WELCOME TO THE JUNGLE HOUSE

DARLINGTON

CplusC Architectural Workshop
Introduction

“A house is a machine for sustaining life”

Consumption: the act of consuming, as by use, decay, or destruction.

Architecture is a form of consumption and the nature in which architecture is consumed has changed dramatically over the past century. Can architecture reduce the exponentially increasing consumption that threatens humanity itself?

Climate change must be reversed, and human beings must become sustainable in every aspect of their lives. Conserving our resources and becoming more sustainable as a species is now critical to our very survival. Almost 100 years ago Le Corbusier famously said that ‘A house is a machine for living in’. If we are to survive the next 100 years a house must be ‘a machine for sustaining life’ and it must promote those values in its architectural expression to the public who largely consume architecture through the media where image is everything. If we are to promote these values, they must be an intrinsic part of the conceptual fabric of a project. Architecture that is not only beautiful; an architecture which generates and stores power; an architecture which harvests and recycles water; an architecture which produces fruit, vegetables, fish and eggs; an architecture which recycles and reuses the waste it produces. Architecture that nourishes the mind, body and soul. Architecture where landscape, food, nature, garden, environment, energy, waste, water and beauty exist symbiotically.

Built within a rejuvenated heritage façade of rendered masonry, steel, timber and greenery, the Welcome to the Jungle House is situated in an inner-city heritage conservation area typified by late Victorian row terrace housing and post-industrial warehouse conversions. A two-storey shop top house in disrepair and close to collapse originally occupied the 90sqm triangular site. The original spackled rendered masonry façade had cultural and streetscape significance to the local heritage conservation area and its necessary reconstruction was managed under strict heritage controls. Original window openings have been framed in pre-rusted steel and juxtaposed with new openings framed in gloss white powder coat steel. A black photovoltaic panel array signals the new addition to the original northern façade, harnessing sunlight throughout the day, acting as a billboard for the sustainability attributes of the architecture and starkly contrasting the original rendered heritage facade.
Acknowledgment of Country

The values of respecting nature and land were passed down to us from the original custodians of the land by Uncle Max, performing a traditional smoke ceremony. We share these lessons with the community, neighbours and students through tours. Ultimately, this house becomes a benchmark for the city and a legacy for our children's future.
Construction

Construction of Welcome to the Jungle House was done by CplusC’s expert site team, whose vast pool of knowledge across all aspects of construction and design ensured the process ran smoothly, and any issues arising on site were quickly resolved.

Throughout the construction the site team, design team, consultants and sub-contractors collaborated and coordinated on design aspects such as the aquaponic and integrated ‘smart’ irrigation systems to make sure the ultimate outcome was achieved in all aspects of the building.
WELCOME TO THE JUNGLE HOUSE
Plans, Sections & Sketches

1. Study
2. Second Living
3. Garage
4. Bathroom
5. Master Bedroom
6. Laundry
7. Bedroom 2
8. Bedroom 3
9. Bathroom
10. WC
11. Living Space
12. Dining
13. Kitchen
14. Outdoor Terrace
AXONOMETRIC

A. Solar Panel Facade
B. Rail & Clip Photovoltaic Mounting System
C. Masonry Structure
D. Original (Corten) & New (White) Openings
E. Reconstructed Original Masonry Envelope
F. Inner Skin: Steel Structure & Operable Windows
G. Roof Structure: Twin Hardwood Beams to Steel Plates
H. 3000L Underground Water Tank
I. Ground Floor Internals
J. 1600L Aquaponic Fish Pond
K. Bedrooms 2 & 3
L. Master Bedroom & Operable Timber Panel
M. Living Space
N. Outdoor Balcony
O. Kitchen & Dining Space
P. Rooftop Garden & Vegetables
A. 180mm concrete raft slab with 100mm topping slab, burnished finish, providing a thermal mass to the house that is shaded in summer, keeping the whole house cool, and receives sunlight in winter to radiate heat back into the house at night. Electric heating is built into the topping slab as a provision if needed, powered by the solar panel array.

