



Northumbria University Architecture Portfolios

# A PLACE OF RESTORATION

## INTERNATIONAL DESIGN COMPETITION

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**Professor**

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*Front cover*

*Visulisation of concept*

# 1. Project Details

Principal Researcher	<b>Paul Jones</b>
Title	<b>A Place of Restoration</b>
Output type	<b>International Design Competition</b>
Curator	<b>Paul Jones</b>
Function	<b>Maggie-inspired Centre for Cancer Patients in Krakow</b>
Location	<b>Krakow, Poland</b>
Budget	<b>2500 euros/m2</b>
Competition Organiser	<b>Beebreeders- in collaboration with the Marie Curie Centre in Krakow</b>
Competition Entry	<b>2015</b>
URL	<b>Xxxx</b>

## 1. Summary

The competition entry, entitled: *A Place of Restoration*, represents a holistic approach to the competition brief to design a Maggie-inspired centre for cancer patients in Krakow. The competition organisers- Beebreeders- in collaboration with the Marie Curie Centre in Krakow- asked entrants to re-interpret the Maggie Centre concept and provide a pollution-free facility for its users to counter the very high levels of air pollution in Krakow. The competition submission extends the Maggie Centre concept to not only provide advice and support, but to promote general wellbeing through the provision of a multi-use activity space that allows for social gatherings, exercise classes and crafts. Also included in the proposal are a range of air purification devices, both natural and man-made, that aim to generate a healthy micro-climate of clean air. The building is conceptualised to use the environment, both internal and external, as therapy- promoting the values of natural light, access to the sun, fresh air and natural materials. External spaces are used for contemplation and to grow and nurture a therapeutic garden of herbs and plants that have medicinal qualities.



## 2. Introduction - Brief & Sponsors

### SPONSORS & STRATEGIC PARTNERS



### MEDIA PARTNERS



In 2015, an international design competition was announced to design a Maggie Centre-inspired building for Krakow, Poland. The architectural agency, Bee breeders, were the organisers for the competition. They have rapidly become one of the world's leading architecture competition promoters; with over 20 competitions completed to date, leading to several important building commissions and extensive media coverage for the winners.

as was the environment in and around the facility. Krakow is one of the most polluted cities in Europe, therefore providing a clean, sustainable facility was an important consideration of the competition brief, not just for the image of centre, but for the users due to airborne pollution compromising their health. The organisers were also clear that the building should be non-institutional, promoting a non-clinical environment.



### The brief

For this competition, Bee-breeders collaborated with the Marie Curie Oncology Centre in Krakow. Collectively they identified a deficiency in the cancer treatment in Poland, arguing that it is singularly-focused on medical intervention (surgery or drugs); while the patients' emotional well-being is largely ignored. Entrants were asked to propose facilities that considered the spiritual and phenomenological aspects of support for the disease in their design of a support facility.

The brief proposed that the facility would operate outside of the mainstream healthcare system, providing an alternative environment to clinical facilities responsible for cancer treatment. The organisers were very supportive of the Maggie Centre concept, but asked entrants for other interpretations of what cancer a facility could be, beyond a centre that just promotes advice and emotional support.

The competition was predominantly ideas-driven, but there was ambition expressed in the brief to build one of the winning entries sometime in the future. Therefore, the brief set a budget of 2500 euros/m<sup>2</sup> and asked entrants to consider the siting of the building in the square and its contribution to the city. Buildability was also considered to be important

### 3. Winning Entries & Judges Comments

#### Winning Entries

**First Prize : Nima Nian, Behdad Heydar. Principals of Tehran Studio**

(£4000 cash honorarium)

**Second Prize : Paul Jones and Chris Brown. Northumbria University**

(£2000 cash honorarium)

**Third Prize: Cameron Kollath. Principal e-Arch USA**

(£1000 cash honorarium)

There were six honourable mentions from team located in Japan, Australia, Poland, Crypus, Romania and Italy. There were 84 entries from 17 countries.

\*The brief stated that the winning entries would be contacted for interview, if client group decided to progress plans for a cancer support centre.

#### General Comments of the Judges

The jury chose winning entries that resonated with the ambition of the brief. The top three designs integrated their buildings with the nearby park and took into consideration the neighbouring Institute of Oncology. The winners were chosen for the singularity of their architectural vision of a healthy, sustainable environment that placed the patients' wellbeing at the heart of the facility.

