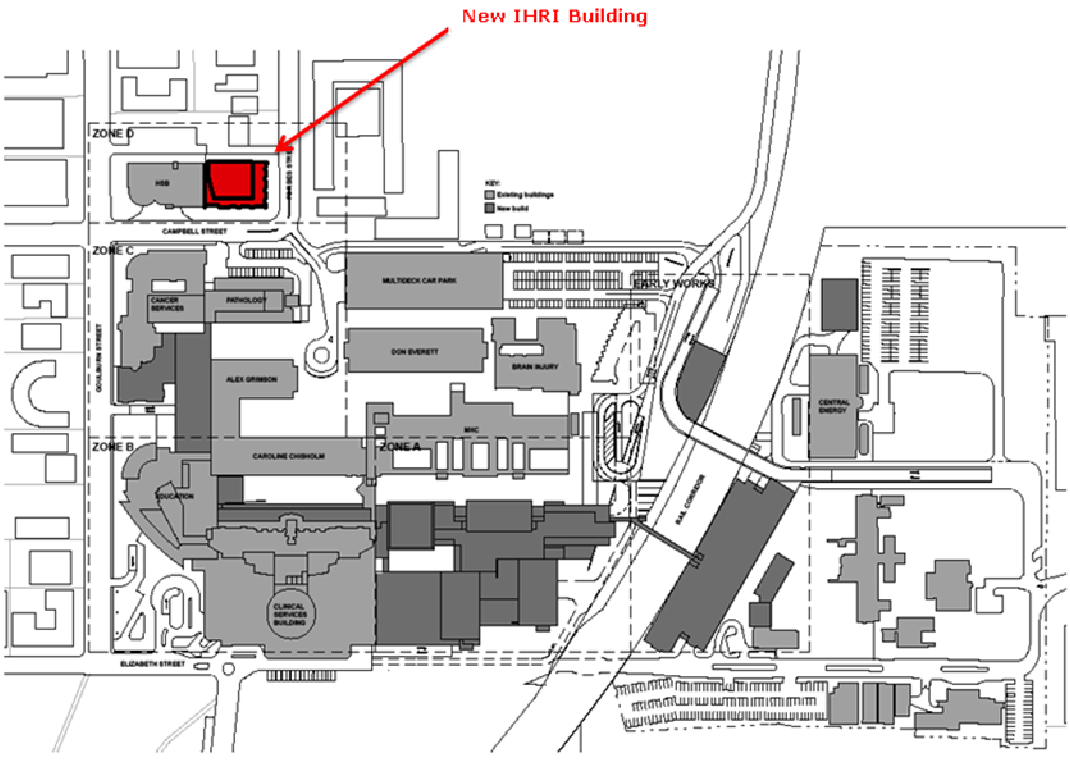
## 3.1 ELECTRICITY SUPPLY

The New Ingham Health Research Institute development HIRI Building consists of a total functional floor area of approximately 5,000 square meters. The assumed load density for this type of installation is 100VA/sqm – 150VA/sqm, which is in line with allowances for this type of development. The estimated maximum demand of the building is identified within the following table.

**Maximum Demand Assessments of existing and new development HIRIBuilding**

| Floor Area sq.m | Type of Development | Average VA/sq.m | Total kVA |
|---|---|---|---|
| 4,959 | Research institute | | 525 kVA |
| | Spare Capacity | 20% | 105kVA |
| | Total | | 630kVA |
| | Anticipated electricity supply required | | **Approx. 876A 3-phase** |

It is proposed to serve the new HIRI building from a new kiosk substation with a 1000A supply, to be located adjacent to the building.




SITE PLAN LIVERPOOL HOSPITAL

## 3.2 POWER FACTOR CORRECTION

Power factor correction will be provided to the HIRI to ensure the power factor figure meets the requirement of Service and Installation Rules of New South Wales – October 2006 and October 2006 Amendment 2: January 2009.

The power factor correction system will be complete with all associated control equipment, current transformer, power factor regulator, harmonic blocking reactors, and capacitor banks with a minimum of six stages, contactors and fuses. The current transformer will be installed in one phase of the main bus bars immediately after the main switch of the associated switchboard.

## 3.3 METERING

An Integral Energy meter panel will be located at the main switch room. Separate metering will be arranged as per the client's requirement.