B. 200mm blockwork wall, rendered on the exterior and fibre-cement sheeted on the interior as part of a raw material palette. The texture of the exterior render pays homage to the historical significance of the site and allows the street-level plants to climb over its surface.

C. 10mm corten steel opening & planter bed. The weathered steel material was used on the existing facade openings, to identify the original from the new. A glimpse of the fish pond can be seen from the street through the bubble motif windows.

D. 1600L, 6mm galvanised steel fish pond. Forming part of the aquaponic system, the pond sits adjacent to the kids’ bedrooms.

E. Exposed timber beams to the Ground Floor, black film plywood, acoustic underlay, timber substrate and engineered floorboards compose the flooring of the First Floor. Operable windows to the fish pond allow interaction & fascination as part of daily routine.

F. The internal skin separates from the exterior masonry wall at the First Floor, with a layer of 6mm galvanised steel planter beds bracing the two, and providing a layer of greenery for transpiration-cooling natural ventilation.

G. 6mm white powder-coated steel frames establish the new openings in the facade, providing a perfect amount of natural light through to the interior with minimal direct heat gains.

H. Spotted gum timber ceiling, floor joists, plywood, acoustic underlay, timber substrate and engineered floorboards compose the flooring of the Second Floor.

I. 140x40mm western red cedar window frames provide far superior insulation properties to windows than aluminium frames, and the fully operable facade allows maximum ventilation through the living spaces when needed.

J. Galvanised steel planter beds sit nested between twin 140x40mm hardwood ceiling beams, a vital part of the home’s aquaponic system and providing space for the family to grow native plants, vegetables and fruits.
A central spiral staircase makes the most of the limited footprint of the site and stretches across all three floors, also acting as a lightwell, using a stack effect to draw cool air from the thermal mass concrete slab and masonry wall spaces of the ground floor up through the bedrooms and living spaces above, pushing hot air out the operable glass skin on the top floor in the warmer months. The centrally located stair allows the first-floor circulation to be kept to a bare minimum with 3 bedrooms, a bathroom, toilet and laundry all accessible from only a few metres of hallway.

An iteration of the staircase design can be seen (left). Ultimately, the chosen design was selected for its material palette, opacity and compatibility within the restrictive design conditions.
Sketching & Documentation

Initial sketches explored the viability of separately occupying the Ground Floor as an office for CplusC, with a connection through the rear to a private courtyard to be enjoyed by the employees. An elliptical spiral staircase provided private access for the family to the Second and Third Floors.

Several iterations of the design were pursued, working to the site’s tight footprint and height restrictions, while trying to maximise the potential space for the family and required program.
As a firm operating as both Architect and Builder, communication between the architectural and construction teams is vital to the success of any project. By staying at the forefront of technology, the practice’s documentation procedures allow for a fluid process between office and site.

A combination of highly detailed specifications and extensive shared knowledge pool between the site and office staff from a range of backgrounds means that every detail is resolved as simply and elegantly as possible, but is built to the properties of the materials and designed to last.

3D rendering of spaces during the design process showed opportunities for details and exposed unresolved junctions, and with the site crew’s level of expert craftmanship, ensured the building could come together with minimal tolerances.
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NATIVE PERENNIALS & EDIBLE ROOF GARDEN
IRRIGATION SYSTEM WITH EXPRESSED COPPER PIPING
CHILDREN’S BEDROOM & FISH POND
KITCHEN & DINING
AQUAPONICS FISH POND
ELECTRIC CAR STORAGE & CHARGING STATION
Welcome to the Jungle House is a machine of sustainability, with a range of passive and active systems working together to ensure the home operates efficiently in terms of energy consumption while still maintaining an exceptional level of thermal comfort and livability.

The sustainable systems utilised are not maintenance heavy, nor are they difficult to utilise. The home automation saves energy by turning off unused lights and appliances, and allowing full control remotely. Photovoltaics provide the bulk of electrical needs for the family, and electricity is sold back to the grid in off-peak times, offsetting bills.

