

Building Services Return Brief

Private Residence

14 Ocean Road
Palm Beach

Client:

ANDAS – Asia Digital Investments Pty Ltd
Re-Form Projects Pty Ltd
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1 Executive Summary

1.1 Summary

This Building Services Return Brief outlines the scope of works, design criteria and components which will be adopted by Intrax Consulting Engineers Pty Ltd for completion of the building services design and documentation for the proposed private residence development at 14 Ocean Road Palm Beach.

Electrical, Hydraulic and Mechanical services within the development will be able to be constructed as required by the NCC and relevant standards. At this stage of the design process, there are not any design items that fall outside of the Deemed-to-Satisfy (DTS) requirements.

2 Introduction

2.1 Background

Re-Form Projects Pty Ltd on behalf of ANDAS – Asia Digital Investments Pty Ltd (the Client) has engaged Intrax Consulting Engineers Pty Ltd (Intrax) to provide building services consultancy for the proposed private residence development at 14 Ocean Road Palm Beach. Specifically, Intrax have been engaged to provide engineering consultancy with regard to the following building services disciplines;

- Electrical Services
- Hydraulic Services
- Mechanical Services

2.2 Aims

The aim of this Return Brief is to provide a detailed description of the building services design proposals associated with development. Specifically, the brief is intended to provide a summary of the following;

- Identification of services to be provided.
- Description of the codes to which they will be installed.
- Description of the basis for design.
- Description of the required performance.

This document shall form the basis for communication of design principles and specific building services design requirements to the Client and wider design team, such that the building services design principles can be fundamentally incorporated into the architectural planning proposal to be submitted for the development.

2.3 Briefing Documents

The building services engineering elements considered within this report have taken into account the following preliminary documentation and investigations;

- National Construction Code.
- Relevant Australian Standards.
- Authority design and guidelines.
- Authority Main Diagrams.
- Preliminary architectural drawings prepared by Mathieson.

2.4 Associated Services

The associated services engineering elements to be considered in conjunction within this report are as follows;

- BCA Report as detailed by the BCA Consultant.
- Fire Engineering Report as detailed by the Fire Engineer.
- BASIX Report as detailed by the ESD Engineer.
- Fire Rated Construction as detailed by the Architect and Structural Engineer.
- Acoustic Performance as detailed by the Acoustic Engineer.

2.5 Code Compliance

The building services covered by this Return Brief will be designed to comply with the following requirements;

Electrical Services	Design Codes	Proposed Compliance
Power Supply	NCC, AS/NZS3000 (2018), AS/NZS3008.1.1 (2017), NSW Installations and Wiring Rules (11/2016), AS/NZS61386.1 (2015), AS/NZS61439 Series (2015)	Deemed to Satisfy
Lighting System	NCC, AS2293(2018), AS/NZS1158(2010), AS/NZS1680(2008), AS/NZS4282(2019), AS/NZS60589 Series (2017), AS/NZS61347.1(2016)	Deemed to Satisfy
Communications System	NCC, AS/NZS3015(2004), Austel Technical Standard TS008(2013), Austel Technical Standard TS009(2013), AS/NZS1367(2016), AS/NZS 3080(2013), AS/NZS3084(2017), AS/NZS11801(2019), NBN-TE-CTO-284(02/2018), NBN-TE-CTO-194(12/2017)	Deemed to Satisfy
Smoke Alarm System	NCC, AS3786(2014)	Deemed to Satisfy

Hydraulic Services	Design Codes	Proposed Compliance
Sub-Soil Drainage Service	NCC (2019), AS3500.3 (2018), Local Council Policy	Deemed to Satisfy
Stormwater Drainage Service	NCC (2019), AS3500.3 (2018), Local Council Policy	Deemed to Satisfy
Rainwater Plumbing Service	NCC (2019), AS3500.3 (2018), Local Council Policy	Deemed to Satisfy
Sanitary Drainage Service	NCC, AS3500.2 (2018)	Deemed to Satisfy
Sanitary Plumbing Service	NCC, AS3500.2 (2018)	Deemed to Satisfy
Potable Cold Water Service	NCC, AS3500.1 (2108)	Deemed to Satisfy
Rainwater Reuse Water Service	NCC, AS3500.1 (2018)	Deemed to Satisfy
Potable Hot Water Service	NCC, AS3500.4 (2018)	Deemed to Satisfy
Natural Gas Service	NCC, AS5601 (2013)	Deemed to Satisfy

