

SPECIFICATION TABLE OF CONTENTS

SECTION 1

CITY OF PORT PHILLIP SPECIFIC REQUIREMENTS

- PROJECT METHODOLOGY STATEMENT
- APC SCOPE OF WORK
- VICTRACK SCOPE OF WORK
- IMPACT TO CURRENT TENANT AND FACILITY
- SITE VISITS
- WORK PROGRAM

SECTION 2

ARCHITECTURAL TECHNICAL SPECIFICATION

SECTION 3

STRUCTURAL ENGINEERING CERTIFICATION & COMPUTATIONS

- STRUCTURAL ENGINEERING CERTIFICATION
- STRUCTURAL ENGINEERING COMPUTATIONS

SECTION 4

ELECTRICAL & FIRE ENGINEERING SPECIFICATION

- ELECTRICAL ENGINEERING SPECIFICATION
- CITY OF PORT PHILIP STRUCTURED CABLING STANDARDS FOR DATA & VOICE, REV 2.4,
- VESDA DATA SHEET
- HID CARD READER DETAILS

SECTION 5

PERMITS

- BUILDING PERMIT APPROVALS
- HERITAGE VICTORIA APPROVALS
- TOWN PLANNING APPROVALS

SECTION 1
CITY OF PORT PHILLIP SPECIFIC REQUIREMENTS

CITY OF PORT PHILLIP PROJECT METHODOLOGY STATEMENT

The following scope of works is to be read in conjunction with the drawings, specifications and schedules for the proposed South Melbourne Town Hall IT Server Room, located at Level 1, 208 – 220 Banks St, South Melbourne

GENERAL NOTES & CONTACT DETAILS:

- All architectural plans and documentation are to be read in conjunction with Structural, Electrical, Mechanical, Fire Engineering and APC Documentation.
- All works on VicTrack Fibre must be undertaken by a Victrack authorised contractor and completed to VicTrack Standards
- All data and fibre cabling is to be meet COPP (City of Port Phillip) City of Port Phillip Structured Cabling Standards for Data and Voice located in Electrical & Fire Engineering Specification Appendix i.
- Communication cabling work is to be carried out by Panduit certified electrical contractor.
- All UPS supplied power to be balanced over each phase.
- All UPS supplied power outlets to be labelled as to the phase it comes from.(Red, White or Blue)
- Notify COPP Curatorial Services of the proposed work site to ensure Art work is protected.

1. STAGE ONE: EXISTING SERVER ROOM WORKS/CONSTRUCTION OF NEW IT SERVER ROOM

Part A: Removal of Compactus by COPP Building Maintenance prior to commencement of building works.

Part B: Demolition works to existing Office 01 to make way for new IT Server Room including:

- Reinforcement of floor to support new IT Equipment.
Refer to Structural Engineering documents and coordinate with structural engineer.

Part C: Building works to proposed new IT Server including:

- Installation of proposed new IT Server Room partition walls.
- Installation of anti static vinyl and associated skirting.
- Supply UPS power as drawn. Refer to City of Port Phillip Structured Cabling Standards for Data and Voice
- Installation of cable tray and Panduit fibre tray as drawn.

Part D: Installation of APC equipment by APC Authorised Contractor:

APC Authorised Contractor to install APC equipment (APC Build Number ISX665479-029)

- APC Authorised contractor to connect APC In row cooling units (x2) to non essential service

Part E: Panduit Certified contractor works to complete the following:

- Each Rack is to have 48x Panduit Cat 6 UTP tie cables fitted off to the Comms rack.
Note: The proposed design includes 3 no. Server Racks & 1 no. Comms Rack
- 2x Panduit Cat 6 from the UPS room to the new Comms Rack
- 2x Panduit Cat 6 from the Air Conditioning control panel on the roof to the new Comms Rack

Part F: These works are to be completed in two phases. Phase one is the roughing in of all services, to enable an afterhours cut over to complete phase two.

Part F: Phase one - Rough in of services

- Rough in new fibre ready to for the relocation of existing VicTrack Fibre, work must be undertaken by Victrack authorised contractor and completed to VicTrack Standards as the Asset is owned by VicTrack.
- Panduit Certified contractor to complete the following rough in works;
20 Pair Cat 3 Tie cable from PABX room and fit off to a 24 Port Panduit RJ45 Highway in a two wire configuration. Fitoff to occur in Comms Rack.
- Cat 3 Tie Cable extension via a 20 pair Krone block with the pairs colour matched.
(Krone Block Location to be noted on the as constructed plans)
- 8x Panduit Cat 6 from the PABX Room to new Server Room, extend via Panduit consolidation box.
(Consolidation location to be noted on the as constructed plans) – fitted off in Comms Rack
- Rough in Fibre for Emerald Hill Library to be extended via splice and tested (Splice location to be noted on the as constructed plans) – Fibre tray to be installed into Comms Rack
- 10 x Panduit Cat 6 from the new IT Server Room Comms Cabinet coiled in roof ready for fit off in new IT Area for works in Stage 2

Part F: Phase two (to be conducted After Hours)

Note: VicTrack authorised contractor to complete VicTrack service relocation. Items to include:

- Electrical Contractor to Relocate the existing Fibre tie cables from Ground Floor cabinets, reroute fibres and retest.
- Electrical Contractor to extend fibre to Emerald Hill Library to be extended via splice and tested.
- Any remaining fibres to be coiled up and sealed into Heavy Duty Plastic Bags and safely mounted in the roof space. (Location to be noted on the as constructed plans)
- Relocation of Networking equipment and Server hardware to be completed by COPP Info Sys Staff during Cut Over/Outage window (Over a weekend to minimise impact to staff)

Part G:

- Disconnect power supply to Sola UPS by Builder's Electrician.
- Disconnect power supply to Liebert Air Conditioning System by Builder's Electrician

2. STAGE TWO: CLEARING OF OLD SERVER ROOM BY COPP

- Removal of Liebert Air Conditioning System by COPP
- Removal of Dell data Racks by COPP
- Removal of Panduit Communication Rack by COPP
- Removal of Sola UPS by COPP

3. STAGE THREE: COMPLETION OF BUILDING WORKS

Part A: Demolition and new building works to proposed new Office/Store including:

- Demolition of raised flooring
- Construction of new partition walls for new Office/Store
- fitout room for COPP IT

Part B: Electrical contractor works by Panduit certified contractor:

- Fitoff 10x Panduit Cat 6 from the Comms cabinet to the new Office/Store.
- Fitoff 5x Double GPO's around perimeter of new Office/Store.

APC SCOPE OF WORK

Installation of APC equipment it to be by an APC Authorised Contractor. Refer to APC Build Number: ISX665479-029 for scope of works and equipment schedule.

The following highlights the general scope of work that needs to be carried out by APC authorised subcontractors.

APC SCOPE OF WORK	
	Equipment supply
1	ISX InfraStruXure Bundle
2	Freight delivery
	Mechanical work
1	Receive, crane and position 2 x Air Cooled condensers onto roof top and position on brackets
2	Receive and position 2 x APC DXRD units in data room
3	Supply and install a new set of refrigerant pipes between roof mounted condensers and the new DX units (approx 20M run) including ALL valves and fittings
4	Supply and install ALL pipe supports, insulation, mechanical shielding and labelling to new pipe work.
5	Evacuate and charge system with R410A refrigerant
6	Supply and install new high temperature drains to existing tundish
7	Make good and seal all wall, ceiling and roof penetrations
	Electrical work
1	Supply and install 3 phase 100A power cabling to new UPS (not more than a 25M run)
2	Supply and install power cabling to 2 x new InRow RD units
3	Supply and install power cabling to 2 x remote condensers installed in plant room (25M run allowed for only)
4	Supply and install cable between UPS and remote PDU
5	Supply and install all necessary cable trays for above cable work
	Management work
1	Dedicated Project Manager to oversee all works. Single point of contact for delivery and installation of all works both APC and parties
2	Attend pre and post install planning meetings as required
3	Pre installation data room project planning and consultation until final project sign off / commissioning

Tenderer is required to use the APC authorised subcontractors listed in the table below.

Partner	Contact person	Phone number
Alphawest/Optus	Carmine Angelone	03 8695 4111
ASI Solutions	Brian O'Rourke	03 9674 3130
Computercorp	James Demos	03 8698 2222
Data 3	Mario Palermo	03 9848 8000
Dell	Jarrold Curtis	0400 332 210
Dimension Data	Cameron MacLean	03 9626 0770
IBM	Joe Modica	03 9626 6412
Perfekt	Roman Shiferson	03 9945 2217
Southern Cross	Wayne Glynn	03 9804 1700
Thomas Duyrea	Erez Grushka	03 8420 0100

For more detail on the APC scope of work, the tenderer is to contact the following APC representative.

APC Contact details:
 Chris La Fontaine
 Account Manager APC
 Direct +613 8637 8809
 Fax +613 9690 0255
 Chris.lafontaine@apcc.com

VICTRACK SCOPE OF WORK

The following highlights the general scope of work that needs to be carried out by VicTrack appointed subcontractor.

	General scope of work
1	Relocate Fibre Optic cable in South Melbourne Town Hall

Tenderer is required to contact the VicTrack representative for quote and more information regarding the proposed relocation of fibre optic cable, as the fibre optic cable is a property of VicTrack and can only be managed by its appointed subcontractor.

The contact information of the VicTrack representative is the following,

VicTrack Contact details:
Rory Fitzpatrick, Victorian Account Manager
Level 17
595 Collins Street
Melbourne Vic, 3000
Phone: 9619-8828

IMPACT TO CURRENT TENANTS AND FACILITY

The South Melbourne Town Hall has a number of occupants currently occupying the building on various floors and locations, while sharing the same utility and facility resources. The tenderer should make sure they have considered all impacts that may cause by the construction works, to the external parties. The Contractor should list out all the items with potential impact, agree with the Superintendent, and make proper notice and communication to the external parties.

The tenderer is to make allowance in their submission (for potential work to be carried out out-of-hours) of any activities that may involve noise or disruption to the existing tenants. E.g. work involving excessive noise that may affect the normal function of ANAM, main switchboard power shut-down to the upgrade of power cable and server room switchboard.

Tenderer is to notify COPP Curatorial Services of the proposed work site to ensure Art work is protected.

SITE BRIEFING DURING TENDER ADVERTISE PERIOD

A site briefing is proposed for Tuesday 24 August at 10am and Thursday 26 August at 10am. The site briefing will run for 30 minutes on both days however attendance to only one site briefing is necessary.

It is a mandatory requirement to attend one site briefing during the tender advertising period. Tenderer attendance will be noted by CoPP staff at site briefing. Tenders submitted without tenderer having attended the site briefing will be considered as non conforming tender submission.

PRACTICAL COMPLETION DATE

The practical completion date for the proposed works is by end of February 2011. Tenderers must submit nominated milestones and milestone deadlines as well as proposed alternate dates of practical completion prior to the end of February 2011. Tenders with practical completion date nominated prior to the end of February 2011 are highly encouraged by the Principal.

SECTION 2
ARCHITECTURAL TECHNICAL SPECIFICATION

CONTENTS PAGE

SECTION	TITLE
SECTION 02050	DEMOLITION
SECTION 05500	METALWORK
SECTION 08100	FIRE RATED DOORS & DOOR FRAMES
SECTION 08200	DOORS & DOOR FRAMES.....
SECTION 08710	DOOR HARDWARE
SECTION 09250	PLASTERBOARD
SECTION 09500	SUSPENDED CEILING
SECTION 09650	RESILIENT FLOORING.....
SECTION 09910	PAINTING
SECTION 15330	SPRINKLER SYSTEMS.....
SECTION 15810	AIR DISTRIBUTION DUCTWORK.....
SECTION 16350	ELECTRICAL INSTALLATIONS.....
SECTION 16710	COMMUNICATION CABLING

SECTION 02050 DEMOLITION

PART I GENERAL

101 General

A. Scope

The work of this section includes but is not limited to the following items:

- Generally **all** existing building features to facilitate new proposed layout
- Cut and opening of existing walls, ceilings and floors to facilitate new layout.
- Removal of existing floor finishes to areas with proposed new floors finishes
- Removal of existing wall finishes to areas with proposed new wall finishes
- Disconnection of services, including existing fire sprinkler system.
- Cleaning the site thoroughly on completion.

B. Examine documents: Examine parts of the drawings and this specification for requirements which affect the work of this section. In particular, take note of related work.

C. Co-ordination: Co-ordinate with other trades affecting or affected by work of this section, co-operating as necessary to ensure steady and satisfactory progress of the work.

D. Protection works maintained at all stages. Ensure that the hoarding remains intact.

E. Existing areas to the building to be maintained free from damage, debris, building materials, noise and nuisance.

F. Maintain hoarding in place to facilitate security of premises until lock up stage.

102 Related Work

Co-ordinate and co-operate with the following trades: Electrical Systems, Mechanical Systems, Steelworker, Plumber.

Disconnection of existing services by appropriate other trades.

Site Preparation – Access and site office.

Water Distribution

Disconnection of services and provision of temporary power requirements

Recycling of demolished materials

Fire Services

103 Quality Assurance

Provide data indicating a minimum of three years of experience in such work as required by this specification. Supply names of contacts, with telephone numbers, who can verify performance quality.

104 References

Comply with applicable portions of the following Australian Standards:

AS 2436 1981	Guide to noise control ... and demolition sites
AS 2601 2001	The demolition of structures

Comply also with the requirements of:

Applicable building regulations,

Statutory authority having jurisdiction, local council.

105 Public and Property Protection

Provide measures required by municipal and state ordinances, laws, and regulations for the protection of surrounding property, footpaths, streets, kerbs, the public, occupants and workmen during demolition operations. Comply with the above ordinances, laws etc. in carrying out measures including barricades, fences, warning lights and signs, rubbish chutes, etc..

No blasting for demolition purposes will be permitted.

Exercise due care in executing this work.

Make good to original condition, damage to structures to be retained and to adjacent property which results from demolition operations.

Perform restoration work without expense to the Principal.

106 Fees

Pay all fees due to all authorities requiring same in connection with the work of this section.

107 Services

Before demolishing and removing parts of building having electrical wiring, gas and water pipes, conduit or similar items embedded in them, notify the Superintendent, authorities having jurisdiction, and make sure that these items are out of service so that they can be removed without danger.

108 Photographic Record

Arrange for a professional quality photographic record of the progress of demolition. Produce for the Principal A4 size (297 x 210mm) prints of "before and after" demolition of typical work involved in demolition.

PART II MATERIALS

201 Demolished Materials

Material required to be demolished becomes the property of the Contractor. Remove it from the site.

Exceptions to this clause are as follows:

- items noted in architectural documentation for reuse, relocation, retention, etc. Position for storage to be confirmed by the Superintendent.
- specific items specified by Principal to be retained either prior to tender or during construction.

The Contractor shall maintain Noted items in clean, good working order without damage and make allowance to place noted items in storage at direction of the Superintendent.

202 Equipment

- A. Supply equipment required to perform the work of sufficient capacity to meet the time schedule.
- B. Provide disposal containers for disposal required.
- C. No containers may be located on public streets or pavements without obtaining required municipal permits for same. Co-operate with Sub-Contractors doing work in or near container locations to prevent disruption of their work.

203 Existing Carpet

Re-use existing carpet as noted in drawings.

204 Recycling Materials and Waste Management

All materials removed shall be recycled where possible and this includes but not limited to: -

- All Concrete recycling
- All Plasterboard recycling
- All Timber recycling
- All Metal recycling
- All Bricks

Provide evidence to the Superintendent of the recycling measures undertaken.

PART III EXECUTION

301 Examine the Site Conditions

Examine carefully the site conditions.

Start of work means total acceptance of conditions.

302 Existing Reinforced Concrete

Not applicable.

303 Methods and Operations

- A. Demolish and remove completely parts of structure listed and/or drawn for demolition. The methods of cutting and removal of floors, walls, and other items to be removed are to be approved by authorities having jurisdiction.
- B. Furnish flame-cutting required to dismantle sections of equipment too large to be otherwise removed. Flame-cutting is to be performed only by experienced and qualified mechanics. Protect combustible surfaces during flame cutting. Maintain fire extinguishers, required by the Fire Authority, at hand.
- C. Do not drop or throw material. Lower by means of hoists or rubbish chutes. Wet down thoroughly during demolition to prevent nuisance of dirt and dust. Equip trucks used in hauling debris with tarpaulins to cover the loads. Do not load so excessively as to spill debris on streets.
- D. Plaster removal: In general, removal of existing plaster showing cracks, bulges or drumminess is required. Refer to Superintendent if in doubt.
- E. Except as placed in approved disposal containers, do not allow combustible material and rubbish to accumulate on the site. Remove daily, or as directed. Burn no debris on site.
- F. Upon completion of wrecking, demolition and the removal of rubbish and debris, remove equipment.

304 Reinstatement

Restore to original condition, without expense to the Principal, any damaged parts of the remaining construction resulting from failure to provide adequate protection. Refer also Clause 105.

305 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the Architect.

The contractor is responsible to coordinate cleaning and ensure that each trade leaves the site in an entirely clean condition, ready for the work of other trades.

END OF SECTION

SECTION 05500 METALWORK**PART I GENERAL****101 Scope**

Supply, engineer and install all required general and architectural metalwork items contained within this Section and required to complete the works.

- Support framing as required for equipment & other equipment cabinets
- Overhead cable trays

Include all nailers, screws, blocking, furring, grounds, hardware, framing, shoring, bracing, incidental framing, scaffolding and barriers required by the Drawings and necessary to complete the Works.

102 Related Work

Coordinate and cooperate with the following trades: - Mechanical Systems, Steelworker, Plumber.

103 References

Comply with the applicable portion of the following Australian Standards:-

AS-1170 Part 1-1989

AS 1428	Disability Code – Parts 1 - 4
AS 1450 - 1983	Steel Tubes for Mechanical Purposes.
AS 1554 - 1994	Structural Steel Welding - Parts 1 and 2.
AS 1627	Metal Finishing - Preparation & Pre-treatment of Surfaces - Parts 1 to 10.
AS 1650 - 1989	Hot Dipped Galvanised Coatings on Ferrous Articles.
AS 1657 - 1992	Fixed Platforms, Walkways, Stairways and Ladders.
AS 1796 - 1993	Certification of welders and welding supervisors.
AS/NZS 3750.9 - 1994	Organic Zinc-Rich Primer.
AS/NZS 4600 - 1996	Cold Formed Steel Structures.
AS 1665 - 1992	Welding of Aluminium Structures.
AS 2312 - 1984	Guide to the Protection of Iron and Steel.
AS/NZS 2312 - 1994	Guide to the Protection of Iron and Steel against exterior atmospheric corrosion.
AS 3884 - 1991	Etch primers for pre-treating metal surfaces.
AS 3715 - 1989	Metal finishing - thermo set power coatings for architectural applications.
AS 4100 - 1990	Steel Structures.
AS 2785 - 1985	Suspended ceilings - Design and Installation.
AS3996 -1992	Metal Access Covers, Road Grates and Frames

104 Shop Drawings

Provide shop drawings for all metal work relating to IT Equipment racking and cable trays, specially manufactured items and where specified.

1. Drawings and details provided are indicative as to general and minimum requirements, and do not show all conditions. The Builder shall develop all details not shown and they shall conform with the indicative details shown.
2. Fabricator shall take and confirm all dimensions on site before commencement of fabrication.

PART II MATERIALS & WORKMANSHIP

201 Materials

A) Cable Tray

Provide galvanised. Cable tray, 600mm wide as per City of Port Phillip Structured Cabling Standards for Data and Voice located in Section 4 Appendix-i Electrical and Fire Engineering Documentation & Specification.

Prior to installation provide to Superintendent system specification and diagram indentifying the location of tray installation with elevation.

Supplier: to be approved by City of Port Phillip.

Accessories: Provide all necessary accessories, supports, etc, for connecting into the ceiling and for a complete installed system.

202 Welding

General: Details of all joints, the techniques of welding employed, the appearance and quality of welds made and the methods used to correct defective work shall conform to requirements of AS 1554- Part 1.

Certification: Welds shall be made only by welders who have previously been qualified by tests as prescribed in AS 1796 for the type of work required.

All welding shall be continuous. Tack welding or skip welding will NOT be permitted where items are to be galvanized. All exposed-to-view welds shall be ground smooth. Non-exposed-to-view welds, where uneven or rough, shall be ground smooth to ensure uniform galvanizing. All weld spatter shall be chipped off smooth or ground smooth. Grinding of welds shall be subject to the approval of the Superintendent.

203 Connection Design

External Items: Design shall conform to the recommendations of the following standard: AS 1554, noting particularly the design criteria on pages 14-22.

Complete Design: Design of connections not indicated on the drawings shall be completed and indicated on the shop drawings.

Flanges : Concealed where possible. Except as otherwise indicated, flanges connecting railings to vertical sections shall be sleeved inside railing sections and secured with flush or set screws. Except where access is impossible, connection screws and bolts shall be on the underside of joints. Fasteners on the top of railing sections will not be permitted.

Shop connections for steel fabrications shall be welded, and field connections bolted.

Exposed surfaces shall have a smooth finish with sharp well-defined lines and arises. Machined joints shall be milled to a close fit. Design all necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.

Thickness of metal and details of assembly and supports shall be such as to provide ample strength and stiffness.

Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Holes shall be drilled or punched and reamed in the shop.

Joints and connections shall be formed to exclude water and to permit draining during galvanizing.

204 Miscellaneous

Fasteners: Provide all required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with Superintendent as to the proper fastening systems suitable for the substrates to which the item is to be secured.

Fasteners for all items shall be galvanized and be vandal proof.

PART III EXECUTION

301 Examination

Inspect site conditions before fabrication and before delivery of materials. Ensure conditions are satisfactory for proper installation. Arrange for any rectification required. Start of work means total acceptance of relevant conditions.

302 Preparation

Site measurements: Take field measurements prior to preparation of shop drawings and fabrication, to ensure proper fitting work. Where possible allow for adjustments and fitting of the work in the field, if taking of site measurements might cause delay.

Co-ordination with work of others: Furnish to each relevant trade foreman anchorages and setting drawings, diagrams, templates and instructions for installation of items having integral anchors which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the project site.

303 Inspection and Reinstatement

All fabrications shall be checked as they are unloaded at the project site for evidence of any physical damage. Damaged fabrications shall be treated as follows:-

1. Damage through galvanizing: Noted and set aside for immediate cold-galvanizing repair. Do not install until reinstated.
2. Architectural metalwork: Returned to shop for repair or replacement.
Galvanizing Reinstatement: Repair per manufacturer's directions.

304 Installation

Errors in shop fabrication or deformations resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be corrected, by approved methods, at the Contractor's expense. Anchors, bolts and other required anchorage items shall be verified for proper size and accurate location prior to erection. During installation and assembly, form tight joints with exposed connections accurately fitted, and reveals uniform. Finished work shall be accurately located, plumb, level, square and true in reference to adjacent construction. All members shall be aligned, leveled and adjusted accurately prior to final fastening. Comply with all requirements set out in this Specification. Allow for all fabrication work, delivery, unloading, handling, hoisting, fitting and fixing in position and all cutting, notching, etc., welding and grinding off smooth and buffing up shop priming protective coatings and for submitting shop drawings and details for approval.

Prepare metalwork as specified and shop prime painting including touching up coat on site.

305 Protection

Immediately following installation, wrap or cover architectural metalwork to avoid wear and tear of finish during subsequent works.

306 Cleaning

Clean all materials installed to the satisfaction of Superintendent. Remove all temporary protective coatings.

307 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

SECTION 08100 FIRE RATED DOORS & DOOR FRAMES

PART I GENERAL

9 Scope

Supply and install a complete system of approved fire doors, frames and hardware, including but not limited to, the following :

- A. Standard fabricated door frames.
- B. Fire doors, doors.
- C. Hinges. (Refer Door Schedule).
- D. All required fastening systems.
- E. Factory prime painting.

10 Related Work

Co-ordinate and co-operate with the following trades: Carpenter, Electrician.
Finish hardware (except hinges) including supply of hardware templates
Wall construction
Doors and door frames

11 Quality Assurance

Approved Manufacturers : Refer Clause 201.

Submit evidence that tradesmen are fully trained and experienced in installation methods and permit only approved personnel on the site.

12 References

Comply with applicable portions of the following Australian Standards :

- | | | |
|-------------|-------------|---|
| AS 1530 | | Methods for fire tests on building materials, compounds and structures |
| AS/NZS 1905 | 1997 | Components for the protection of openings in fire-resistant walls |
| | | <i>There are 3 parts and 1 supplement to this standard, 1988 - 1997</i> |
| | 1905.1 1997 | Fire resistant door sets |
| | 1905.1 1988 | Supplement No. 1. Logbook for the maintenance of fire-resistant doorsets. |

13 Submissions

- A. Submit schedules and samples for approval within fifteen days of written notice or award of the contract has been received.
- B. Test prototype : Ensure that doors and frame assemblies supplied below are identical in construction to a prototype assembly which has been tested in accordance with the provisions of AS 1905 and AS 1530, except as permitted under AS 1905.
- C. Marking : Mark and tag doors and frames in accordance with the provisions of AS 1905.

14 Submissions Required at Completion of Work

Certification of Compliance and Log Book in accordance with AS 1905.

15 Delivery, Handling and Storage

Packing and Marking : Provide screws, bolts and fastenings necessary for proper installation, wrapped in paper and packed in the same package as the hardware. Legibly label each package, indicating that portion of the work for which it is intended.