\* See P11 for specific comments

**Please see boards in pages 12-15**

□

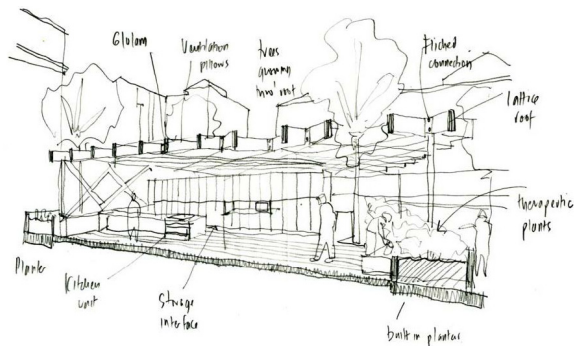


Fig 01\_ Concept sketch of facility



## 4. Statement of Significance



*Fig. 02 \_ PI (Jones - 3rd left) after presentation to members of the Barbados Government, Civatech and Project-C*

*Fig. 03 \_ View of health tourism facility at Harrison Point Barbados for Project-C and Barbados Government*

1. The project has been seen by health professionals and dignitaries in Poland as a consequence of the dissemination of competition. As yet, there has been no commitment to build one of the winning entries; this was described as a future possibility by the competition organisers, but the entry was described as the most buildable and realistic for the budget.

2. The research report was seen online by an international healthcare provider, Project-C, who are based in the UK, but operate within the Caribbean. This organisation commissioned the PI (Jones) to present to the Barbados Government about the importance wellbeing in healthcare architecture. They were interested in the research and holistic approach for the design of the cancer support centre in Krakow (seen on the internet) that promoted wellbeing through support and exercise. Cancer support facilities at present do not exist in Barbados; this facility was planned as part of wider healthcare initiatives for the island, supported and partly funded by the Barbados Government. The PI presented to the Barbados Ministry in Kingston in September 2017 and Feb 2018.

3. Based on the ideas contained in the competition - and subsequent dialogue with Project-C and the Barbadian Government - the PI (Jones) was invited to the island to advise on the design-research component of a £400 million health tourism resort that is planned for the island. This project is a huge investment for the island, so is progressing slowly; however, the PI has engaged and contributing to the design works (see Fig 03) and presented to Ministers in person. This significant opportunity demonstrates the

extent of the significance of the project beyond architecture to other fields.

4. This project, along with other healthcare projects at Northumbria, have contributed to health and well-being becoming a design research area within the department. This approach has benefitted the students, particularly the Masters in Architecture and doctorate students who are now engaging with health related research projects. There is now a healthy and consistent collaboration with the Health department at Northumbria University with staff and students working on design projects using the Healthcare academics expertise and evidence-based research. Design research projects are now being undertaken in subjects such as Ageing (dementia and Alzheimers); Cancer facilities (including hospice design) and Obesity. There are impact case studies to unit 13 that will be returned to the REF in these areas.



Fig. 04\_ Bradley Lowery as a mascot with ex-Sunderland professional footballer Jermaine Defoe

Fig. 05\_ Design for Bradley Lowery has utilising ideas of wellbeing developed in Maggie Centre Competition

6. As a consequence of the research contained in the Maggie Centre project-particularly the use of the environment as *therapy*- the PI (Jones) was invited to present the research to trustees of the Bradley Lowery Foundation as part of an invited competition format. This charity was set up in memory of seven-year-old boy who lost his life in 2017 to Neuroblastoma, a rare form of brain and nerve cancer. Working in collaboration with Richard Marsden CEO of Building Design North, the PI (Jones) won the competition to design the facility. The intention is for this house to be the first of an ongoing programme to build Bradley Centres (*Bradpads*) around the country following the model of Maggie Centres, the next one is planned in Devon. This is an amazing opportunity to initiate a new care typology. There will be significant impact generated from this project and will no doubt lead to other impactful projects in health research and extensive dissemination opportunities.

Bradley was a mascot for Sunderland football club; his bravery was broadcasted on local and national television stations and in newspapers. His battle against the disease touched the nation. The trust-with support of Sunderland football club and a number of the club's professional footballers, including Jermaine Defoe - have provided funding to construct a holiday respite home for families of children who are undergoing gruelling treatments for cancer and other life threatening diseases.