Mechanical Services	Design Codes	Proposed Compliance
The use of ventilation and air-conditioning in buildings - Fire and smoke control in multi-compartment buildings	AS 1668.1	Deemed to Satisfy
The use of ventilation and air-conditioning in buildings - Mechanical ventilation in buildings	AS 1668.2	Deemed to Satisfy
Methods for fire tests on building materials, components and structures	AS 1530	Deemed to Satisfy
Gas Installation Code (2004)	AS 5601	Deemed to Satisfy
Electric Duct Heaters (2002)	AS/NZS 3102	Deemed to Satisfy
Ductwork for air-handling systems in buildings	AS 4254	Deemed to Satisfy
Thermal insulation of pipework, ductwork and equipment - Selection, installation and finish	AS 4426	Deemed to Satisfy
Wiring Rules – Electrical Installations	AS 3000	Deemed to Satisfy
Fixed platforms walkways stairways and ladders	AS 1657	Deemed to Satisfy
Acoustics - Recommended design sound levels and reverberation times for building interiors	AS 2107	Deemed to Satisfy
Methods of tests for air filters for use in air conditioning and general ventilation	AS 1132	Deemed to Satisfy
Air filters for use in air conditioning and general ventilation	AS 1324	Deemed to Satisfy
Refrigerating systems.	AS 1677	Deemed to Satisfy
Air conditioning units - methods of assessing and rating performance.	AS 1861	Deemed to Satisfy
Part 2 Limitations of harmonics caused by industrial equipment	AS 2279	Deemed to Satisfy
Industry association design guide publications of AIRAH, ASHRAE and ARI shall also be referred.		

NCC – National Construction Code includes:

- Volume 1 – National Construction Code – Class 2 to Class 9 buildings
- Volume 2 – National Construction Code – Class 1 and Class 10 buildings
- Volume 3 – Plumbing Code of Australia

3 Development Information

3.1 Development Description

The proposed development scheme continues to be developed for the Development Application to Council and is yet to be finalised. However, for the purposes of this Return Brief we have made the following assumptions for the development.

The development will contain:

- The development will be an entirely new construction, requiring all existing buildings on the site to be fully demolished.
- The development will feature a complaint scheme to achieve;
 - A multi-storey Private Residence
- The development will be less than 25m in effective height.

3.2 ESD Targets

Preliminary ESD targets for the development are understood to be as detailed below;

Stratum	National Construction Code - Section J	BASIX	Greenstar	NABERS	Nathers
Residential	Compliance	Compliance	Not Applicable	Not Applicable	Not Applicable

4 Design Principles

ANDAS – Asia Digital Investments Pty Ltd have specific requirements in terms of building services outcomes with regard to this development including the following areas;

- Cost & Efficiency
- Quality & Longevity
- Uniformity
- Serviceability

All design shall be prepared with due regard to building services such that the Client's overall objectives for the development can be realised. In particular, the spatial requirements for building services have been determined and incorporated into the architectural proposals from first principles so that further development of the architectural proposals can be undertaken as the design progresses without the need to backtrack and compromise architectural integrity of the submission as a result of building services requirements that have not previously been adequately considered.

4.1 Cost & Efficiency

The Client has ambitious cost benchmarks which will be required to be achieved for the procurement of this development. These benchmarks are not be able to be achieved without the fundamental integration and coordination of building services concurrent with development of the architectural design. **Building services that are adapted to architectural design as an afterthought will not achieve the cost efficiency required of this development.** Specific areas for consideration include the following;

- Equipment location for maximum efficiency.
- Adequate floor to floor heights.
- Vertical alignment of services risers.
- Standardised design forms that bring cost savings through repetition.
- Development of typical components that can be pre-fabricated off site.
- Continuity of wet area locations at typical floor changes to reduce bulkheads below.
- Modular design of plant where applicable to match proposed construction staging.
- Selection of standard manufacture equipment that is readily available.
- Selection of low maintenance plant & equipment.
- Duplication of equipment where required to provide operational redundancy in critical aspects of the building's operation.

