(pre) fabulous city
recycling london’s forgotten spaces

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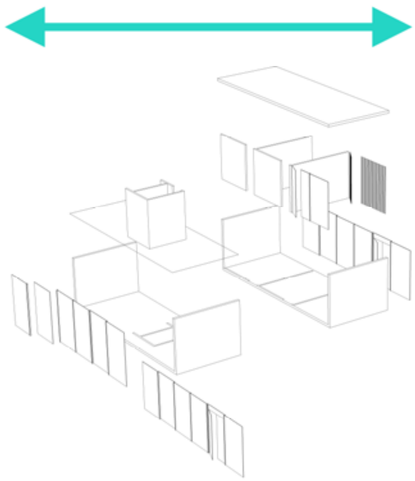
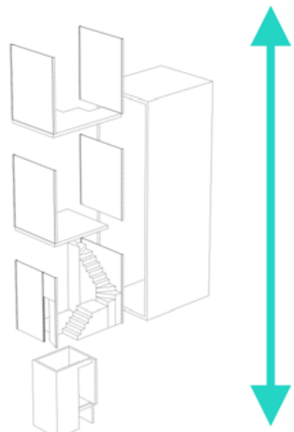
Housing defines the character of our cities. It is the single most important building type that simultaneously affects the simple activities of day to day life, our experience of the street, urban environment, and ultimately the global, ecological environment.
This scheme proposes to transform the most economical, efficient, mass-produced housing possible – the prefabricated modular unit – into a unique and poetic architecture that speaks of the lifestyles and choreography of modern urban living. The design of the units themselves employs the idea that a single repeatable system could be applied to a maximum number of instances. Non-site specific, these modular pods can inhabit a multitude of spaces in a variety of positions and configurations.





Throughout the city of London lay areas devoid of a pulse. These areas have inherent qualities of density, character, and history but simply lack people. The Polemic of my design presents the city's existing inert and exhausted spaces as territory for future use. Using what exists and removing as little as possible, there are ways to utilize that which has been abandoned, ultimately re-defining the way these forgotten spaces can be used. Like the action of parking a car in the only space left or often the only space it will fit, the modular pod will take residence in any space willing to accommodate. Take for example an alleyway between two buildings (single unit) or an abandoned fire hall (multiple units)
I have chosen a site along the Regent's Canal in London, England which currently contains an abandoned honey factory. The modular pods require the volume of the site, and use this existing architecture as a shell. Because the structures of the pods are independent of the building in which they inhabit, the honey factory remains in appearance much as it always has. There are however new questions to be asked as to what goes on beyond, and in this case, above the old building. The façade has been cut open to accommodate for the large amounts of glazing used in the pods and entrances and access have been provided. In this attempt, construction work and costs have been limited immensely.

Site from street

Site from canal

UK - Environmental Context

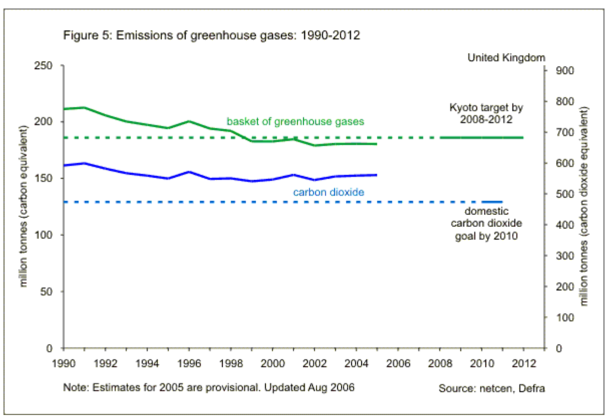
It is appropriate that I chose London as the location for this competition. Although the competition brief did not stress sustainability so highly, for an architecture student there is a certain level of responsibility and awareness that should be executed at all times in design.