The aquaponic system is a symbiosis of the fish pond and rooftop garden, where rainwater from the rooftop garden flows through the soil and into the irrigation, which provides the fish with nutrient-rich water that allows them to thrive. The fish waste-water then becomes full of nitrogen and is pumped back up to the rooftop, where the vegetables and native plants flourish with this optimal mixture of water.

A native Australian bee hive sits among the vegetable garden, pollinating the native plants and surrounding neighbourhood, and becomes a rest-stop for bees all around the suburb.
The 4.2kW photovoltaic system and 9.8kWh battery provide ample renewable energy usage to the young family, meeting their needs and significantly reducing the cost of their electricity bills.

The thermal mass slab on the ground floor retains heat through direct sunlight heating and in-slab electric heating in the cooler weather, and the fully operable inner façade provides transpiration cooling from predominant breezes over an abundance of greenery in the warmer months, removing the need for space heating or air-conditioning to the upper floors.

The project provides immense value to the clients, allowing them to live and promote their sustainable lifestyle to those who pass and visit, demonstrating how sustainable living principles can be integrated into any scale of development.
Welcome to the Jungle House is fitted with water-efficient fittings and fixtures throughout and uses an array of water-focused sustainable initiatives in the project to ensure the home performs to its maximum potential.

A 3000L underground water tank sits below the ground-floor garage, filled with rainwater collected through the 20 planter-beds on the 66sqm rooftop. A 5000L tank was going to be installed, but after a usage and collection analysis was carried out, the difference in storage was not necessary when looking at the consumption predicted for the family and irrigation systems.

A 1600L galvanised steel fish pond, which hosts 50 edible silver perch fish. The fish pond itself is monitored by the home’s smart-system, providing temperature and chemical balance information in real-time and alerting the owner of any sudden changes that may affect the health of the fish. The water is then cycled through the pond and as the fish waste enriches it with nitrogen, it is automatically pumped to the rooftop irrigation for the vegetable garden and native plants.

The irrigation system is also integrated to the smart-home system, with local environmental inputs like temperature, rainfall and humidity affecting when the irrigation is deployed, helping to reduce unnecessary watering and waste of water.

This aquaponic system allows the family to grow vegetables for themselves and the community, maximises the usage of rainwater and minimises the amount of mains-water consumed (a critical asset in Australia’s ongoing drought issues) and provides a source of edible fish for the family.
A 1600L aquaponics fishpond is linked in a cyclical system to the accessible rooftop of planter beds, providing the native Australian plants and fruit and vegetables nutrient enriched water caused by the edible silver perch (fish) that inhabit the pond.

Fully operable glazing to the bedrooms allows a level of play, interaction and fascination between the kids, fish and plants - facilitating a continual sense of wonder and learning.
A fold down ladder to the outdoor terrace provides access to a roof garden for growing the family’s fruit and vegetables, composting food scraps and producing worms for the garden and to feed the fish. The roof is shared with a perimeter of native Australian plants and desert grasses which filter stormwater for the aquaponics pond.

The native plant perimeter acts as the green top hat of the dwelling, providing a conceptually integrated roof with multiple functions and expressing the aesthetic benefits of rooftop landscaping and gardens in the city to the public as well as facilitating the pollination of the hive of native Australian bees hosted on the rooftop.

A ‘smart’ irrigation system is integrated to the planter-beds, feeding the vegetables and plants with nutrient rich water only when needed; factoring in local weather occurrences and real-time temperature, humidity and sun exposure.
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The ground floor bathroom serves as a secondary washroom for entertaining guests or occupants lounging in the Second Living space.

The bathroom is concealed behind a cove of deep storage joinery serving the Garage & Charging Station, resulting in a relief nook, carefully crafted to feel spacious and offer a relieving palette of colour, material and texture in contrast to the cavernous ground floor spaces.

Cemintel Barestone Fibre Cement wall panelling and polished concrete flooring compliments the spotted gum veneer joinery, Calacatta marble benchtop and handthrown glazed clay basin from Tasmanian-based potter Lindsey Wherret. Matte black tapware and showerhead create the perfect counterpoint to a rich palette in the bathroom.