4.2 Operation & Maintenance

The client requires a building that is fit for purpose in terms of the requirements for its ongoing operation. **Selection of plant and equipment shall provide trouble free operation over the duration of its life cycle, aside from the regular maintenance program.** Equipment shall be selected with due consideration to having demonstrated proven reliability on similar installations, in similar operating conditions. Equipment supply shall be via companies that can demonstrate a long-term trading history in the Australian market and have local agents capable of providing the necessary technical support and parts availability as will be required throughout the equipment's life cycle.

4.3 Uniformity

Uniformity of type and manufacture of each specific type of equipment and accessory shall be preserved throughout the whole installation. Where possible the number of types of equipment provided by an individual supplier shall be maximised.

4.4 Serviceability

The Client requires a building that is fit for purpose in terms of the requirements for its ongoing operation. Spatial allocation for plant and equipment shall provide due consideration for all ongoing maintenance requirements of the equipment, including total replacement of the equipment at completion of its life cycle. Adequate clearance shall be provided around all equipment for maintenance access, with due consideration given to aspects of Safety In Design principles as may be applicable. Access shall be arranged so as to provide minimal disruption to the normal operation of the building and minimise any inconvenience to the building occupants. **Any need to alter or damage building fabric to effect equipment maintenance shall be avoided under all circumstances.**

5 Electrical Services Design Criteria

5.1 Preliminary Maximum Demand

A preliminary electrical maximum demand calculation has been undertaken for the development. The results indicate an electrical maximum demand of 82Amps/ph. It is proposed that the existing connection to the site to remain as existing with an existing pillar on site acting as the connection point. Connection from the pillar is proposed to be via an underground main. Final confirmation for power supply arrangements to the site will be sought via a preliminary connection application to Ausgrid.

The preliminary electrical maximum demand calculation is in accordance with the following allowances;

Area/ Equipment	Design Allowance	Calculation Method
EV Charger	Single Phase 32 Amps	1 off
Residential	26kVA	Per AS/NZS3000:2018 Table C1
Swimming Pool Plant	7kVA	Allowance
Lift	17kVA	125% rating of first lift + 75% rating of second lift + 50% rating of the remainder
Miscellaneous (Fire & Hydraulics Plant)	15kVA	Allowance

5.2 Lighting

The proposed lighting schemes for this development will be selected in accordance with the following allowances;

Area	Lighting Performance	Luminaires	Control System	Maximum Power Density
Garage	40 Lux	LED	Light Switch	2W/m ²
Stairs	80 Lux	LED	Light Switch	2W/m ²
Study/ Lounge/ Dining	100 Lux	LED	Light Switch	5W/m ²
Bathrooms/ Ensuites	100 Lux	LED	Light Switch	5W/m ²
All other internal areas	100 Lux	LED	Light Switch	5W/m ²
Balconies	N/A	LED	Light Switch	4W/m ²
External Security	50 Lux	LED	Time Clock Daylight Sensor	2W/m ²
External Lighting	To AS1158 & AS4282	LED	Time Clock Daylight Sensor	2W/m ²

6 Hydraulic Services Design Criteria

6.1 Stormwater Drainage

Stormwater drainage designs for this development shall be prepared based upon the following rainfall intensities;

Design Storm	Rainfall Intensity
10 Year ARI - 2 Hour Storm	33.0mm/h
20 Year ARI - 5 Minute Storm	209.0mm/h
100 Year ARI - 5 Minute Storm	286.0mm/h

6.2 Sanitary Drainage

Sanitary drainage designs for this development shall be prepared based upon the following loading allowances;

Loads	Fixture Unit Allowance
Level 2	11
Level 1	21
Ground	6
Lower Ground	5

6.3 Potable Cold Water

Potable cold water designs for this development shall be prepared based upon the following water supplies;

Consumption	Supply	Source
Residential – Toilet Flushing	Potable	Towns Main
Residential – All Other Uses	Potable	Towns Main
Landscape Irrigation	Non-Potable	Rainwater Harvesting