Deliver doors and frames cartoned or crated to provide protection during transit and job storage.

Inspect materials upon delivery for damage. Minor damage may be repaired provided finish items are equal in respects to new work and acceptable to Superintendent; otherwise, remove and replace damaged items as directed.

Store doors and frames at building site under cover. Place units on wood packers at least 100mm high, or otherwise store on floors in manner that will prevent rust and damage. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 6mm spaces between stacked doors to promote air circulation.

16 Project Conditions

Refer Clause 301. Check and confirm dimensions at the site before starting fabrication.

PART II MATERIALS

1 Acceptable Manufacturers

Doors and frames : Pyropanel

2 Materials - Doors and Frames

Doors : Fire resistant [2 hours] plywood face sheets, mineral core, identical in construction to tested and approved assembly rated for opening rating required. Comply with AS 1905. Doors to be clearly labeled with compliance.

Support and Anchors : Fabrication of galvanised sheet steel or wire as required :

Wire ties : Standard, 3mm minimum, eight or ten per frame, in accordance with AS 1905.

Strap : Minimum 25mm x 3mm low carbon steel.

Inserts, Bolts and Fasteners : Manufacturer's standard units, including hot-dip galvanised items to be built into exterior walls.

Fit each frame with two (2) black rubber stops on the closing side.

Supply frames fitted with one galvanised 35mm x 12mm x 1.2mm sheet steel channel floor spreader.

Shop Applied Paint : Rust inhibitive primer to steel ready to receive finish coats on site. Refer Schedule of Finishes for Doors.

3 Fabrication

General : Fabricate steel frame units to be rigid, neat in appearance and free from defects, warp or buckle. Electrically weld corners and grind welds flush accordance with AS 1905.

PART III EXECUTION

6 Examination

Inspect site conditions.

Start of work means total acceptance of conditions.

Ensure that installation conditions will permit the specified requirements.

7 Manufacturer's Instructions

Comply with manufacturer's printed instructions except where more stringent requirements are shown, and except where manufacturer's technical representative directs otherwise.

8 Compliance with Standards

Be responsible for ensuring that the installation of doors and frames furnished is in full compliance with AS 1905.

Anchor and fully grout frames installed in masonry walls in conformance with the provisions of AS 1905.

Furnish required anchors and supervise installation to ensure installation is in compliance with the Standards.

9 Installation of Frames

Finish Hardware Preparation : Prepare doors and frames to receive finish hardware in accordance with final Schedule of Finishes and templates provided by hardware supplier. Comply with requirements of AS 1905 for door and frame preparation for hardware. Reinforce doors and frames to receive surface-applied finish hardware. Provide tapped holes for fittings.

Provide each frame with mortar-proof universal strike mortise blockout.

Provide each frame with provision for recessed hinges, with hinge reinforcement of not less than 3mm steel sheet, drilled and tapped to receive hinge screws.

Provide each frame to receive a closer with appropriate head stiffeners.

Frames with surface closers : 3mm steel stiffener.

Stiffen the head of each frame of doors in masonry with a welded steel section to accept the weight of masonry above.

Supply each frame with required hinges, welded to frame or loose, as specified on the Door Schedule.

10 Grout

Grout frames mounted in masonry openings with one part Portland cement and three parts sand, with sufficient water for pressure grouting. Provide fire rated grout to fire doors/frames to maintain integrity.

Provide bracing as required during grouting to maintain frame in true position.

Form face of grout to a nominal 5mm back from the face of the frame.

11 Finish

Clean frames thoroughly after assembly. Touch up with rust-inhibitive primer. Refer Finishes Schedule.

Make good surface imperfection of doors.

12 Numbering of Doors (Optional)

Number doors and frames to match Door Schedule.

13 Installation and Adjustment

Hang doors in strict compliance with manufacturer's recommendations and the applicable provisions of AS 1905.

Adjust doors to frames to obtain precise clearances.

Adjust door hardware to complete and proper operating conditions.

14 Cleaning and Protection

Properly clean work of this section and protect as necessary under various working conditions to avoid damage of any nature.

Repair or replace damaged parts, including repairs to adjacent work damaged in connection with work in this Section.

15 Certification

Refer Clause 106.

16 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 08200 DOORS & DOOR FRAMES

PART I GENERAL

17 Scope

Supply and install doors and metal door frames including but not limited to:
Internal doors

18 Related Work

Co-ordinate and co-operate with the following trades:

Carpentry
Plasterboard
Metalwork
Painting
Electrical

19 Quality Assurance

Prototype : At a location selected by the Superintendent construct a complete prototype installation of :
Include in each prototype elements required by this Specification, finished in every respect. When approved by the Superintendent, each prototype remains part of the work and becomes the standard for the remaining work.

20 References

Comply with applicable portions of the following Australian Standards:

AS 1288	1994	Glass in buildings - Selection and installation
AS 2689	1984	Timber doorsets
AS 4145	1993	Locksets

There are 4 parts to this standard, 1993 - 2002

21 Submissions

Submit the following for inspection by the Superintendent before installation:
Product literature on proposed hardware items
Samples of items as requested by Superintendent

22 Delivery, Handling & Storage

Deliver specified items shortly before installation is due to occur.
Prevent damage and deterioration during transport and handling.
Store carefully at site in a secure area. Prevent twisting and warping of doors. Note the condition requirements of Clause 304.

23 Warranty

Provide to the Principal a warranty covering faulty materials, and installation, warping of materials and other faults which may occur within five years of Practical Completion.

PART II MATERIALS

4 Acceptable Manufacturers

Capral Aluminium
Dorma

5 Internal Doors

Comply with AS 2688
Refer to Drawings , A3.01 and A3.02 Door Schedule, Door Hardware legend and Schedule

PART III EXECUTION

17 Examination

Inspect site conditions. Ensure conditions are satisfactory for installation. Start of work means total acceptance of conditions.

18 Preparation

Prepare openings in walls or other structures before installation. Install fixing grounds and inserts as required to secure frames.

19 Installation of door frames

Erect frames plumb and true. Brace as required until surrounding structure is complete. Comply with AS 2689.

20 Installation of Doors

Comply with manufacturers instructions and AS 2689. Reject doors which do not comply with AS 2688 Appendix A. Condition doors to average humidity in area prior to hanging..

Align doors to frame for proper fit and uniform clearance at edge and machine for hardware. Seal cut surfaces after machining.

Provide clearance of 3mm at jambs and heads; 3mm at meeting stiles at pairs of door; 12mm from bottom of door to top of floor finishing or covering. At thresholds provide 6mm clearance.

21 Installation of Hardware

Refer Schedule Door Schedule and Finishes Schedule and Door hardware Schedule and legend. Check deliveries on arrival. Keep items locked until needed. Assume responsibility for delivered items. Fit accurately and at correct heights, protect with heavy cloth until completion of project.

Label keys, and hand over to contractor.

Master key locks as instructed.

22 Adjustment and Cleaning

Adjust each door in its frame and ensure silent operation. Oil locks and hinges. Clean all surfaces marked during the installation of door frames, doors and hardware.

23 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 08710 DOOR HARDWARE

PART I GENERAL

Refer to Door Schedule and Door Hardware Schedule on drawings A3.01 and A3.02.

24 Scope

Supply and install door hardware including but not limited to :

Hinges

Pivots

Latches

Locks

Door holders

Push plates

Fasteners : Provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Confirm with Superintendent if in doubt.

25 Related Work

Co-ordinate and co-operate with the following trades:

Floor construction

Painting

Wall construction

Doors and door frames

Ceiling construction

Electrical

Carpentry

Fire Services

Metal finishing

Fire Rated Doors & Door Frames

26 Quality Assurance

Work of this Section shall be performed by experienced craftsmen familiar with the quality required in this class of work.

Where 5 or more items of a similar product are required, construct a prototype, full size. Finish the prototype in every respect. When approved by the Superintendent, this sample remains part of the work and becomes the standard for the remaining work.

27 References

Comply with applicable portions of the following Australian Standards :

AS 4145

Locksets

4145.2 1993 – Mechanical locksets for doors in buildings.

AS 4178

1994

Electromagnetic door holders.

Comply with requirements of statutory and local authorities.

28 Deliver Handling & Storage

Deliver items to site in original packaging, each clearly labeled for the relevant door by door number.

106 Warranty

Provide to the Principal a warranty covering faulty materials and installation for five years from date of Practical Completion.

PART II MATERIALS

6 Manufacturers

Ingersoll Rand Security Technologies Pty Ltd
Raven Products Pty Ltd
Dorma

7 Hardware Items

Refer to hardware schedule prepared by Ingersoll Rand

Door seals:

Refer to hardware schedule prepared by Ingersoll Rand
Provide sample of all door seals to approval of Superintendent

8 Miscellaneous

Fasteners : Provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to Superintendent if in doubt.

PART III EXECUTION

24 Examination

Examine the materials to which door hardware is to be fixed.
Ensure conditions are satisfactory for installation.
Start of work means total acceptance of conditions.

25 Preparation

Remove hardware from surfaces to be painted. Replace when paint is dry.

303 Installation

Comply throughout with the written instructions of manufacturer.

304 Keys

Supply duplicate labeled keys for each lock. Provide plastic tags for each key.

305 Testing

Check each key in relevant lock for satisfactory operation. Replace defective keys or locks.
Clean the materials installed.
Remove construction keys.

306 Coordination

Before finalizing hardware order, review with security sub-contractor work related to reed switches, electric locks/strikes etc. Generally such items will be supplied by the security contractors and fitted to doors and frame by the Contractor.

307 Schedule

Refer to Door Schedule and Door hardware Schedule on drawings A3.01 and A3.02 for details.

END OF SECTION

SECTION 09250 PLASTERBOARD**PART I GENERAL****101 Scope**

Supply and install a complete installation of plasterboard including but not limited to:-

- Plasterboard walls.
- Plasterboard ceiling margins.
- Plasterboard bulkheads and spandrels.

Refer to Architectural drawings and finishes schedule for extent and locations.

102 Related Work

Close co-ordination is required with installers of masonry walls, stud walls, suspended ceilings, electrical and other services.

Recycling of all removed existing plasterboards / soffit linings etc.

103 References

Complying with applicable portions of the following Australian Standards; current edition:-

- AS 2588 - 1983 Gypsum Plasterboard
- AS 2589 - 1983 Application and Finishing of Gypsum Plasterboard in Framed Dwelling Construction.
- AS 2592 - 1983 Gypsum Plaster for Building Purposes.
- AS 2753 - 1985 Adhesives, mastics, for bonding gypsum plaster linings to wood and metal framing members.

104 Warrantee

Provide to the Principal a warranty covering faulty materials, installation, warping of materials and other faults which may occur to plasterboard/linings etc within two (2) years of Practical Completion.

PART II MATERIALS**201 Acceptable Manufacturers:**

- C.S.R. Gyprock EC 08 Partition
- Boral Australian Gypsum;
- C.S.R. Building Materials;
 - Rondo Building Services Pty. Ltd.
 - FA Mitchell & Co Pty Ltd
 - Austral Plywoods

202 Materials

1. Refer to Finishes schedule on drawing A3.01 for details.
2. Cornice
Ceiling to Wall junctions shall be square set.
Location: All ceiling/wall junctions unless noted otherwise on drawings
3. Casing Beads
External corners Rondo Plasterlock Corner Bead P32.
Internal corners Rondo PSI7
4. Square Set Finish
Provide Rondo P11, P12 stopping beads to ends of plasterboard at bottom edges to skirting
Generally Allow to square set finish to all plasterboard throughout.

Accessories: Provide for all necessary Stopping beads, end stops, furring channels, angles, battens, tapping to achieve square set finish and level, straight walls. Where fixing to an existing substrate, generally provide for all necessary packing and battens to achieve straight level wall finish. Use Rondo proprietary items.

PART III EXECUTION

301 Examination

Do not install materials until space is enclosed and weatherproof, and until wet-work in space is completed and nominally dry.

302 Preparation

- (a) Provide all additional stud, nogging, trimmed openings, boxed studs, fixing grounds, etc., required by other trades.
- (b) Penetrations through plasterboard for services shall be provided under this Section. Co-operate in installation of frames, duct openings, etc.

303 Installation - General

- (a) Comply with manufacturer's written installation instructions and recognised industry standards.
- (b) Take care and protect surrounding work, including other finishes, equipment and components, during installation. Provide protective covering where necessary.

304 Finishing Details

All boards to be jointed using three coat system.

Apply treatment at board joints (both directions), flanges of trim accessories, penetration, fasteners, heads, surface defects and elsewhere as required to prepare work for decoration. Pre-fill open joints and rounded or bevelled edges, using type of compound recommended by manufacturer.

305 Cleaning

- (a) Remove all splatterings and droppings resulting from work. Remove all surplus materials and rubbish resulting from the work area daily.
- (b) Leave floors broom clean at completion.

306 Completion

Completion all contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 09500 SUSPENDED CEILING

PART I GENERAL

29 Scope

Adjust existing suspended ceiling to suit partition layout, including but not limited to :

Plasterboard ceiling margins
Ceiling access panels
Insulating material
Metal Work
Fire rated ceilings

30 Related Work

Co-ordinate and co-operate with the following trades:

Mechanical services
Plasterboard
Electrical

31 Quality Assurance

A. Prototype

At a location and time to be selected by the Superintendent construct a complete prototypical ceiling installation in one bay from one column to another of each ceiling type. Include elements provided under this Section and finish in every respect. When approved by the Superintendent, the prototype becomes the standard for the remaining work, and will remain as part of the work.

B. Acoustical Ceilings Installer

Sub-Contractor is to have not less than three years of successful experience in installation of ceilings similar to requirements for this project and who is acceptable to manufacturer of each ceiling type.

32 References

Comply with applicable portions of the following Australian Standards :

AS 2753	1985	Adhesives - Mastic - For bonding gypsum plaster linings to wood and metal framing members
AS 2785	2000	Suspended ceilings - Design and installation
AS 2946	1991	Suspended ceilings - Recessed luminaires and air diffusers - Interface requirements for physical compatibility
AS/NZS 4600	1996	Cold formed steel structures

33 Samples

N/A

34 Delivery, Handling and Storage

Deliver manufactured materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand.

Protect materials from dampness. Store off the ground or slab, under cover and away from wet walls and other damp conditions.

35 Warranty

Provide Warranty covering the work against defective materials and workmanship for a period of ten (10) years from the date of Practical Completion.

Include a statement that the whole of the work has been carried out in accordance with relevant Australian Standards and manufacturer's instructions in effect at the time of installation.

PART II MATERIALS

9 Acceptable Manufacturers

Rondo/ RGS

10 Materials

Refer to architectural drawings and finishes schedule.

11 Accessories

Supply and install necessary accessories as indicated by component manufacturer for satisfactory and complete installation.

12 Equipment

Supply equipment, forms, scaffolding, ladders, frames, etc. necessary for the satisfactory installation of specified items.

PART III EXECUTION

26 Examination

Acceptance : Visit site and inspect conditions, comparing conditions to Drawings before delivery of materials to site. Rectify unsuitable situation.

Start of work means total acceptance of conditions. Comply with referenced standards and manufacturer's recommendations regarding environmental conditions.

27 Preparation

Space Enclosure : Do not install interior acoustical ceilings until space is enclosed and weatherproof, and until wet-work in space is completed and nominally dry, and until work above ceilings completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

Protect wood, metal, glass, flooring and other finished work during progress. Damage is to be made good in every respect at no additional cost to the Principal.

Prepare areas and surfaces against which installation will be constructed. Ensure work by other trades is completed before erecting suspension system.

Powder driven fasteners are not approved for use.

28 Installation

Comply throughout with applicable portions of AS 2785, or AS 2946, and with the data sheets supplied by material manufacturer.

29 Field Quality Control

When requested by Superintendent, arrange for manufacturer's representative to visit site and check installation. Any costs associated with this inspection shall be borne by the contractor.

30 Adjustment

Adjust installation to permit installation of such items as light fittings, mechanical vent registers and the like.

31 Protection

Protect completed installation from possible damage until issue of Practical Completion Certificate.

32 Cleaning

Clean surfaces exposed to view. Replace sections or components which cannot be cleaned. Make good damaged sections or panels affected by later work of other trades.

33 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 09650 RESILIENT FLOORING

PART I GENERAL

101 Scope

Supply and install anti static resilient floor surfacing material with necessary accessories and related equipment required for the work including but not limited to:

Vinyl tile
Linoleum sheet
Vinyl sheet
Cork tile
Vinyl skirting
Rubber sheet or tile

102 Related Work

Co-ordinate and co-operate with the following trades:
Internal wall construction

103 Quality Assurance

Suppliers and installers need to be widely experienced in the class of work required for the work of this section. At a place selected by the Superintendent, construct a prototype of a completed installation of vinyl floor and skirtings, 3 square metres in area. On completion of the prototype and approval by the Superintendent of aspects of the installation, the work remains in place and becomes the standard for the remaining work.

104 References

Comply with applicable portions of the following Australian Standards:

AS 1884 1985 (obsolescent) Floor coverings - Resilient sheet and tiles - Laying and maintenance practices.

AS/NZS 3661.2 1994 Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.

Comply also with instructions of manufacturers of materials to be installed.

Anti Static Vinyl to comply with Fire Hazard Indices AS/NZS 1530.3 and AS 1530.4

105 Submissions

Provide samples and data sheets of materials.
Obtain Superintendent's approval for each item before ordering.

106 Delivery, Handling and Storage

Deliver materials in the packaging of the supplier, bearing the brand name, colour, thickness and other relevant data.

Store materials in a secure dry area away from other materials which may cause deterioration.

107 Warranty

Provide a warranty covering aspects of the installation performed by this trade, against defective materials and workmanship for a period of 5 years from the date of Practical Completion. The warranty includes a statement that the whole of the work has been carried out in accordance with AS 1884 and the instructions of the manufacturers of components in effect at the time of installation.

PART II MATERIALS

201 Materials

Vinyl sheet:
Adhesive: refer AS 1884.
Vinyl tile:
Skirting:
Fibre cement underlay:
Stair treads:
Stair nosing:

202 Equipment

Supply equipment required for the preparation of floor, and installation of vinyl materials as recommended by the material manufacturer.

PART III EXECUTION

301 Examination

Examine the site conditions applicable to each installation and comply with AS 1884.
Start of work means total acceptance of conditions.

302 Preparation

Prepare each area to be surfaced in accordance with AS 1884. Test the dryness of concrete sub-floor in accordance with AS 1884.

303 Installation

- A. Adhesives: comply with AS 1884, and manufacturer's instructions.
- B. Install material in accordance with AS 1884, including conditioning of both the materials and the sub-floor.
 - 1. Weld joints of vinyl sheet.
- C. Skirting, to manufacturer's instructions.
- E. Form junctions of different materials (eg. tiles to carpet) so that they occur under the centre line of doors.

304 Cleaning

Remove excess adhesive and blemishes from the completed surfaces of flooring and skirtings.

305 Protection

Apply suitable hardboard or plywood to completed floors and maintain in position until final cleaning prior to Practical Completion.
Remove and replace work which cannot be successfully repaired or cleaned.

306 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 09910 PAINTING

PART I GENERAL

36 Scope

Supply labour and materials, services and equipment necessary for the preparation, application and finishing of painting and staining as indicated on Drawings, schedules and as specified herein, to internal and external surfaces of building, as follows:

Refer Finishes schedule on drawing A3.01

Consult with the Superintendent with regard to requirements of other Sections of the Specification which require painting, and include as part of the work of this Section the appropriate preparation, painting, and finish required to complete the installation.

37 Related Work

Co-ordinate and co-operate with the following trades :

- A. Substrates to be painted.
- B. Cleaning and finishing.
- C. Scaffolding.

38 Quality Assurance

A. Compatibility of Shop and Field Paints :

Determine that the materials specified in the Schedule of Finishes are compatible with shop coats. Failure to do so will be construed as accepting the paints specified. Contractor is to correct, at his own expense, defects in his work resulting from the use of such materials.

B. Test Samples :

- 1. Prepare test samples for painting types and typical locations, where determined by the Architect. Do not commence painting of the substrate type until the sample is approved by the Superintendent. Apply samples in conditions approximating as closely as possible the lighting conditions of the finished work.
- 2. Test Samples include the suitable preparation of substrates.
- 3. After approval, Test Samples are to be the standard for quality control of the completion of work of same type.

39 References

Comply with applicable portions of the following Australian Standards :

- AS/NZS 2311 2000 Guide to the painting of buildings (NB : Maintain this document at the project site by the Contractor as a Controlling General Reference)
- AS/NZS 2312 2002 Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings.

40 Submissions

Submit the following materials :

- A. Product literature on proposed painting systems.
- B. Colour samples for approved painting materials. Identify samples with :
 - 1. Manufacturer's colour code and colour name (if any)
 - 2. Match to Schedule Colour Code and name in Finishes schedule.
- C. Samples are not to be less than 100 x 100mm, and are to be of the same gloss level as specified in the Finishes schedule.

41 Delivery, Handling and Storage

- A. Store materials in designated spaces in a manner which meets the requirements of applicable codes and fire regulations. When not in use, keep such spaces locked and inaccessible to those not employed under this Section. Provide each space with a fire extinguisher of carbon dioxide or dry chemical type bearing a tag of recent inspection.

B. Bring materials to the building and store in manufacturer's original sealed containers, bearing the manufacturer's standard label, indicating type and colour. Deliver materials in sufficient quantities in advance of the time needed in order that work will not be delayed in any way.

42 Project Conditions

Temperature : Comply with the requirements of Clause 6.3 of "AS 2311 The painting of buildings" and of paint manufacturers with regard to both ambient temperature and relative humidity.

43 Warranty

Provide a written warranty stating that preparation of surfaces, materials and material application installed under this contract will show no deterioration and remain in good condition for a period of seven years from date of Practical Completion.

PART II MATERIALS

13 Materials

General : Where manufacturer makes more than one grade of any material specified, use the highest grade of each type, whether or not the material is mentioned by trade name in these Specifications.

Paints and finishes used for the project may be manufactured by one or more of the following manufacturers :
Dulux

Other products may be approved by Superintendent. Apply to Superintendent for approval of alternatives.
Provide materials necessary for preparation of surfaces, and for application of paint finishes.

14 Schedules

A. A Finishes Schedule on drawing A3.01 is included in this documentation.

15 Paint Types

Australian standard *AS 2311 "The painting of buildings" contains Tables relating to available paint types and their uses.

16 Priming Materials

Colours of priming coats (and body coats where specified) are to be lighter than those of finish coat.

PART III EXECUTION

34 Examination

Inspect surfaces and determine that they are in proper condition to receive the work to be performed under this Section. Refer 302 A, below.

The starting of work under this Section will be taken to mean acceptance of such surfaces as being satisfactory and defects in work resulting from accepting poor surfaces are to be corrected at no cost to the Principal.

Refer AS 2311 Appendix C.

35 Preparation

A. General : Prepared to a standard not less than that described under AS 2311, Section 3 : Preparation of Un-Painted Surfaces inclusive, and other Clauses of Australian Standards referenced therein.

This Standard is incorporated by reference as part of this Specification and applies to the work below to the same extent as if written herein.

B. Broom clean floor surfaces before painting. Remove dust, dirt, plaster, grease and other extraneous matter affecting the finish work.

C. Putty-stop or plug nail holes and cracks on both exterior and interior work, as required. Natural or stained wood finishes are to have putty coloured to match. Putty wood after prime coat or

sealer coat has been applied.

D. Clean bare metal surfaces of mill scale, rust, grease, oil, dirt, or other foreign matter, then properly washed with spirit or other approved cleaning agents. After cleaning, etch, pickle, prime, or otherwise prepare, as recommended by the paint manufacturer.

E. Remove blisters or other imperfections in previous coats caused by foreign substances or paint skins from painted surfaces before the subsequent coat is applied.

F. Rub down wood and metal surfaces before finishing and between coats with No. 00 and finer sandpaper or steel wool, leaving a perfectly clean surface. Sand smooth-finished surfaces before finishing and between coats as required to smooth out rough areas and to assure a smooth, even finish. Surfaces to receive paint are to be smooth and free of sandpaper scratches, mill-marks, and other imperfections.

G. Remove hardware, accessories, plates, lighting fixtures and similar items in place prior to painting and re-position upon completion of each space, or protect as otherwise directed by the Superintendent.

H. Thoroughly stir materials in containers before application, unless otherwise directed by the manufacturer of the paint used, to ensure uniformity of colour and mass. Strain out paint skins or other materials which would cause lumps or roughness. Thin only as recommended by the manufacturer.

36 Protection

Furnish and lay suitable drop cloths in areas where painting is being done to protect floors and other surfaces from damage during the work.

37 Application

A. General : Execute work of this Section in strict compliance with paint manufacturer's recommendations, and with the provisions of AS 2311, Section 6 : Paint Application, inclusive. This Standard is incorporated by reference as part of this Specification and applies to the work below to the same extent as if written herein. In the event of conflict between manufacturer's recommendations and the provisions of AS 2311, manufacturer's recommendations govern.

B. Maintenance or Repainting

Execute work of this Section in strict compliance with paint manufacturer's recommendations, and with the provisions of AS 2311, Section 7 : Maintenance of Painted Surfaces on inclusive and Section 8 : Maintenance Painting Systems. This Standard is incorporated by reference as part of this Specification and applies to the work below to the same extent as if written herein. In the event of conflict between manufacturer's recommendations and the provisions of AS 2311, manufacturer's recommendations govern.

