# Otago Polytechnic

## Student Village- Accommodation

# Overview

- Strategic AM Plan – outlines rationale for Dunedin Campus modernisation programme
- Student Accommodation 3rd build of a $110M programme of works over 10 years
- Strategic Sustainability Framework - Living Building Challenge: Red List: Tier 1 (most of) – aim for Tier 2; Tier 3 (aspirational); Certification – Te Punaka Owheo
- SPM Assets strategic asset management system informs future buildings – sustainability & lifecycle analysis and test new /pre builds; inform asset database at commission stage.
- SAM Plan includes Levels of Service standards for assets, spaces, services & sustainability – linked to ILM & SP.

# OVERVIEW

- Growing Dunedin Campus- limited accommodation options
- International and 1st year students
- 231 Student Beds
- Mix of dormitory, studio and self catering 3 & 4 bed apartments
- Split 5 & 4 Levels
- Construction Started October 2016
- Forecast Completion **February 2018**
- First of its kind in NZ
- Most sustainable student village in NZ

# Some Basics - Want versus Needs

- Meeting an accommodation needs – Internationals & Domestic
- Exemplar of buildings – prefabricated wood innovation
- Sustainability of the building; energy savings, waste management and earthquake prone/risks
- Cost of ownership (building costs, maintenance & renewal)
- Environmental concerns -green builds & living building, living campus – educating future generations – our commitment.

# Stage One - Foundations

# CLT - Modular Construction

# Build - Operational February 2018

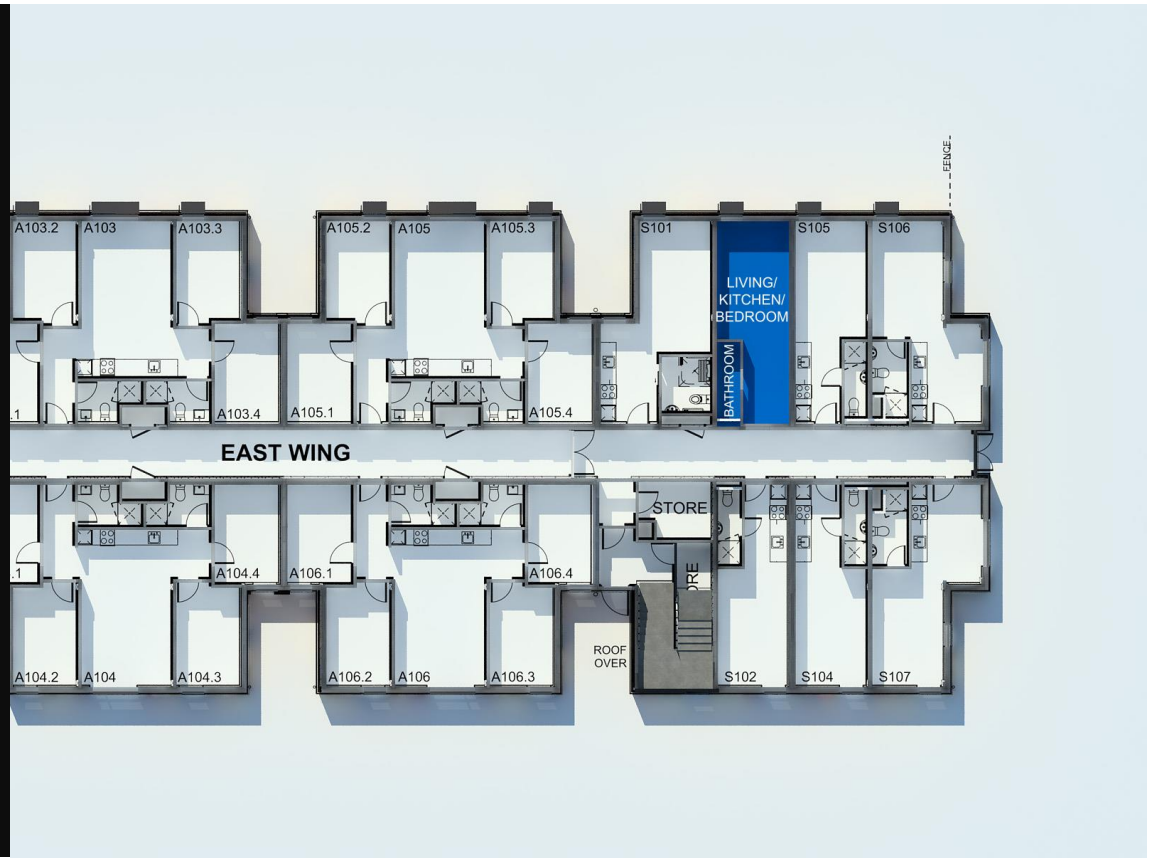
- Cross Laminated Timber (CLT) - Multi layered structural panels pressed and glued together
- Sustainable products - Structure is carbon neutral
- CLT is 80% lighter than steel or concrete and therefore reduced the amount of concrete in the foundations
- Large panels that are mechanically fixed together quickly speed up construction
- Offsite manufacture limits storage space needed on site : Just in time delivery
- Costs comparable with traditional materials (steel, concrete) – But savings attained through speed of construction and labour savings
- 700 Stone columns stabilizing ground before construction. Recycled concrete as hard fill.  Concrete slab, steel roof,  metal and cement sheet cladding (SwissPearl: environmentally sustainable and no painting required)