Potable cold water designs for this development shall be prepared based upon the following loading allowances;

Loads	Flow Rate	Diversity	Min. Pressure	Max. Pressure	Max. Velocity
Level 2	0.24L/s	Yes	250kPa	500kPa	1.5m/s
Level 1	0.32L/s	Yes	250kPa	500kPa	1.5m/s
Ground	0.27L/s	Yes	250kPa	500kPa	1.5m/s
Lower Ground	0.28L/s	Yes	250kPa	500kPa	1.5m/s
Irrigation	10mm/m ² /week	No	250kPa	500kPa	1.5m/s

6.4 Potable Hot Water

Potable hot water designs for this development shall be prepared based upon the following loading allowances;

Loads	Flow Rate	Storage Capacity	Min. Pressure	Max. Pressure	Max. Velocity
Level 2	0.21L/s	Yes	250kPa	500kPa	1.5m/s
Level 1	0.26L/s	Yes	250kPa	500kPa	1.5m/s
Ground	0.23L/s	Yes	250kPa	500kPa	1.5m/s
Lower Ground	0.15L/s	Yes	250kPa	500kPa	1.5m/s

6.5 Natural Gas

Natural gas designs for this development shall be prepared based upon the following loading allowances;

Loads	Allowance	Diversity	Metering Pressure
Hot Water Units	410MJ/hr (total)	No	2.75kPa
Cooktop	32MJ/hr	No	2.75kPa
Bayonet	18MJ/hr	No	2.75kPa
BBQ	54MJ/hr	No	2.75kPa

7 Mechanical Services Design Criteria

7.1 Preliminary Heat Load

The preliminary heat load for this development will be calculated in accordance with the following allowances;

Building Area	Design Estimated Allowance	Diversity Factor
Residential	120W/m ²	No Diversity allowed in load estimation.

7.2 Design Conditions

The proposed outdoor design conditions for this development will be prepared in accordance with the following allowances;

WB/DB	Summer	Winter
DB °C	32	7.2
WB °C	23	-

The proposed indoor design conditions for this development will be prepared in accordance with the following allowances;

Space	Internal Design Temperature	Control Tolerance	Relative Humidity
Residential	22.5°C	±1°C	50% RH (refer to Note 1)

Note 1: No active RH control other than by performance of cooling coil which should limit RH to 55% on a cooling design day.

7.3 Ventilation

The proposed outdoor air supply rates for this development will be prepared in accordance with the following allowances;

Space	Flow Rate
Residential - Apartments	Make-up air to suit bathroom and laundry exhaust system. Bathroom/toilet: 40L/s/room Laundry: 40L/s/room Residential range Hood: <i>TBC by Client</i>

7.4 Fabric Performance

The building fabric is required to be designed and installed to comply with the requirement of BCA Section J and/or ESD Report. Details will be confirmed by the architectural team for the purpose of heat load calculation.

7.5 Noise Levels

TBC by Acoustic Engineer.

8 Electrical Services Systems Design

8.1 Power Services

- The low voltage power design will cover the overall electrical infrastructure works and power distribution system arrangement. It is proposed that the existing connection to the site to remain as existing with an existing pillar on site acting as the connection point. Connection from the pillar is proposed to be via an underground main. Final confirmation for power supply arrangements to the site will be sought via a preliminary connection application to Ausgrid.
- Liaison with the supply authority with respect to the calculated site maximum power demand.
- The power infrastructure will be designed to allow future growth. The power cables will utilize cable support systems throughout the whole installations via heavy duty PVC conduits, cable ladders, cable trays and catenary wires.
- For all spare conduits a draw string wire will be noted as a requirement for future installation and alterations.
- The design will allow for separation with all other services be highlighted in accordance with Australian Codes and Standards.
- Electrical Private Pillar will be specified to be of high insulation properties, high mechanical strengths, chemical resistance and zero water absorption. Drainage will also be highlighted to comply with the NSW Service and Installations Rules and the Australian Codes.
- Consumer mains and electrical distribution board will be sized for the capacity of the maximum demand of the site.
- Solar panels to be installed, pending BASIX report requirements.
- 1 off EV Charger (NHP – Delta AC Mini Plus) to be installed (to be confirmed by the client).

