Introduction.
We are enamored by a brick as a metaphor for an individual. The individual is comprised of genetic and instinctual characteristics, but also intrinsically responsive to conditions of the present. The individual exists within society, and is dependent upon it. In turn, the nature of society is dependent on the relationships between and the behaviours of individuals within it. With this metaphor we empowered ourselves to add innovation to the ancient technology of unit masonry while retaining a hold on its etymology.

We expanded this metaphor to encapsulate a residential model we were interested in investigating and the relationship between this model and its locale. Through consultation with Rob Adams we have chosen a 1300m2 site owned by the Melbourne City Council on Curzon Street, North Melbourne. The site is proximal to public transport, child care, parks, and the Errol Street retail strip.

Our project, entitled Collective Noun, comprises 25 affordable residential units, 15% of which conform to the Disability Discrimination Act (DDA), a small showroom with associated office space, a half basement providing cursory car spaces, and ample bicycle parking. One third of the site is given over to publically accessible space. The building's height of 14m is defined by what can be comfortably accessed by stair. Two flights of stairs allow access to the first two levels above ground, with the upper level of duplexes having an internal stair to their upper bedrooms. This augers well with the general massing of the street-scape.

Area Schedule.
- site area 1300m2.
- private outdoor space 100m2.
- show room 200m2 .
- ten x 2bed duplex. 75m2 each.
- eight x 2bed. 60m2 each.
- 15% DDA accessible.
- bicycle spaces 30.
- public outdoor space 200m2.
- semi-private outdoor space 150m2.
- office space 450m2 .
- two x 3bed duplex. 90m2 each.
- five x 1bed. 35m2 each.
- car spaces 10.

Socially responsive architecture.
This project achieves affordability by offsetting the apartment costs against the returns of the commercial space, by naturally ventilating all spaces, for which the thermal mass of brick is crucial, by keeping apartment sizes down with cleverly designed interiors, by providing limited number of car spaces and by maximising floor plate efficiencies by limiting the building height to that accessible by stair, thus negating the need for lifts, sprinkler systems and dual escape routes. To offset the smaller apartment sizes, private outdoor spaces, a semi-private outdoor space and a public outdoor space are arranged in a gradients across the procession of the building.

Research.
Digital design technologies and Computer Numerical Control (CNC) robots enable us to arrange modular building components in configurations that are locally recursive but vary overall. Brick lends itself to these developments particularly well, producing spaces and surfaces that warp and stretch, but are still created from a simple assemblative logic used for centuries. CNC robots can work in factories, but also on site.

They can work alone or in pairs and can perform complex brick laying task at high speed. In addition to picking up and placing to sub millimeter accuracy their active heads can be programmed to cut and router bricks and, trowel, undercut and strike mortar. The speed at which a number of different shapes can be cut from a standard brick module means that the cost of large numbers of unit variation is dramatically reduced.

Face brick.
Face brick provides rich opportunities for pattern. Stretcher bond, Stacker bond, Flemish bond and so on all occupy familiar places in our collective graphic memory. How then to innovate with pattern? The idea of relationships between individuals as defining of a whole suggested to use that perhaps the bricks themselves might define pattern. Rather than designing the whole, we designed a series of rules describing the relationship between each brick and the next, and allowed space for a pattern to emerge from that.

Versatility.
Bricks vary wildly across the spectrums of size, colour ,texture and shape. Each brick is designed for a specific purpose. In the subversion of purpose we saw great opportunity for innovation in the use of brick. How would mortar patterns read in a face brick wall laid entirely with bull-header bricks? What sort of texture would result in a wall with corner squints used as soldiers? What would a facade be where the frog's of its pressed bricks were to be considered as face?

ESD Characteristics.
Brick has some very obvious sustainable characteristics. It performs excellently as thermal mass, the ease with which it can be used to form breeze walls makes it a powerful tool in cross ventilation. It is a stable material and re-cycles well. These we eagerly incorporated in to our project.

But what about the less obvious ways? We propose using three hole wire cut bricks laid on their face as a internal flooring. Pipes are then threaded through the holes through which closed system hot water is circulated through a solar heating system. During cold months, this same system capitalises on excess heat produced by a tri-generation plant in the basement level.

