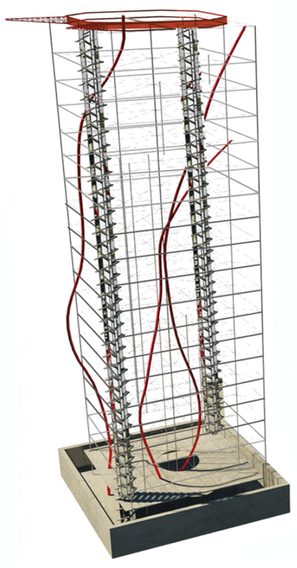
environmental strategy

We propose an infrastructure that promotes sustainable living:
Waste produced is reused, recycled or used to power the combined heat and power system.
Construction methods are intended to be low cost and energy efficient and enable self-building and adaptability.
The environment and systems strategy is designed to be holistic and integrated. To fulfill the requirements of the brief we have developed strategies in the following areas:
-Natural Ventilation
-Solar Shading + Gain
-Skin and Construction
-Waste Management
-Water Recycling
-Mechanical and Electrical Installation
-Heating and Energy Supply

for cities to remain viable, they will have to assume the role of supplier of resources, as well as consumer. Jane Jacobs

breakdown of development into components



structural frame
and transfer slab

crysallis

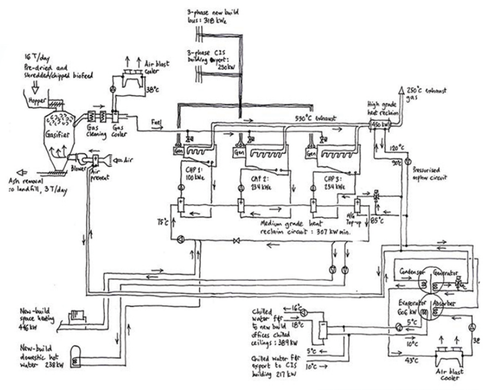
biorooms

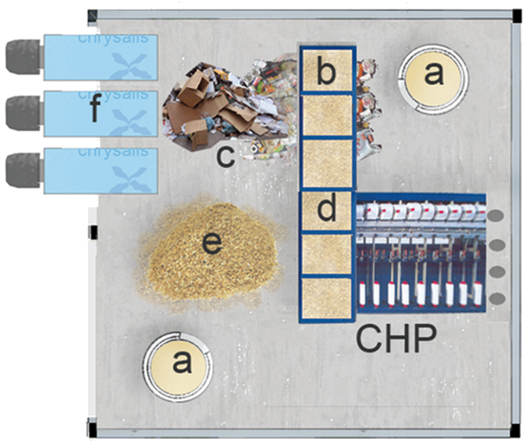
housing and shed units

energy production with use of CHP

Rationale behind the use of a CHP system
The CHP plant is sized for the new build development, selling surplus power to the rest of newcastle. The suggested export price will be 3.5p/kWhe generating an annual income for the development of £33000/yr (estimated).

Smaller night base load CHP plant of 100 kWewill operate continuously. Two larger modules (234kWe) will operate daytime power.
To sustain summer operation coupled absorption cycle refrigeration, replaces the winter heating demand. 606kW of refrigeration is delivered which satisfies all new-build loads, as well as a small surplus of 217kW for export to the CIS building.
Thiscooling is intended to offset the high occupancy and equipment use, in the offices and retail developments that generate significant heat.
All fuel consumed by the CHP plant is derived from refuse-derived-fuel (that refuse that is not recycled) and imported wood chips from Manchester's vast tree waste, collected at the City dump, as well as human and food waste compost from the development. (estimated at 1500kg/week from all the dwellings, workshops and shops).