## 5. Statement of Rigour

This project has involved extensive practice and praxis-based activities, as well as more traditional research methods to realise the development and answer the four research questions.

We engaged in primary research activities by visiting a number of support facilities, including Maggie Centres, Dundee, Edinburgh, Cheltenham and Newcastle. This was to see what their approach was to support and to record their facilities and attempt to capture the spirit of the building.

We use participatory research methods including interviews to gain the perspectives of a number of users. This work was centred on the Newcastle Maggie Centre where we interviewed staff and users. This was incredibly useful and helped us derive an approach to the brief based on task-based activities and exercise.

A comprehensive literature review was carried out (see table right) into four areas:

1. the benefits of exercise and task-based activities and health outcome.
2. The role the physical environment has on health and wellbeing.
3. Place- making
4. Clean air devices (natural and manmade). The findings and underlying principles have been integrated into- and informed-the design of the project.



Fig. 06 \_ A Visit to Edinburgh  
Maggie Centre

Key Authors/references	Subject related to competition brief
See reference section for full selection of papers and books	
<ul style="list-style-type: none"> <li>- Hill AB . (1965)</li> <li>- Alvarsson, J., et.al (20130)</li> <li>- Ben-Abraham, et al. (2002)</li> <li>- Beute, F., &amp; de Kort, A. W. (2014)</li> <li>- Boyce, P. R. (2010).</li> <li>- Fife, D., &amp; Rappaport, E. (1976).</li> <li>- Keniger, L. et al (2013)</li> <li>- Park, S.-H., &amp; Mattson, R. H. (2008)</li> <li>- Partonen, T., &amp; Lönnqvist, J. (2000)</li> <li>- Sternberg, E. M. (2009)</li> <li>- Stichler, J. F. (2001).</li> <li>- Ulrich, R. S. (1984).</li> <li>- Ulrich, R. S., Berry, L., (2010).</li> </ul>	<p>Environment as medicine, healing environments. Papers cover:</p> <p>Environment and wellbeing (physical and mental)</p> <p>Role of: natural light, natural ventilation, the sun, views and contact with nature, use of artwork, natural materials, on wellbeing and health outcomes</p>
<ul style="list-style-type: none"> <li>- Brenner DR , et al (2016) .</li> <li>- Behrens G , Leitzmann MF (2013)</li> <li>- Hallal PC et al (2012)</li> <li>- Keum N et al (2016)</li> <li>- Highfield (1987)</li> <li>- Bullen and Love (2011)</li> <li>- Snyder (2005)</li> <li>- Liu Y , Hu F , Li D , et al (2011).</li> <li>- Markozannes G , et al (2016)</li> <li>- Moore SC, et al (2016)</li> <li>- Neilson HK et al (2017)</li> <li>- Pizot C et al (2016)</li> </ul>	<p>The effects of exercise on cancer. Papers cover:</p> <p>Improved health outcomes of exercise Improved general mood and wellbeing from exercise</p> <p>Extent of exercise and regularity</p>
<ul style="list-style-type: none"> <li>- Bosman (2011)</li> <li>- Coates and Friedman(1984)</li> <li>- Hall- Lew (2014)</li> <li>- Lew (2007)</li> <li>- Main (2015)</li> <li>- Manzo (2015)</li> <li>- Silbeberg (2013)</li> </ul>	<p>Value of history for Placemaking</p> <p>Place-making and the city</p> <p>Heritage Identity and Place</p> <p>Placemaking and Planning Theory</p> <p>Place Identity and Agency</p> <p>Place Attachment</p> <p>Components of Placemaking</p>
<ul style="list-style-type: none"> <li>- Roberts (BR) (1971)</li> <li>- Weidensaul TC (1972)</li> <li>- Rich S (1968)</li> <li>- Zhang (2011)</li> <li>- Durfee (2018)</li> <li>- A Burton - (2012)</li> <li>- D Davis, C Divya (2015)</li> </ul>	<p>Trees as air purifiers</p> <p>Plants as air purifiers Plasma as air purification</p> <p>Paints and materials as air purifiers</p>

## 6. Statement of Originality

This competition entry reflects the nature of the design brief that called for speculations to a *new* interpretation of a Maggie Centre. Through primary and secondary research methods the team designed a runner up entry that was deemed by the judges to extend the concept of the Maggie Centre. Therefore, there is originality in the proposition. The facility was conceptualised to move beyond the support culture to also include community-based activities that are known to improve the users' state of mind and general wellbeing.

