

Abstract:

Our design-‘Plug & Play’ explores the opportunity of using prefabricated modules on a macro scale, that includes the building layout and construction, all the way down to its’ micro scale, which looks at the potential of using prefabricated modules as movable plug-ins within units. The site we have chosen is a 50 x 20m rectangular site located on Brougham Street, Geelong, Victoria, and sits next to Geelong train station. The proposed residential building will be constructed over the former “Winter and Taylor” automotive service centre. The proposed building design tries to retain as much of the existing façade and roof, as possible.

Using a 3D volumetric method of prefabrication, the building will be created as modules that will be manufactured off-site, and then brought to the site for assembly. This project is created as a starting point for entrepreneurs and acts as a business incubator. It will be a place where they work on their independent projects and even use the commercial spaces on the ground floor for a commercial start.

This building is primarily built of CLT (Cross Laminated Timber), concrete and steel with a façade created using solar glass. This skin aims to shade the building against sharp solar glare that can be expected so close to the beach.

The proposed building uses a number of solar panels that make up 9% of the building’s energy demands while also using water recycling and rainwater harvesting systems to reduce the building’s water usage by 20-25%.

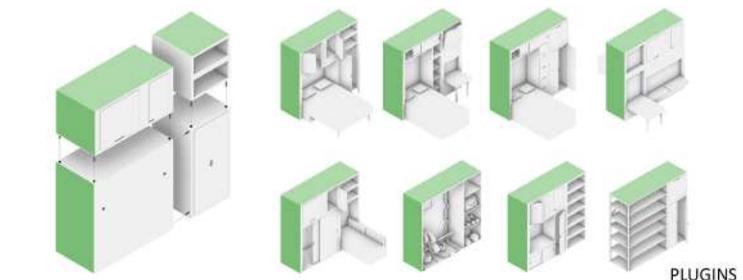
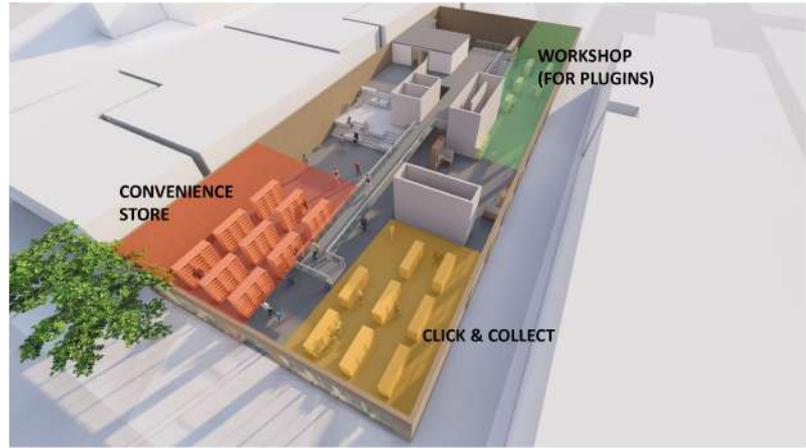
The building is designed to stand out, to be unique in the face of other prefabricated buildings.



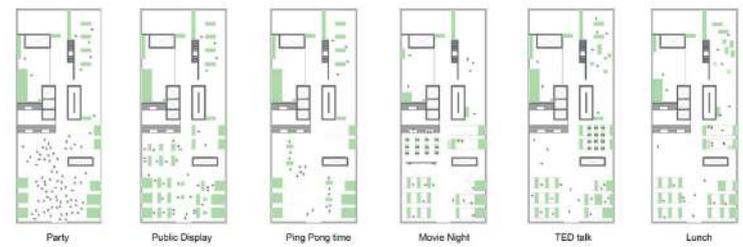
PLUG INS

Plugin: A multifunctional and adaptable furniture system that allows habitants to use a small space flexibly.
Sub-plug-ins: plugin parts which are assembled and bolted together to form plugins.
Modules: A set of standardised and independent parts that, when combined, forms a habitable Unit.
Unit: A habitable volume that includes living, kitchen and bathroom modules along with Plugins.
Cores: 3 set of vertical spaces- north, south and middle core that are used for vertical garden, servies and circulation respectively.