38 Cleaning

At completion of work in each area, remove paint spots, oil and stain from adjacent surfaces, including finish hardware.

Replace hardware previously removed.

39 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 15330 SPRINKLER SYSTEMS

PART I GENERAL

44 Scope

A. Alterations to existing sprinkler system. Design, supply, removal and repositioning of pipe branches, valves, sprinkler heads and each required item for execution of the work.

Advise the building owner, Superintendent and fire brigade in writing of the extent of and period the system will be out of service.

B. Provision of control valve to the Server room sprinkler heads controlled via the VESDA fire detection system.

45 Related Work

A. Co-ordinate and co-operate with the following trades:

Water supply

Suspended ceilings

Plasterboard

Electrical installation

46 Quality Assurance

Perform the work of this section using skilled trades people whose training complies with the requirements of the controlling statutory authority.

47 Reference Standards

Comply with applicable portions of the following Australian Standards :

AS 1074 1989 Steel tubes and tubulars for ordinary service

AS 1851 Maintenance of fire protection equipment

There are 16 parts and 2 supplements to this standard, 1984 - 1997

AS 2118 Automatic fire sprinkler systems

There are 9 parts to this standard, 1995 - 1999

AS 4118 Fire sprinkler systems

There are 89 parts to this standard, 1994 - 1999

Comply also with :

Building Code of Australia

Statutory Authority requirements

Fire Brigade requirements

Independent fire protection services organisation

Building Surveyor.

48 Delivery, Handling and Storage

Deliver materials when required for installation. Minimise on-site storage. Handle with care. Damage to existing materials and surfaces of the building shall be made good to the satisfaction of the Superintendent without cost to the Principal.

49 Fees

Pay required fees to the relevant Statutory Authorities.

50 Drawings

Drawings provided for sprinkler installation are diagrammatic and do not show all structural and architectural details.

Before ordering materials, measure and record accurate dimensions on site.

Prepare shop drawings and submit for approval prior to fabrication.

Provide two sets of "as-built" drawings of the completed work on the CAD disk provided by the Architect or Engineer for this purpose.

51 Site Access

Use access and entrances nominated for the purpose by the site superintendent. Do not use other access.

52 Warranty

Provide the Principal with warranties covering :

- A. Materials : in the form supplied by manufacturers of specified components.
- B. Installation: complete installation for one year from the date of Practical Completion.

PART II MATERIALS

17 Acceptable Manufacturers

Acceptable manufacturers of each component type are required to submit written evidence of Statutory Authority approval of their equipment.

18 Materials

Independent water supply from main :

Control valve : Provide in control valve for the Server room sprinkler heads controlled via the VESDA fire detection system.

Flow switch, connected to Fire Brigade :

Piping : black steel to AS 1074 with one coat of zinc rich paint.

Pipe supports (galvanised steel)

Sprinkler heads: As appropriate use within IT Server room.

Sleeves

for pipes through walls : 1.6mm galv. steel or UPVC

for pipes through concrete floors : galv. steel

extending 100 mm above top of floor

Allow 25mm space between pipe and sleeve.

Fill with high density mineral wool.

PART III EXECUTION

40 Examination

Visit the site before delivery of materials, and compare conditions with those shown on drawings.

Start of work means total acceptance of conditions. Refer Clause 108 above.

Sub Contactor to submit detail works plan which shall include the VESDA fire detection system, location of all effected items such as sprinkler heads, control panels and valves. This works plan is to be approved by the Superintendent prior to works commencing. This is to ensure that the provided works plan meets all requirements as set out in the project specification. This Works Plan will be reviewed by an independent consultant qualified in such works at the Contractor's cost.

41 Connections to Supply

Connect to existing sprinkler system in the case of alterations

Co-ordinate with cold water supply Plumber.

42 Fire Precautions

A. In making alterations to an existing sprinkler system, comply strictly with the requirements of AS 2118.1 and AS 1851.

B. Before making alterations to the sprinkler system, notify the Principal and the Fire Brigade before turning off supply valve. Restore to operation on completion of work each day or if work ceases at the site for any reason.

43 Fabrication and Jointing

Shop fabricate components where possible and provide threaded pipe junctions. Where welding is unavoidable,

comply with current, relevant Australian Standard to achieve safe welding practice. Use fire blanket to prevent damage to materials. Only certificated welders may perform welding.

44 Installation

- A. Install all components to the Superintendent's and the Authority's approval, to applicable Australian Standards and to the manufacturer's instructions.
- B. Co-ordinate with other trades, particularly where pipes pass through other elements of the building and plan relevant work to produce the whole installation in proper sequence.

Ensure that interfaces are of appropriate size and type and are properly sealed.

Seal penetrations as needed to achieve a watertight installation. Refer to the Warranty Clause 109.

Provide and fix expansion joints at positions indicated on drawing and as required by the authority.

Water Hammer : Take precautions to prevent water hammer and rectify it where it occurs.

Sprinkler Pipes and Heads : As required to meet all codes and regulations

Piping shall run at least 200mm above the ceiling suspension to enable installation of light fittings.

Notwithstanding the design shown on the drawings, ensure new and relocated sprinkler heads are clear of full height door swings and are not within 2 metres of existing sprinkler heads and comply with Section 5 of AS 2118.

Allow to supply and install additional sprinkler heads complete with escutcheon plate, arm pieces and hangers including draw down and re-instating of system as shown.

Upon completion of the works, allow for the system to be certified by an independent approved certifier confirming conformity to the relevant Australian Standard.

Allow to provide necessary test certificates, hydraulic calculations etc for approval of alteration works to the sprinkler system.

Reticulation :

Reticulate as indicated on the drawings throughout the building.

Provide isolating valves with stuffing boxes of appropriate diameter where indicated on drawings at branches to fixtures or groups of fixtures.

Co-ordinate the work of lining up services with other trades.

Where joints are required between piping and screwed fittings, provide suitable teflon tape.

45 Testing and Commissioning

Pressure test pipe installation in accordance with rule 7.2 of AS 2118, witnessed by the consulting engineer.

Obtain certificate of satisfactory completion before ceiling is installed or enclosed in a duct.

Arrange for a second test and inspection after all work is finished so that the engineer can issue a completion certificate.

Should a part of the installation fail to pass a test by the services certifying organisation, correct the fault and arrange for further inspection until satisfactory.

46 Protection

Protect all work of this Section from damage until Practical Completion is achieved.

47 Cleaning

On completion, remove all debris and clean all visible work to the Superintendent's satisfaction.

48 Completion

Complete all contracted work in accordance with contract documents and written variation orders issued by the Superintendent. This includes providing all certification and test results which indicate the system is fully operational and meets all required standards and statutory requirements.

END OF SECTION

SECTION 15810 AIR DISTRIBUTION DUCTWORK**PART I GENERAL****53 Scope**

Design, fabricate, supply, install and test a complete air distribution and associated exhaust system ductwork consisting of but not limited to:

Ductwork and fittings

Insulation to ductwork

Exhaust and intake grilles

Painting of all exposed ductwork

Testing

Warranty

54 Related Work

Co-ordinate and co-operate with trades in the following other sections:

Metal decking and roof plumbing

Metalwork

Packaged roof top air conditioning units

Electrical installation

55 Quality Assurance

Provide written evidence to the Superintendent of required experience and skills of personnel proposed for this project.

56 References

Comply, as a minimum requirement, with the applicable parts for supply and installation of the following publication:

Refer to the SMACNA website (American Sheet Metal & Air Conditioning Contractor's Association), www.smacna.org.

Comply with applicable portions of the following Australian Standards:

AS 1324

Air filters for use in general ventilation and air-conditioning – application, performance and construction.

There are 2 parts to this Standard, 2001-2003.

AS/NZS 1530.3 1999

Methods for fire tests on building materials, components and structures - Simultaneous determination of ignitability flame propagation, heat release and smoke release.

There are 5 other parts to this Standard and 1 Amdt, 1993-2007

AS 1668

The use of ventilation and air-conditioning in buildings.

There are 3 parts, 3 Amdts and 2 Supplements to this Standard, 1998-2003.

AS/NZS 2107 2000

Acoustics - Recommended design sound levels and reverberation times for building interiors.

AS/NZS 3666

Air-handling and water systems of buildings - Microbial control.

3666.1 2002 Design, installation and commissioning.

3666.2 2002 Operation and maintenance.

3666.3 2000 Performance-based maintenance of cooling water systems.

AS 4254 2002

Ductwork for air-handling systems in buildings.

There are 2 Amdts to this Standard, 2002 - 2004.

57 Submissions

Submit for approval to Superintendent details of the proposed materials intended for use in the project.

58 Shop Drawings

A. Show on drawings details that are necessary for fabrication, assembly transport and installation of ductwork and associated fittings, including: sizes, dimensions and markings, full details of connection legend for symbols and hatching, etc.

B. Draw to a scale nominated by the consulting engineers/architect.

C. Sizes are to be in millimetres and represent clear internal dimensions of the ductwork.

59 Delivery, Handling and Storage

Arrange with builder dates of delivery and installation of ductwork and associated fittings, crange or handling to installed position and handling arrangements.

Where possible, install materials directly in place. Store other materials in a secure location on site as directed by builder.

60 Project Conditions

Inspect drawings and visit site. Check aspects of required work and refer any discrepancy to Contractor and/or Superintendent, for decision.

Determine final locations and dimensions from site measurements prior to fabrication.

61 Warranty

Provide a statement that the capacity of the ductwork will be as documented, and that the completed installation complies with the requirements of documents listed in clause 104 above.

PART II MATERIALS

19 Rectangular Ductwork

Galvanised steel sheet specifically manufactured for roll forming such as "Galvabond" or other, approved in writing by the engineer.

20 Flexible Ductwork

Patent aluminium spiral wound type.

PVC is not acceptable.

Provide fire dampers as required by engineer. Refer drawings.

21 Insulation

Comply with AS/NZS 1530.3: Test for early fire hazard properties of materials and have the following results certified:

Ignitability Index 0

Spread of Flame Index 0

Heat Evolved Index 0

Smoke Developed Index 0

Material:

Colour: Finish: to match adjacent ceiling colour Colour: Dulux Vivid White

"R" rating:

22 Diffusers

Aluminium louvre, powder coat/enamel finished:

Air deflection is required to be adjustable horizontally and vertically.

23 Return and Exhaust Air Grilles

Aluminium eggcrate, powdercoat/natural anodised/enamel finished:

24 Fresh Air Grilles

Powdercoat/Natural anodised aluminium louvre weather and vermin proof.

Finish: to match adjacent ceiling colour Colour: Dulux Vivid White

25 Flexible Connections

Waterproof canvas secured with galvanised steel straps and fixing.

26 Fabrication Waterproof Canvas

Shop fabricate in long lengths suitable for cartage and access to building, with a minimum of site joints.

PART III EXECUTION

49 Examination

Inspect site conditions.

Ensure that conditions will permit installation.

Arrange with Contractor for correction of unsatisfactory conditions.

Start of work means total acceptance of conditions.

50 Preparation

Contractor is to provide for the mechanical services contractors, a clear opening, access opening, cutting patching. Check associated air conditioning units and equipment are of the correct type and able to be operational. Report any discrepancy to Contractor and/or Superintendent for decision and request correction.

51 Installation

Install ductwork complete with transitions, bends, tees, supports, dampers, off-sets, flexible connections, take-offs and similar fittings necessary for the balancing and full operation of the system.

Form bends in flexible ductwork to manufacturer's recommendations. Bends to remain at full cross section.

Ensure galvanising remains unbroken after fabrication and installation.

Adequately stiffen to prevent 'drumming'. Adequately support ductwork with cushioned hanging straps, located to prevent sagging.

52 Duct Supports

Hanging and supporting systems to SMACNA standards and of the trapeze type of hanging system. Install hot dip galvanised steel supports. Fix supports for ductwork to the building structure at recommended spacings and at each change of direction.

53 Insulation

Install insulation as scheduled, indicated or required, over entire surface of ductwork fixed with adhesive, adhesive tape or bands avoiding any damage to insulation blanket or foil.

54 Flexible Connections

Use to prevent transmission of vibration from moving equipment to adjacent ducting. Also use between main ducts and unit casings and to prevent excessive movement of long ducts and where ducts cross building expansion joints.

55 Balancing Dampers

Fit to branches and where a branch serves more than one outlet. Control air volumes by means of dampers in branches, opposed blade dampers in necks, behind grilles, or stream splitter dampers as appropriate. Ensure that factory manufactured opposed blade dampers are fitted at the air outlet to balance and straighten the air flow across the face of the grille. Do not use plastic cogs.

56 Air Outlets

Install supply and return air outlets as indicated on the drawings or arrange with builder to have other trades install. Ensure diffusers have provision for air pattern adjustment, both horizontally and vertically.

57 Testing

Balance air quantities at air grilles to within $\pm 10\%$ of specified quantity.

Measure air quantities in air ducts. Include an N.E.B.B. or N.A.T.A. certification for air and water balancing.

Perform final balancing under the supervision of the Contractor, and complete to his satisfaction.

58 Completion

Complete the contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 16350 ELECTRICAL INSTALLATIONS

PART I GENERAL

All materials and workmanship are to comply with the City of Port Phillip Structured Cabling Standards for Data and Voice and Services Consultants Specifications. This section is to be read in conjunction with Electrical Engineering specification and documentation. Where conflicting information is found, the Architectural and Engineering documents and specifications are to take precedence over the City of Port Phillip Structured Cabling Standards for Data and Voice.

62 Scope

The work of the Section includes but is not limited to the design, supply and installation of electrical transmission and reticulation materials from the mains supply to parts of the building, site, and connection for:

- Power reticulation including new switch board to main building switch board
- Lighting reticulation
- Control Systems including the control gear for future generator connections
- Door Security

63 Related Work

Co-ordinate and co-operate with the following trades:

- Floor Construction
- Wall Construction
- Ceiling Construction
- Carpentry

64 Quality Assurance

- A. Licensed electrical technicians only may perform work, experienced in the requirements of the project. Licences are those issued by the State Authority having direct control or interest in the work.
- B. Perform the entire installation in accordance with the requirements of the Statutory Authority having jurisdiction.

65 References

Comply with applicable portions of the following Australian Standards :

- | | |
|------------------|---|
| AS 1680 | Interior lighting
<i>There are 10 parts to this standard, 1990 - 2001</i> |
| AS/NZS 2053 2001 | Conduits and fittings for electrical installations
<i>There are 8 parts to this standard</i> |
| AS/NZS 2293 | Emergency evacuation lighting for buildings
<i>This standard is in 3 parts, 1993 - 1998</i> |
| AS/NZS 3000 2000 | Electrical Installations (AS/NZS wiring rules)
<i>This standard is in constant revision</i> |
| AS 3786 1993 | Smoke alarms |

66 Submissions

On request of the Superintendent, submit for approval any item related to the installation, including : data sheets on materials; wiring diagrams - plans; samples of products; licence certificates and obtain written approval of each item so requested.

67 Delivery, Handling and Storage

Deliver, unload and store in a secure area, in accordance with manufacturer's instructions where applicable, to prevent damage, deterioration and loss.

68 Warranty

Provide a warranty covering aspects of required work of this Trade Section, for a period of not less than ten years from the date of Practical Completion. Provide a warranty covering Panduit products or a period of not less than 25 years from the date of Practical Completion.

69 Fees and Notices

Pay fees, and submit notices to Supply Authority
Arrange for inspections by Authority Inspector and obtain final certificate.

PART II MATERIALS

27 General

Supply only products which bear the required indication of approval of the Statutory Authority having jurisdiction.

At Superintendent's request supply list of proposed materials, showing name of manufacturer where not named below.

28 Materials

All materials are to comply with the Port Philip City Council Structured Cabling Standard for Data and Voice and Services Consultants Specifications.

29 Fabrication

Components manufactured off-site are to be compatible with the requirements of the project and to Superintendent's approval.

Refer to Superintendent for approval of finishes of components where item will be exposed to view after installation.

30 Source Quality Control

Where Supply Authority or Superintendent requires, submit data relating to manufactured components in the form of :

- A. Test Reports.
- B. Certificates issued following inspection of products.
- C. Verification of Performance Statement.

PART III EXECUTION

59 Examination

Request rectification of existing work or preparation of additional or new work by Contractor where necessary to facilitate electrical installations.

The contractor is to gain approval from the Superintendent prior to start of works on site of location of new switch board, switching gear for generator and VESDA fire detection system

60 Preparation

Provide necessary safety or security controls where required to ensure safe practices and installations.

- A. Chasing and making good for conduit access for skirting
- B. Chasing and wiring duct, G.P.O.'s switches etc.
- C. Supply and installation for access opening where required.
- D. Provision of electrical riser.
- E. Provision of signwriting to Main Switchroom & Distribution board.
- F. Forming , trimming, patching and making good of openings for luminaries to sizes required by the Electrician.
- G. Provision of concrete
- H. Making good existing roadway etc.

61 Installation

Comply with Regulatory requirements relating to installation methods and systems.

Ensure that installations are within the Regulatory maximum loads and tolerances.

A. Chases

Form chases, in co-operation with Contractor, where necessary in structural items within limits set by Superintendent and Contractor.

B. Cable

Secure cable, using materials specified above, at centres recommended by Regulations and/or manufacturer.

C. Conceal wiring and cable equipment. Conduit cable where necessary or required in approved material.

62 Field Quality Control

A. Where requested by Supply Authority supply test data obtainable from component manufacturer.

B. Arrange for inspections by component manufacturer's representative to ensure correct application, use and installation.

63 Adjust and Clean

Adjust installations of components to ensure proper fit and alignment.

Remedy items of inefficient operation or of doubtful performance.

Clean visible items to original condition.

Remove debris from installation in concealed spaces.

64 Protection

Protect installed items from damage from any source until Practical Completion.

65 Schedules

Refer Electrical Engineering Drawings and APC schedule of equipment .

66 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 16710 COMMUNICATION CABLING

PART I GENERAL

All materials and workman ship are to comply with the City of Port Phillip Structured Cabling Standard for Data and Voice 2.4 and Services Consultants Specifications located in Section 4 Electrical & Fire Engineering Specification Appendix i.

70 Scope

Refer to Electrical Engineering documentation and APC documents refer to Build Number: ISX665479-029.

71 Related Work

Co-ordinate and co-operate with the following trades:

Electrical installation	Floor construction
Wall Construction	Ceiling Construction
Finishing trades	Door Security

72 Quality Assurance

Perform work employing experienced tradespeople familiar with the quality of work required and who are AUSTEL-licensed in accordance with requirements of TS009.

Arrange for a conference with relevant other trades to decide upon matters which affect them.

73 References

Comply with applicable portions of the following Australian Standards :

AS/NZS 3085	Telecommunications installations- Administration of communication cabling systems
AS 3086 1996	Telecommunications installations - Integrated telecommunications cabling systems for small office/home office premises
AUSTEL TS 008	Requirements for authorised cabling products
AUSTEL TS 009	Installation Requirements for customer cabling (Wiring Rules)

74 Submissions

On request of the Superintendent, submit for approval any item related to the installation, including : data sheets on materials; wiring diagrams - plans; samples of products; licence certificates and obtain written approval of each item so requested.

75 Delivery, Handling and Storage

Deliver, unload and store in a secure area, in accordance with manufacturer's instructions where applicable, to prevent damage, deterioration and loss.

76 Warranty

Provide a warranty covering aspects of required work of this Trade Section, for a period of not less than ten years from the date of Practical Completion. Provide a warranty covering Panduit products or a period of not less than 25 years from the date of Practical Completion.

77 Fees and Notices

Pay fees, and submit notices to Supply Authority

Arrange for inspections by Authority Inspector and obtain final certificate.

PART II MATERIALS

31 Acceptable manufacturers

All materials are to comply with the City of Port Phillip Structured Cabling Standard for Data and Voice Consultants Specifications.

Provide Certification by Panduit on all equipment, cabling and associated cable management systems.

32 Materials. Refer to AS/NZS 3086

All materials are to comply with the City of Port Phillip Structured Cabling Standard for Data and Voice and Services Consultants Specifications.

33 Carrier's Recommendations

Before ordering materials for the project, submit to the carrier a list of the components and their descriptions. The carrier then has the opportunity to approve materials chosen.

PART III EXECUTION

67 Examination

Examine carefully the proposed route for cable installation and installation of other components. Obtain Superintendents approval before executing the work.
Start of work means total acceptance of conditions.

68 Preparation

Provide necessary safety or security controls where required to ensure safe practices and installations. Provide needed penetration, openings, chases and structures for safe secure and effective installation of cable.
If installation is required in the electrical riser, co-operate with the Electrician.

69 Installation

Comply with AS/NZS 3086 . Refer also to installation clauses for each item.

70 Marking and Identification

Comply with AS/NZS 3086

71 Administration

Comply with AS/NZS 3086

72 Field Quality Control

- A. Where requested by Supply Authority supply test data obtainable from component manufacturer.
- B. Arrange for inspections by component manufacturer's representative to ensure correct application, use and installation.

73 Adjust and Clean

Adjust installations of components to ensure proper fit and alignment.
Remedy items of inefficient operation or of doubtful performance.
Clean visible items to original condition.
Remove debris from installation in concealed spaces.

74 Protection

Protect installed items from damage from any source until Practical Completion.

75 Completion

Complete contracted work in accordance with contract documents and written variation orders issued by the Superintendent.

END OF SECTION

SECTION 3
STRUCTURAL ENGINEERING CERTIFICATION & COMPUTATIONS

PROPOSED IT SERVER ROOM

**AT: 208-220 BANK STREET
SOUTH MELBOURNE**

FOR: K20 ARCHITECTURE

REF: FC10-0010

Building Act 1993**Building Regulations 2006****REGULATION 1507: CERTIFICATE OF COMPLIANCE - DESIGN****To**

Relevant Building Surveyor: Bill Yannelis
Postal Address: 99a Carlisle Street, St. Kilda Vic
Postcode: 3182

From

Building Practitioner: Anthony Furr
Category and class: Civil Engineer
Registration No: EC-17435
Postal Address: 146 Junction Road, Nunawading, Victoria
Postcode: 3131

Property details

Project: Proposed IT Server Room
Location: 208-220 Bank Street, South Melbourne
Municipal District:

Compliance

I did prepare the design and I certify that the part of the design described as **Structural aspects of the proposed it server room strengthening** shown on the documents listed below, complies with the following provisions of the Regulations:

BCA	Part B1 of the Building Code of Australia 2010
AS/NZS 1170.0-2002	Structural design actions, Part 0: General principles
AS/NZS 1170.1-2002	Structural design actions, Part 1: Perm., Imposed and other actions
AS4100-1998	Steel structures
AS1720.1-1997	Timber Structures, Part 1: Design methods

Design documents

Drawing Numbers: FC10-0010 Dwgs S01 to S03 Revision A
Prepared by: Furr Consulting Pty. Ltd. Date: 22 Jun 10

Computations: FC10-0010 Pages 1-8, SK1-SK3
Prepared by: Furr Consulting Pty. Ltd. Date: Jun 10

Geotechnical Report: N/A
Prepared by: N/A Date: N/A

Signature

Signed:



Date: 30 Jun 10

COMPUTATIONS

Project: Proposed IT Server Room
Address: 208-220 Bank Street, South Melbourne
Ref: FC10-0010

Client:
Arch: k20 Architecture

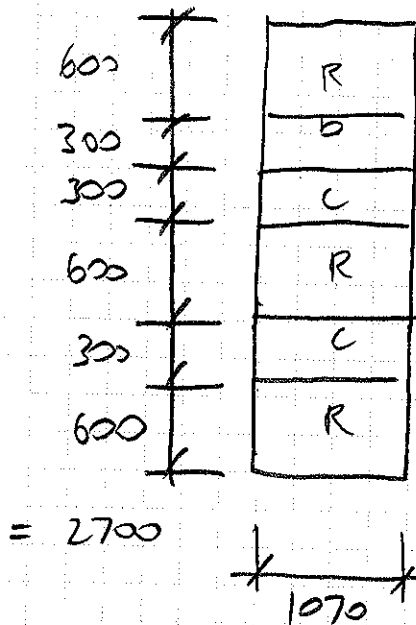
Standards

BCA	Part B1 of the Building Code of Australia 2009
AS/NZS 1170.0-2002	Structural design actions, Part 0: General principles
AS/NZS 1170.1-2002	Structural design actions, Part 1: Perm., Imposed and other actions
AS4100-1998	Steel structures
AS1720.1-1997	Timber Structures, Part 1: Design methods

DESCRIPTION

IT IS PROPOSED TO INSTALL 2 NEW IT SERVER RACKS ON A SECTION OF EXISTING TIMBER FLOOR ON THE FIRST FLOOR OF THE SOUTH MELBORNE TOWN HALL. (REFER SK1)