It is proposed to provide local digital metering with BMCS interface within the new main switchboard of the new building, to monitor all major loads within the building.

## 3.4 CLEAN EARTH SUPPLY

Clean earth will be provided according to IHRI requirement for specialised equipment:

## 3.5 SURGE PROTECTION

Surge protection will be installed on the main switchboard.

GPO's with integral surge arrester protection will be provided for supply to communications, fire and security equipment.

Final design and installations requirements will be determined during the Design Development Stage of the works.

## 3.6 LIGHTNING PROTECTION SYSTEM

A lightning protection risk assessment shall be undertaken for the HIRI building in accordance with Australian Standard AS 1768.

Should lightning protection be required, then it shall be provided in accordance with the requirements of Australian Standard AS 1768.

## 3.7 ELECTRICAL RETICULATION

A new main switchboard will be located within a new switch room constructed of fire rated material. Sub mains will be reticulated from the new Main Switchboard throughout the HIRI building via cable trays in the ceiling space and cable risers.

New distribution boards will be enclosed within a cupboard of 2000mm wide by 1000mm deep, constructed of fire rated material and incorporating smoke seals to the doors. Sub mains will terminate at distribution boards. Electrical cupboards will be located at each floor of the development to facilitate the reticulation of sub-circuit cabling to approximate lengths of 35meters.

Electrical distribution cupboards will form a riser and these risers will be vertically aligned where possible to ensure a cost effective installation and provide minimal life cycle costs. With the risers vertically aligned this will help to ensure that ceiling heights are maximised and co-ordinated between structure and other services.

Power sub circuits will originate from each respective distribution board to provide electrical supplies to outlets, equipment and appliances. It is proposed that sub circuit cabling will also be reticulated through wall mounted skirting duct, where adjacent walls and dropped from the ceiling in the general laboratory via the reagent shelf system where required. Skirting duct system will be installed along benches located adjacent to walls, column and within the suspended reagent system. Drop down type service columns will be installed at island benches. Final design and installations requirements will be determined during the Design Development Stage of the works.

It is proposed that new sub circuits be loaded to provide 25% spare capacity for future expansion. Cable management systems will be utilised to ensure that cables are installed in a neat and professional manner and to ensure that equipment is serviceable.

To provide added security in relation to fire protection to the building and it's occupants it is proposed that all sub circuit cabling and exposed conduits be manufactured with a Critical Oxygen Index of 30, thereby not to propagate a flame in the case of a fire.

All GPO's will be RCD protected as per AS 2982 requirements. GPO's will be located at a minimum of 300mm above bench height.

## 3.8 POWER OUTLETS PROVISIONS

Provision of power outlets will be confirmed at a later stage.

## 3.9 STANDBY POWER REQUIREMENT

A New diesel generator will be provided to support essential & emergency standby loads at the IHRI building.

It is proposed that the generator system shall be arranged such that the generator to be synchronised to the grid, so generator can facilitate live testing on building load as oppose to provide a separate dummy load bank. It proposed to provide backup standby power time of a approximately 10 hours at full load.

The load requirement at the generator are yet to be defined, however, we consider a generator with a capacity at 250kVA to be provide back up supplies to critical load as proposed below.

| **Essential Loads (as per BCA requirement)** | **Standby Emergency Loads** |
|---|---|
| BCA loads such as lifts | UPS – Uninterruptible Power Supply (100%). |
| Fire Safety Services | BRU animal room (mechanical exhaust and air conditioning where required – 100%) |
| | Specialised equipment (50%) |
| | -80 freezers (100%) |
| | Wet laboratories (100%) |
| | Mechanical exhaust from PC2 laboratories where required (100%). |
| | Other system and equipment as per client requirement. |

| | |
|---|---|
| Total assessed requirement | 250kVA (rating to be confirmed) |
| № of generating sets One (1) by | 250kVA |
| Heat banks for testing included | no |
| № of heat banks | n/a |
| Diesel storage capacity | 10 hours @ full load. |

## 3.10 EMERGENCY STOP

Emergency shutdown will be provided at each laboratory and strategic area. The push button will be similar to a mushroom head actuator designed for emergency stop with standard colour red. Latched, twist to release 40mm diameter “emergency stop”.