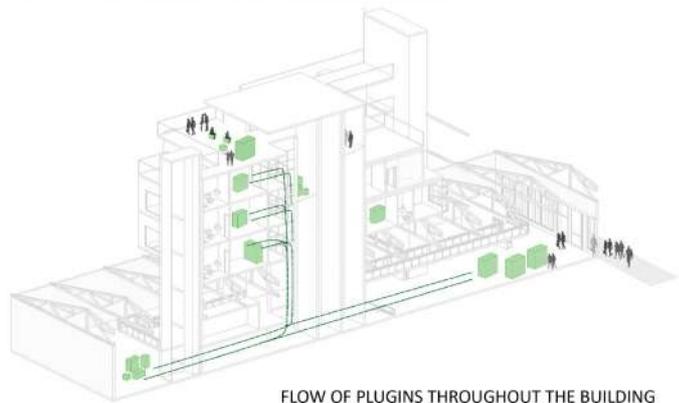
BUSINESS MODEL



PLUG INS



GROUND FLOOR ADAPTATIONS



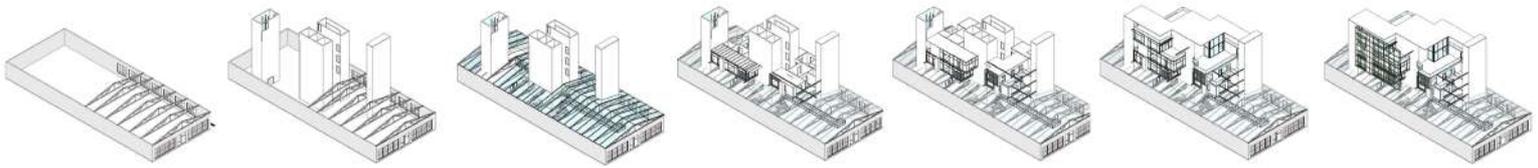
FLOW OF PLUGINS THROUGHOUT THE BUILDING

PLUG & PLAY

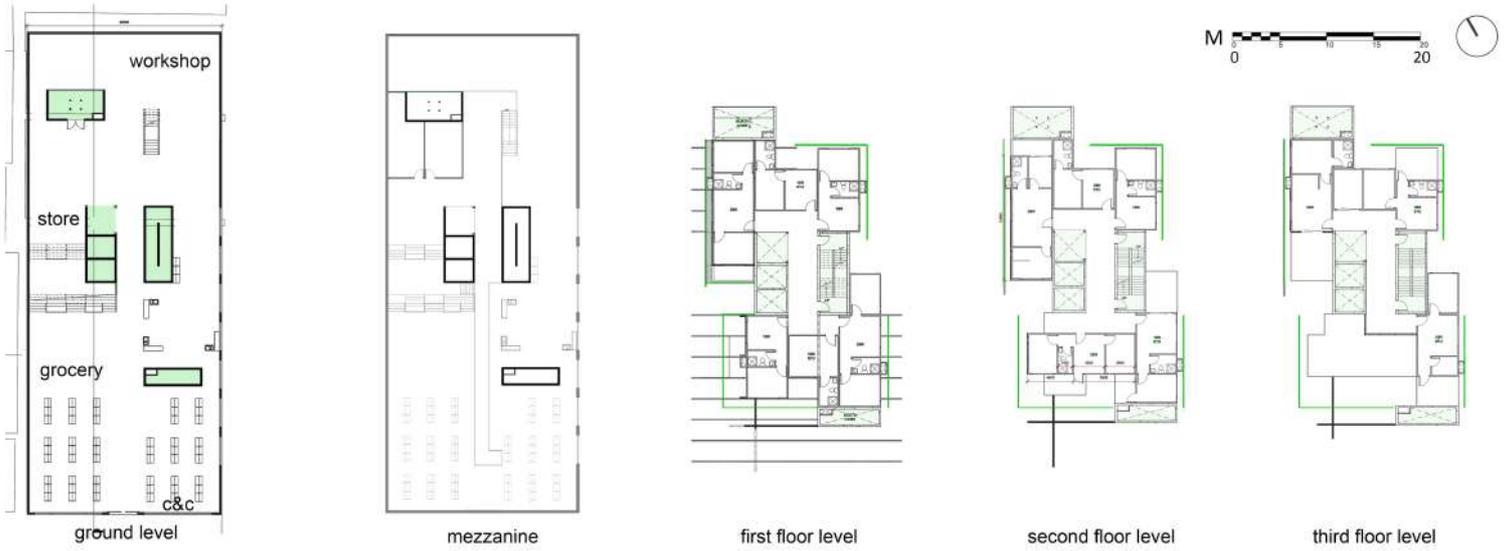
Abstract
 The design explores the possibility of an adaptive resilient housing typology on an unused industrial site in Geelong, Victoria, using prefabricated modular construction techniques.
 'Plug & Play' is more than a prefabricated structure that is assembled on site, it gathers inspiration from the local and historical context of Geelong as a port city that used to be a major wool hub.



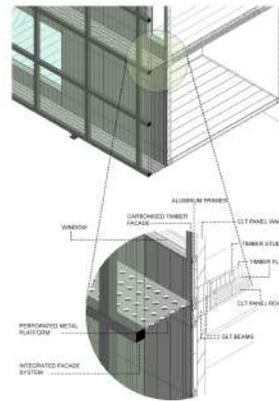
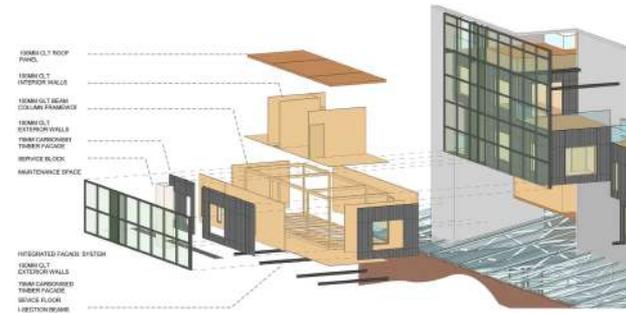
CONSTRUCTION PROCESS