8.2 Data Communications

- Design of data communication reticulation systems and associated accessories for fibre cable entry into the site via dedicated communications route.
- Co-ordination of fibre lead-in conduit from NBN pit appropriate to the site
- Provision of adequate spatial clearance as per NBN's requirements.
- Schematically Design for NBN Co active equipment for Premises Connection Device and Network Termination Device.
- Schematically Design of horizontal pathways.
- Provision of horizontal Category 6A UTP copper cabling terminating into RJ45 data outlets.

8.3 Lighting Services

- Internal lighting will be designed in accordance to Australian Standard AS1680 and Section J6 of the NCC.
- All areas are proposed to be controlled via Dyalite Lighting Control System (pending Home Automation Brief, to be confirmed by the client).
- External lighting will be designed in accordance to Australian Standard AS1158 and AS4282 as well as Section J6 of the NCC. These standards take into account public safety regarding:
 - better visibility during the night,
 - theft,
 - security and crimes within a given suburb and
 - preventing disturbances via glare emitting from the luminaires to the neighboring sites.
- Emergency luminaires and exit signs are not required.

8.4 CCTV and Intercom Services

- The system will be a site wide system that is fully programmable and capable of integrating with other building systems.
- The central hub will be housed in the communications cupboard in tamperproof enclosures. The system will utilise distributed intelligence so it can continue to function locally in the event of communication errors or loss of the central control hub.
- All building entry points will be key locked. (to be confirmed by the client)
- The garage roller shutter/door system will contain an interface to facilitate access to the garage for the resident via radio frequency remote control access buttons.
- A Closed-Circuit Television (CCTV) system will be provided to monitor the major entry and exit points of the development.
- The system will be of the digital, IP based and colour type. Monitoring stations for the CCTV system shall be set up for remote monitoring.
- The system will operate on a 24-hour basis and be capable of storing up to 30 days of storage footage on site utilising a networked hard drive storage device. Storage equipment shall be located in the communications cupboard. The system will be provided with facilities to record information and store on site, and store off site, if required.
- A colour video intercom system will be provided to allow communication between caller and the resident.
- Entry panel shall be provided external to the front entrance of the building. The panel shall be of the recessed and vandal proof type, colour camera to allow viewing of caller to the resident, and full duplex audio facilities.
- The residence shall be provided with an intercom station complete with colour screen to view entry door call, full duplex hands free type audio facilities. Intercom stations shall be of the recessed and flush type.

8.5 MATV/Pay TV

- A new MATV/ PayTV system will be installed throughout the development. The MATV system will utilise a 5-wire solution with head-end located in the communications cupboard. RG11 and RG6 coaxial cable backbone is proposed.
- A new PayTV satellite dish will be installed on the roof to enable Foxtel. The entire PayTV system will be Foxtel compliant and installed by a suitably qualified contactor with Foxtel accreditation.

8.6 Smoke Alarms

- The smoke alarms system will be designed in accordance with AS3786 and the BCA.
- All the smoke alarms shall be inter-connected so if one smoke alarm is triggered then all smoke alarms activate.

8.7 Home Automation

- Home automation requirements pending Home Automation Brief (to be confirmed by the client).

9 Hydraulic Services Systems Design

9.1 Stormwater Drainage

- Conventional gravity stormwater drainage will be provided across all suspended slabs throughout the site and connect into the civil OSD tank and pit and pipe network as required.
- Roof top catchments will be drained via a combination of conventional gravity and siphonic stormwater drainage and connect to the rainwater reuse tank. The rainwater reuse tank will overflow to the civil OSD tank.
- All balconies, planters and surface areas will be collected via conventional stormwater drainage systems and will bypass the Rainwater tank and connect directly to the OSD Tank.