The emergency switching will cut off any unexpected flow of electricity energy, to remove any hazard to persons and property. The emergency switch will be readily accessible, located next to the laboratory exit door. The emergency switching encompasses power circuits only, and excludes lighting circuits as well as fume cupboard extraction system and experimental processes that may result in catastrophe if electricity supply is suddenly cut off. For these circuits, a “controlled access” means of switching off the power supply coupled with an audible and visual alarm system to provide warning signal. Such switching will not be included as part of emergency shutdown switching.

A common alarm signal of the emergency stop system will be relayed to Building Facility Manager (or engineering office).

## 3.11 UNINTERRUPTIBLE POWER SUPPLIES

Uninterruptible power supplies will be provided with 10-20minute battery autonomy and proposed to be adequately sized to accommodate the electrical capacity of the following:

a. Server Room.
b. Liquid Nitrogen Alarm Monitoring System
c. Security
d. BMCS
e. Communications & active equipment.

The electrical reticulation associated with each UPS will be designed and installed to incorporate an external maintenance bypass to allow removal of the UPS (for maintenance if required) without compromising the integrity of the power supply to the items of equipment listed above.

All UPS’ will be sized to suit the load requirements of the equipment to be served and be equal to American Power Conversions type.

Final design and installations requirement will be determined during the Design Development Stage of the works.

# 4 COMMUNICATION SYSTEM

## 4.1 NEW COMMUNICATIONS SYSTEM

The new communications system shall be designed in accordance to the IHRI standard. It is anticipated that the IHRI will be cabled with a minimum Cat 6 UTP copper voice and data communication cable with RJ 45 terminator at desktop.

Fixed and Wireless network services will be provided at strategic locations where laptop computers are to be used for occasional short periods. Wireless hot spot locations, such as, office, meeting, interaction and wet and dry research areas including BRU and selected floor location.

In addition, we anticipate providing the following as specified in the brief.

- Internet Protocol (IP) based communications including Voice over Internet Protocol (VoIP) to provide an integrated communication service.
- Connectivity to Australia's Academic and Research Network (AARNET) 10-gigabit per second (Gbps) connection and the SSWAHS, UNSW and UWS IT networks.
- While data connections are conventionally by copper cable or increasingly fibre optics these arrangements require expensive switchgear; consideration needs to be given to what extent (if not all) needs might be met more effectively by a local wireless network.
- Fixed and wireless IT connectivity is to be available to office, meeting, interaction and wet and dry research areas including the BRU.
- Video conferencing facilities in the central meeting/seminar areas and the common room.
- Sufficient Capacity for telehealth/video conferencing in all meeting rooms.
- Data outlets are to be located above the desk top in office areas. Exact position to be confirmed at later stage.
- Wireless tablets/computers on wheels (COW's) in the BRU for the maintenance of animal and procedure logs.

## 4.2 COMMUNICATIONS CABINET

It is proposed to provide communication cabinet to communication room within the IHRI building. Each cabinet will have the following specifications:

45RU cabinet to accommodate standard 19" rack mounted equipment, complete with power rail, and sufficient number of RJ45 passive patch panels to terminate field outlets. Steel cable management panels are required at regular intervals. A 15A screw type power outlet will be provided to each cabinet. The cabinet will be mounted on plinth with adjoining ground mounted tray with check plate lid. Cable enter and exit the cabinet from the bottom of the cabinet.

Ventilation: Rack Top Mounted Fans x 2, Open at side bottom.

| | |
|---|---|
| Shelves: | 2 fixed + 2 removable, perforated steel capable of holding 20 kg safely and adequately. No greater than 2RU on face mount. |
| Cable Entry: | Top, Provide cable management to the sides. |
| Power Outlets: | Single GPO x 12; mounted vertically down the rack |
| Colour: | Beige, with black frame |
| Fixing: | Adjustable feet |

## 4.3 STRUCTURED CABLING

New voice and data structural cabling system will be provided within the IHRI building. The installation will conform to AS/NZS 3080 requirements.

Communications backbone and facility cabling will be UTP Category 6 (performance) and terminate with RJ45 outlets at the required locations. Communications voice and data structural cabling will be enclosed within the communications room. Reticulation of cabling will be such that the cable lengths are within 90m, with additional 5 m lengths allowed for fly leads and patch leads, total length 90m maximum. Provision of active data network equipment is not included in this scope of works. RJ45 end-to-end connection is recommended.