FLOOR PLANS



DETAIL OF CROSS LAMINATED TIMBER UNIT

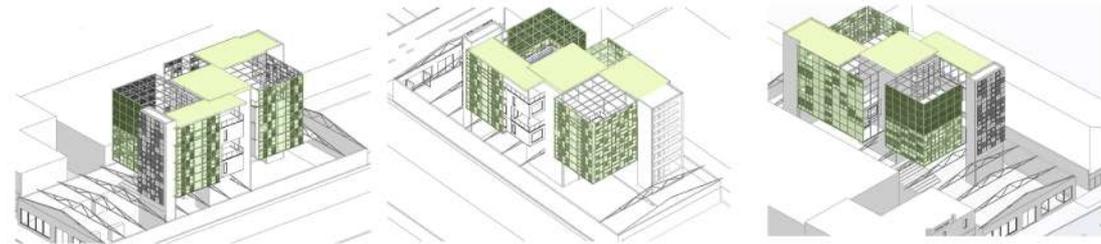


KINETIC SKIN TO CONTROL SOLAR GAIN

The prefabricated skin encases the jenga like volumes to create a unified structure. The skin is placed in various areas of the building facade and acts as the merging element between the external environment and the CLT modules. The unified volume allows for modularity to exist.

The frame is a combination of Aluminium and carbon fibre. Prefab panels are plugged in and out of this frame to respond to the environment.

Through the use of vialux a greater understanding of the solar impact on the building facade is understood. This allows us the capability to place varying panels in response. Panels are total size of 1.6x1.6m and each panel includes 3 secondary panels. The various options are listed below:



GROUND FLOOR ADAPTATIONS



LUNCH TIME



MOVIE NIGHT



PARTY



PING PONG



PUBLIC DISPLAY

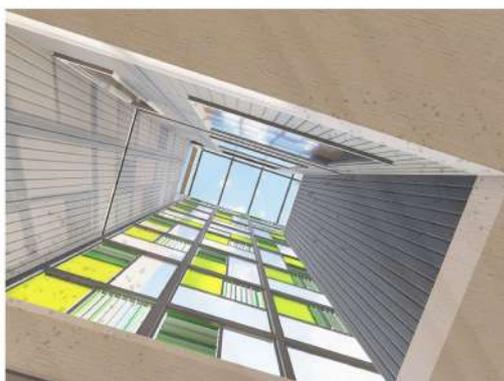


TED TALK

With the Ground floor we are maintaining the built environment as is with the original walls and truss. The proposal for the ground floor was thought to be as flexible and adaptable as possible. Since the whole ground is open plan we tried a few iterations for it. Which we can see here on the sheet the green boxes are the plug-ins which are pre designed and manufactured in the workshop at the back and stored in the storage space under the mezzanine. So these are the iterations which we came up with party, public display, ping pong time , movie night, TED talk & lunch time.

Basically it's a flexible public realm under one roof. The mezzanine About the plug-ins we are creating it at the workshop on the north-eastern side of the the ground floor

SECTION



PLUG & PLAY

SUMMARY:

As the name 'Plug & Play' insinuates, the project proposes to adapt and evolve with user's lifestyle and background. These abstract ideas are manifested in the design along the spaces that can be re-configured by the occupants through the movable units i.e., plug ins which can be moved throughout the site as per their preference and comfort. Not only in their individual units but these plug ins can be rolled out on any of the common shared spaces for their use.

The production of the plug ins which is the key feature of the project is done on site and are designed and manufactured in the 'workshop prompting the use of carbon fibre and timber' which takes up half of the ground level of the proposed building. From there on, some of the plug ins which are ready to be rolled on tracks are displayed on the front side for selling and some are moved up to the residential levels as per occupants plug in specification. The flexibility here, relates to the fact that each Plug in can operate in a variety of configurations, and the occupant can choose an individual configuration of plugins from the given options.

In a nutshell, Plug & play system enables occupants to quickly adjust the use of the same floor space in a matter of seconds, transforming a room from a generous office into a comfortable dining room or bedroom. With the ability to reconfigure the apartment to meet their immediate needs, the occupant may organize their room around their day rather than the other way around.

Now, about the construction of the residential units, these prefabricated residential modules are cantilevered up to 10m from the core on the northern and southern directions. By doing so, the entire mass would appear as if its floating on the existing trusses of the building.

The ground floor is designed to meet the needs of the commercial space planned for the building along with the carbon fibre and timber workshop. The convenience store operates on an open floor plan with the goods loaded into an automated rack. The open floor space and modular space of each unit makes this building a novel design and a unique interpretation of prefabrication.

On the above levels, communal spaces acting as gathering spaces are designed facing the Bay so that residents can relish the views. Similar strategy is followed while designing a landing of staircase which allows occupants to take a pause on a landing and enjoy the beautiful views of the bay.