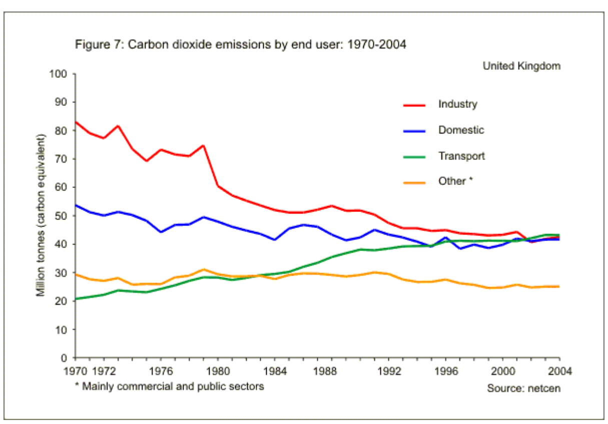
Until only recently London has had a poor environmental track record, relative to other western countries. Energy consumption, related to GDP (gross domestic product), is almost twice as high then in some western nations. While the natural environment has suffered throughout the UK, some heavily industrialized regions can accurately be called ecological disaster zones. Social awareness of the relationship of energy use to environmental conditions or to the economy, while still much higher than some nations, is questionable.
Until recently, energy efficient and environmentally sound building design had been systematically neglected by the majority of the industry because of a long standing emphasis on volume production over efficiency or quality. With the exception of few UK practices such as Norman Foster and Associates, Rogers and Associates, and Michael Hopkins, few practices are working beyond an environmental ‘sensitivity’.

In the past prices for energy and fuel were kept artificially low, which favoured energy intensive industries and allowed for extravagant energy use in the building sector, as well as others.
A consequence of the factors outlined above is that residential and non-residential buildings in the UK consume too much energy. One comparative measure is the energy needed to heat a single square meter of a typical housing unit: in typical London housing, this value was 255 kWh for homes designed in the last 13 years; in Sweden, it was approximately 100 kWh; and in Ottawa, the comparable figure was about 150 kWh. While in western countries, there has been a gradual and systematic development of energy policies leading to considerable improvements in energy efficiency and environment protection since the early 1980’s. This has been possible only due to methodical development of coherent legal, economic, organizational, financial and educational frameworks which favour economic and environmental policies through a combination of regulation, incentives and technological stands.

Sustainability

There is a desperate need to protect the environment and use its resources in a way that provides for future generations. Economic factors do not always allow the most thorough implementation of eco-friendly design and construction practice, however there are a large number of simple strategies that greatly improve the sustainability without significant additional investment. Sustainability in design must work at three levels to be successful – it must be economically sustainable, socially sustainable and environmentally sustainable.





Recent UK statistics regarding emissions

Environmental Strategy

Overview

London is primarily a heating environment for buildings, although there are brief periods in the summer that exceed 30oC. With this in mind the strategy is to provide an efficient heating system that sensibly and sustainably heats the pod and yet at the same time allows a strategy to control summer high temperatures.

Heating

The heating can be provided by small individual biomass boilers fired by recycled wood pellets. Low temperature hot water is delivered throughout the pods via eternal pre-insulated pipes. Once inside the spaces and rooms, pressed steel radiators will be used throughout. A central domestic hot water tank is utilized so that a solar hot water collector array can be used to offset the energy consumption associated with heating water for consumption. Glazing allows beneficial solar gains in the winter to offset heating demand.

Biomass heating involves very little production of CO_2, only that used in the pelletization and transportation of the fuel. The biomass releases, during combustion, the same amount of carbon that it absorbed whilst growing. The carbon emitted for heating via biomass is typically a 5th that of the most efficient fossil fuel will dramatically reduce the potable water consumption of the development, typically to a 50% of a traditional building. Mechanical ventilation is required for the kitchen and toilets. Heat reclaim will be used to extract beneficial heat energy from the air being rejected from the apartment into the supply air stream.

Ventilation heat reclaim often saves more energy than that used to power the fans to run the system. Other rooms will have ventilation incorporated into the glazing units to limit the infiltrations of cold external air whilst at the same time providing a healthy internal environment.

Summer Conditions

One of the traditional drawbacks of steel constructions and modularized constructions is their thermal light weight. Whilst in winter this provides a benefit as it allows a fast heating response, in summer it limits the buildings ability to absorb peaks in temperature. The use of specific *phase change materials as a replacement to plasterboard offers the ability to gain the advantages of a lightweight building in winter and a heavy weight building in summer. BASF produce a plasterboard version that goes under the trade name SmartBoard and incorporates their Micronal technology.