9.2 Sanitary Drainage

- The existing 100mm authority sideline entering the site from Ocean Rd shall be retained and reused.
- A 100mm house drainage service will extend into all areas including connection of the sanitary plumbing stacks rising throughout. Total load will be approximately 50FU.
- Typically, sanitary plumbing branches will be provided to each individual bathroom group and connected to stacks and elevated drainage systems, located within the adjacent services ducts. Plumbing will typically be provided using the elevated drainage system.
- Any fixtures and fittings unable to drain to the gravity sanitary drainage system will discharge to a sewer pumping station. This will be pumped back to the gravity system. The sewer pumping station will be provided with dual pumps and have a capacity equal to 1 days' storage.

9.3 General Potable Cold Water Service

- A new dedicated 25mm potable cold water service will be provided to the site.
- The service will be provided with site containment backflow prevention valves.
- Velocities within the system will be limited to a maximum of 1.5m/s.
- Supply pressure within the system will be controlled to a minimum of 250kPa and a maximum of 500kPa.
- Isolation valves will be provided to each mechanical plant, each hot water plant, each service riser and at all major water uses.

9.4 Rainwater Re-Use Water Service

- A new dedicated rainwater re-use water service will be provided to the development.
- The service will be fed from a rainwater storage tank.
- An integrated pump and filtration system will be used to treat and distribute rainwater.
- First flush diverters shall be provided upstream of the rainwater tank to maintain water quality within the rainwater tank.
- A mains pressure automatic top-up will be provided to the rainwater tank for times of low rainfall.
- The reuse water shall be used for irrigation only.
- Velocities within the system will be limited to a maximum of 1.5m/s.
- Supply pressure within the system will be controlled to a minimum of 250kPa and a maximum of 500kPa.

- Isolation valves will be provided for extension by the landscape irrigation contractor.

9.5 Residential Potable Hot Water Service

- Individual gas fired instantaneous hot water units will be provided.
- Water temperature within the system will be maintained at a minimum of 60°C.
- Water temperature to fixtures and fittings will be controlled in accordance with code requirements via thermostatic mixing valves and tempering valves.
- Velocities within the system will be limited to a maximum of 1.2m/s.
- Supply pressure within the system will be controlled to a minimum of 250kPa and a maximum of 500kPa.
- Isolation valves will be provided to each service riser and at all major hot water uses.

9.6 General Natural Gas Service

- A new natural gas service will be provided to the site.
- The natural gas service shall be provided with a Boundary Regulator and meter set to drop pressure from 210kPa to 2.75kPa and meter gas usage.
- Pressure loss within the system will be limited to a maximum of 1.5kPa.
- Isolation valves will be provided to each hot water plant, and each service riser.

10 Mechanical Services Systems Design

10.1 Ventilation System Generally

Specifically, this section of the report shall cover the following services;

- Toilet and Laundry Exhaust system
- Kitchen Exhaust system

Generally, all ventilation systems ductwork and associated fans will be sized to provide adequate ventilation to the area they are associated with. In addition, ductwork will be of adequate size to ensure velocities do not exceed that of the acoustic constraints for each zone and as detailed by the acoustic consultant report (TBC).

All ventilation systems will be coordinated with all other services disciplines, structure and architecture to ensure the design not only meets the mechanical requirements but also achieves accessibility without compromising the design intent of the project.

10.2 Toilet and Laundry Exhaust

Exhaust air from these rooms will be discharged horizontally or to the roof from each room complete with a local fan. These rooms would be kept under negative pressure to ensure foul odours do not escape into adjacent areas of the associated apartment.

Allowances for Toilet and Laundry Exhaust air flow estimates are based upon minimum allowances as outlined in AS 1668.2-2012 and increased where higher flow rates are required to reduce the steam where showers are located.

10.3 Kitchen Exhaust

Exhaust air from kitchen would be discharged horizontally from each apartment using the kitchen exhaust hood fan and then expelled to the outside.

Apartment Kitchen Exhaust air flow estimates would be sized nominally at 250 l/s per Kitchen. Final figures TBC by client/project manager.

Kitchen Exhaust system will utilise the fan supplied with the kitchen hood.