EACH RACK CONSISTS OF THE FOLLOWING



Server rack = 1363 kg

Cabinet = 185 kg

Cooling = 185 kg

= 1363

= 185

= 1363

∴ WT = 4650 kg

REFER SK2/SK3 FOR
GIVEN LOADS

area = $1.07 \times 2.70 = 2.889 \text{ m}^2$

kPa = $\frac{4650 \times 10}{1000 \times 1.07 \times 2.70} = 16.1 \text{ kPa}$

line = $\frac{4650 \times 10}{1000 \times 2.70} = 17.2 \text{ kN/m}$

Room

$$\text{Area} = 6.15 \times 4.5 \text{ m} = 27.7 \text{ m}^2$$

$$\text{Ranks} = 2 \times 2.889 = 5.8 \text{ m}^2 @ 16.1 \text{ kPa} = 93.4 \text{ kN}$$

$$\text{Floor} = 27.7 - 5.8 = 21.9 \text{ m}^2 @ (3+1) \text{ kPa} = 87.6 \text{ kN}$$

$$\underline{\underline{181 \text{ kN}}}$$

$$\text{ave kPa} = \frac{181}{27.7} = 6.53 \text{ kPa}$$

PER JOIST

existing joists are 265x50 F7 page 4

page 3 provides an estimated capacity of 4.90 kPa which is at max capacity and absolute max deflections.

$$\text{Floor kPa} = 6.53 > 4.90 \text{ kPa}$$

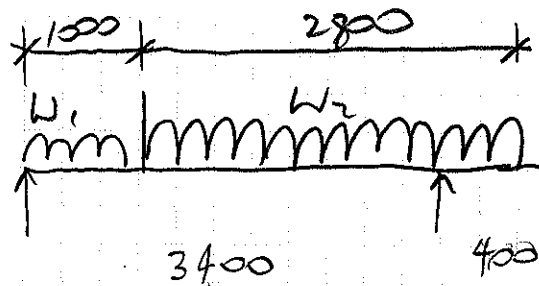
∴ therefore strengthening required

STEEL FLOOR BEAMS

as average kPa take 7.50 kPa

ISO PFC ok

as live load share on 2 joists



W1 $w_{dl} = 0.57 \text{ kN/m}$
 $w_u = 0.45 \times 4.0 \text{ kPa} = 1.80 \text{ kN/m}$

W2 $w_{dl} = 0.57 \text{ kN/m}$
 $w_u = 17.20 / 2 = 8.60 \text{ kN/m}$

Refs attached

$M^*_{max} = 20 \text{ kNm}$
 $\delta_{max}(u) = 7 \text{ mm}$ OK / L/485

For 150x75 PFL refer attached

$\phi_{mb} = 372 \text{ kNm}$ OK

150x75 PFL

Timber floor beam design V3.06

EXISTING

Furr Consulting Pty Ltd

Beam:	(Floor Beam FB1) 260mm x 50mm F7 Oregon (Single span)	
Bending:	$M(dI)^* = 2.61\text{kNm} < \phi M(dI) = 3.83\text{kNm}$, $M^* = 5.38\text{kNm} < \phi M = 5.38\text{kNm}$	OK (0.68,1.00)
Shear:	$V(dI)^* = 3.16\text{kN} < \phi V(dI) = 6.27\text{kN}$, $V^* = 6.52\text{kN} < \phi V = 8.79\text{kN}$	OK (0.50,0.74)
Deflection:	$\delta(dI+\Psi I.II) = L/264$ (13mm), $\Psi_s \delta_{II} = L/727$ (5mm)	Warning (vibr.)
Reactions:	(Each end) $R_{dI} = 0.9\text{kN}$, $R_{II} = 3.6\text{kN}$, $R^* = 6.5\text{kN}$	

Geometry (For a primary building member)

Importance =	B (H)ouse, Primary (B)uilding elements, (I)mportant		
Span (L) =	3300 mm	Span type =	S (S)ingle, (D)ouble
Centres (cts) =	450 mm	Edge restrained =	C (T)ension, (C)omp.
Lay =	600 mm		

Loadings

Floor area (A) =	1.49 m ²	Load type =	N (N)ormal, (S)torage, (M)annual	
Uniform dead loads				
Floor dead load (wdl) =	0.50 kPa *	450 mm +	kN/m =	0.23 kN/m
Finishes (wdl) =	0.50 kPa *	450 mm +	kN/m =	0.23 kN/m
Other dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es, (N)o		S.Wt =	0.09 kN/m
			$\Sigma wdl =$	0.54 kN/m
Uniform live loads				
Floor live load (wll) =	4.90 kPa *	450 mm +	kN/m =	2.21 kN/m
Other live load (wll) =	kPa *	mm +	kN/m =	0.00 kN/m
Alternate point live load =	1.80 kN	Dist. to	2 members	$\Sigma wll =$ 2.21 kN/m
Long term LL factor (Ψ) =	0.40			
Short term LL (Ψ_s) =	0.70			
Point loads				
Dead load (pdl) =	kN	Position =	1650 mm from LHS	
Live load (pll) =	kN	Shear using PL at support =	N (Y)es, (N)o	
$w(dI+\Psi I.II)^* =$	1.91 kN/m	$M(dI+\Psi I.II)^* =$	2.61 kNm (Max at 1650mm)	
$w^* =$	3.95 kN/m	$M^* =$	5.38 kNm (Max at 1650mm)	
$p(dI+\Psi I.II)^* =$	0.00 kN	$V(dI+\Psi I.II)^* =$	3.16 kN	
$p^* =$	0.00 kN	$V^* =$	6.52 kN	

Bending Capacity - CI 3.2

Member = 260mm x 50mm F7 Oregon	Area (A) =	12079 mm ²
Description = F7 unseasoned softwood	Section modulus (Zx) =	517 x10 ³ mm ³
Design depth (dD) = 257 mm	Stiffness (Ix) =	66.5 x10 ⁶ mm ⁴
Design width (dW) = 47 mm	Modulus of elasticity (E) =	7900 MPa
$S1=1.25*dD/dW*(Lay/dD)^{0.5} =$	10.44 For comp. edge restrained - CI 3.2.3.2	
$k12 = 1 =$	1.000 for pb*S < 10 - CI 3.2.4	F'b = 20.0 MPa
Strength reduction factor (ϕ) =	0.65 Refer CI 2.3	F's = 2.1 MPa
$\phi M(dI) = \phi * 0.57 * k4 * k6 * k9 * k11 * k12 * [F'b * Zx] =$	3.83 kNm	Material constant (pb) = 0.88
$\phi M = \phi * k1 * k4 * k6 * k9 * k11 * k12 * [F'b * Zx] =$	5.38 kNm	Duration factor (k1) = 0.80
		Factor (k4) = 1.00
$\phi V(dI) = \phi * 0.57 * k4 * k6 * k11 * A * F's / 1500 =$	6.27 kN	Temp. factor (k6) = 1.00
$\phi V = \phi * k1 * k4 * k6 * k11 * A * F's / 1500 =$	8.79 kN	Sharing factor (k9) = 1.00
		Size factor (k11) = 1.00

Deflections

Ireq'd DL+ Ψ I.LL (L/300) =	75.6 x10 ⁶ mm ⁴	< Critical	$\delta_{DL+\Psi I.LL} =$	12.5 mm	Span / 264
Ireq'd Ψ_s .LL (L/300) =	27.4 x10 ⁶ mm ⁴		$\Psi_s \delta_{LL} =$	4.5 mm	Span / 727
$j2 =$	3.0		1kN midspan $\delta =$	1.4 mm	

Furr Consulting Pty Ltd
Job: Beam
Beam
Beam

INPUT/ANALYSIS REPORT

Job: Beam
Title: Beam
Type: Plane frame
Date: 22 Jun 2010
Time: 09:20 AM
Nodes 5
Members 4
Spring supports 0
Sections 1
Materials 1
Primary load cases 2
Combination load cases 1
Analysis: Linear elastic

LOAD CASES

Case Type Analysis Title
1 P L Dead
2 P L Live
3 C L 1.2 Dead + 1.5 Live

Analysis Types:
S - Skipped (not analysed)
L - Linear
N - Non-linear

NODE COORDINATES

Node	X	Y	Z	Restraint
1	0.000	0.000	0.000	111000
2	3.400	0.000	0.000	010000
3	3.800	0.000	0.000	000000
4	1.000	0.000	0.000	000000
5	1.600	0.000	0.000	000000

MEMBER DEFINITION

Member	A	B	C	Prop	Matl	Rel-A	Rel-B	Length
2	2	3	Y	1	1	000000	000000	0.400
3	1	4	Y	1	1	000000	000000	1.000
5	4	5	Y	1	1	000000	000000	0.600
6	5	2	Y	1	1	000000	000000	1.800

LIBRARY SECTIONS

Section	Library	Name	Axis	Comment
1	asw	150PPC	Y	

SECTION PROPERTIES

Section	Ax	Ay	Az	J	Iy	Iz	fact
1	2.250E-03	0.000E+00	0.000E+00	5.490E-08	1.290E-06	8.340E-06	

MATERIAL TABLE NOT PRINTED

CONDITION NUMBER

Maximum condition number: 2.065E+01 at node: 5 DOFN: 2

APPLIED LOADING

CASE 1: Dead

Gravitational Acceleration

X Comp	Y Comp	Z Comp
0.000	-9.810	0.000

Member Loads

Member	Form	T	A	S	F1	X1	F2	X2
2	UNIF	FY	GL		-0.570			
3	UNIF	FY	GL		-0.570			
5	UNIF	FY	GL	FR	-0.570			
6	UNIF	FY	GL	FR	-0.570			

Sum of Applied Loads (Global Axes):

FX: 0.000 FY: -2.824 FZ: 0.000
Moments about the global origin:
MX: 0.000 MY: 0.000 MZ: -5.366

NODE DISPLACEMENTS

CASE 1: Dead

Node	X-Disp	Y-Disp	Z-Disp	X-Rotn	Y-Rotn	Z-Rotn
1	0.0000	0.0000	0.0000	0.00000	0.00000	-0.00071
2	0.0000	0.0000	0.0000	0.00000	0.00000	0.00069
3	0.0000	0.0003	0.0000	0.00000	0.00000	0.00068
4	0.0000	-0.0005	0.0000	0.00000	0.00000	-0.00041
5	0.0000	-0.0007	0.0000	0.00000	0.00000	-0.00006

MEMBER FORCES

CASE 1: Dead

Member	Node	Axial	Shear-y	Shear-z	Torque	Moment-y	Moment-z
2	2	0.00	-0.30	0.00	0.00	0.00	-0.06
3	3	0.00	0.00	0.00	0.00	0.00	0.00
3	1	0.00	0.00	0.00	0.00	0.00	0.00
4	4	0.00	-1.25	0.00	0.00	0.00	0.00
5	4	0.00	-0.50	0.00	0.00	0.00	0.87
5	5	0.00	-0.06	0.00	0.00	0.00	0.87
6	5	0.00	-0.06	0.00	0.00	0.00	1.04
6	2	0.00	1.28	0.00	0.00	0.00	-0.06

Positive Forces (Member Axes):

Axial - Tension Shear - End A sagging
Torque - Right-hand twist Moment - Sagging

SUPPORT REACTIONS

CASE 1: Dead

Node	Force-X	Force-Y	Force-Z	Moment-X	Moment-Y	Moment-Z
1	0.00	1.25	0.00	0.00	0.00	0.00
2	0.00	1.58	0.00	0.00	0.00	0.00

SUM: 0.00 2.82 0.00 (all nodes)

Max. residual: 3.553E-15 at DOFN: 11

(Reactions act on structure in positive global axis directions.)

CASE 2: Live

Member	Form	T	A	S	F1	X1	F2	X2
2	UNIF	FY	GL		-8.600			
3	UNIF	FY	GL		-1.500			
5	UNIF	FY	GL	FR	-8.600			
6	UNIF	FY	GL	FR	-8.600			

Sum of Applied Loads (Global Axes):

FX: 0.000 FY: -25.880 FZ: 0.000
Moments about the global origin:
MX: 0.000 MY: 0.000 MZ: -58.692

NODE DISPLACEMENTS

CASE 2: Live

Node	X-Disp	Y-Disp	Z-Disp	X-Rotn	Y-Rotn	Z-Rotn
1	0.0000	0.0000	0.0000	0.00000	0.00000	-0.00653
2	0.0000	0.0000	0.0000	0.00000	0.00000	0.00687
3	0.0000	0.0027	0.0000	0.00000	0.00000	0.00682
4	0.0000	-0.0057	0.0000	0.00000	0.00000	-0.00413
5	0.0000	-0.0072	0.0000	0.00000	0.00000	-0.00080

MEMBER FORCES

CASE 2: Live

Member	Node	Axial	Shear-y	Shear-z	Torque	Moment-y	Moment-z
2	2	0.00	-3.44	0.00	0.00	0.00	-0.69
3	3	0.00	0.00	0.00	0.00	0.00	0.00
3	1	0.00	-8.62	0.00	0.00	0.00	0.00
4	4	0.00	-6.82	0.00	0.00	0.00	0.00
5	4	0.00	-6.82	0.00	0.00	0.00	7.72
5	5	0.00	-1.66	0.00	0.00	0.00	7.72
6	5	0.00	-1.66	0.00	0.00	0.00	10.26
6	2	0.00	13.82	0.00	0.00	0.00	10.26

Positive Forces (Member Axes):

Axial - Tension Shear - End A sagging
Torque - Right-hand twist Moment - Sagging

SUPPORT REACTIONS

CASE 2: Live

Node	Force-X	Force-Y	Force-Z	Moment-X	Moment-Y	Moment-Z
1	0.00	8.62	0.00	0.00	0.00	0.00
2	0.00	17.26	0.00	0.00	0.00	0.00

SUM: 0.00 25.88 0.00 (all nodes)

Max. residual: -5.684E-14 at DOFN: 11

(Reactions act on structure in positive global axis directions.)

CASE 3: 1.2 Dead + 1.5 Live

Load Combinations

Case	Factor
1	1.200 Dead
2	1.500 Live

Sum of Applied Loads (Global Axes):

FX: 0.000 FY: -42.209 FZ: 0.000
Moments about the global origin:
MX: 0.000 MY: 0.000 MZ: -94.478

NODE DISPLACEMENTS

CASE 3: 1.2 Dead + 1.5 Live

Node	X-Disp	Y-Disp	Z-Disp	X-Rotn	Y-Rotn	Z-Rotn
1	0.0000	0.0000	0.0000	0.00000	0.00000	-0.01065
2	0.0000	0.0000	0.0000	0.00000	0.00000	0.01113
3	0.0000	0.0044	0.0000	0.00000	0.00000	0.01105
4	0.0000	-0.0093	0.0000	0.00000	0.00000	-0.00668
5	0.0000	-0.0118	0.0000	0.00000	0.00000	-0.00127

MEMBER FORCES

CASE 3: 1.2 Dead + 1.5 Live

Member	Node	Axial	Shear-y	Shear-z	Torque	Moment-y	Moment-z
2	2	0.00	-5.52	0.00	0.00	0.00	-1.10
3	3	0.00	0.00	0.00	0.00	0.00	0.00
3	1	0.00	-14.42	0.00	0.00	0.00	0.00
4	4	0.00	-10.83	0.00	0.00	0.00	12.63
5	4	0.00	-10.83	0.00	0.00	0.00	12.63
5	5	0.00	-2.55	0.00	0.00	0.00	16.64
6	5	0.00	-2.55	0.00	0.00	0.00	16.64
6	2	0.00	22.27	0.00	0.00	0.00	-1.10

Positive Forces (Member Axes):

Axial - Tension Shear - End A sagging
Torque - Right-hand twist Moment - Sagging

SUPPORT REACTIONS

CASE 3: 1.2 Dead + 1.5 Live

Node	Force-X	Force-Y	Force-Z	Moment-X	Moment-Y	Moment-Z
1	0.00	14.42	0.00	0.00	0.00	0.00
2	0.00	27.79	0.00	0.00	0.00	0.00

SUM: 0.00 42.21 0.00 (all nodes)

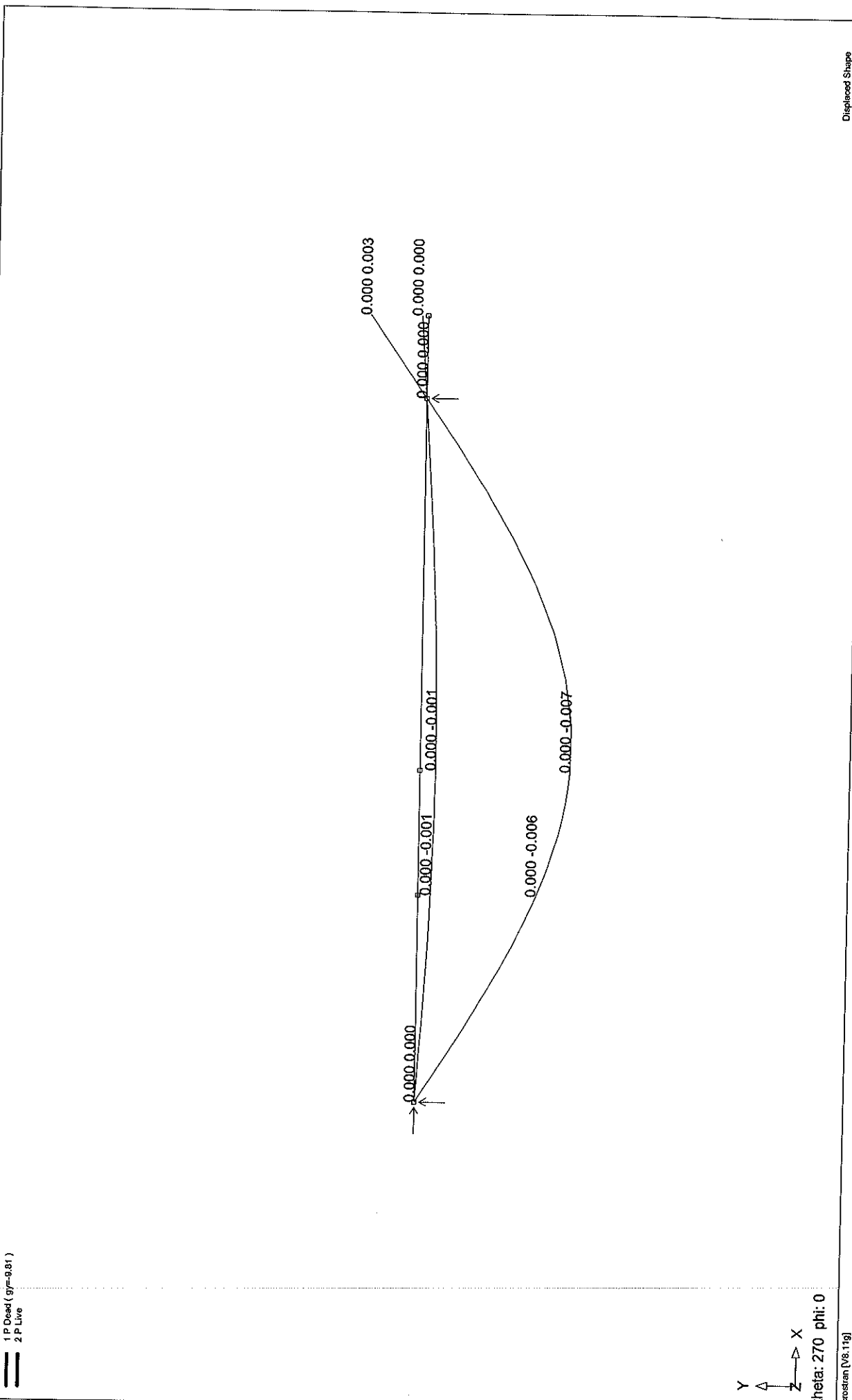
(Reactions act on structure in positive global axis directions.)

Furr Consulting Pty Ltd
500, 5 Beam
Beam
Beam

22 Jun 2010
09:20 AM

Load Cases:
1 P Dead ($g_f=0.81$)
2 P Live

Y
Z
X
theta: 270 phi: 0

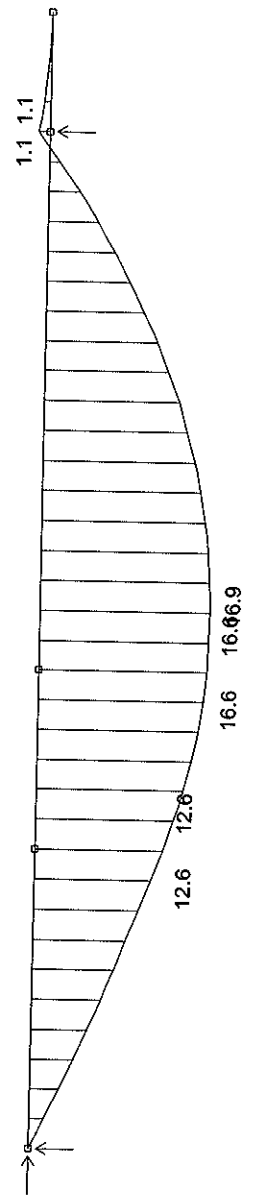


Displaced Shape

P:\PFC10-0010\Analysis\Beam

Microstran (V8.11g)

Load Cases: 3 C 1.2 Dead + 1.5 Live



Y
Z
X
theta: 270 phi: 0
Microstrain [V8.1g]

Floor beam design V3.00

Furr Consulting Pty Ltd

Member: (Floor Beam FB1) 150x75PFC
 Bending: $M^*(max) = 19.7kNm < \phi Mb(1700, \alpha m=1.30) = 37.2kNm$
 Deflection: $\delta_{dl} = L/5199$ (1mm), $\Psi_s \delta_{ll} = L/541$ (6mm), $\delta_{tot.} = L/490$ (7mm) OK (0.53)
 Precamber: Not required OK
 Reactions: (Each end) $R_{dl} = 1.1kN$, $R_{ll} = 14.6kN$, $R^* = 23.2kN$

Geometry

Span (L) =	3400 mm	Effective length (Le) =	1700 mm
Centres (cts) =	450 mm	$\alpha m =$	1.30
Design at =	M mm from LHS, (M)ax, (S)eg		
Effective length (Le) =	1700 mm		
$\alpha m =$	1.30		

Loadings

Floor area =	1.5 m ²	Load type =	N (N)ormal, (S)torage
Apply reduction =	N (Y)es, (N)o	Short term LL (Ψ_s) =	0.7
Floor reduction (Ψ_a) =	1.00 Cl 4.9		

Uniform dead loads

Floor dead load (wdl) =	1.00 kPa *	450 mm +	kN/m =	0.45 kN/m
Super. dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Other dead load (wdl) =	kPa *	mm +	kN/m =	0.00 kN/m
Include S.Wt =	Y (Y)es, (N)o		S.Wt =	0.18 kN/m
			$\Sigma wdl =$	0.63 kN/m

Uniform live loads

Floor live load (wll) =	kPa *	450 mm +	8.60 kN/m =	8.60 kN/m
Partitions (wll) =	kPa *	mm +	kN/m =	0.00 kN/m
			$\Sigma wll =$	8.60 kN/m

Point loads

Point dead load (pdl) =	kN	Position =	1700 mm from LHS
Point live load (pll) =	kN		

$w^* = 1.2 * wdl + 1.5 * wll =$	13.65 kN/m	$R_{dl} =$	1.1 kN
$p^* = 1.2 * pdl + 1.5 * pll =$	0.00 kN	$R_{ll} =$	14.6 kN
Max M^* at =	1700 mm	$R^* =$	23.2 kN
$M^* =$	19.7 kNm (Maximum)		

Capacity

Description =	150x75PFC	Warping constant (Iw) =	4.59 x 10 ⁹ mm ⁶
Flange yield (fyf) =	320 MPa	Torsional constant (J) =	54.9 x 10 ³ mm ⁴
Area (Ag) =	2250 mm ²	Effective section mod. (Zex) =	129 x 10 ³ mm ³
Stiffness (Ix) =	8.34 x 10 ⁸ mm ⁴	Effective section mod. (Zey) =	38.5 x 10 ³ mm ³
Shear modulus (G) =	80000 MPa	Elastic modulus (E) =	200000 MPa
$M_{sx} =$	41.3 kNm	$\phi M_{sx} =$	37.2 kNm
$M_{oa} =$	81.4 kNm	$\alpha s =$	0.779
		$\alpha m =$	1.30
		$\phi M_{sy} =$	11.1 kNm
		$\phi M_{bx} =$	37.2 kNm

Deflections

Ireq'd DL (L/360) =	0.6 x 10 ⁶ mm ⁴	$\delta_{DL} =$	0.7 mm	Span / 5199
Ireq'd Ψ_s .LL (L/360) =	5.5 x 10 ⁶ mm ⁴ < Critical	$\Psi_s \delta_{LL} =$	6.3 mm	Span / 541
Ireq'd DL+ Ψ_s .LL (L/250) =	4.3 x 10 ⁶ mm ⁴ < Critical	$\delta_{Total} =$	6.9 mm	Span / 490

Max. precamber (0.3%*span) =	10 mm	Min. precamber =	15 mm
Precamber 80% of $\delta_{DL} =$	1 mm	Adopted precamber =	0 mm

1kN midspan $\delta =$ 0.5 mm

So we have a depth of;

Row A Door Clearance	=1000mm
Row A Cabinet Depth	= 1000mm
Row Distance	= 1500mm
Row C Cabinet Depth	= 1000mm
Row C Door Clearance	= 1000mm
Total	= 5500mm

Width requirements should be easy to accommodate;

Cabinet B	= 600mm
Cabinet U	= 600mm
Cabinet C	= 300mm
Cabinet R	= 600mm
Total	= 2100mm

Please note the Below for your drawings and design work;

Cabinet U (UPS)