108

DORMITORY ROOMS

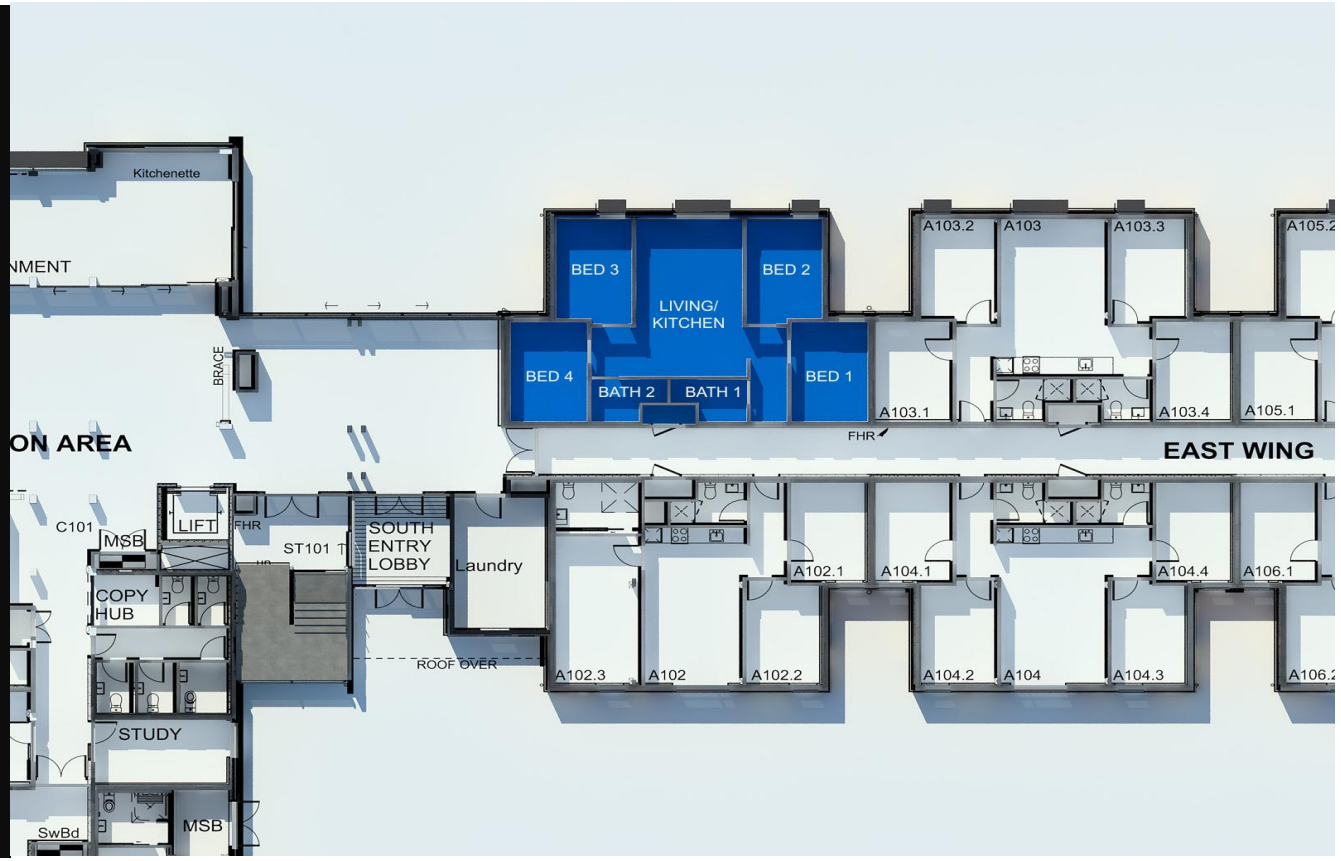
27

STUDIOS


FENCE
A103.2
A103
A103.3
A105.2
A105
A105.3
S101
LIVING/
KITCHEN/
BEDROOM
BATHROOM
S105
S106
A103.4
A105.1
A105.4
EAST WING
STORE
A104.4
A106.1
A106.4
ROOF
OVER
A104.2
A104
A104.3
A106.2
A106
A106.3
S102
S104
S107

24

FOUR BEDOOM APARTMENTS
(96 rooms)



# Faster – Timber versus Concrete/Steel

- CLT product = large panels enables the build to progress exponentially faster than a traditional build.
- No waiting for concrete curing time meaning service trades first fix earlier
- Subcontractors have larger numbers on site for a shorter period of time (7 rather than 10 weeks)
- Less requirement for propping and strutting - More room to move, cleaner safer site
- Less truck movements (also sustainable/environmental plus )
- Minimum waste - Timber cut to size in factory
- Safer working platforms (floor) are installed as the works progresses

# Lighter

- Different type of piling method Stone Columns used - Ground stabilization (re-cycled concrete aggregate)
- Allows reduced Foundations – Built on the shores of Lake Logan
- CLT – Circa 80% weight of concrete/steel

# Smarter

- Largest CLT timber framed building in NZ-  using cutting edge construction techniques
- Earth quake –Flexibility of wooden structure
- Piling choice and ground stabilisation re soft ground/swamp ( ex Christchurch earthquake)
- Cladding – SwissPearl, limestone/concrete, air dried, pre painted – 50 year plus life
- Built in two sections- gap between allows pipe network to move independently
- CAD drawn to minimal tolerance, structure is modeled in BIM 3D which allowed greater coordination of services. Panels cut on CNC machine
- Lifecycle analysis - Electricity over wood burner – CAPEX /OPEX
- Organisational structure / collaborative team - working closely during design, procurement and construction.
- The working relationships of key team members – OP project manager, external project manager (Logic Group), main contractor (Naylor Love).