Communication outlets will consist of Cat 6 RJ45 jacks, mounted in a faceplate to match the electrical power faceplates. The location of each outlet will be coordinated with power, and other relevant equipment. The cable will run back to the nearest communications room using cable tray and centenary wire cable support systems in the ceiling space.

Communications cabling shall reticulate on separate and individual cable trays from the power cabling within the accessible ceiling space wherever possible. Communications facility cabling shall also reticulate within segregated skirting duct or within benches to access communication outlet locations.

Final design and installation requirements will be determined during the Design Development Stage of the works.

## 4.4 BACKBONE CABLING

Optical fibre backbone cabling shall be provided within the IHRI and to remote buildings where required to facilitate communications link to the existing Hospital.
Where fibre optic cable runs underground, it will be a loose-tube, jelly-filled construction, with spare cable coiled at every pit, and at each point where the cable enters a building.

For telephone services, major distribution frames will be connected by multi-pair UTP external grade block cable, in the form of a hierarchical tree structure. The capacity of the cable will be determined by the local requirements, in multiples of 100 pairs. Where available, these will be run within building spaces, however, where this is not possible, the cables will be run underground, within a pit and conduit network established for this purpose.

Final design and installations requirement will be determined during the Design Development Stage of the works.

## 4.5 DATA OUTLETS PROVISION

Provision of data outlets shall be confirmed at a later stage.
Note: communication outlets can be used for both voice and data communications

Final design and installations requirement will be determined during the Design Development Stage of the works.

## 4.6 TELECOMMUNICATION ROOMS AND RISERS

Communication Rooms will be provided at the HIRI building. Within the communications rooms there are communications risers, which will be vertically aligned wherever possible to ensure a cost effective installation and provide minimal life cycle costs. With the risers vertically aligned where possible this helps to ensure that ceiling heights are maximised and coordination between structure and other services is possible.

The communications rooms will not have a raised floor but rather a grid of cable trays above the communications racks.

The rooms will have air conditioning and be provided with standby power supply. The rooms will also have no ceiling, be painted and have anti-static flooring to architectural details. The wall will be of full height for equipment mounting.

The rooms will be the service nodes for:

a. Voice and Data Structured Cabling
b. Security
c. MATV
d. BMCS

Note that the BMCS is to interface/ be compatible with the system at Liverpool Hospital. The BMCS is to be monitored and controlled. From BMCS head end at Liverpool Hospital with a relay alert to the Institute Facility Manager.

The services within the communications room will be supported by a rack mounted UPS.

## 4.7 INTERCOM SYSTEM

An intercom base station will be provided at a selected external entry point, interconnected with the individual local stations. This will include speakers and microphones. Wall mounted intercom local stations will be provided to interconnect with the base stations and external entry points. An audible tone device will indicate that the individual station is being called, with a press-to-talk switch so that the local station can communicate with the base station only when the switch is held down. Integral momentary action door release switches will be provided to operate the door release or opening mechanisms at the external entry point.

Emergency two-way communication systems, to an attended location, will be provided at laboratories if required.

Final design and installations requirement will be determined during the Design Development Stage of the works.

## 4.8 PUBLIC ADDRESS SYSTEM

The Public address system with zone selection facility will be provided at selected location of the new building. The system will include the following functions and feature:

a. Ceiling mounted PA speakers
b. Multi channel mixer amplifier
c. Selector switch
d. Volume controller
e. Automatic anti feedback

An automatic override switch shall be provided to interface with the Building Emergency Warning Intercom System (EWIS)/ Building Occupancy Warning System (BOWS).

Due to the nature of the building operations, we recommend to link the PA system with the emergency evacuation alarm system for building evacuation.

Final design and installations requirement will be determined during the Design Development Stage of the works.

## 4.9 VIDEO AND AUDIO SYSTEM

Provision of cabling will be allowed to facilitate the connection of Video and Audio equipment, including microphones, ceiling mounted speakers, and cabling from Video and Audio equipment at Equipment Racks to ceiling mounted equipment.

AV systems will be provided to nominated locations such as rooms and meeting rooms. Each room will have facilities for ceiling mounted video projector and video conferencing/ tele-presence connections.