Maximum Height	1991.00 mm
Maximum Width	600.00 mm
Maximum Depth	1070.00 mm
Rack Height	42U
Net Weight	666.40 KG

Cabinet B (Battery Unit)

Maximum Height	1991.00 mm
Maximum Width	600.00 mm
Maximum Depth	1070.00 mm
Net Weight	1252.00 KG

Cabinet C (Cooling) each

Maximum Height	1991.00 mm
Maximum Width	300.00 mm
Maximum Depth	1070.00 mm
Net Weight	183.64 KG

Cabinet R (Standard Server Racks)

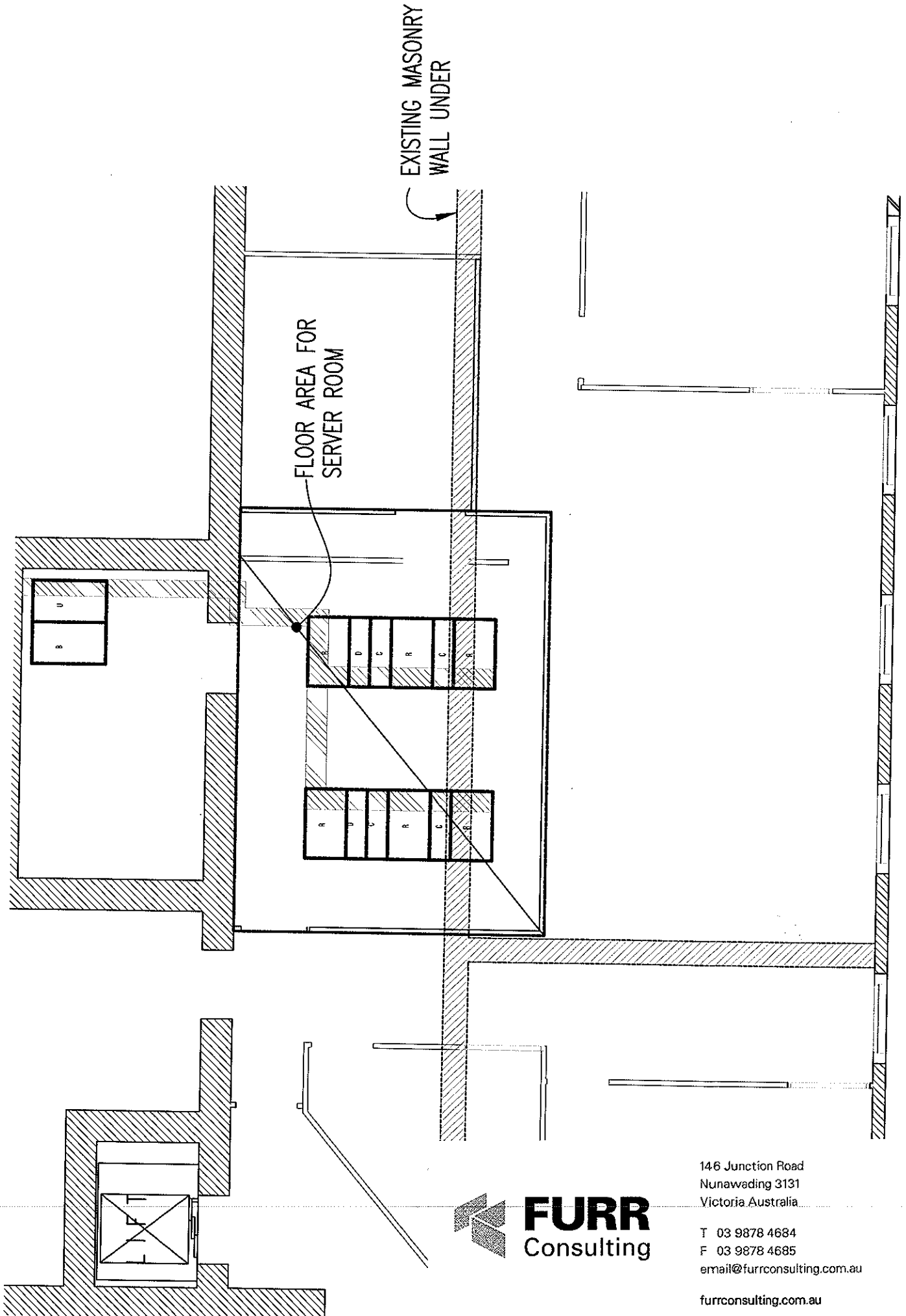
Net Weight	125.09 KG
Maximum Height	1991.00 mm
Maximum Width	600.00 mm
Maximum Depth	1070.00 mm
Shipping Weight	144.55 KG
Shipping Height	2118.00 mm
Shipping Width	899.00 mm
Shipping Depth	1219.00 mm
Weight Capacity (static load)	1363.64 KG
Weight Capacity (dynamic load)	1022.73 KG

Cabinet D

Maximum Height	1991.00 mm
Maximum Width	300.00 mm
Maximum Depth	1070.00 mm
Net Weight	183.64 KG



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FLOOR AREA FOR
SERVER ROOM

EXISTING MASONRY
WALL UNDER



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FL10-0010 SK1

SECTION 4
ELECTRICAL & FIRE ENGINEERING SPECIFICATION

ELECTRICAL & FIRE SERVICES
1725M-SP-E01

associated with the

SOUTH MELBOURNE TOWN HALL
IT SERVER ROOM REFURBISHMENT

for

K20 ARCHITECTURE

SPECIFICATION

C	07/10	Revised Issued for Tender	GB	LL	IB	AGB GROUP ACN 006 572 461	Specification. No: 1725M-SP-E01
B	07/10	Issued for Tender	GB	LL	IB		
A	06/10	Issued for Review	GB	LL	IB		
No	DATE	REVISION	BY	CHK	PIC		SHEET 1 OF 19

TABLE OF CONTENTS

1.0	SCOPE OF WORK	3
2.0	WORK BY OTHER TRADES	10
3.0	EQUIPMENT SUPPLIED BY THE PRINCIPAL.....	11
4.0	REFERENCE DOCUMENTS.....	12
5.0	APPROVAL OF EQUIPMENT.....	15
6.0	SHOP DRAWINGS.....	16
7.0	TESTING AND COMMISSIONING.....	17
8.0	"AS BUILT" DRAWINGS	18
9.0	OPERATION AND MAINTENANCE MANUAL.....	19
10.0	APPENDIXES	
i)	CITY OF PORT PHILIP STURCTURED CABLING STANDARDS FOR DATA & VOICE	
ii)	VESDA DATA SHEET	
III)	HID CARD READER DETAILS	
iv)	CONTRACT DRAWINGS	

1.0 **SCOPE OF WORK**

1.1 **General**

A site inspection to view existing conditions and equipment, and location of facilities, will be required by Tenderers, prior to tendering.

It is the Tenderers responsibility to visit the site to assess the nature and extent of the work required.

The Installer shall coordinate fully with the Responsible Authorities, both internal and external to the client, to ensure: -

- all requirements are understood and incorporated,
- all necessary applications are made,
- all necessary approvals are gained,
- all safe working procedures are followed, and
- all inspections and tests are satisfactorily completed.

The Installer acknowledges that allowance for all these conditions are included in the Tender price submitted.

All electrical work shall be in accordance with the current regulations and requirements of all relevant Statutory Authorities.

The requirements of AS/NZS 3000:2007 - Wiring Rules, AS/NZS 3008.1.1 - Selection of Cables - Australian conditions, Victorian Service and Installation Rules, shall be taken as the minimum standard for this installation.

The electrical tradesman who are to carry out the work shall be licensed by EnergySafe Victoria for the category of work to be performed, and approved by the Superintendent.

At the completion of the Contract, the Contractor shall arrange inspection of the electrical work by a suitably qualified Licensed Electrical Inspector, and the subsequent issue of Certificate/s of Electrical Safety.

The Contractor shall ascertain the Distribution Company requirements for the supply and metering of the whole installation, if required, and shall allow for all labor and materials required to complete the work as specified.

Drawings of Main Switchboards that incorporate unmetered conductors and/or Distribution Company equipment shall be submitted to the Distribution Company for their acceptance, prior to submission to the Superintendent.

The route of any underground cables shall be permanently recorded on a durable card or other suitable material which shall be completed and fixed in a suitable position to provide a permanent record, such that the position of the underground cables at any point can be determined with an accuracy of 200 mm.

All materials and equipment supplied and installed for this project are to be new, and of best quality.

All loads are to be balanced as equally as possible across the phases. Evidence of such balancing is to be provided at completion of the work.

Debris generated during execution of the Contract is to be progressively removed from site in

such a manner so as to prevent: -

- any build-up of debris that could affect access and egress, or safe working, on site,
- any build-up of debris that could become a fire hazard,
- any build-up of debris on a floor or surface that could affect the integrity of the floor or surface.

1.2 Details

The work to be carried out under the Contract shall comply with the requirements of relevant Australian Standards, Codes of Practice, Specification, Drawings, and Data Sheets.

- demolition of existing power and data outlets, exit & emergency lighting, general lighting, and other equipment and associated cabling back to their sources, to locations as shown on the Drawings.
- Demolition of existing IT room Switch Board and replace with new IT room Switch Board with details as follows.
- **supply, installation, testing and commissioning of new IT Server Room Switch Board, DB-SM-IT, 160A, 3 phase, 36 way, Form 2, rated IP44, 20KA at 1 second, complete with ATS, auto transfer switch and all miscellaneous required parts and accessories. Refer single line diagram for details.**
- **supply, installation, testing and commissioning of new 4X1C - 50mmsq XLPE/PVC cable from existing MSB at Ground Floor to Level 1 new DB-SM-IT. Replace exiting circuit breakers within MSB with new 160A MCCB for new cabling. Arrange with South Melbourne City Council for ON/OFF power switching. Contractor to survey site and confirm new cable route, during tender. Any variation raised after tender on this item shall not be entertained.**
- **supply, installation, testing and commissioning of all required circuit breakers within new DB-SM-IT for existing IT equipment within old IT room. Contractor to survey and confirm all required items, during tender. Any variation raised after tender on this item shall not be entertained.**
- supply, installation, testing, and commissioning of new general light and power and associated cabling to locations as shown on the Drawings. All lighting and power outlet circuits shall be 20A and to be protected by earth leakage circuit breakers/RCDs at their origin. All light switches shall be Clipsal or approved brand with 15A mechanisms. All 10 Amp power outlets are to be double pole units.

Electrical Notes:

1. For lighting circuits, the total leakage current cause by the total light fittings inclusive lamp ballast in a single circuit, shall not be over the allowances of RCDs setting, which is normally 30mA.
2. All 10 Amp power outlets are to be double pole units.
3. The Installer is to ensure sufficient capacity to accommodate the additional outlets, with 10% (minimum) spare capacity on completion.
4. Electrician shall ensure that the loads are balanced as closely as possible over 3

phases. Maximum 10% unbalance allowed between the highest and lowest load in phases.

- supply, installation, testing, and commissioning of new 2X28W – T5 fluorescent fittings (recess in 1200 X 300 ceiling tiles) with reflector (Sustain T5, supplied by Thorn Lighting or approved equivalent) & lamps (4000K), (All T5 Lamp lumen to be at least 2600 lumens for single lamp 1X28W or 5200 lumens for double lamps 2X28W, luminaire efficiency to be above 90%) and associated cabling, to locations as shown on the Drawings.
- supply, installation, testing, and commissioning of new 2X28W – T5 surface mounted fluorescent fittings with diffuser (Maxibattern T5, supplied by Thorn Lighting or approved equivalent) & lamps (4000K), (All T5 Lamp lumen to be at least 2600 lumens for single lamp 1X28W or 5200 lumens for double lamps 2X28W, luminaire efficiency to be above 90%) and associated cabling, to locations as shown on the Drawings.
- supply, installation, testing, and commissioning of 2-tier cable trays, 1 for electrical cables and 1 for communication cables (Panduit fibre tray) at high level, to location as shown in the drawings.
- supply, installation, testing, and commissioning of voice/data outlets and associated Cat 6 Panduit cabling from IT server Room to all new data outlets. Test results are to be provided the satisfaction of the superintendent & Principal after commissioning with numbering and labelling of outlets on the drawings.

Communications Notes:

1. The Installer is to ensure sufficient capacity exists to accommodate the additional outlets, with 10% (minimum) spare capacity on completion.
 2. All communication works shall be carried out by Panduit certified contractor. Refer City of Port Philip Structured Cabling Standards for Data & Voice, Rev 2.4 dated 01/07/2010 as attached.
 3. All Victrack Fibre must be undertaken by Victrack authorised contractor and completed to Victrack Standards.
- supply, installation, testing and commissioning of 3 sets of 48 pair Panduit CAT 6 cables from existing relocated communication rack to new communication racks, as shown in the drawings.
 - supply, installation, testing and commissioning of 20 pair CAT 3 Krone Tie cable in a two wire configuration, from PABX room to communication racks at new server room, as shown in the drawings.
 - supply, installation, testing and commissioning of 8 pair Panduit CAT 6 cables & Panduit Consolidation box at existing IT room, as shown in the drawings.
 - supply, installation, testing and commissioning of 2 pair Panduit CAT 6 cables from Roof A/C panel to new server room, as shown in the drawings.
 - supply, installation, testing and commissioning of Panduit consolidation box and associated cabling and accessories, as shown in the drawings.

- supply, installation, testing and commissioning of Fibre Splice and associated cabling and accessories, as shown in the drawings.
- supply, installation, testing, and commissioning of all patch & fly leads, (Panduit RJ45, Class E, CAT 6) Refer City of Port Philip Structured Cabling Standards for Data & Voice, Rev 2.4 dated 01/07/2010. Reconfirm patch leads detail with the Principal before order.
- supply, installation, testing, and commissioning of new iCLASS RK40/RWK400 security card reader and associated cabling to connect to existing PA COM system within the South Melbourne Town Hall, to location as shown on the Drawings.
- supply, installation, testing, and commissioning of lighting switching and associated wiring to location as shown in the drawings.
- supply, installation, testing, and commissioning of power outlets & associated wiring, to locations as shown in the Drawings.
- supply, installation, testing, and commissioning of Exit and Emergency lighting to locations as shown on the Drawings. Exit and Emergency lighting is to be Legrand Minitronics, wired, monitored, single point units, as specified on the Drawings.

At completion of installation and prior to handover, the standard initial test for Exit and Emergency lighting, as required by AS 2293, complete with "NATA" Test Certificate, is to be carried out as part of commissioning, and details recorded. Any faulty units or wiring discovered during testing is to be replaced immediately at the Contractors expense.

Identification details, locations, and serial numbers of Exit and Emergency light fittings are to be provided on a drawing and submitted to the superintendent for their records following successful commissioning of the Exit and Emergency lighting

- supply, installation, testing and commissioning of VESDA system, as shown on the drawing, complete with all required equipment, VESDA VLF 250, VESDA Laser Focus 250, cabling & piping, and interface with existing Fire Indicator Panel, for the successful operation of the VESDA system. Refer attached data sheet for further information.
- liaison with other trades and installer involved on the project, and assistance with commissioning of total systems on completion.
- provision of any approvals or permits required, including any costs associated with inspections by Authorities or others.
- all testing and commissioning.
- provision of electrical inspection by a suitable Licensed Electrical Inspector, on completion of the project, and provision of appropriate Certificate/s of Electrical Safety.
- provision of preventive maintenance services (Equipment installer to recommend frequency required) for a period of 12 months from the date of practical completion.

- provision of samples (section 5.0) for approval.
- provision of “Shop Drawings”.
- provision of “as built” drawings.
- provision of recommended Spare Parts schedule.
- provision of defects liability guarantee for a 12 month period from the date of Practical Completion.
- any other work not specified in Section 2.0 (Work by Other Trades).

The work shall be executed in such a manner as to form complete and operable systems to the satisfaction of the Superintendent and the Architect, within the intent of this Specification and referenced Drawings.

1.3 Cables and Wiring

a) General

Under no circumstances shall the colour Green or Green/Yellow be used for anything other than Earthing in any wiring system.

b) Cable Types

Unless otherwise specified, all power cables shall be PVC/PVC orange circular cable, or PVC insulated, TPS sheathed cables, with individual phase colour cores and multi-stranded copper conductors to AS 3147, minimum sizes to be used for Power -- 2.5 mm² (black colour), and Lighting -- 2.5 mm² (white colour)

c) Cable Sizing

Cable sizes shall match or exceed the current rating of the cable protective device and shall comply with the requirements of AS/NZS 3000:2007 for fault loop impedance and touch voltage, and AS/NZS 3008.1.1 for both current rating and voltage drop.

Calculations verifying that proposed cable sizes and route lengths comply with these requirements shall be supplied as part of the “shop drawings”.

The Contractor must supply evidence of this compliance on completion of the installation, before a Certificate of Practical Completion will be issued.

d) Cable Installation

Cable installation methods shall comply with AS/NZS 3000:2007 - Wiring Rules, AS/NZS 3008.1.1 - Selection of Cables - Australian conditions, and Victorian Service and Installation Rules, as a minimum.

The final cable and wiring routes shall be determined by the Contractor in conjunction with the Superintendent, and are dependent on the structural and mechanical site limitations.

All cables shall be carefully installed to avoid damage to the insulation and sheathing and to any structures or support systems. At locations where cables or conduits are exposed to risk of mechanical damage the Contractor shall supply and install galvanised steel guards of substantial construction, or similar, as a method of

mechanical protection.

Any cables or cable supports that are damaged will be rejected and shall be immediately replaced at the Contractors expense.

Cables shall be installed in unbroken lengths between termination points unless otherwise approved by the Superintendent.

e) Cable Entry and Termination

Cables shall enter enclosures using cable glands approved by the manufacturer for the associated cable.

All cable glands are to have an IP protection rating equal to the switchboard, enclosure, equipment, etc. to which they are installed.

f) Conductor Termination

All multi-strand conductor cores shall be terminated using compression type lugs of the correct size for the conductor. All lugs are to be installed using the correct compression tool.

g) Cable Identification

All cables shall be labelled at both ends using "Grafoplast Trasp" cable markers or approved equivalent. Additionally, where cables are terminated at switchboards, cable markers shall also be fitted to the cable within the interior of the switchboard.

The Contractor shall submit a numbering system for approval by the Superintendent. All numbering shall conform to the Contractors "As Built" drawings.

h) Cable Core Identification

Each individual conductor shall be labelled at both ends of the cable using "Grafoplast Trasp" markers or approved equivalent.

The Contractor shall submit a numbering system for approval by the Superintendent. All numbering shall conform to the Contractors "as built" drawings.

1.4 Conduits

Conduits used throughout the installation shall comply with AS/NZS 3000:2007 - Wiring Rules, AS/NZS 2053 - Conduits and Fittings for Electrical Installations, and Victorian Service & Installation Rules.

The minimum conduit size is to be 20 mm. All conduits shall be sized to have a minimum of 30% spare capacity.

Unless specified otherwise, all conduits and conduit fittings shall be of rigid heavy duty PVC, coloured orange. Large radius bends shall be used at all major changes in direction.

Galvanised conduit shall be used in the following locations: -

- where exposed to direct sunlight.
- where exposed to temperatures at or above 60°C.

- where exposed to risk of mechanical damage.

Conduits shall be installed in straight continuous runs wherever practical. Easy sets shall be used for all minor changes of direction and conduits shall in no part be under stress.

Any incorrectly located or damaged conduit caused by the Contractor's neglect shall be immediately relocated or replaced at the Contractor's expense.

During installation and building operations, the ends of all conduits shall be tightly capped or plugged and the Contractor shall take all necessary precautions to prevent the ingress of moisture or foreign matter. Immediately prior to drawing in cables, the conduits shall be thoroughly swabbed out.

1.5 Cable Ladders/Tray

Cable ladders/trays, associated fittings and accessories shall be of Unistrut or other approved manufacture. They shall be fabricated from mild steel, and after fabrication shall be hot dip galvanised.

The size and gauge of all ladders/trays shall be chosen to suit each particular application. Cable ladders/trays shall be sized to have a minimum 50% spare capacity, unless noted otherwise. They shall be adequately stiffened and braced both transversely and longitudinally, to ensure a true finished run.

All ladders/trays shall be supported by hot dipped galvanised brackets at intervals sufficiently small to produce a robust installation and to ensure that there is no perceptible deflection of the finished ladder, and its associated supports.

All bends, tee-offs, changes in section and changes in direction shall be made with supplier recommended fittings. Bends, risers, and tees shall allow for minimum permissible cable bending radii.

All joints shall be butt joints made with approved jointing plates. Lapped joints will not be accepted. All joints shall be bridged with stranded copper, green and yellow PVC insulated, lugged earth links, minimum size 6 mm².

All screws, washers, nuts, etc, used in the installation shall be cadmium plated.

All ladders/trays, fittings, brackets, etc, shall be hot dipped galvanised.

1.6 Catenary Supports

Where catenary wires are used to secure cabling they shall comply with the requirements of AS 3000:2007.

2.0 WORK BY OTHER TRADES

The following work associated with Electrical and associated Services shall be carried out by other trades associated with the project: -

- all civil, hydraulic, mechanical, structural, and building work.
- all audio/visual work.

3.0 EQUIPMENT SUPPLIED BY THE PRINCIPAL

The Principal shall supply the following equipment for use by the Contractor: -

- Not available for this project.

All other items of equipment shall be supplied and installed by the Contractor.

4.0 **REFERENCE DOCUMENTS**

4.1 **General**

Except as stated in written Contract or Specification to the contrary, all work shall meet the requirements of relevant Australia Standards, Codes of Practice, Data Sheets, and Drawings.

The latest issue of the aforementioned documents at the time of Contract shall form part of this Specification.

4.2 **Australian Standards**

Electrical

AS/NZS 1660	Test methods for electric cables, cords and conductors.
AS 1680	Interior lighting
AS 1939	Degrees of protection provided by enclosures for electrical equipment (IP Code).
AS/NZS 2053	Conduits and fittings for electrical installations.
AS 2184	Low voltage switchgear and controlgear – Moulded-case-circuit-breakers for rated voltages up to and including 600 V a.c. and 250V d.c.
AS/NZS 2293	Emergency escapes lighting and exit signs.
AS 2700	Colour Standards for General Purposes.
AS/NZS 3000:2007	Electrical installations (known as the Australian and New Zealand Wiring Rules).
AS/NZS 3008.1.1	Electrical Installation - Selection of Cables - Cables for alternating voltages up to and including 0.6/1kV. Typical Australian installation conditions.
AS/NZS 3017	Electrical Installations – Verification guidelines.
AS 3439.1	Low voltage switchgear - Control gear assemblies. Type tested and partially type tested assemblies.
AS/NZS 3947	Low voltage switchgear and control gear.

Communications

AS/ACIF S008	Requirements for Authorised Cabling Products.
AS/ACIF S009	Installation Requirements for Customer Cabling (Wiring Rules).
AS/NZS 3080	Integrated Telecommunications Cabling for Commercial Premises.
AS/NZS 3084	Commercial Building Standard for Telecommunications Pathways and Spaces.

AS/NZS 3085.1	Administration of Communications Cabling Systems – Basic Requirements.
AS/NZS 4117	Surge Protective Devices for Telecommunications Applications.
AS/NZS IEC 61935.1	Testing of Balanced Communication Cabling in accordance with ISO/IEC 11801 – Part 1.
ISO 11801 Ed 2	Information Technology – Generic cabling for Customer premises..
TIA/EIA 568-B.2-1	Transmission Performance Specification for 4-pair 100 Ohm Category 6 cabling.
TIA 568-B.2-10	Information Technology - Augmented Category 6 cabling.

Fire

AS 1603	Automatic fire detection and alarm systems.
AS 1668	The use of ventilation and air-conditioning in buildings.
AS 1670	Fire detection, warning, control and intercom systems - System design, installation and commissioning.
AS 1851	Maintenance of fire protection systems and equipment.
AS/NZS 1905	Components for the protection of openings in fire-resistant walls.
AS 2362	Fire detection, warning, control and intercom alarm systems – Methods of test.
AS/NZS 3000:2007	Electrical installations (known as the Australian and New Zealand Wiring Rules).
AS 3008.1.1	Electrical Installations - Selection of Cables – Cables for alternating voltages up to and including 0.6/1kV -Typical Australian conditions.
AS/NZS 3013	Electrical installations – Classification of the fire and mechanical performance of wiring system elements.
AS 4428	Fire detection, warning control and intercom systems. Control and indicating equipment.
AS/NZS 4507	Cables – Classification of characteristics when exposed to fire.
AS 7240	Fire detection and alarm systems.

4.3 Codes of Practice

Victorian Service and Installation Rules.
 Building Code of Australia - (BCA).
 Local Fire Authority Rules.
 Environment Protection Authority Regulations.
 Occupational Health and Safety - Plant Regulations.
 Occupational Health and Safety – Working at Heights Regulations.
 Occupational Health and Safety Act 2004.

4.4 Reference Documents

- i) CITY OF PORT PHILIP STURCTURED CABLING STANDARDS FOR DATA & VOICE
- ii) VESDA DATA SHEET
- iii) HID CARD READER DETAILS

4.5 Contract Drawings

<u>Drawing No.</u>	<u>Title</u>
1725M-DR-E01	ELECTRICAL SERVICES, IT SERVER ROOM DEMOLITION LAYOUT
1725M-DR-E02	ELECTRICAL SERVICES, IT SERVER ROOM PROPOSED LIGHTING & POWER LAYOUT
1725M-DR-E03	FIRE SERVICES, IT SERVER ROOM VESDA SYSTEM PROPOSED LAYOUT

5.0 APPROVAL OF EQUIPMENT

A complete sample of the equipment listed below shall be submitted to the Superintendent for approval, prior to installation.