The project also was a critique on the traditional Maggie Centre that had been largely unchallenged

as a concept. The designs of these facilities are often more about the architect- and their abilities as designers- than the needs and views of the users. Our submission is an output of evidenced based and participatory design.

The project is used as a vehicle to accommodate the needs of men in the Maggie Centre concept. Currently there is five times more users that are female than male. Our facility actively looks to engage male users and broadens the concept. This is particularly important as the incidence of lung cancer in Poland (the key cancer sufferers that the brief wished to attract) is currently four to one, men to women, due to smoking and industrial disease (*source: the competition brief*).

The research into clean air environments- both natural and manmade- is a growing research area of the design team. This competition, along with a number of real architectural projects, has utilised *phytoremediation*, through use of roof gardens and perimeter planting, and pollution absorbent materials to sequest pollutants from the domestic environment. The competition speculates a clean air, plasma purged, ceiling plenum. This technology is being considered for the Bradley Lowery house (see ceiling plenum left) working with the German company *Plasma-Made* and the Angle-Spanish company *Premiumtec* who have experience of integrating this technology into domestic environments. They are interested in how we can develop a pressurised ceiling system utilising an array of plasma units to destroy odours, pathogens and mould spores creating a totally clean air internal environment.



Fig. 07\_ The clean-air approach taken in the competition being developed for the Bradley Lowery House.

## 7. Research Outcomes



- **Second Place** in international architecture competition
- Positive feedback from competition judges that valued the approach to the design/research problem.
- Opportunity to exhibit research, exposing Polish healthcare practitioners to the value the medical environment's capacity for patient well-being, thus challenging their singular focus on medical intervention.

(\* a criticism that partly inspired the competition)

- Produce a new type of support facility that expands the Maggie's concept that promotes exercise and *positive distraction* within the building, through activities and an engaging environment.

### Comments specific to Jones/Brown submission

*The second-place project is distinguished by sensible siting and materiality. The care centre is situated along the street between existing oncology centre buildings. This placement establishes a street presence without obstructing the park. Spanning from street to park, a lattice roof structure unifies the activity and function of the building while mediating environmental conditions. Through the use of vegetation and a performative roof, the building negotiates private and public, light and shadow, views in and views out; selectively conciliating the environment and its user. The interior spaces are designed with adequate flexibility for an ever-changing program, allowing for the building to evolve as needs of the care centre and users change. Through the development of a large roof datum, and reinforcement of the ground plane through planting, the project moderates a diversity of programs and users, while defining a sensitive and tactful environment. ▣*



*"Increasingly cancer treatment and care has to be seen holistically. Cancer recovery, or extension of life, requires effective medicine, as well as consideration of the patient's wellbeing, their outlook, stress levels and physical and mental fitness. It is important that we bust the myth that cancer patients should rest up. Exercise, interaction with others, hobbies, communal activity, and even work related activities can significantly improve recovery, reducing the impact of cancer treatment, such as depression, fatigue, increased stress, and physical side effects such as bone thinning, muscle wasting and heart damage. The building is conceptualised to facilitate the above."*

Professor Jane Maher (2012) Chief Medical Officer, Macmillan Cancer Support



Approach to main entrance

# OXYGEN HOME A PLACE OF RESTORATION

Krakow Oxygen Home - 'A place of restoration' represents a holistic approach to the competition brief, the proposal has been designed as a care centre for both the body and mind while considering an approach to solving the core problem of Krakow's high levels of air pollution. Included in the proposal are a range of air purification devices, both natural and man-made, which aim to generate a health boosting micro-climate of clean air; this is coupled with the integration of alternative herbs and plants with strong health benefits for brewing in teas. The patient's mental well being is also a core consideration with the provision of a multi-use activity space allowing organised social gatherings, exercise classes and crafts.