Provision of active equipment (such as, projector, AV equipment, Amx) is not included in this scope of works.

Details of Video and Audio System will be determined during design development stage.

### 4.10 MATV SYSTEM

A new MATV system will be provided to HIRI.

Free-to-air bands: A system will be suitable for the reception of the following local Free-to-air services:

- SBS.
- ABC.
- Seven Network.
- Nine Network.
- Network 10.

### 4.11 COMMUNICATIONS SYSTEM PROVISION FOR FUTURE

The communication system will be designed that it will be flexible, expandable and be able to link and connect to the new communication systems to be installed in the future.

## 5 FIRE AND BOWS SYSTEM

A new addressable smoke detection and alarm system in accordance with the Building Code of Australia, AS1670 and comprise of smoke detectors, thermal detectors and fire alarm activation devices shall be provide throughout the building. The maintenance testing of the fire detection system shall also be designed in accordance with the requirements of AS1670.

The fire indicator panel (FIP) shall be located within the main entrance and it is proposed that the new FIP be connected to the existing Liverpool Hospital fire alarm system network.

The FIP shall be interfaced with the electronic security door locking system and provide fire trip signals to the respective mechanical control switchboards.

The FIP shall also interface with a building occupancy warning system to sound throughout the building in the event of a fire alarm.

# 6 AUSTRALIAN STANDARDS, STATUTORY REGULATIONS AND BCA COMPLIANCE

## 6.1 EMERGENCY LIGHTING

Within the HIRI emergency lighting and emergency exit lighting will be provided in accordance with the Building Code of Australia, AS/NZS 2293 and comprise of self contained emergency exit and emergency luminaries. The maintenance testing of the emergency lighting system will also be designed in accordance with the requirements of AS/NZS 2293.

The emergency lights will be integrated within base building luminaries where possible or recess 10-watt tungsten halogen emergency fittings complete with self-contained battery and charger.

# 7 LIGHTING DESIGN

## 7.1 LIGHTING

Artificial lighting will be provided throughout the HIRI in accordance with the requirements of Australian Standard AS 1680 and the requirements of BCA. Luminaries will be energy efficient in their operation and incorporate a high output ratio.

The laboratory will be provided with a lighting system that achieves the value of illuminance recommended in AS 1680.1. Level of task lighting will be adequate for the specific tasks involved as recommended in AS 1680.2.4.

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Type of interior or activity | Maintenance illuminance lx | Lamp colour appearance group | Lamp colour rendering group | Maximum glare index | Other recommendations and advice |
| 32 LABORATORIES AND TESTING AREAS | | | | | Special lighting requirements may apply for some laboratories. See AS 1680.2.2 for recommendations for office type tasks. See AS 2243 series for recommendations for safety in laboratories. Regulations also exist covering safety in laboratories. |
| 32.1 General | 400 | 1 or 2 | 2 | 19 | |
| 32.2 Calibrated scales, precision mechanisms and instruments | 600* | 1, 2 or 3 | 1B or 2 | N/A | * The use of local lighting is desirable. Care should be taken to avoid unwanted reflections. |
| 32.3 Screen-based tasks | * | * | * | * | * See recommendations of AS 1680.2.2 |

Overhead lighting fittings will consists of closed units sealed to the ceiling to prevent ingress of un-filtered air when a laboratory is under negative pressure or accumulation of gases in the ceiling spaces when the laboratory is at a positive pressure.

Up-lighters will be provided to supplement laboratories general lighting system. The up-lighters will integrate with the laboratory reagent shelves and services columns. Reflective panels within the suspended ceiling over the reagent shelves will be installed. The luminaires will provide indirect lighting with reflection from the reflective ceiling panel to optimise lighting output.

Alternatively, reflective recessed luminiares will be installed at the laboratory.

The majority of luminaires used within the HIRI will incorporate efficient tri-phosphor fluorescent lamps and electronic control gear.

Luminaires will incorporate tri-phosphor fluorescent lamps or metal halide lamps. The lighting system will consider the security requirements of the HIRI.

All tri-phosphor fluorescent lamps and metal halide lamps will incorporate high colour rendering properties Ra ≥ 85 and a colour temperature of 4100K, to comply with the recommendations of Australian Standards.

Architectural lighting will be incorporated to enhance the visual features for aesthetics, image and identity.