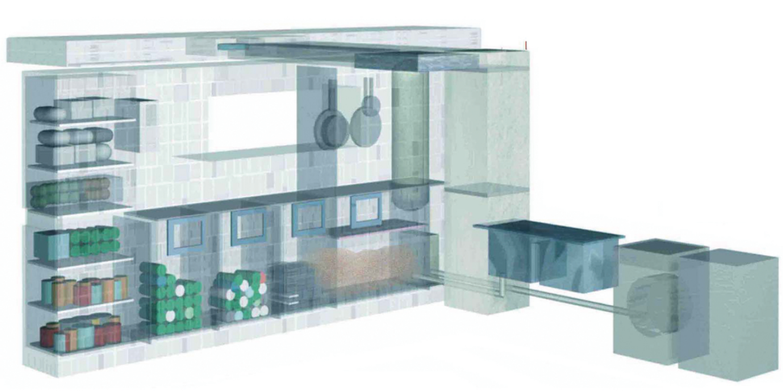
legend

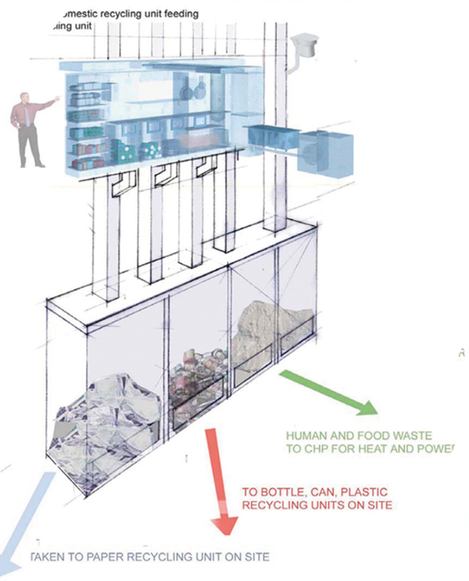
a lift
b macerators
c cardboard and paper waste
d hopper
e macerated cardboard
f truck stop for recycling
g CHP and heating and cooling pipes

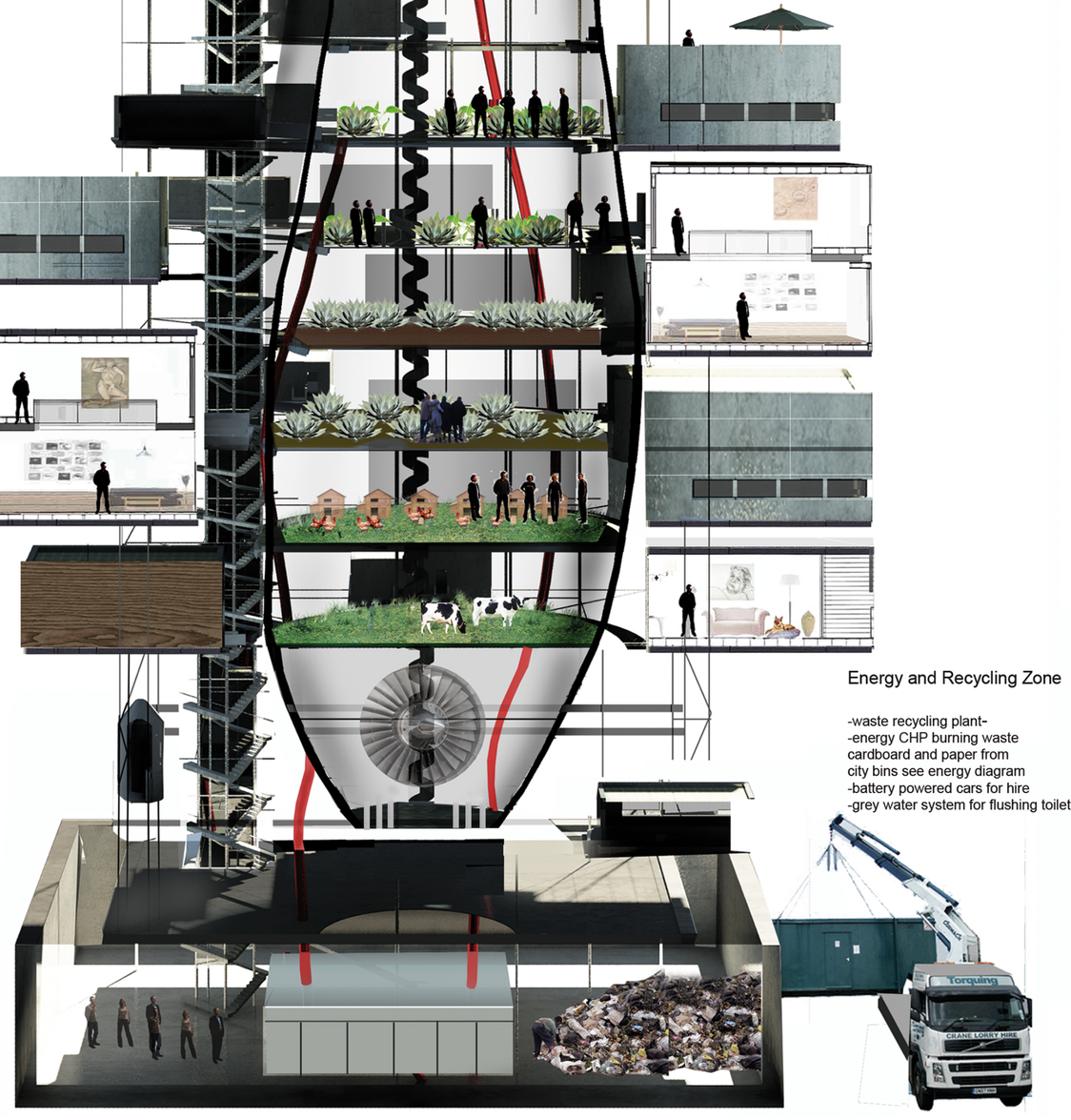
The chrysalis skin is constructed of Diax, a material perfect for economical construction. It is a tough translucent laminate with great structural stability and u-value; it can be used in various application and thicknesses from lightweight tensile sheets to poured compressive units that can be moulded into complex forms. The chrysalis skin is semi rigid and suspended with tensile cables from the primary structural frame. A 45 deg, mesh can be woven into the material to increase its strength. Pigments can be added to improve the materials UV resistance.