The sample supplied shall be in every respect a true indication of the equipment to be supplied by the Contractor.

No fabrication, manufacture, or supply of the equipment shall be commenced until written approval has been received from the Superintendent.

Equipment required for approval shall include: -

- samples of all T5 light fittings, flood lighting, including Exit & Emergency fittings including mounting facilities,
- samples of all power outlets, switches and junction box proposed for use,
- samples of distribution board
- sample of VESDA system equipment & piping

6.0 **SHOP DRAWINGS**

The Contractor shall produce “shop drawings” of the following: -

- proposed layout showing locations of all lighting, power, communication & fire, equipment outlets & fittings confirming proposed works are able to fit into site spatial and situation.
- proposed circuit diagrams showing circuit breaker ratings, proposed route, cable sizes and types, for power & lighting circuits,
- proposed circuit diagrams showing proposed route, cable sizes and types, for lighting control circuits,
- proposed circuit diagrams showing circuit breaker ratings, proposed route, cable sizes and types, for Exit & Emergency lighting circuits,
- calculations showing circuit breaker ratings, proposed route length, cable sizes and types, for fault loop impedance, and touch voltage.

The “shop drawings” shall be submitted in triplicate to, and reviewed by, the Superintendent.

The Contractor must receive a set of “shop drawings”, reviewed and signed by the Superintendent, before installation is commenced.

Note:

Review of “shop drawings” does not relieve the Contractor of the responsibilities detailed in this Specification.

7.0 TESTING AND COMMISSIONING

7.1 General

The Contractor shall be responsible for testing and commissioning of the Electrical and associated Services, and will be required to ensure properly functioning and compliant systems on completion of the project.

The Contractor shall supply all necessary equipment, materials, and services for testing and commissioning.

The Superintendent shall be given five (5) working days notice of any proposed testing and commissioning.

The following tests for electrical work, as a minimum, shall be carried out -

- tests as required by AS/NZS 3000:2007.
- tests as required by AS/NZS 3017.
- initial test as required by AS/NZS 2293, complete with "NATA" Test Certificate.
- commissioning tests to AS 1670.
- tests required by the relevant authorities.

Following satisfactory inspection and testing as above, independent inspection by a Licensed Electrical Inspector is to be carried out, and "Certificate/s of Electrical Safety" issued.

The original, plus two (2) copies, of the "Certificate/s of Electrical Safety" are to be included in the Operation and Maintenance Manual.

The following tests for voice/data work, as a minimum, shall be carried out -

- test procedures are to be implemented at the completion of the installation phase of cabling works as part of the system commissioning test. All test results are to be included in the Operation and Maintenance Manual, and must provide details of equipment used, make/model, date of calibration certificate and test parameters used.
- all fibre links and cable types (both single mode and multimode) shall be tested in accordance with AS 3080 Annexure A.1 Section Gigabit Ethernet and 625 Mbit/sec ATM requirements, including the following: -
 - a. at both ends of the fibre provide Optical Time Domain Reflectometer (OTDR) graphical lot and cable length measurements for each fibre.
 - b. provide link attenuation measurements using a Light Source and Optical Detector.
 - c. provide an electronic and hard copy of all tests for ASCII text format on CD/DVD ROM. Test results shall include the following items
 - point to point identification and direction of test,
 - wavelength,
 - test method used,
 - test equipment manufacture, model number, serial number, date and details of last calibration,
 - date of testing
 - tester(s) name and qualifications.
- cable records to be updated and provided on site

7.2 Test Results

Certified test results are to be included in the Operation and Maintenance Manual.

8.0 “AS BUILT” DRAWINGS

As the works progress, the Contractor shall mark, in red ink, on a separate copy of the contract Drawings, all deviations and changes from the contract Drawings due to site conditions, variations, and other reasons, keeping an accurate record of work as actually installed. “shop drawings” shall not be used as record drawings, or “as built” drawings.

The Contractor shall be responsible for producing “as-built” drawings in CAD format to the requirements of the Client at the conclusion of the project.

The Contractor shall provide copies of approved “as-built” drawings for inclusion in the Operation and Maintenance Manual.

9.0 OPERATION AND MAINTENANCE MANUAL

The Contractor, on completion of commissioning and before issue of the Certificate of Practical Completion, shall produce an Operating and Maintenance Manual containing the following information's of the electrical services works: -

- system descriptions.
- list of main items of equipment, with manufacturer's name, model number and serial number.
- list of all contact personnel, including after hours phone numbers.
- maintenance instructions for each 12 months period.
- original vendor data for all main items of equipment.
- spare parts schedule.
- "as-built" drawings.
- testing and commissioning results.
- Certificate/s of Electrical Safety.
- Data & Comm's "certificate of compliance".
- Fire "certificate of compliance".

Manufacturer's information shall be in original printed form. Photocopies of data are not acceptable.

On manufacturer's information sheets, the applicable equipment and model number shall be clearly highlighted.

A "preliminary" copy of the Operating and Maintenance Manual shall be submitted to the Superintendent for approval. Any changes required by the Superintendent shall be incorporated before final issue of the manual.

A Certificate of Practical Completion will not be issued until the Client has received a suitable Operating and Maintenance Manual.

Confirm with superintendent copies of the Operating and Maintenance Manual which shall be issued in A4 sized hard-back black folders. The title of the manual shall be embossed on the front and spine of the folders in appropriately sized white letters.

10.0 APPENDIXES

City of Port Philip Structured Cabling Standards for Data & Voice, Rev 2.4, 01/07/2010

VESDA data sheet

HID card reader details

CONTRACT DRAWINGS

City of Port Phillip Structured Cabling Standards for Data and Voice

Revision 2.4 01/07/10



Document Revisions

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TABLE OF CONTENTS

1. DOCUMENT SUMMARY	6
1.1. INTRODUCTION.....	6
1.2. GENERAL.....	6
1.3. WORK AREA	6
1.4. HORIZONTAL DISTRIBUTION	6
1.5. CABLE MANAGEMENT	7
1.6. LAB RACKS.....	7
1.7. BACKBONE CABLING (VOICE).....	7
1.8. OPTICAL FIBRE CABLING.....	7
1.9. LABELLING	7
1.10. TESTING - COPPER	8
1.11. TESTING – OPTICAL FIBRE	8
1.12. DOCUMENTATION.....	8
2. INTRODUCTION	9
2.1. GENERAL.....	9
2.2. USE OF DOCUMENTS	9
2.3. DESCRIPTION OF SYSTEM	9
2.4. TYPES OF USE	10
2.4.1. Telecommunications	10
2.4.2. Data Networks	10
2.5. CONFORMITY WITH STANDARDS.....	10
2.5.1. General.....	10
2.5.2. Quality Standards	10
2.5.3. Performance Standards	11
2.5.4. Environmental Conditions	11
2.5.5. Acceptable Cabling Specifications and Solutions.....	11
2.5.6. Use of Sub-Contractors.....	12
3. ENVIRONMENTAL SPECIFICATION	13
3.1. GENERAL.....	13
3.2. OCCUPATIONAL HEALTH & SAFETY	13
3.3. DETAIL DESIGN VARIATION TO STANDARDS	13
3.4. REQUIREMENTS OF VARIOUS TENVIRONMENTS	13
3.4.1. Office Area Environment	13
3.4.2. Building Distributor (Computer Room) Environment	13
3.4.3. Fibre Building Backbone Environment.....	14
3.4.4. Copper Building Backbone Environment	14
4. CABLING INFRASTRUCTURE	15
4.1. CIVIL WORKS.....	15
4.1.1. Excavation.....	15
4.2. CABLE INSTALLATION (OUTDOOR).....	15
4.3. COMMUNICATIONS PITS	16
4.4. MECHANICAL PROTECTION FOR CABLE	16
4.4.1. Guidelines for use.....	16
4.4.2. Conduits	16
4.4.3. Cable Tray.....	17
4.4.4. Catenaries.....	17
4.4.5. Reinstatement of penetrations.....	18
4.4.6. Painting and Corrosion Protection	18
4.5. CABLING	18
4.5.1. General.....	18
4.5.2. Allowance for Spare Cable Length - Copper	19
4.5.3. Allowance for Spare Cable Length – Optical Fibre.....	19
4.5.4. Cable running Internal	19
4.5.5. External Cabling.....	19
4.6. OUTLETS	20

4.6.1.	General.....	20
4.6.2.	Outlet Identification	21
4.7.	DISTRIBUTION FRAMES (COPPER).....	21
4.7.1.	General.....	21
4.8.	19" RACK PATCH PANELS.....	21
4.8.1	. COPPER	21
4.8.2	Fibre	21
	22 4.9
	LABELLING CONVENTIONS.....	22
4.10.	PATCHING METHODOLOGY	23
4.10.1.	Method of Administration.....	23
4.10.2.	Patch Cords	23
4.11.	CABLE RECORDS MANAGEMENT SYSTEM.....	24
4.12.	EARTHING.....	24
4.13.	IDENTIFICATION.....	24
4.13.1.	Identification Conventions	24
5.	MATERIALS.....	25
5.1.	COPPER CABLES	25
5.1.1.	Backbone Cable	25
5.1.2.	Outside Plant Cabling.....	25
5.1.3.	Internal Riser Cabling.....	25
5.1.4.	Horizontal Wiring to Outlets.....	25
5.1.5.	Patch / Fly Leads	25
5.1.6.	Patch Cable Management	25
5.2.	OPTICAL FIBRE CABLES	26
5.2.1.	General.....	26
5.2.2.	Outside Plant fibre Cabling.....	26
5.2.3.	Multimode Backbone Cable	26
5.3.	CROSS CONNECTION SYSTEM	26
5.3.1.	Copper Circuits	26
5.3.2.	Connection to Fixed Copper Wiring.....	26
5.3.3.	Fibre.....	26
6.	QUALITY OF WORKMANSHIP	27
6.1.	COMPLIANCE WITH STANDARDS.....	27
6.2.	INSPECTIONS	27
6.3.	CERTIFICATION	27
6.4.	INSTALLATION TESTING	27
6.4.1.	Test Parameter and Set Up.....	27
6.4.2	Copper Cabling.....	28
6.4.2.1.	Voice Backbone	28
6.4.3.	Optical Fibre Cabling	29
7.	DOCUMENTATION.....	30
7.1.	HAND-OVER DOCUMENTATION REQUIREMENTS	30

1. Document Summary

1.1. Introduction

- (a) This Standards Document defines the minimum technical and functional parameters to be met by the Structured Cabling System in order to meet the communication requirements of City of Port Phillip. The latest Revision shall be used and is in force at all times
- (b) All City of Port Phillip site specific documents will be issued with a unique Project ID that shall be used to identify the project on all correspondence and as built documentation
- (c) This section shall be used as the reference for any person that is required to recommend, scope, design, install, terminate, test or certify any structured cabling system within any City of Port Phillip Site.
- (d) These guidelines are relevant for all City of Port Phillip sites, including office and outdoors environments.
- (e) This document shall be read in conjunction with any Site Specific Specifications. Site Specific Specification details will take precedence over details in this document
- (f) This document does not cover other media types such as wireless.
- (g) This document shall be accompanied by a detailed design document that shall provide the scope of requirement for an individual environment.
- (h) For the complete description of City of Port Phillip Structured Cabling System Standards, refer to the body of this document.

1.2. General

- (a) City of Port Phillip has selected Panduit as the preferred supplier of unshielded twisted-pair and optical fibre structured cabling components.
- (b) All cabling installed at any City of Port Phillip site must be fully certified with a Panduit[®] 25 year Performance Certification and the Applications Assurance Program for copper and optical fibre.
- (c) All cabling installations shall comply with Australian / New Zealand Standards as listed in Table 1-1 in section 2.5.3 Performance Standards.
- (d) All cabling shall comply with the current Panduit[®] Design and Installation Guidelines.
- (e) All Installations and Testing shall be carried out by a Current Panduit Certified Installer (PCI) Approved by City of Port Phillip
- (f) A Panduit Appendix I document shall be submitted to Panduit prior to any work commencing.

1.3. Work Area

- (a) Each workstation shall have a minimum of 3 outlets installed, terminated and tested.
- (b) Each outlet shall be installed with the key at the bottom of the jack and the conductors at the top to prevent dust contaminating the conductors. In a high dust environment, shuttered outlets shall be installed.
- (c) All outlets shall be installed and terminated to the T568A wiring scheme.

1.4. Horizontal Distribution

- (a) All City of Port Phillip sites shall be cabled in a home run configuration unless Consolidation Points are specified.
- (b) The contractor shall refer to the detailed design document for site installation requirement for specific site details.
- (c) All cables shall be run on standards compliant support structures, for example cable tray, Catenary wire or J Hooks. Cables shall not be laid on ceiling tiles.

1.5. Cable Management

- (a) Horizontal cable management shall be as per detailed design document.
- (b) Vertical cable management is required for the full length of the communications cabinet.
- (c) Overhead cable management is required to connect all Racks in a multiple installation.
- (d) The overhead cable management shall be sized to accommodate sufficient 4 pair cables to completely populate a fully loaded rack.

1.6. 19" Equipment Racks

- (a) Unless otherwise specified all Active equipment, Patch Panels and Fibre Optic termination enclosures shall be housed within Panduit 4 post rack with PatchRunner vertical cable management.

1.7. Backbone Cabling (Voice)

- (a) Category 3 cables shall be used to supply voice services across the backbone cabling system.
- (b) 25, 50 or 100 pair cable is permissible for use within City of Port Phillip premises.
- (c) All backbone cable shall be home run between the BD and FD on each floor. Cable pairs shall be terminated and tested for Polarity and Continuity.
- (d) Refer to detailed design document or scope of works for site requirements.

1.8. Optical Fibre Cabling

- (a) All Optical Fibre components shall be certified by Panduit.
- (b) All Fibre Cabling shall be Single-mode, Unless specified in Site Specific documentation
- (c) All Single-mode fibre Cables shall be terminated with Standards Compliant LC type connectors.
- (d) Hybrid patch cords to accommodate the connection of active equipment shall be used
- (e) Fibre terminations shall be mounted in 24 port 1 RU termination shelves. Where high fibre counts exist, for example the BD, the use of 72 or 144 capable fibre termination enclosures may be specified.
- (f) All fibre termination enclosures shall be labelled with laser radiation warning labels.
- (g) All Multi-mode fibre shall be 50/125 OM 3 compliant fibre connection type SC.
- (h) All Multimode fibres are to be terminated using Pre-polished Field
- (i) All Single-mode fibres are to be terminated using Fusion Spliced Pigtailed.
- (j) A minimum of 12-core Single-mode fibre shall be installed as intra-building backbone cabling.
- (k) Refer to the scope of works or detailed design document for specific requirements.

1.9. Labelling

- (a) Each outlet shall be labelled with a unique identifier compliant to AS3085.1:Latest Revision
- (b) Each T.O. outlet label shall be integral to the Outlet Plate.
- (c) Each Cable shall be labelled permanently 100mm from at each end
- (d) Refer to section 4.9 for details.

1.10. Testing - Copper

- (a) 100% of installed cables shall be fully tested, Compliant to Panduit Certification
- (b) All cabling shall exceed the performance specifications of Class E (Cat 6) Permanent Link .
- (c) Refer to section 6.4 for further details on expected testing requirements.

1.11. Testing – Optical Fibre

- (a) 100% of installed fibre cores shall be tested.
- (b) All cabling shall exceed the performance specifications of OS1 Link where installed.
- (c) All cabling shall exceed the performance specifications of OM3 Link where installed.
- (d) ILM (Insertion Loss Measurement) shall be performed as a minimum.
- (e) Refer to section 6.4.2 for further details on testing requirements.

1.12. Documentation

- (a) City of Port Phillip expects documentation to be supplied to the department prior to hand-over of any structured cabling system.
- (b) Panduit warranty certificate shall be supplied as part of the documentation and infrastructure hand-over.
- (c) Refer to section 7.1 for Hand-over documentation requirements.

2. Introduction

2.1. General

- (a) This Specification Document defines the minimum technical and functional parameters to be met by the Structured Cabling System in order to meet the communication requirements of City of Port Phillip
- (b) This document describes the installation, termination and testing of the structured cabling system for various applications such as Voice, Data and Multi-media services required at the various City of Port Phillip premises throughout Australia. Panduit Certified Installers shall adhere to all requirements of this specification document and ensure that all of their employees assigned to perform any installation tasks are made fully aware of their obligations under this document except where explicitly varied or excluded in supporting documentation for this site.

2.2. Use of Documents

- (a) The document provides a guideline for the minimum requirements for structured cabling system at all City of Port Phillip sites.
- (b) As a foundation document, all works performed must comply with this document unless written authorisation is obtained from an authorised City of Port Phillip or their representative.
- (c) Any works taken out which do not adhere to the guidelines contained in this document will be deemed non-compliant, and will be rectified by the Contractor responsible for the works at the Contractors expense.
- (d) Where reference herein is made to the "Project Manager", this person may be a nominated employee of City of Port Phillip or a nominated representative.
- (e) This specification is to be read in conjunction with the scope of works and sites specific drawings issued.

2.3. Description of System

The structured cabling system shall be comprised of the following subsystems:

- (a) Building Distributor (Computer Room).
- (b) Backbone Cabling.
- (c) Floor Distributor (Telecommunications Room)
- (d) Horizontal Cabling.
- (e) Work Area.
- (f) Building Entrance Facility , Incorporating Carrier Network Terminations

2.4. Types of Use

The structured cabling system shall be capable of supporting but is not limited to the following services.

2.4.1. Telecommunications

- (a) Telephone
- (b) Facsimile
- (c) Telecom leased lines, including data services (DDS)
- (d) ISDN services, up to 2.048 Mbps
- (e) Exchange line services for PABX

2.4.2. Data Networks

- (a) IEEE RS - 232-D, RS - 422, RS - 485
- (b) IEEE 802.310Base-T
- (c) IEEE 802.310Base-FL
- (d) IEEE 802.3100Base-TX
- (e) IEEE 802.3100Base-FX
- (f) IEEE 802.31000Base-T
- (g) IEEE 802.31000Base-TX
- (h) IEEE 802.31000Base-SX *
- (i) IEEE 802.31000Base-LX *
- (j) IEEE 802.AE-10Gbase-SR *
- (k) ATM
- (l) FDDI
- (m) TP-PMD

* Subject to Optical Fibre type

2.5. Conformity with Standards

2.5.1. General

- (a) All works specified in this and related documents shall be implemented and completed in strict compliance with regulations of statutory bodies, and the applicable standards and codes. In general, standards and codes shall be those issued or endorsed by Standards Australia or ISO/IEC. Contractors shall adhere to the Latest issue of applicable standards at the time of execution.
- (b) Unless otherwise stated, the equipment and installation standards shall conform in every way to the requirements of the latest issue of appropriate international and local standards (refer 2.5.3).
- (c) Local regulatory specifications shall be complied to with due regard to the potential indirect connection of equipment to the Public Switched Telephone Network.

2.5.2. Quality Standards

The Contractor shall have a quality system in place that conforms to the requirements of ISO 9000 or ACA Code of Practice , or shall provide details of progression toward accreditation to the relevant standard.

2.5.3. Performance Standards

- Cabling materials, practices, testing equipment and documentation shall comply or exceed the following standards.
- Local standards shall take precedence at all times, the following standards and reference documents shall be applicable to the structured cabling system, Where the local standard does not cover a given issue, rulings held within the ISO/IEC or TIA/EIA standards shall apply.
- All standards documentation used shall be the latest issue.
- The contractor shall have in their possession a copy of all relative standards as a point of reference.

A	AS/NZS 3000	SAA Wiring Rules (latest edition)
B	AS/NZS 3080	Telecommunications Installations – Integrated Telecommunications Cabling Systems for Commercial Premises (latest edition)
C	AS 3084	Telecommunications Installations - Telecommunications Pathways and Spaces for Commercial Buildings (latest edition)
D	AS/NZS 3085-1	Telecommunications Installations - Administration of Communications Cabling Systems (latest edition)
F	AS 3260	Safety of Information Technology Equipment including Electrical Business Equipment. (latest edition)
G	AS 3548	Electrical Interference - Limits and Methods of Measurements of Information Technology Equipment. (latest edition)
H	AS/NZS 4251.1	Electromagnetic compatibility – Generic emission standard – Residential, Commercial and Light Industry (latest edition)
I	AS/NZS 2053	Conduits and fittings for electrical installations. (latest edition)
J	AS 3600	Concrete structures. (latest edition)
K	AS/NZS 2648	Underground marking tape. (latest edition)
L	AS/ACIFS008 (Formerly ACA TS008)	Requirements for authorised cabling products (latest edition) – Mandatory
M	AS/ ACIF S009 (formerly ACA TS 009)	Installation requirements for Customer Cabling (Wiring Rules) (latest edition) – Mandatory
N	AS/ANZS 61935.1	Testing of Balanced Communication Cabling
O	AS/NZs 14763.3	Testing of Fibre Optic Cabling

□ Table 1-1: Australian Standards

2.5.4. Environmental Conditions

- The equipment offered shall be capable of operating continuously and without degradation in performance, for 24 hours per day, 365 days per year in an ambient temperature of -15°C to + 60°C, with a relative humidity between 5% to 95% (non condensing).

2.5.5. Acceptable Cabling Specifications and Solutions

- The Structured Cabling System shall be a Panduit Giga-TX™ Class E / Category 6 copper solution utilising PATCHRUNNER™ distribution hardware and Panduit™ fibre solution utilising OS1 Single Mode optical fibre cabling or OM3 Multi Mode optical fibre where specified.
- The performance specifications shall meet or exceed Class E Permanent Link.
- The installation shall be guaranteed with a Panduit® 25-year Warranty. The contractor and all of its employees must be an Existing Panduit Certified Installer (PCI) Approved by the City of Port Phillip and must have as a minimum an ACMA Open Cabling Registration to install a structured cabling system within the City of

Port Phillip environments. Any individual contractor or employee performing any termination or testing must be fully qualified and have fully completed any and all Panduit training without exception.

- (d) The contractor shall submit a copy of Panduit PCI certification status with response as proof of such certification.

2.5.6. Use of Sub-Contractors

Any contractor that quotes for structured cabling must be able to perform the design, installation, termination, testing and organise the manufacturers certification without the use of sub-contractors.

3. Environmental Specification

This section describes typical environments within any City of Port Phillip site and describes the minimum requirements for that environment.

3.1. General

- (a) It is a vision of City of Port Phillip that the type and quality of service that the structured cabling solution is to support should not be affected by the location of the installation site within the organisation for which the service is required.
- (b) It may not be appropriate that the structured cabling solution be installed the same way in all areas within City of Port Phillip. Environmental factors will affect the way in which the infrastructure will be installed. Contractors shall adhere to the environmental specification to prolong the life span of the system.
- (c) This section is to define typical environments within City of Port Phillip and to define minimum requirements for the installation of infrastructure within these environments.

3.2. Occupational Health & Safety

- (a) All Contractors that perform any work on a production site are to undertake a site safety induction.
- (b) No Contractor is permitted to commence any work on site without having completed this site safety induction.
- (c) The induction program will be arranged with the Project Manager where applicable.

3.3. Detail Design Variation to Standards

These Standards shall apply for all installation activity. Due to specific circumstances for a particular site, the Project Manager may approve in writing acceptable variations.

3.4. Requirements of various City of Port Phillip environments

Each of the various environments has differing requirements.

3.4.1. Office Area Environment

- (a) The office areas unless otherwise noted in the scope of works, are standard work areas. These areas require a minimum of three outlets per work area or desk. These are to be used for voice and/or data (as required).
- (b) Cable to these areas shall be distributed via Home Run to Telecommunications Outlets (TO's).
- (c) All Cables shall be supported at all times via a standards compliant mechanical pathway, refer AS/NZS 3084

3.4.2. Building Distributor (Computer Room) Environment

- (a) Computer rooms are used to store City of Port Phillip file-servers and backbone networking devices. These rooms shall be furnished with open racks (as per section 4.7) to house the computer and networking hardware, Backbone cabling, Local Horizontal cabling.
- (b) Carrier Network terminations may also be at the Building Distributor
- (c) Each rack shall be fitted with PATCHRUNNER, Angled RJ45 panels. The RJ45 outlet requirement for each rack can be found in the scope of works.

Refer to the Site Specifications for detailed Computer Room layout plan.

3.4.3. Fibre Backbone Environment

- (a) All Single -mode fibre shall be 9/125-micron (OS1) compliant, TM fibre.
- (b) All Indoor cabling shall be run and secured on cable tray. The installation of this cabling shall comply with section 4 of this document.
- (c) Any cable that is run in an Outdoor environment shall be outside plant rated and water -blocked, the degree of mechanical protection required is site dependant.
- (d) All cabling run in an outdoor environment shall be run within conduits. The installation of this cabling shall comply with section 4 of this document.
- (e) Refer to the backbone design document within the scope of works for detailed requirements per floor.