External lighting will be designed in accordance with AS 1158, AS4282 Obtrusive Lighting Code and AS4485.

Lighting control within the HIRI will generally be by local switches to individual rooms. Large open plan spaces may be bulk switch controlled. The lighting control system is to be designed and installed to utilize daylight wherever possible to minimise energy usage.

External luminaires will be switched via photoelectric cell and time clock control.

Lighting controls system will be provided in accordance to BCA requirement.

### 7.1.1 Special lighting control at BRU

Special programmable lighting control system will be provided to BRU for both lighting levels and time controls. The system will be suitable for 24-hour operation and experiment use.

# 8 SECURITY SYSTEM

## 8.1 GENERAL

A new electronic security system will be provided to the HIRI. The new system shall be interfaced with the existing Liverpool Hospital security system to provide individual alarm signals. The existing security system located at Liverpool Hospital will be modified, under the HIRI work package for system interfacing, if required, subject to clients confirmation.

It is anticipated that the HIRI will incorporate the following security systems:

a. A lockable perimeter monitored by the Security Control Room (or Engineering Office)

b. Comprehensive recorded CCTV coverage

c. Access control on selected entry points to secure against unauthorised access (such as, research laboratories, building entrance)

d. Safe and secure staff only access between the Institute and the research and clinical areas at Liverpool Hospital.

e. Further access control for dry and wet laboratory areas by an electronic controlled key system which identifies and logs the user.

f. After hour access control and monitoring

Note:

- A standardised set of modular (clip in/clip out) office furniture components is to be used throughout the wet and dry laboratory areas to allow the easy reconfiguration of office areas to meet changing requirements.
- A standardised set of modular laboratory components is to be used throughout the wet laboratory areas to allow the easy reconfiguration of the laboratory areas to meet changing requirements.
- The heights of partitioning elements and storage units within office work areas should not exceed 1250-1350mm suggested to ensure that natural light penetration is preserved.
- Consideration is to be given to the use a networked, badged printing (Canon Uniflow) system to preserve the confidentiality of material sent to the printer, and reduced paper wastage, and improve access to available printing equipment. Item sent to print can only be printed using a key card.

Electrical Services provisions will be as follows:

a. All alarm signals will relay to the Security Control Room

b. The intruder alarm system (reed switches) will monitor street accessible doors and windows.

c. The Security Control Room will monitor all intruder alarm devices.

d. Fixed high resolution CCD digital colour CCTV cameras will be installed at strategic locations. The master CCTV monitors, control panels and recorder will be located at the Security Control Room.

e. Duress alarm button will be provided at Reception Desk if required.

Details of the electronic security system, field devices locations and cable installation details are to be finalised during the design development period of the project as to the type and extent of systems to be provided throughout the building.

The work will comply with the relevant section of, but not limited to AS220.1 Intruder Alarm Systems and the BCA.

## 8.2 ACCESS CONTROL SYSTEM

The proposed access control system will incorporate sufficient door reader modules, electronic strikes (fail safe), electric latches (fail safe), proximity card readers and door release pushbuttons as required to serve the nominated locations.

All external perimeter doors will be electrically locked to prevent unauthorised access. Some doors will require free access during certain periods and will be set with predetermined times to automatically unlock or open.

The alarm software will display the status of these doors, so that security staff can monitor what doors are open at all times.

The electric latch door locks along the egress path will be of fail-safe-type; these doors will allow people to escape from the building during emergency. During normal and after hours, the door reed switches will be programmed such that un-authorised use of the monitored door will raise an alarm signal to the security system.

Selected storerooms and special rooms will be fitted with fail-secured type electric latches door control for special security arrangement. These selected locations will not form part of the building egress path.

Specialised laboratories and spaces, such as, special equipment rooms, dry and wet laboratory areas will be fitted with Access Control System.

Selected rooms will be provided with interlocks on doors to prevent unauthorised access. The doors will allow access when the equipment is switched off or the sealed radioactive source is shielded in its storage position.

Electronic access control and other complimentary security systems shall be used to ensure appropriate levels of security are maintained throughout the facility.

## 8.3 INTRUDER DETECTION AND ALARM SYSTEM

Intruder detection and alarm system will be provided to monitor perimeter doors and incorporate zone expanders, door reed switches and passive infrared movement detectors to nominated locations as required.