- Open knowledge sharing by all parties – ongoing student visits throughout the project, tours internal/external and presentations; student projects
- Communications – up to date relevant and regularly circulated including staff and students

# RED LIST BUILDING MATERIALS

Worst Materials used in building industry that are harmful to living creatures and the environment.

Common materials include PVC, Epoxy Resins and Vinyl

- Formaldehyde - glue for particle board manufacture
- Chromium VI – used in textile dyes and pigments
- Bisphenol A ( BPA) – water pipe linings

Student Accommodation

# Sustainability Features

LOV – VOC MATERIALS

NO UPVC PIPES IN PLUMBING

Noise

Recyclable materials

Student Accommodation

# Sustainability Features

CROSS LAMINATED
TIMBER

SOLAR PANEL
POWER SUPPLY

HIGH PERFORMING
THERMAL ENVELOPE

FSC CERTIFIED
TIMBER

Student Accommodation

# Sustainability Features

LED LIGHTING

LOW E GLASS
ARGON FILLED
GAS
THERMALLY
BROKEN WINDOWS

LOW FLOW
WATER FITTINGS

HEAT RECOVERY
VENTILATION

Student Accommodation

# Sustainability Features

ON SITE BIKE STORAGE

WASTE MANAGEMENT

ENERGY EFFICIENT APPLIANCES

SUSTAINABILITY EDUCATION

# Lessons Learned

- Panel construction – 1st corner took 3wks; Now ½ level in 3wks
- Ensure the contractor and subcontractors are aware of the ease of construction to enable the client to realise the savings. (10 weeks down to 7 weeks – re fixing to wooden structure)
- Just in Time : Stored products earlier rather than on time deliveries – to ensure manufacturing delays, earthquakes, roading issues do not cause project delays.
- Passive Fire – Due to the unique nature of the building limited fire testing information available.  Future builds will benefit from the testing  and as CLT becomes a more common method
- Future projects greater prefabrication – external walls pre-cut and pre-nailed.
- Better use of SPM Assets modelling of lifecycle analysis build options for BC ‘s and capital intentions.