Our project has a series of outdoor areas. Brick being porous is ideal for the application of the principles of water sensitive urban design (WSUD). In times of light rainfall, the ambition is that water would drain through small holes in the surface brick to a crushed recycled brick layer below and then into the the ground and the natural water table. This assists in maintaining a healthy sub-soil layer and keeping large trees strong and healthy with minimal maintenance. In acute moments of high rainfall the storm water streams across this subtle surface and draining in to a long-term storage water tank in the basement, which is also supplied by a black water treatment plant. This surplus can then be utilised for local irrigation on site, and in neighbouring streets and properties.

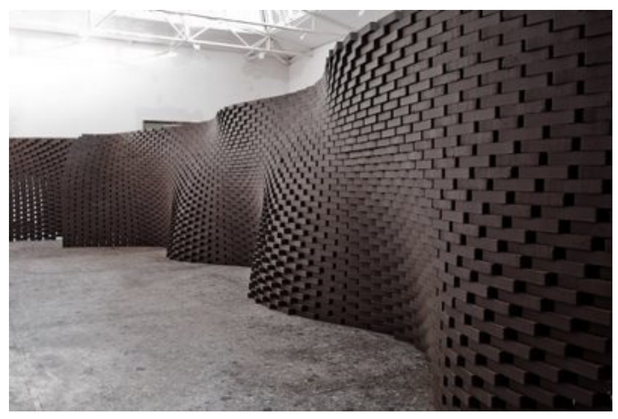
The chemical stability of brick makes it an excellent internal finish as has extremely low levels of Volatile Organic Compounds.

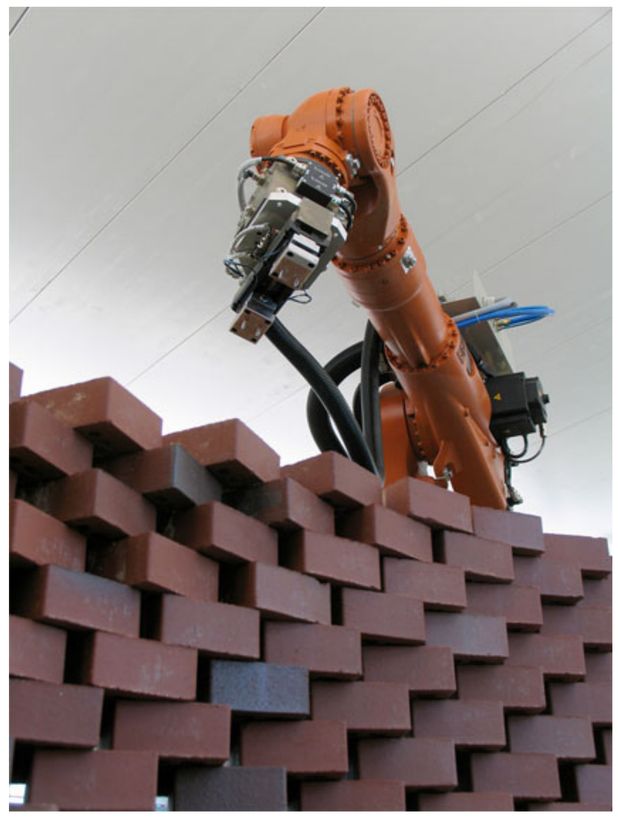
The majority of brick specified in Collective Noun is locally produced wire-cut brick. Wire cut brick is quicker to mold and bakes more evenly it has far lower levels of embodied energy. That it is locally produced reduces energy, and costs, required for transportation.

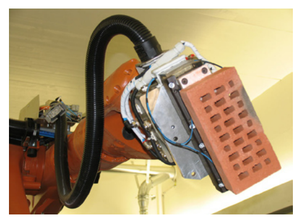
Unique aesthetic qualities and formal potential.
This project seeks to exploit in the three dimensional potentials of brick. Initially through digital design technologies and CNC machines but also through re-thinking the way in which are designed to be used. Bricks have a face, but so to do they have a top, sides and a base. We considered the magical qualities that a breeze wall might take on if the rear and sides of a brick where glazed white, while the front remained a natural dark mat finish. The interior enclosed by the breeze wall would seem to glow.