All external doors will have reed switches.

The intruder alarm system will be controlled from a central security location.

Where alarm systems, are used for transmission of other applications such as fire detection system, they will also comply with the relevant standards for those systems. All equipment will be located in a position to minimise the risk of interference and will be located within, and will not be visible from outside the armed zone.

The response to alarms will be dependent on the location of the area in alarm in relation to the location of, security staff. All alarms will report to the Security Control Room.

## 8.4 CCTV SYSTEM

A surveillance system is designed to be a deterrent to illegal activity as well as providing the ability to review incidents after the event. It is not intended for the CCTV system to be monitored at all times as incidents will be recorded automatically.

It is proposed to install a new CCTV system utilising digital IP colour cameras throughout the HIRI. The cameras will be fixed, with network cards required within each server. Recording of digital IP cameras is to be stored into new hard drives.

A digital system will be software driven. It will provide continuous recordings of all cameras with search capabilities using date, time or any number of user-defined filters. The software will have the ability to be set for motion detection of a user defined area and is fully programmable by the administrator. This system will also be capable of receiving external inputs from alarms etc to enable automatic response e.g. if a duress alarm is activated the monitor will automatically save the relevant images to an event file as well as display a full screen image at the monitoring site.

All controls for this system will be software driven including camera adjustments such as contrast, brightness etc and the system has a number of security features that prevent unauthorised access to the program.

All images will be recorded onto Hard Disk Drives within the servers. The length of recording is dependent on the amount of activity, number of cameras and quality of image recorded. Each server is capable of expansion to four HDDs.

Images can be saved in either JPEG or BITMAP format, saved images can then be transferred via E-mail', CD or other data -transfer method.

The system will have the ability to be connected to external locations for retrieval of images either by the computer network or by telephone line and modem.

All areas covered by CCTV will have display warning notices provided on all entries to warn all persons entering the facility that the area is under surveillance. This warning will be displayed in all public areas within the facility where surveillance systems are in use.

Final design and installations requirement will be determined during the Design Development Stage of the works.

# 9 VERTICAL TRANSPORTATION

It is proposed that two passenger lifts will be provided to service the Ingham Health Research Institute building with the estimate population of 300 people for this building.

### Passenger Lifts

Passenger lifts shall have a minimum car size of 1400mm wide x 2000mm deep x 2300mm high above the floor level to accommodate for stretcher facility for passenger lifts installed in any storey above an effective height of 12m in accordance to the BCA (Building Code of Australia) Part E3 Lift Installations.
In addition, passenger lift shall provided with handrail all round and a skirting and the minimum clear width of car door openings shall not be less then 900mm as specified in the lift Code AS1735 Part 2.

**LIFT SERVICES – SPACIAL REQUIREMENTS**

The proposed lift services infrastructure will comprise two lifts in the centre of the building both lifts will serve all floors.

Lift equipment schedules – this information has been based on a (motor room less) lift solution.
Note that below are estimated dimensions. Exact dimensions shall be confirmed as the design progresses.

| | |
|---|---|
| **Classification** | Machine Roomless |
| **Quantity** | Two |
| **Type** | Gearless |
| **Speed** | 1.0m/s – 1.6 m/s |
| **Shaft Size** | 2400mm Wide<br>2650mm Deep |
| **Minimum Car Size** | 1450mm Wide<br>2000mm Deep<br>2300mm High |
| **Pit Depth** | 1300mm (1.0m/s) – 1400mm (1.6 m/s) |
| **Door Opening width** | 1000mm |
| **ReGen Drive** | Optional |

# 10 REFERENCE

*Building Code of Australia (BCA)*

*Wiring Rule AS/NZS 3000:2000*

*Interior Lighting Part 1 AS1680*

*Control of the Obtrusive Effects of Out- door Lighting AS 4282:1997*

*Laboratory Design and Construction Part 1: General Requirements AS/NZS 2982.1*

*Safety in Laboratories Part 7: Electrical Aspects AS 2243.7*

*Emergency and Exit Lighting AS/NZS2293*

*Security Intruder Alarm System AS2201*

*AS3080*

*Telecommunication Installations AS/NZS 3084:2003*

*ACA Installation Requirement for Customer Wiring S009*