10.4 Air-cooled VRF System

- Residential air-cooled VRF systems (multi-head, heat Pump) with concealed fan coil units mounted in the ceiling space. The A/C systems designed so the bedrooms and living room indoor units can run simultaneously and be able to provide the required cooling nominated in the mechanical schedules.
- The VRF condenser plant location TBC.
- Condenser location to comply with the manufacturer's separation distances.
- Refrigerant pipework would reticulate from the condenser plant area to each FCU.

11 Spatial Requirements – Electrical

11.1 Electrical:

Item	Description	Area	Configuration	Comments
1	Electrical Cupboard	0.48m ²	1.2m x 0.4m Full height	Full width door with full access to the cupboard, minimum 0.6m clearance around door swing.
2	Solar Panels	N/A	1.2m x 1.6m	To be located on the roof, PV panels to be oriented to face north, on a 15 degrees tilt (inclusive of roof tilt). Final quantity of solar panels to be confirmed pending BASIX report.
3	EV Charger	N/A	0.363m x 0.318m x 0.136m	To be confirmed by the client

11.2 Communications:

Item	Description	Area	Configuration	Comments
1	Communications Cupboard	0.4m ²	1.0m x 0.4m Full height	Full width door with full access to the cupboard, minimum 0.6m clearance around door swing.
2	Premises Connection Device	N/A	0.3m x 0.1m x 0.3m	Located on the external building Measurement from finished ground level to bottom of PCD: minimum: 0.41m and maximum: 1.5m

11.3 MATV/PayTV:

Item	Description	Area	Configuration	Comments
1	MATV Antenna	N/A	1.0m x 1.0m x 0.5m	To be located on the roof
2	PayTV Antenna	N/A	1.0m x 1.0m x 0.5m	To be located on the roof

12 Spatial Requirements - Hydraulic

12.1 Stormwater Drainage:

Item	Description	Area	Configuration	Comments
1	Site Stormwater Connection	TBC	TBC	Refer to civil engineer.
2	Water Quality	TBC	TBC	Refer to civil engineer.
3	On-Site Stormwater Detention	TBC	TBC	Refer to civil engineer.

12.2 Sanitary Drainage:

Item	Description	Area	Configuration	Comments
1	Site Sewer Connection	3m ²	2m x 1.5m	Locate and connect to existing service at lower ground level

12.3 Cold Water Service:

Item	Description	Area	Configuration	Comments
1	Cold Water Meter and backflow	0.3m ²	1.0m x 0.3m	Meter and backflow device on accessible side of boundary fence perpendicular to Ocean Road

12.4 Rainwater Reuse Water Service:

Item	Description	Area	Configuration	Comments
1	Rainwater Reuse Plant	1m ²	1m x 1m	Plant room located at lower ground level. Includes: <ul style="list-style-type: none"> • RR Water Pump • RR filter • RR UV disinfection Automatic top-up for rainwater tank with air gap.
2	Rainwater reuse tank	3.4 ² m	2.6m x 1.3m	Cast in-situ tank adjacent OSD tank

12.5 Hot Water Service:

Item	Description	Area	Configuration	Comments
1	Ground Level	0.7m ²	0.300m x 0.225m	Individual Instantaneous Hot Water Unit
2	Level 1	0.7m ²	0.300m x 0.225m	Individual Instantaneous Hot Water Unit

12.6 Natural Gas Service:

Item	Description	Area	Configuration	Comments
1	Gas Regulator / Meter Area	0.15m ²	0.5m x 0.3m	Regulator and meter on accessible side of boundary fence perpendicular to Ocean Road

12.7 Swimming Pool Plant:

Item	Description	Area	Configuration	Comments
1	Pool Plant Room	2m ²	1m x 2m	Lower ground Level. (TBC by pool contractor)

12.8 Hydraulic Risers:

Item	Description	Area	Configuration	Comments
1	Risers	0.15m ²	0.60m x 0.25m.	Located adjacent to each bathroom group.

13 Spatial Requirements - Mechanical

13.1 Main Mechanical Plant area:

Building A Mechanical Risers				
Item	Type	Size-Clear internal Dimensions Only	Quantity	Comments
1	Condensers	1000 x 3000	1	Open to air. Location and size TBC and dependent on discussions with architect and manufacturer.
2	Refrigerant riser	400 x 200	1	Masonry riser.