3.4.4. Copper Backbone Environment

- (a) Each Floor distributor shall be connected to the Building Distributor via a minimum of 100 pairs of category 3 copper cabling for voice services to the Building distributor. Where work area locations exceed 100 per floor, the pair count shall be one pair per work location, with a 30% growth factor
- (b) All cabling run in this environment shall be run and secured on cable tray. The installation of this cabling shall comply with section 4 of this document.
- (c) Any cable that is run in an outdoor environment shall be outside plant rated and water-blocked multi-pair cable, the degree of mechanical protection required is site dependant..
- (d) Refer to the backbone design document within the scope of works for detailed requirements per floor.

4. Cabling Infrastructure

This section describes the minimum requirements in terms of quality of workmanship for passive cabling installations.

4.1. Civil Works

4.1.1. Excavation

- (a) Excavation shall be the responsibility of the Contractor unless explicitly specified to the contrary.
- (b) The Contractor shall be responsible for all excavation, cable protection, back fill, surface restoration and the installation of cable markers.
- (c) All excavation and back fill works shall be carried out with the use of hand tools. The use of mechanical or power-assisted tools shall be permitted only when specifically stated in the contract documents or authorised in writing by the Project Manager.
- (d) Before proceeding with any excavation work, the Contractor shall ascertain details of any underground services in the area.
- (e) Where excavations are required near footings, foundations, concrete floors etc, the Contractor shall ensure that the earthworks do not interfere with these structures and backfill is well consolidated.
- (f) Unless otherwise agreed by the Project Manager, the Contractor shall arrange the installation so that all trenches are excavated and back-filled on the same day.
- (g) The Contractor shall ensure that the specified safety precautions are observed at all excavations by the provision of safety barriers, warning notices, shoring, work authority requirements are obtained and any other items as deemed necessary are obtained and provided.

4.2. Cable Installation (Outdoor)

- (a) Cables under roadways shall be laid in roadway ducting within approved conduit. These ducts shall project at least 300mm beyond the kerb lines and unless specified otherwise, shall be supplied and installed by the Contractor. The conduits shall be heavy-duty, rigid UPVC or heavy-duty fibrous cement conduit in accordance with AS /NZS 2053.
- (b) All conduits shall be laid at a minimum cover depth of 500mm, in a bed of clean sand, with a minimum cover of 75mm above the top of the conduit. The trench shall be back-filled and consolidated to finished ground level.
- (c) Protection slabs making up the roadway ducting lids shall be pre-cast concrete having a thickness of not less than 40 mm, and a classification of not less than Grade 15 to AS 3600 shall be used unless otherwise specified in the project specification.
- (d) An orange marker tape complying with AS 2648.1 shall be laid continuously along the route of the cable approximately 300mm above protection slabs.
- (e) All underground cable will be contained within 100mm conduits. The installation of the conduit and pit system is defined in this document.
- (f) The Installation shall comply with the ACMA, (formerly known as AUSTEL) requirements.
- (g) The minimum requirement is for two 100mm conduits.
- (h) All conduits shall be sealed to prevent rodent occupation.

4.3. Communications Pits

- (a) When required pit's shall be installed every 30meters or at every change in direction. The Contractor shall install a pit having adequate dimensions to contain loops of cabling while maintaining the manufacturer's minimum bend radius requirements.
- (b) Pits shall be minimum 800mm deep.
- (c) Each pit shall be provided with a seepage hole cast into the bottom surface to allow the disbursement of any accumulated water.
- (d) Pits shall be provided with appropriate strength lids depending on the placement of the pits.
- (e) Pit lids should be capable of being locked to prevent unauthorised entry. Lids shall be sealed to prevent rodent occupation.
- (f) All pit installation shall comply in full to the manufactures installation guide lines.

4.4. Mechanical Protection for Cable (Indoor)

4.4.1. Guidelines for use

The Contractor shall supply and install approved mechanical protection for all equipment and wiring that meets the following criteria:

- (a) Mounted within 1400mm above an operating floor or access platform.
- (b) Subject to damage during normal plant operation and maintenance.
- (c) On which scaffolding and planks may be used for means of access for abnormal plant maintenance,
- (d) Any cabling leaving the under floor space, false ceiling space of a Communication room , or from external tray to a cable termination or patch frame shall do so via , FibreRunner Ducting or Cable tray . All pathways shall be firmly secured to the racks , walls or building structure
- (e) All pathways shall be sized to accommodate 140% of the maximum capacity of the distributor being served

4.4.2. Conduits

- (a) Intermediate wiring joints are not permitted in conduit or wiring ducts.
- (b) Inspection tees or elbows are Not permitted
- (c) All conduit ends shall be reamed or filed free of burrs and conduit threads entering junction boxes or fittings shall be at least 10mm long.
- (d) Any conduit cast in-slab should protrude the surface of the slab a minimum 100mm, and located as close as practical to sidewalls, and exit the slab perpendicular to the surface.
- (e) Draw wire shall be provided in all conduits.
- (f) At least 40% of conduit capacity must remain after the initial installation is complete.
- (g) Consideration should be given to the upgrade requirements of the particular site before selecting the required numbers of conduit. The requirements shall be specified in the Detail Design document.
- (h) Pull boxes shall be installed along conduit and ducting routes where there is a change in direction and at distances not exceeding 12 metres between pull boxes.

4.4.3. Cable Tray

- (a) Cable trays shall be of a size suitable for the volume of cable at any given location , plus 40% within the structured cabling system. This may necessitate the use of varying width cable tray within the system. All cable tray shall be a minimum of 1 mm thick with rolled or folded sides. All bends, tee and joining pieces, covers and cable retainers shall be factory manufactured. All trays shall be hot dipped galvanised, fittings and accessories will be of the same manufacturer.
- (b) All cable tray installation shall follow without exception the manufactures guidelines. Floor and vertically mounted trays shall only use Uni-Strut supporting mounts.
- (c) Where cable trays are exposed or liable to mechanical damage they shall be protected.
- (d) All cable tray installed in an outdoor environment is to be mounted vertically to prevent the build up of dirt. In cases where this is not practical and as approved by the Project Manager, tray may be installed horizontally with a peaked 45° cover.
- (e) Any cable tray that is located in an exposed location shall be enclosed unless agreed by the Project Manager. This enclosure will be determined on-site to its functionality and as such may be removable for access. The materials used for this enclosure will be made of steel and should this be removable, handles will be provided. The structure to support this enclosure can be made from metal framing and will be installed in an approved and tradesman like manner. All exposed materials shall be painted in accordance with Customers Name requirements.
- (f) Any metal covers deemed necessary for the installation to comply with segregation standards shall be of the "Peaked" type and shall be secured to the tray in a tradesman like manner. These metal covers shall have retaining chains with a minimum length of 500 mm.

4.4.4. Catenaries / J Hooks

- (a) All cables shall be supported at a Maximum of 1500mm spacings
- (b) Catenary wire shall be minimum seven strand galvanised steel wire.
- (c) The in-ceiling cable support structure shall comprise catenary wire suitably anchored and supported to the ceiling slab and tensioned by way of turnbuckles.
- (d) The use of catenary wire for under-floor cable support is not allowed.
- (e) Where the cable loading is excessive for catenary wire or saddle type structures, cable tray as defined should be used, mounted to be compliant with local regulatory specifications.
- (f) Where any cables traverse electrical power cables, consideration shall be given to the appropriate regulatory requirements and adequate separation shall be provided.
- (g) Where cables traverse areas above set plasterboard ceiling (or similar) causing access difficulties, the use of fixed conduit secured to the ceiling slab shall be required. Multiple 100mm conduits are recommended so long as space permits.

Note: Cable Pathway Mechanical Support

A combination of Cable Tray , Catenary wire and J Hooks is the preferred method of reticulation.

J Hooks shall be used where bundles are less than 50 cables and branch from a Centenary run..

4.4.5. Reinstatement of penetrations

- (a) The Contractor shall effectively fire seal all openings (made or provided) in or through building walls, floors, etc. after cable reticulation.
- (b) The Contractor shall effectively fire proof any openings (made or provided) in or through building walls, floors, etc. with approved fire retardant materials where such sealing is deemed necessary.
- (c) The Contractor shall effectively seal all cable duct openings above ground level, and all cable entries into trenches in buildings to prevent the ingress of moisture and the entry of rodents.
- (d) The Contractor shall ensure that all spare conduit and cable entries into equipment are effectively plugged and sealed to prevent the ingress of moisture, dust, rodents and insects.
- (e) The Contractor shall ensure that all openings through roofs and external walls are made weatherproof including the installation of flashing and/or rain hoods to prevent the entry of driving rain, seepage, etc.

4.4.6. Painting and Corrosion Protection

- (a) The Contractor shall be responsible for corrosion protection and the painting treatment of all brackets, supports, cable ladders, weather shields, etc. being supplied and/or installed by the Contractor. The Contractor shall also be responsible for the restoration to the supplier's finish (or approved matching equivalent) on any damaged paintwork to equipment and accessories.
- (b) Other painting and corrosion protection shall be in accordance with the main painting specification for the particular area.
- (c) Where no special painting procedure is specified, all metal surfaces shall be wire brushed (or equivalent) to remove all traces of rust, scale, grease, etc. and prime coated with one coat of an approved rust inhibiting paint. The finishing coats, including colour and type of paint, shall be advised by the Project Manager.

4.5. Cabling

4.5.1. General

- (a) Cables shall not be installed under residual tension or pressure except as required to secure to cable tray or catenary cable.
- (b) All cable runs shall be continuous between the termination points specified. No joints, splices, junctions, or similar are permitted.
- (c) All UTP cabling, terminations and/or patching shall be at the Panduit Distribution Racks.
- (d) In addition to any general requirements covered under these specifications, the need exists to maintain the separation distances from power cables specified in AS/NZS 3080 and AS/ACIF S009. Cable pathways that do not meet these criteria shall not be used.
- (e) All cables shall be installed in accordance with the minimum bending radii specified by the manufacture for that specific cable type and size.
- (f) All mechanical protection and cable supports shall be free of burrs and sharp edges. Additional bushing, sleeving, etc. shall be provided as required to ensure adequate bending radii and to prevent cable damage.

4.5.2. Allowance for Spare Cable Length - Copper

- (a) All cables at a Floor distributor shall have 3 Mtrs of spare Cable installed to allow relocation of any rack . NB Spare cable shall NOT be coiled.
- (b) Slack retention at termination points shall be restricted to the amount of cable required for re-termination (less than 1 meter). The storage of cable shall comply to the minimum bend radius for that cable type as per manufactures specifications.
- (c) Slack cable shall only be allowed in skirting duct if minimum bend radius can be achieved.

4.5.3. Allowance for Spare Cable Length – Optical Fibre

- (a) All cables at a Floor distributor shall have 3 Mtrs of spare Cable installed to allow relocation of any rack .
- (b) To provide an allowance for fibre cable re-termination at some future time, provision is to be made for additional 2 metres of unsheathed fibre to be looped at each end of each cable run. This spare length shall be housed within the Fibre Optic Enclosure.
- (c) Cable looping shall not exceed the manufacturer's minimum bending radius requirements.
- (d) Where the fibre is run through external conduit and pit systems, there shall be an allowance of two times the circumference of the pit left in the first and last pit locations. Where this cannot be achieved, a minimum of a 2-metre fibre loop within the first and last pit shall apply.

4.5.4. Cable running Internal

- (a) All cables installed shall be supported via an approved cable support system.
- (b) Where cables are run through steel noggins or studs, appropriate grommets shall be provided to protect the cables. Cable entry into a wall cavity shall be directly above or below the physical location of the information outlet location. The cable entry hole into the cavity should be sufficient to permit free running of all cables and a minimum of 20% spare capacity for additional cable.
- (c) Cables reticulated via skirting duct shall be run in Panduit T70 ducting. Cable within the confines of skirting duct shall not be cable tied under any circumstances.
- (d) Where cables exit from skirting ducts and enter into workstation furniture, flexible conduit shall be used to reticulate cables and to afford protection.
- (e) Cables reticulated via workstation duct shall be run via the appropriate duct. Separation from workstation power shall comply with AS ACIF S009.
- (f) Cables shall be fixed with cable ties these may be either Nylon or Velcro dependant on location. In all cases manufactures installation guidelines are to be followed.
- (g) The use of cable tray or cable basket with 100mm sides may be considered. In such cases cables reticulated via a Telecommunications cable tray of this design may be left, loose (i.e. not cable tied) securing shall be required at all 90 degree bends and where cable exits the tray.

4.5.5. External Cabling

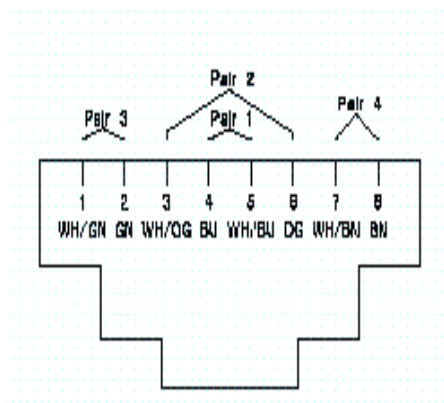
- (a) All external cables shall be rated for outside plant use.
- (b) All external cable shall be reticulated underground; any variation to this shall be approved in writing by City of Port Phillip.

4.6. Outlets

4.6.1. General

All Telecommunication Outlets shall be PANDUIT TG .Minicom mounting

- (a) All outlets shall be installed and terminated to the T568A wiring scheme. Refer to figure 1-1 below;



□ Figure 1-1: T568A Wiring Scheme

- (b) All Wall mounted outlets shall be mounted on Panduit Ultimate ID Angled faceplates with integral Labels suitable for mounting in standard wall boxes, skirting ducts, modular partition systems and similar. The Contractor prior to supply shall submit Sockets/connectors and mounting hardware to be used as a sample for approval. Mounting shall be arranged to minimise the risk of damage during removal and replacement of skirting duct covers or other associated hardware.
- (c) Where specifically required due to the construction of a building, surface mount boxes shall be used instead of flush mount outlets.
- (d) Outlets shall be firmly attached to a permanent structure.
- (e) Outlets in workstations shall be mounted in Panduit Ultimate ID Angled Furniture plates.
- (f) Each faceplate shall have the capacity for 4 x RJ-45 outlets. Nominally each Work area will have 3 Outlets installed with the spare positioned blanked unless otherwise specified on drawings.
- (g) Outlets shall be mounted with the keyway at the bottom and contacts at the top to reduce the risk of contamination with grit and dust.
- (h) Cable entry strain relief point to the outlets shall be at the rear of each jack.
- (i) Faceplates shall be provided in colours that will blend with the chosen decor, or as per the Project Manager requirements.
- (j) Outlets shall not be mounted where there is a risk of mechanical damage.
- (k) Outlets shall not be mounted where there is a risk of water or moisture ingress.

- (l) Generally, outlets shall be mounted at the following standard locations or heights. Specific requirements are detailed on site drawings.
 - 300 mm above floor level (for walls without skirting ducts)
 - 100 mm above desk height where access is restricted by furniture
 - Semi recessed within Skirting duct
 - All Telecommunications Outlets shall be flush mounted wherever possible, surface mounting is a last option and shall only be carried out after conformation by City of Port Phillip.

- (m) Only qualified personnel, who have been trained by the manufacturer on the correct termination technique, shall terminate outlets to the manufacturer's specifications.

4.6.2. Outlet Identification

- (a) Each RJ45 jack at the work area shall have a unique identifier. The labels at the floor distributor where the telecommunications outlet 's terminate shall carry the matching unique identifier. Reference AS 3085.1:Latest Revision
- (b) Each faceplate shall be constructed with an integral label and clear cover.
- (c) The identification plate shall clearly identify the floor distributor and the outlet number.

4.7. Distribution Frames

4.7.1. General

- (a) Panduit shall manufacture all Copper and Fibre cabling components and racks.
- (b) The Panduit Racks Frames shall be installed in an orderly and tidy manner. They shall be designed such that progressive moves, adds and changes may be made with a minimum of disruption. Frame layout shall follow exactly the detailed frame layout schematic's found in the annex of the scope of works.
- (c) The system may be configured either as an interconnect direct to the active switch equipment, or a cross connect with separate fields for active equipment and telecommunications outlets.
- (d) The above option is based on an as per site basis, exact requirements per site are to be found in the scope of works for that site, and apply to that site only.
- (e) A City of Port Phillip delegate prior to the commencement of works shall specifically approve the layout of the distribution frames.

4.8. 19" Rack Patch Panels

4.8.1 Copper

- (a) Panduit Angled Modular 24 Port PATCH Patch Panel's shall be the preferred density
- (b) Higher density Panduit Patch panels may be specified where required. exact requirements per site are to be found in the scope of works for that site, and apply to that site only

4.8.2 Optical Fibre

- (c) 19" Rack mounted termination enclosures specifically designed to house optical fibre cable terminations shall be provided at each fibre termination point. The preferred fibre termination enclosures shall be Panduit Modular FCE1U.
- (d) Such termination enclosures shall, be mounted High within the distribution frame. Where such an enclosure is required, the exact position shall be determined in consultation with Port Phillip their Project Manager or representative prior to any installation-taking place.
- (e) Each termination enclosure shall be arranged to accommodate at least twenty-four (24) "LC" connections. (Note that the preferred method of terminating connectors is Fusion Splice for Single Mode Cables.
IF Multimode cables are specified by site specifications Panduit Pre Polished direct field termination " SC" connectors shall be used
- (f) The use of industry standard hybrid patch cords is allowed where active switch equipment is different to Cabling termination . All loss budget requirements remain unchanged.
- (g) A schematic diagram showing each fibre terminated and the service to which it is connected shall be prepared and secured in a transparent protective cover to an appropriate location adjacent to the respective termination enclosure to facilitate easy location of circuits.
- (h) A warning notice detailing the hazards associated with optical devices shall be affixed to each termination enclosure in a prominent position.
- (i) All unpatched fibre ports shall have a dust covers fitted.
- (j) All unused patch cords shall be fitted with dust caps and stored to comply with bend radius requirements.
- (k) All fibre cores shall be terminated and tested at installation, unless otherwise specified in the scope of works.

4.9. Labelling Conventions

- (a) All labelling shall comply with AS 3085.1 Latest Revision
- (b) A schematic diagram showing all cabling between shall be provided. The schematic diagram shall be mounted in a suitable location adjacent to the Building distributor for future reference.
- (c) Patch panels, distribution frames and outlets shall be prominently labelled. Labels shall be printed, not hand written.
- (d) The labelling convention across all sites shall be uniform. All labelling shall use the following convention:
 - Equipment designation e.g. Switch number followed by a port number
 - PABX Port, Trunk or extension number
 - Tie Cable Tie to, Tie from including the pair identification
 - Racks Alphabetical
 - Panels Numerical (01-45 Top down)
 - Telecommunications Outlets Rack , Panel , Outlet number IE, **A - 40 - 22**

LABELLING NOTES:

- Telecommunication Rack Labelling may need to be prefixed by Comms Room 1, 2 etc if more than 1 Comms room is specified.
- In the case of a Distributor with only one Rack installed , The Rack name shall be "A" and included in any telecommunication outlet numbering.

4.10. Patching Methodology

4.10.1. Method of Administration

- (a) All circuit administration for copper shall be carried out by means of RJ-RJ patch cords.

4.10.2. Patch Cords

- (a) Patch cords shall be supplied in different lengths to reduce slack on the frame. The longest cord length shall be sufficient to interconnect the most distant cross-connection points of a distribution frame. Cords shall be installed such that the distribution frame does not become congested with excess lead lengths.
- (b) Sufficient patch cords of the colours listed below shall be supplied on the day of hand over to patch all working circuits with 10% spare being divided between the separate floor distributors.
- (c) The Contractor shall provide a purpose built rack to hang patch cords at each distributor. Spare patch cables shall be left hanging on the rack.
- (d) Patching shall be carried out in accordance with the Structured Cabling System manufacturer's methodology.
- (e) The contractor shall provide on-site training, detailing the use of the patch panels and installation, moving and removing of patch cords.
- (f) Refer to the scope of works for patch/fly lead qty's and lengths.
- (g) All patch leads shall be PANDUIT[®], RJ 45. Class E (Category 6)
- (h) The patching convention requirements are as follows;
 - (i) YELLOW ----- PABX DATA/VOICE INTER-CONNECTIONS
 - (j) BLUE ----- DATA CONNECTIONS
 - (k) RED ----- BACKBONE CONNECTIONS
 - (l) GREEN ----- VOICE PABX CONNECTIONS
 - (m) WHITE ----- TEMPORARY CONNECTIONS
 - (n) PURPLE ----- PRINTER CONNECTIONS
 - (o) GREY ----- PUBLIC NETWORK CONNECTIONS
 - (p) ORANGE ----- OUT OF BAND NETWORK CONNECTIONS

4.11. Voice Cable Records Management System

- (a) A cable records management system shall be provided as an integral part of the Voice connections within the Structured Cable System.
- (b) A full cross connect record book shall be supplied, as a minimum it shall comply to Appendix D of AS/NZS 3085. One hard copy shall be supplied per distributor. IN addition a record of backbone ties and incoming services shall be included.
- (c) The Scope of Works shall include the preparation and entering of all site-specific data into the cable records management system up to the point of practical completion

4.12. Earthing/Grounding

- (a) All distribution frames, cable trays, racks, cabinets and catenary wires shall be connected to the building protective earth as, specified for each case in AS3000 and AS/ACIF S 009 (latest revision).
- (b) Sizing of earthing conductors shall be as per AS 3000 or AS/ACIF S 009 (latest revision).
- (c) All network equipment that has a ground plate shall be directly connected to the ground system.

4.13. Identification

4.13.1. Identification Conventions

- (a) The Contractor shall identify all electrical equipment, cables and wiring as detailed below, and in accordance with project drawings.
- (b) All backbone cabling shall be clearly identified at both ends.
- (c) All numbering shall be configured from;
 - Left to Right
 - Top to Bottom.
- (d) All horizontal cable shall be identified at each termination by means of cable markers indicating a:
 - Unique workstation identifier, with an associated Building Distributor identifier.
- (e) Each cable shall be identified at the time of installation.

Where identification details for nameplates, cable, wire and/or terminal numbers are not shown on project diagrams, wiring diagrams or schedules, etc., the Contractor shall refer to the Project Manager City of Port Phillip for particulars of identification.

5. Materials

This section describes minimum requirements in terms of quality and type of products and equipment used on site, See site specifications for detail

5.1. Copper Cables

5.1.1. Data Backbone Cabling.

Data rated Class E indoor Copper cables may be used as Building backbone .

5.1.2. Voice Backbone Cabling

The cable used for backbone voice cabling shall be , 100 pr Category 3 UTP cable .

Multiples of these cables to be used where appropriate.

5.1.3. Outside Plant Cabling

All outdoor cables shall be water-blocked.

Metallic Cable strength members and metallic armouring shall be connected to the building protection earth as per AS/ACIF S 009 and AS/NZS 3000

5.1.4. Horizontal Wiring to Outlets

All cabling to outlets shall be Class E (Category 6), 4 Pair UTP from a Panduit Approved , Cable partner

5.1.5. Patch / Fly Leads

- (a) All Voice / Data Patchleads and fly leads shall be Panduit - RJ45/RJ45 , Class E (Category 6), of colours as per **4.10.2** of this document. Lengths to be appropriate to site
- (b) PABX handsets shall use the fly lead provided with each set for connection to the appropriate telecommunications outlet.

5.1.6. Patch Cable Management

- (a) Horizontal and vertical cable management for patch cables shall be provided as part of all distribution frames, independent of the number of racks in a given location.
- (b) Vertical cable management troughs shall be provided on both the left and right side of all Racks. The troughs shall extend to the full height of the Racks.

Note. See Scope of works for site specifications .

5.2. Optical Fibre Cables

5.2.1. General

- (a) All Optical Fibre cabling shall be Single-mode , from a Panduit
- (b) Optical fibre cables shall be clearly marked as such to distinguish them from other cables.
- (c) Only cables designed and specified as suitable for a given environment shall be used in that environment.
- (d) The outside cable shall be installed within a conduit and where applicable the conduit shall be laid within a trench.

5.2.2. Outside Plant fibre Cabling

All outdoor cables shall be water-blocked, Indoor /Outdoor Distribution Style

Metallic Cable strength members and metallic armouring shall be connected to the building protection earth as per AS/ACIF S 009 and AS/NZS 3000 or local equivalents.

5.2.3. Indoor fibre Cabling

All Indoor optical fibre cables shall be CMR rated

Note. See Scope of works for site specifications .

5.3. Cross Connection System (Racks)

5.3.1. Copper Circuits

- (a) All cross-connect functions shall be performed on Panduit PATCHRUNNER™ Floor distribution frames.
- (b) Distribution frames shall be free standing in a location approved by the Project Manager Company Name. On a per site basis.

5.3.2. Connection to Fixed Copper Wiring

- (a) All connectors to fixed wiring shall be by way of RJ45 –RJ45 Patch leads.
- (b) All termination and routing of cable and Patch leads is to be in accordance with the Panduit Structured Cabling system.

5.3.3. Fibre

- (a) All optical fibre cables and Patch cables shall be protected from breakage or stress through suitable protective ducting and Cable management as required.
- (b) All fibre cores shall be terminated with the appropriate fibre connector as specified in the scope of works.
- (c) All terminated fibre shall be tested as per section 6.4.4

6. Quality of Workmanship

This section describes the minimum requirements for the testing, inspection and commissioning of the installation.