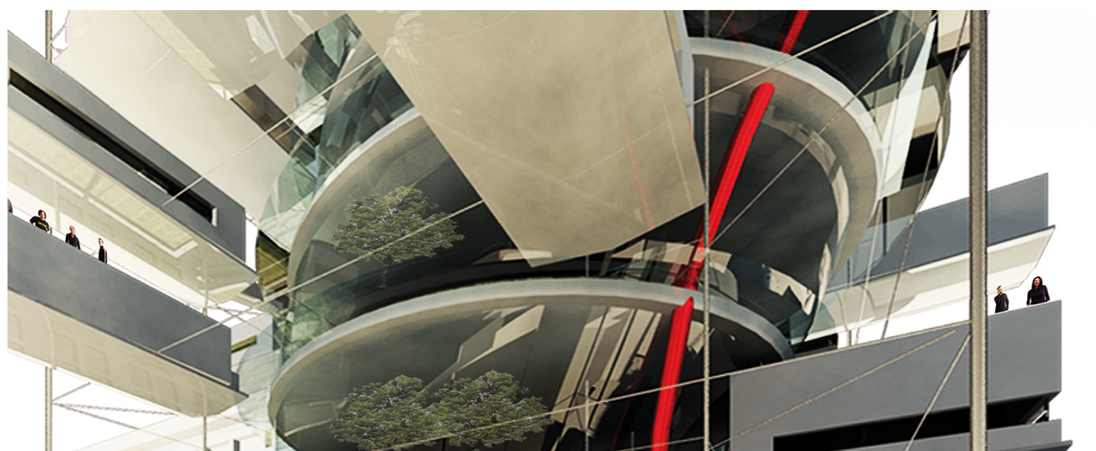
waste interface

The interface recycles and collects family waste for collecting paper, cans, bottles,and tins etc. This waste in the dropped into the block recycling unit. The waste food is macerated and then composted. The unit actively recovers heat from the appliances and the heat is fed back into the dwelling
This development attempts to deal with its own waste; bottles, cans, paper and tins are all gravity fed to the block-recycling unit.
There is no traditional refuse collection, the block recycling units are emptied and then the waste is redistributed to the recycling plant on site. Residents are responsible for the items that they bring into the development and the materials that they discard, forcing them to reconsider the material possessions and waste that they may otherwise readily dispose of.

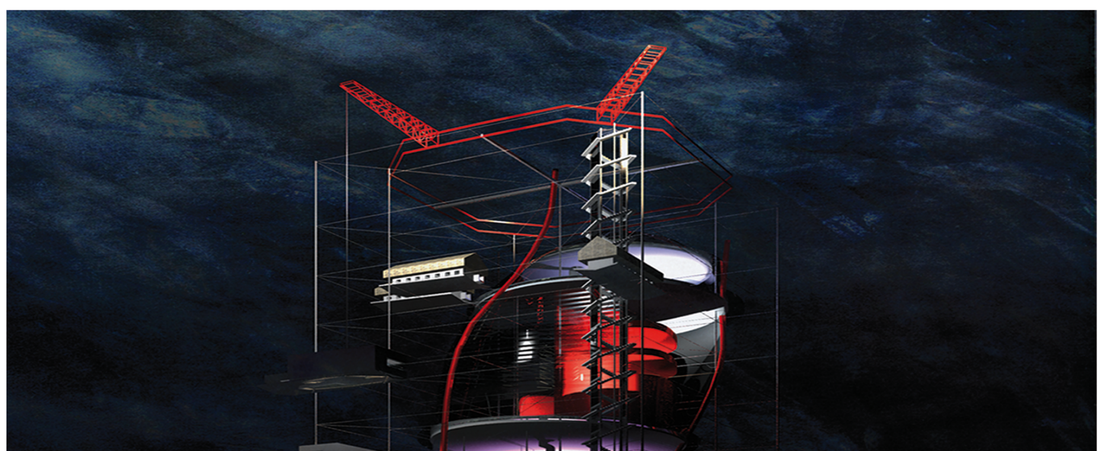








view into agricultural zone and living pods



nighttime view of the development