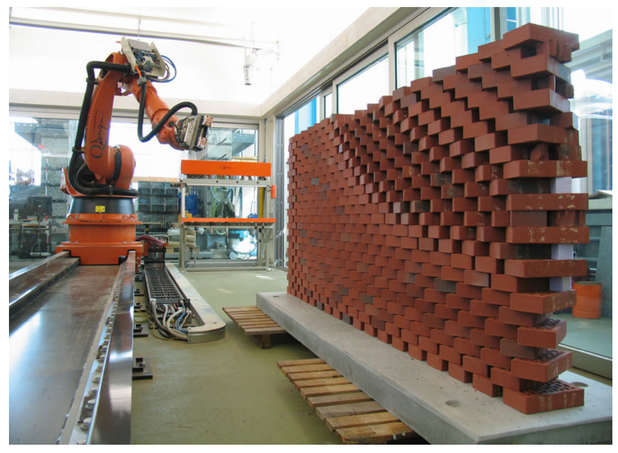
Rethinking brick.
Archaeological exploration of the structures of early human civilisations have revealed evidence of unit masonry. That brick is integral to very the fabric of architecture is instinctual. Innovation in brick use is innovation in architecture. Through research in to digital design, CNC robotics, ESD imperatives, social response and first principles re-evaluation of the intended purpose of brick product Collective Noun re-thinks brick into the complex contemporary world.

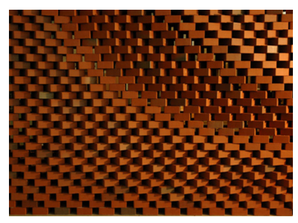

ELADIO DIESTE Cristo Obrero Church (Atlantida, Uruguay)

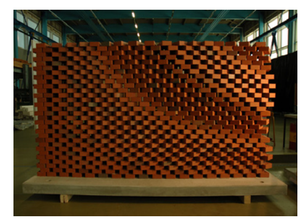

GRAMAZIO + KOHLER Swiss Pavilion (Venice Biennale 2008)











FABRICATION BY COMPUTER NUMERICALLY CONTROLLED ROBOT (CNC)

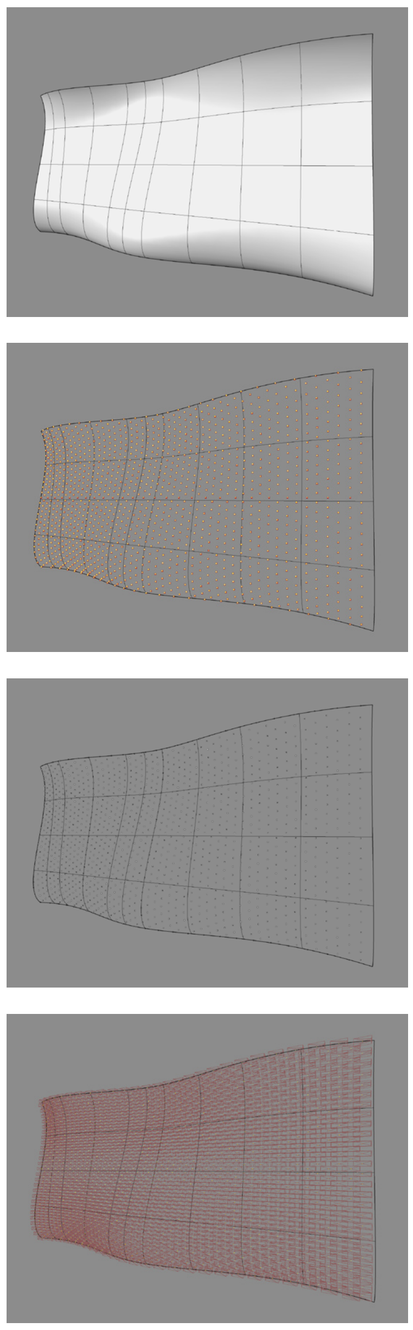
ROBOT USED ON SITE

RECYCLED BULLNOSE BRICKS


ANCIENT BRICK USAGE

BRICK VARIETIES


Object and urban space integrated through brick


DIGITAL DESIGN OF BRICK WALL