6.1. Compliance with Standards

- (a) In addition to anything specified herein, all works and materials shall comply with all relevant International and local standards.
- (b) A list of some of the main applicable standards is contained in Section 2.5.3
- (c) The Contractor shall provide all regulatory approval documents.

6.2. Inspections

- (a) The Project Manager and /or Panduit representative shall conduct installation inspections. These inspections shall be scheduled by the Communication Contractor at "Rough-in " and Testing stages
- (b) The Contractor shall conduct all tests and provide testing equipment as required in this document and the attached scope of works.

6.3. Certification

- (a) The installation of the system is to be certified under Panduit 25 year Performance Certification and the Applications Assurance Program for copper and optical fibre. The certificate is to be issued with the As built documentation.
- (b) City of Port Phillip shall retain 10% of the contract fee until receipt of Manufacturer Certification and complete documentation.

6.4. Installation Testing

- (a) The installation shall be thoroughly tested to ensure the as-built performance meets the requirements specified within the Detail Design document and such other specifications referenced either explicitly or implicitly.
- (b) The installation shall not be deemed complete until all wiring and equipment has been checked and tested to the satisfaction of the Project Manager City of Port Phillip.
- (c) The Contractor shall supply all testing equipment.
- (d) At least 2 days notice of any compliance tests shall be given to the Project Manager City of Port Phillip, who shall witness such tests at his/her discretion.
- (e) Test reports must be submitted to the Project Manager within two weeks of test completion.
- (f) Test results shall be supplied in an unaltered format; that is as they are printed from the test equipment with no alteration.

6.4.1. Test Parameters and Set up

Testing shall be in accordance with Panduits certification.

- Copper Testing shall follow AS/NZS 61935.1 for Permanent Link.
- Fibre Testing shall follow AS/NZS 19763.3 OLTS and OTDR
- Test equipment shall be used with strict adherence to the manufactures guidelines.
- Only manufactures certified test leads shall be used.
- The software version installed on the test equipment shall be the latest for that test instrument.

6.4.2. Copper Cabling

The following shall be the minimum testing requirements for Data copper cabling:

- (a) 100% testing of all runs for continuity and polarity. (wire map)
- (b) 100% testing of horizontal cabling with compliance to AS/NZS 61935.1 Class E Refer 2.5.3 and Panduit Certification requirements.
- (c) A soft copy on CD-Rom shall be submitted and included with the as-built documentation.
- (d) The preferred cable tester is the FLUKE or DTX series Digital Cable Analyser. The contractor prior to performing any testing must seek approval from Project Manager if any other cable tester is to be used.
- (e) The following parameters must be tested on 100% of Data cables for certification;
 - Near-End Cross-talk (NEXT) (Both directions)
 - Power sum Near-End Cross-talk (PSNEXT) (Both directions)
 - Far-End Cross-talk (FEXT) (Both directions)
 - Power sum Far-End Cross-talk (PSFEXT) (Both directions)
 - Power sum Equal Level Far-End Cross-talk (PSELFEXT) (Both directions)
 - Insertion Loss
 - Return Loss (Both directions)
 - Delay Skew
 - Wire Map
 - Characteristic Impedance
 - Length
 - DC Loop resistance
 - Attenuation to Cross-talk Ratio (ACR)
 - ACR
 - Power sum ACR
 - Propagation Delay (Both directions)

6.4.3. Voice Backbone testing

100% of all Pairs shall be tested for Polarity and continuity

6.4.4. Optical Fibre Cabling:

- (a) All Fibre Optic cabling shall be tested in accordance with AS/NZS 14763.3.
- (b) All Single -mode fibre links shall be tested with a Optical Loss Test or FLUKE or DTX series Digital Cable Analyser at both 1310nM and 1550nM in both directions.
- (c) NOTE: IF any Multi-mode cabling is specified on a site,
All Multi -mode fibre links shall be tested with a Optical Loss Test or FLUKE or DTX series Digital Cable Analyser at both 850nM and 1300nM in both directions.
- (d) Where any Fibre Optic length exceeds 300meters, fibre tests shall include OTDR testing Single direction test only
- (e) Results shall reflect loss, length, fibre identification and the number and type of Connectors and splices used in the fibre link.
- (f) Expected loss budget Calculation results shall be included as a direct comparison to the actual test results.

- **NOTE:** All test results shall be included with the as-built documentation.

No actual test result shall exhibit more loss than the Calculated loss budget,

7. Documentation

This section describes the minimum requirements for the documentation to be submitted as part of the completed installation.

7.1. Hand-over Documentation Requirements

- (a) The Contractor shall maintain on site, a set of drawings including the City of Port Phillip construction drawings and all others that the Contractor produces for installation, progressively marked up to cover the actual “as-built” installation.
- (b) The following as-built documentation shall be provided in hard copy and soft copy format:
 - Cable routes shall be marked on site drawings defining the exact route
 - A1 size floor plans on AutoCAD DOS 11, 12 or 13 format
 - Cabinet layout diagrams
 - Structured Cabling System frame layouts
 - Panduit Certification and Application Guarantee
 - ACA Certificate of Compliance TCA-1
 - Test reports for copper cable
 - Test reports for optical fibre cable
 - One bound and one soft copy of all documentation shall be provided.

Xtralis VESDA VLF



The Xtralis VESDA VLF-250 detector is a very early warning smoke detector designed to protect small, business-critical environments of less than 250 m² (2500 sq. ft.).

The detector works by continually drawing air into sampling holes in a pipe network. The air is filtered and passed into a detection chamber where light scattering technology detects the presence of very small amounts of smoke. Detector status information is communicated on the detector display and via relays or optional interface cards.

Out-of-the-box operation

The VLF can be installed and commissioned out-of-the-box without the need for a special interface or software programming tools.

In operation, the unique Smoke Dial display provides the user with an instant understanding of a smoke event, even from a distance. Should a fault occur, the user simply opens the field service door and activates the Instant Fault Finder feature to determine the specific fault condition. This information can then be passed onto their fire service company, ensuring that service technicians arrive onsite fully prepared.

Ultrasonic Flow Sensing

The patent-pending Ultrasonic Flow Sensing used in the VLF provides a direct reading of the sampling pipe flow rate. The system is immune to air temperature and pressure changes and is unaffected by contamination. The VLF is the first air sampling smoke detector to use ultrasonic flow sensing.

VLF-250

Features

- Out-of-the-Box Installation and Commissioning
- Ultrasonic Airflow Sensing
- Laser-Based Absolute Smoke Detection
- Pre-engineered pipe network designs
- Programmable Alarm Thresholds
- Clean air barrier optics protection
- Instant Recognition Display
- Instant Fault Finder™
- AutoLearn™ Smoke
- AutoLearn™ Flow
- Field Service Access Door
- Multiple Event Logging in separate logs
- Event log – up to 18000 events
- Offline/online configuration capability
- Up to 250 m² (2500 sq. ft.) coverage*

Listings/Approvals

- UL
- ULC
- FM
- CFE
- LPCB
- VdS
- VNIPO
- AFNOR
- ActivFire
- CE - EMC and CPD
- EN 54-20
 - Class A (12 holes / 0.12% obs/m)
 - Class B (12 holes / 0.35% obs/m)
 - Class C (12 holes / 0.80% obs/m)

Classification of any configuration is determined using ASPIRE2.

Regional approvals listings and regulatory compliance vary between Xtralis VESDA product models. Refer to www.xtralis.com for the latest product approvals matrix.

Specifications

Input Power	24V DC Nominal (18-30 V DC)
Voltage:	220 mA nominal, 295 mA in alarm
Current @ 24 VDC:	
Dimensions (W x H x D)	255 mm x 185 mm x 90 mm (9 7/8 in x 7 1/8 in x 3 1/2 in)
Weight	Approx. 2 kg (4.4 lbs)
IP Rating	IP30
Mounting	Upright, inverted or horizontal
Operating Conditions*	
Detector Ambient:	0 °C to 40 °C (32 °F to 104 °F)
Sampled Air:	0 °C to 40 °C (32 °F to 104 °F)
Humidity:	5% to 95% (non-condensing)
Sampling Network	
Maximum pipe lengths:	1 x 25 m (80 ft.) (Max. 12 holes) 2 x 15 m (50 ft) per branch (Max. 6 holes per branch)
Sampling Hole Options:	Pre-Engineered Option or Maximum Pipe length in accordance with Pipe Modelling Design Tool (ASPIRE2™)

Air Inlet Pipe
Accepts both metric and American standard pipe sizes.
Metric: 25 mm (1.05 in.) American Pipe: IPS 21 mm (¾ in.)

Area Coverage
Up to 250 m² (2500 sq. ft.) depending on local codes and standards

Relay Outputs
3 changeover relays (Fire 1, Action, Fault), Contacts rated 2A @ 30 VDC (max). NO/NC Contacts

Cable Access
3 x 25 mm (1.05 in.) cable entries (1 rear entry, 2 top entry)

Cable Termination
Screw Terminals 0.2-2.5 mm² (30-12 AWG)

Interfaces
Shown in Terminal Block Connections diagram, to right, plus an RS232 Programming Port. General Purpose Input (GPI) interface offers: Reset, Disable, Standby, Alarm set 1, Alarm set 2 and External Input functions.

Alarm Threshold Setting Range

Alert, Action,	0.025 - 2.00% obs/m (0.008 - 0.625% obs/ft)
Fire 1, Fire 2	0.025 - 20.00% obs/m (0.008 - 6.25% obs/ft)
Individual Alarm Delays	0 - 60 seconds
Two Alarm Threshold Settings	Either time or GPI based

Display

• 4 Alarm State Indicators	• Fault and Disabled Indicators
• Smoke Level Indicator	• Instant Fault Finder
• Reset, Disable and Test Controls	• Smoke and Flow AutoLearn Controls

Event Log
Up to 18000 events, time and date stamped in separate, non-volatile, logs for: Smoke Level, Flow Level, Detector Status and Faults

AutoLearn Smoke & Flow

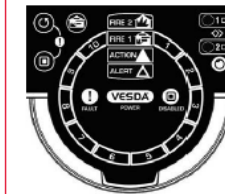
- Automatically set acceptable alarm thresholds for both smoke and flow levels
- Minimum 15 minutes, maximum 15 days (default 14 days)
- During AutoLearn thresholds are NOT changed from pre-set values

Warranty Period
2 years

Ordering Information:
VLF-250-00 Xtralis VESDA VLF European language set, English display labels
VLF-250-01 Xtralis VESDA VLF European language set, International display labels
VLF-250-02 Xtralis VESDA VLF English + Asian language set, International display labels
VLF-250-04 Xtralis VESDA VLF English + Russian language set, International display labels
VLF-250-05 Xtralis VESDA VLF English + Eastern Euro language set, International display labels
VIC-010 VESDAnet Interface Card, VIC-020 Multifunction Control Card (MCC)
VIC-030 Multifunction Control Card (MCC) with Monitored Powered Output (MPO)
VSP-005 Filter Cartridge, VSP-722 Aspirator for Xtralis VESDA VLF-250

Display:

The display provided to the user includes a Smoke Dial and alarm and status indicators.

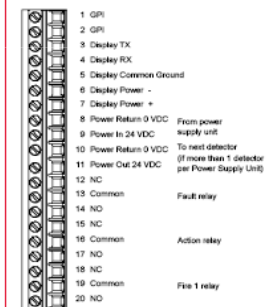


When the field service access door is open, the user has access to the RESET (R), DISABLE (D), Fire Test (T), AutoLearn (A) and Instant Fault Finder functions. When the Instant Fault Finder function is activated, the Smoke Dial converts to a fault indicator, with the dial segment numbers corresponding to the faults listed below.

Legend of fault indicators:

- | | |
|-------------|-----------------------|
| 1 Filter | 6 External Device/PSU |
| 2 Aspirator | 7 Interface card |
| 3 High flow | 8 Field wiring |
| 4 Low flow | 9 AutoLearn Fail |
| 5 n/a | 10 Detector failure |

Terminal Block Connections:



Approvals Compliance

Please refer to the Product Guide for details regarding compliant design, installation and commissioning

iCLASS® RK40 and RWK400 Readers

13.56 MHz Contactless Smart Card Readers
with Keypad
Plug-n-Play with new and existing access
control systems

- ▶ **Dual-Factor Authentication** - Add secure pins to the already highly secured iCLASS card and reader authentication.
- ▶ **Flexible Configuration** - Choose from a variety of pin pad outputs that allow for compatibility with almost any panel.
- ▶ **Backlit** - Use lighted numbers to assist users during operation in poorly lit areas.



ACCESS flexibility.

Using 13.56 MHz contactless smart card technology, the iCLASS RK40 and RWK400 provide a powerful solution. Combine a contactless card presentation with a personal identification number (PIN) to support dual authentication of identity. Or, configure the panel for single-factor authentication, using only a card or a PIN.

The PIN can be verified either at the access control panel or locally by the keypad reader. When verified locally, the PIN must be programmed into the iCLASS card using the iCLASS Card Programmer (CP400).

The RWK400 offers the same features as the RK40, with the extended ability to read/write user data to HID iCLASS credentials. Read/write applications include the storage/retrieval of data such as biometric templates, health records, time and attendance, and digital cash. The possibilities are endless!

Featuring crisp architectural styling, the keypad reader and reader/writer have an elegantly curved faceplate. The 12-position weatherproof keypad uses discrete switches to provide positive tactile response, optionally reinforced by an audible tone. The keypad also features a waterproof silicone rubber boot, vandal-resistant metal keycaps, and backlit numbering.

The readers are equipped with a Wiegand output that easily interfaces with most existing access control panels. The RWK400 is equipped with bi-directional communications of RS232, RS485 (full-duplex), UART or USB to enable host controlled reader behavior. In addition, uni-directional communication of RS232, RS485 (full-duplex) or UART is enabled when the reader is running its own internal applications. In addition the RK40 can be configured to output data over Clock-and-Data hardware interface.

The iCLASS RK40 and RWK400 are compatible with all iCLASS credentials. The units can read or read/write to credentials compatible with several ISO standards (See back page for more details).

Features

Security

64-bit authentication keys are extremely secure. Readers and cards require matching keys to function. All RF data transmission between the card and reader is encrypted using a secure algorithm. The key management system reduces the risk of compromised data or duplicated cards.

Elite Custom Keys

Custom keys provide the highest level of security, where cards and readers are uniquely matched to individual sites or customers, and are non-interchangeable. Combining Elite custom keys with our Corporate 1000 can offer companies a scalable solution that can be implemented in facilities worldwide.

Audiovisual Indication

Audio sounder provides various tone sequences to signify access granted, access denied, power up and diagnostics. Visually impaired cardholders can easily distinguish between access granted and access denied. A high-intensity light bar provides a clear visual status indication in red, green or amber, even in bright sunlight. Note: Light bar will illuminate amber when a FIPS 201 / PIV card is read.

Keypad

Twelve discrete switches are covered with a silicone rubber boot and vandal resistant metal keycaps. Raised tactile mark on "5" key for visually impaired users. Configurable audio feedback. Backlit numbers in bezel overlay, above each key. Lighting is configurable: "Always On", "Always Off", "Triggered by Card Read", or "Triggered by Key Press". Configure the reader for single-key or buffered output, or pin on card authentication.

Easily Interfaced

The reader's Wiegand output easily interfaces with most existing Wiegand and Clock-and-Data protocol access control panels. The reader reads standard proximity format data from HID iCLASS® cards and will output data as encoded. When reading ISO 14443A cards (MIFARE® / DESFire®), the reader can be configured to output 26-bit, 32-bit (MSB), 32-bit (LSB), 34-bit, 40-bit or 56-bit Wiegand formats based on the CSN (card serial number).

Indoor/Outdoor Design

Rugged, weatherized polycarbonate enclosure, designed to withstand harsh environments, provides reliable performance and resistance to vandalism.

Options

Colors - Black or Gray
 Key Management - Standard or Elite
 Selectable Output Type (for MIFARE cards)
 Termination Options: 18" Pigtail or Terminal Strip
 Programmable LED/Beeper operation
 Programmable Keypad Output
 Accessory - Security Tool; 04-0001-03
 Transit - Enable FeliCa IDm

	RK40	RWK400
*Model Numbers	6130B (Wiegand) 6138 (Clock-and-Data) 6139 (Transit)	6131BxT (Wiegand and RS232) 6131Bx4 (Wiegand and Full Duplex RS485) 6131BxU (Wiegand and USB) 6131BxB (Wiegand and UART)
**Read Range	iCLASS Card: Up to 4" (10.2 cm) iCLASS Key/Tag: Up to 1.25" (3.2 cm) MIFARE / DESFire Card (CSN): Up to 2" (5.1 cm)	iCLASS Card: Up to 4" (10.2 cm) iCLASS Key/Tag: Up to 1.25" (3.2 cm) MIFARE / DESFire Card (CSN): Up to 2" (5.1 cm)
Mounting	The RK40 is designed to mount and cover single gang switch boxes primarily used in the United States and includes a slotted mounting plate for European and Asian back box spacing.	The RWK40 is designed to mount and cover single gang switch boxes primarily used in the United States and includes a slotted mounting plate for European and Asian back box spacing.
Dimensions	3.3" x 4.8" x 1.1" 8.5 cm x 12.2 cm x 2.8 cm	3.3" x 4.8" x 1.1" 8.5 cm x 12.2 cm x 2.8 cm
Power Supply	5-16 VDC, Linear supply recommended	
Current Requirements	85mA AVG, 116mA PEAK	85mA AVG, 132mA PEAK
Operating Temperature	-40° to 150° F (-40° to 65° C)	
Operating Humidity	5% to 95% relative humidity non-condensing	
Transmit Frequency	13.56MHz	
Cable Distance	Wiegand/Clock-and-Data Interface 500ft (150m) (22AWG)	Wiegand/Clock-and-Data Interface 500ft (150m) (22AWG), RS232 50ft (15m), RS485 4000ft (1220m), USB 16ft (4m), UART 25 ft (7 m)
Card Compatibility	<ul style="list-style-type: none"> • I5693 - read only; 2k bit (256 Byte), 16k bit (2k Byte), 32k bit (4k Byte) iCLASS credentials, serial number • I4443B - read only; 2k bit (256 Byte), 16k bit (2k Byte), 32k bit (4k Byte) iCLASS credentials • I4443A - read only; MIFARE® and DESFire (serial number) • US Government PIV • FeliCa IDm (Transit Readers Only) 	<ul style="list-style-type: none"> • I5693 - read only; 2k bit (256 Byte), 16k bit (2k Byte), 32k bit (4k Byte) iCLASS credentials, serial number • I4443B - read only; 2k bit (256 Byte), 16k bit (2k Byte), 32k bit (4k Byte) iCLASS credentials • I4443A - read only; MIFARE® and DESFire (serial number) • US Government PIV
Certifications	UL 294/cUL, FCC Certification, Canada Certification, CE Mark (EU), Australia C-Tick, New Zealand, Taiwan, Korea, Japan, China, RoHS Compliant (EU and China) Pending: IP54	UL 294/cUL, FCC Certification, Canada Certification, CE Mark (EU), Australia C-Tick, New Zealand, Taiwan, Korea, Japan, China, RoHS Compliant (EU and China) Pending: IP54
Housing Material	UL94 Polycarbonate	
Warranty	Warrantied against defects in materials and workmanship for life. (See complete warranty policy for details.)	Warrantied against defects in materials and workmanship for life. (See complete warranty policy for details.)

*Consult How to Order Guide for specific ordering instructions.

**Dependent upon installation conditions.

*** Add 40mA current draw for USB expansion module. Add 10mA current draw for RS232, RS485 and UART expansion modules.

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MKT-RK40_RWK400-DS-EN



ACCESS experience.

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**SECTION 5
PERMITS**

06-Aug-2010

K20 ARCHITECTURE
325 Coventry St
SOUTH MELBOURNE VIC 3205



CITY OF
PORT PHILLIP
ABN 21 762 977 945

**Re: Building Permit Application (B/590/2010)
208-220 Bank Street, SOUTH MELBOURNE VIC 3205**

Following the recent submission of additional information in response to our previous report dated 27-Jul-2010 we advise the following issues are outstanding and require your attention prior to the issue of the building permit for the works:

1. Provide the Building Practitioners registration number of the commercial builder.
2. Provide three (3) copies of the finalised architectural, structural, services etc drawings & specifications for the works incorporating the amendments required by this report.
3. Please provide details of the public protection proposed to the site during construction including the location of hoarding etc. Note that egress from other areas of the building must be maintained.
4. Provide a copy of the Heritage Victoria letter that has been signed and is printed on Heritage Victoria letter head. Also note that the exemption must make reference to the external works being the air-conditioning plant and platform/handrails.
5. Provide a copy of the town planning permit and endorsed drawings.
6. Confirm/include on your documentation the location of an exit sign above the door to the lift/entry foyer.
7. Relocate the exit sign to the end of the passageway between the Office 03 and the new Office/Store. The sign should also be a directional exit sign pointing towards Office 02.
8. The manufacturers test report provided for the fire hazard indices of the Polyflor product to not detail compliance with BCA C1.10. Please note that the material must be tested to AS/NZS 1530.3 and AS 1530.4 by a Registered Testing Authority.

We hope this report has been of assistance to you. If you have any further queries or require any additional information please do not hesitate to contact our office.

Regards

BILL YANNELIS
Delegate of the Municipal Building Surveyor

Cnr Carlisle St & Brighton Rd,
St Kilda Victoria 3182
Private Bag No 3,
PO St Kilda Victoria 3182,
Phone (03) 9209 6777
Facsimile (03) 9534 9105
assist@portphillip.vic.gov.au
www.portphillip.vic.gov.au

Permit Application No: P15847
File No: PL-HE/03/1205

25 May 2010

Kate Butler
K20 Architecture
325 Conventry Street
SOUTH MELBOURNE
VIC 3205

Dear Kate

**RE: SOUTH MELBOURNE TOWN HALL, 208-220 BANK STREET SOUTH
MELBOURNE, H0217**

I refer to your email received by this office on 25 May 2010 regarding the revised scope of works to the IT Server Room, including an extension to an existing room on the first floor at the above place.

I confirm receipt of drawings TP00 – TP10 prepared by your office for the City of Port Phillip with revisions dated 25/05/2010 showing the existing and proposed situations.

It is noted that Heritage Victoria previously granted a permit exemption for the original scope of works to the IT Server Room. As per the previous proposal, there are no works to the external fabric. The revised scope includes new steel beams at first floor to support the IT equipment, and an up-grade of the existing corridor kitchen, including the removal of non-original partition walls and the installation of new partition walls, floor finishes and skirtings.

Based on the above it has been determined that a permit is not required for the works pursuant to section 66(3) of the *Heritage Act 1995* subject to the following:

1. Original ceilings and ornate cornices at ground level shall not be affected by the works;
2. Works shall be undertaken in accordance with the submitted documents.

If you have any queries please contact Sheree Morrison, Acting Manager – Permits & Consents on (03) 8644 8934 or write to Heritage Victoria PO Box 2392 Melbourne, Vic 3001.

Yours sincerely

Jim Gard'ner
Executive Director
HERITAGE VICTORIA

Any personal information about you or a third party in your correspondence will be collected, held, managed, used, disclosed or transferred in accordance with the provisions of the Information Privacy Act 2000 (Vic) and applicable laws. Enquiries about access to information about you held by the Department should be directed to the Privacy Officer, Department of Planning and Community Development, PO Box 2392, Melbourne, VIC 3001.

Notwithstanding the above, please note that information provided to enable the administration of the Heritage Act 1995 may be disclosed to persons with an interest in the heritage place or object particularly, and information provided as part of a permit application may be made available on-line where the application has been publicly advertised under section 68 of the Heritage Act 1995.

Enquiries: Bez Hasen
Telephone: 9209 6424
Facsimile: 9536 2740

Our Ref: 491/2010

08-Jun-2010



CITY OF
PORT PHILLIP
ABN 21 762 977 945

K20 ARCHITECTURE
325 Coventry St
SOUTH MELBOURNE VIC 3205

Dear Sir/Madam,

Re: Planning Application 491/2010
Address: 208-220 Bank Street, SOUTH MELBOURNE VIC 3205

Thank you for your planning application of the 3rd of June 2010.

An assessment of your application has revealed that none of the planning controls affecting this site trigger a planning permit from Port Phillip City Council for internal alterations. These controls are detailed below:

The subject site falls under a Public Use Zone 6 (PUZ6) and Heritage Overlay 28 (HO28). Clause 36.01-2 of the Port Phillip Planning Scheme states that a permit is not required for buildings and works which correspond to a section 1 use. Since the land is used for the purpose of Local Government, which is a section 1 use, no planning permit is required for buildings and works.

Pursuant to the schedule of Heritage Overlay 28, the site is included on the Victorian Heritage Register under the Heritage Act 1995, reference number H217. Pursuant to Clause 43.01-2 of the Port Phillip Planning Scheme, no planning permit is required to develop a heritage place which is included on the Victorian Heritage Register. As such, no planning permit is required from Port Phillip City Council.

Accordingly, a planning permit is not required for the proposed internal alterations at 208-220 Bank Street, South Melbourne.

Yours sincerely

A handwritten signature in black ink that reads "Bez Hasen".

Bez Hasen
URBAN PLANNER

Cnr Carlisle St & Brighton Rd,
St Kilda Victoria 3182

Private Bag No 3,
PO St Kilda Victoria 3182,
DX 35706 Balaclava

Phone (03) 9209 6777

Facsimile (03) 9534 9105