*Phase-change materials work by melting micro-capsules of material typically when the temperature reaches 24 - 26oC. This means that at lower temperatures the material acts thermally like plasterboard allowing the temperature to be rapidly raised to a habitable level after a period of no occupation. In summer as the temperature increases the materials starts to act like a heavier weight construction, offering similar thermal performances to a concrete building at their design temperature.

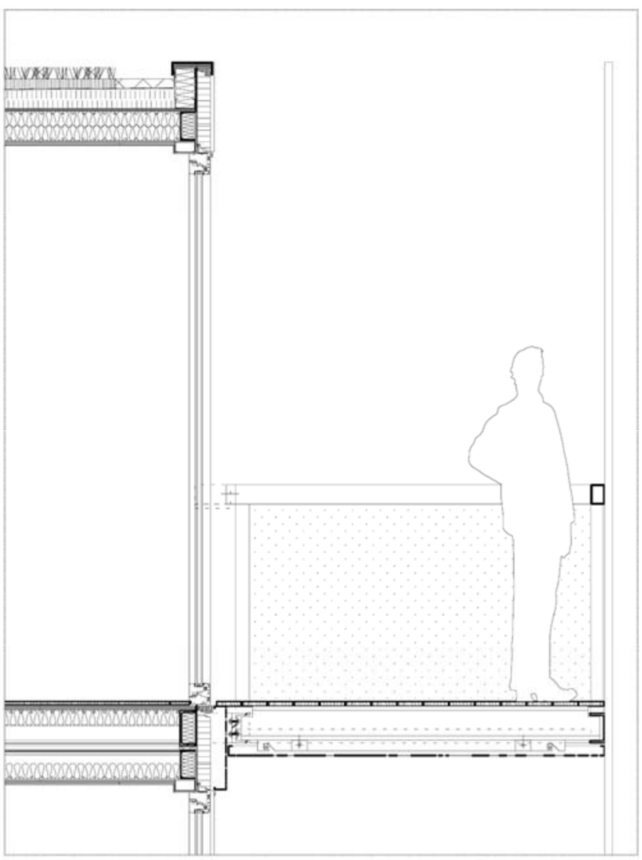
Windows will be fully operable on both sides of the apartments, through the employment of two-way sliders to provide cross ventilation though the space. This allows high ventilations rates to be achieved and night-purging of the built up heat inside the building. Blinds and curtains will limit solar overheating on southern facades during these more temperate months.

Water
Water will be supplied from central water tanks and heated in the pods by individual electric boilers. Rain water will be collected and used for non-potable uses, e.g. Toilet flushing and irrigation of soft landscaping. Rain water recycling will dramatically reduce the potable water consumption of the development, typically to a 50% of a traditional building.

Electrical
Electrical distribution will be provided to each pod following current best practices standards for residential accommodation. Due to the large glazed areas of the building and the depth of the spaces very little electrical lighting will be required during daylight hours. To limit electrical consumption at night high efficiency compact fluorescent fittings will be used throughout the development.

Building Envelope
High insulation standards will be used throughout the party elements reducing the heating requirements of the building. Thermal transmissions values will exceed current best practices, walls will be insulated to a 20R value while walls and floor will achieve 15R value. The glazing system will be specified with argon to achieve a maximum insulation capability. It is proposed to use sandwich panels for the cladding of non-glazed elements of the building. This system benefits from highly developed detailing allowing the panels to be interconnected to a high degree of air tightness. Air tighness is incredibly important; air that leaks out of the building can be viewed as energy leaking out of the building by the heat that this air will contain.

Green Roof
Parts of the roof will be covered in vegetations, possibly raspberries, and be naturally irrigated by rainfall. This acts to give added thermal mass to the area of the building that has the highest solar exposure. Green roofs have additional beneficial effects outside of the development they are within, they help keep urban albedo low reducing the summer city overheating and break the visual appearance of human intervention within a cityscape.



The Birth and Afterlife of the Pods
Steel Recycling and Sustainability
Buildings are typically designed for a useful lifespan of 30 - 50 years. At present this means that steel recovered in demolition has to be expensively re-smelted to be re-used. As part of the construction of the building all the steel elements will be tagged and data-based. This will allow the steel to be readily re-used in other projects once this development has outlived its useful lifespan. One of the waste products from the steel smelting and forming process is slag. This will be recovered from the furnace and used to form concrete tombstones for the buildings that have come and gone.

Detail section

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