Vertically aligned jade finger tiles adjoin a brass niche and wrap the rounded corner. A custom shaped curved glass wall subtly encloses the shower space and reflects the rounded geometry of the bathroom.

Spotted gum decking resolves shower drainage creatively whilst providing a familiar feeling of warmth underfoot.

A floor to ceiling bay of translucent louvres brings in fresh air from the outside whilst a frosted picture window at head height to the shower washes the space with diffused daylight.

A round LED backlit wall mirror, translucent glass louvres and an offset pendant light offer a variety of lighting atmospheres.
The central bathroom on the First Floor - robust and flexible - serves all bedrooms of the middle floor and an expansive living and entertaining space on the top floor. The resulting main bathroom balanced perfectly the demanding needs of the family, children and guests whilst still providing serenity and sanctuary for the parents.

Two full-height bays of translucent Aneeta Flomotion sashless windows installed to the central corridor creates opportunity to open up the bathroom during family bathtime or morning rituals such as making sure the children have brushed their teeth - but can also close off for private moments.

A continuous Corian vanity with twin thermoformed sinks blend into the Corian splashback, Corian lines the walls and wraps to the flooring, requiring no tiling, grout or silicone joins. This ensures no mould and provides hygienic, highly durable, easy to clean and low maintenance surfaces for a busy family of five day in day out for decades to come.

Automated pendant lighting over the bath combined with recessed LED strip lighting over the vanity and behind the wall niche ensures even light distribution for daily preparations and pre-programmed for a relaxing ambience during down times.

A space age palette of white finishes and joinery is continued in the details of the heated towel rail, sink mixers, hanging bath spout, bathtub and shower roses, contributing towards a minimalist aesthetic and a welcoming contrast to the rich dark timbers of the adjoining hallway.

Expansion joints between the wall and the floor were avoided by using a linear strip drain as the control joint. This was a solution developed in collaboration with the supply/installer. Underfloor heating has also been accommodated and the Corian performs extremely well under the gentle heat load.
An array of intricately patterned pressed tiles lines the walls of the WC on the First Floor, sandwiched between the spotted gum boards of the floor and ceiling & diffusing the dimmable LED strip light, which can be used to provide a soft night-lighting, or a brighter focused lighting in combination with the contemporary feature chandelier.

With tight spatial restrictions, fittings were carefully selected to work with each other and within the spaces. When a selected fitting went out of stock and out of production mid-way through construction, and no other option available on the market, a custom copper spout was crafted on-site in conjunction with the plumber JH Gordon, resulting in an elegant and simple solution.

A dark-stained western red cedar shiplap cladding door conceals the space in the hallway between the master bedroom and bathroom.
Lighting to the house was carefully considered throughout the design process, and with thorough research into the lighting scheme and products, the best outcome was achieved for the space in terms of lighting control, efficiency and workability.

The home is flooded with natural light during the day, reducing the need for lighting to be used while the sun is still up, and night lighting was designed with a particular intensity and required mood in mind.

The client had no desire to fill the ceiling with as many downlights as possible to make the space as bright as possible when the raw and honest material palette encouraged a more considered lighting. Energy efficient LED strip lights are used throughout the home in place of the typical downlights, washing walls with light that spills gently into the warm spaces, perfectly lighting the spaces enough without becoming overly bright.

On the second floor, LED strip lights are nested between the twin hardwood ceiling beams, with full dimmable control to create the exact desired mood whether it be for cooking, dining, entertaining or relaxing on the couch.
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Architecture that is not only beautiful: an architecture which generates and stores power; which harvests and recycles water; which produces fruit, vegetables, fish and eggs; which recycles and reuses the waste it produces.

The concept promotes integrated sustainability in architectural design to an image obsessed generation of students. With clients devoted to positive and sustainable architecture the Welcome to the Jungle House presents a future model for inner-city living. A House is a Machine for Sustaining Life.