PASSIVHAUS
Student Competition

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TIME MACHINE TOWER

in partnership with

TARMAC
A CRH COMPANY

PROJECT FACTS

Mixed-use	Manchester	112,000m²
Building Use	Location	TFA

PASSIVHAUS STRATEGY

Tall building apartments can be inherently PH compliant because the unit envelope shares walls & structures with neighbours, apart from the outer facade.

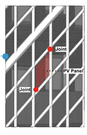
South, SW and SE facades are exposed to direct sunlight. To avoid overheating from solar gain, dynamic photovoltaic facade and horizontal shading elements (exoskeleton and cantilevered balconies) are used. The building can use the gains of low altitude sunlight in the winter.

In Summer, windows can be opened by residents in daytime to allow natural ventilation. Transom light to apartment door permits cross ventilation. Optivent shows that for one flat in summer, wind driven ventilation is in the comfort zone. From Autumn to Spring, windows are closed and MVHR maintains comfortable humidity, healthy air supply and heat conservation from Autumn to Spring.

DesignPH testing has been applied to selected apartments. Dynamic responsive photovoltaic facade on the residential tower generates energy & prevents solar overheating. Social skycourts and the vertical atrium can be used to provide natural ventilation and enhance daylight.

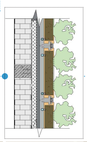
DESIGN PHILOSOPHY

The Time Machine Project is located in **NoMa, Manchester**. This site has just north of the City Centre, with short walking distances to city attractions such as the Victoria Railway station, Arndale Centre, the Exchange, Co-Op Square & Football Museum. The project is a 'vertical city', including NHS hospital, farming, sport, training college, entertainment, shopping & public space. The driving concept of the Time Machine is to provide over 50s people with excellent city centre living, connecting with younger generations. The vertical atrium and social skycourt areas provide natural ventilation and good sky daylight. Dynamic photovoltaic facade on the tower allow voice-activated varying power, light & shade conditions. Active green facades and allotment gardens on podium enhance connection with nature.



Dynamic Photovoltaic Facade

Solar and Privacy Control Facade



Green Facade

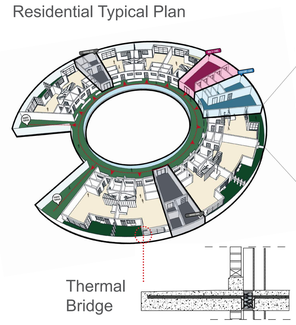
Corridor

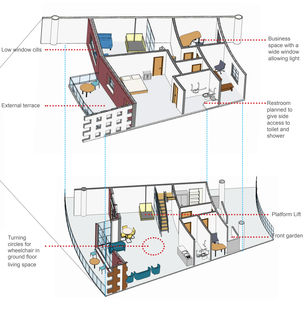
Living room

Dining room

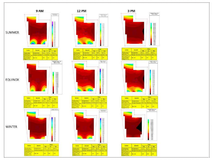
Materials:
Main Structure:
Reinforced Concrete
Facade Structure:
Stainless steel
Internal Wall:
Hollow bricks with rock wool insulation

Residential Typical Plan





Thermal Bridge



IES analysis:
After increasing the openings on northeast side, the quality of light has been improved and has reached to 6%. So, the flat is bright enough.

SEFAIRA analysis:
The percentage of floor is where daylight factor (DF) is measured at 0.90 meters above the floor plate.

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designPH

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