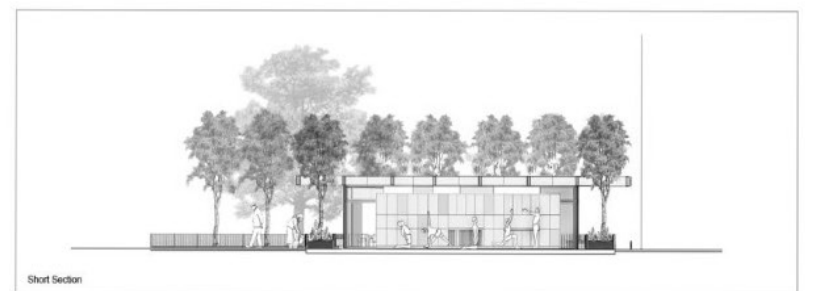
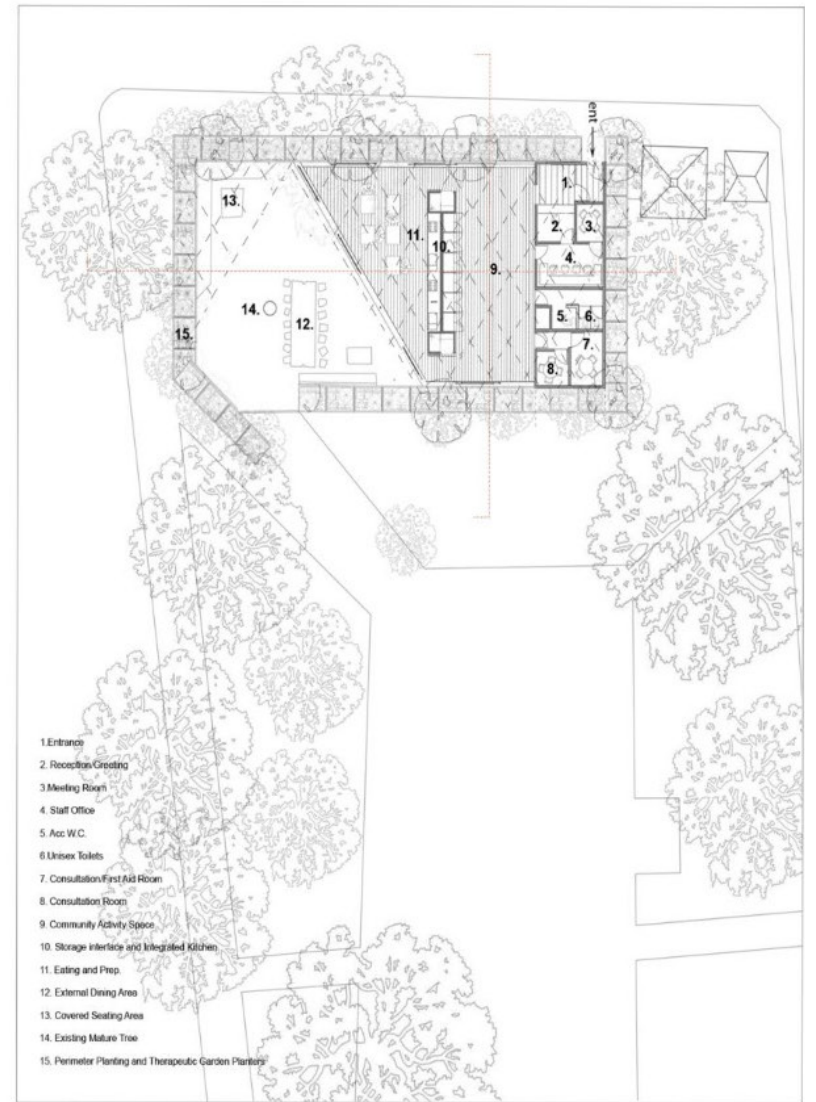


- 1. Therapeutic garden and planting
- 2. Micro-climate generating silver birch
- 3. Titanium Dioxide coated ceramics
- 4. Keeping cancer sufferers active



- TiO<sub>2</sub> coated lattice structure acts as a filter, 'scrubbing' potentially harmful pollutants from the air, it's position creates a privacy screen and structure for planting to attach to.
- Communal kitchen is positioned to encourage mingling in the private courtyard and good connection with the outside as well as views of the park.
- Glulam timber lattice structure allow open spans in the internal spaces to create maximum flexibility in the activity space.
- Storage interface with fully integrated kitchen. It forms the dividing wall between the kitchen and activity space as well as including fold out craft tables and additional storage.
- Silver Birch trees are integrated into the facades and roof structure to absorb toxic air pollution from the local atmosphere and act as a privacy screen.
- Perimeter planting includes medicinal herbs to be used in teas and cooking as well as providing a therapeutic gardening project for lung cancer patients.

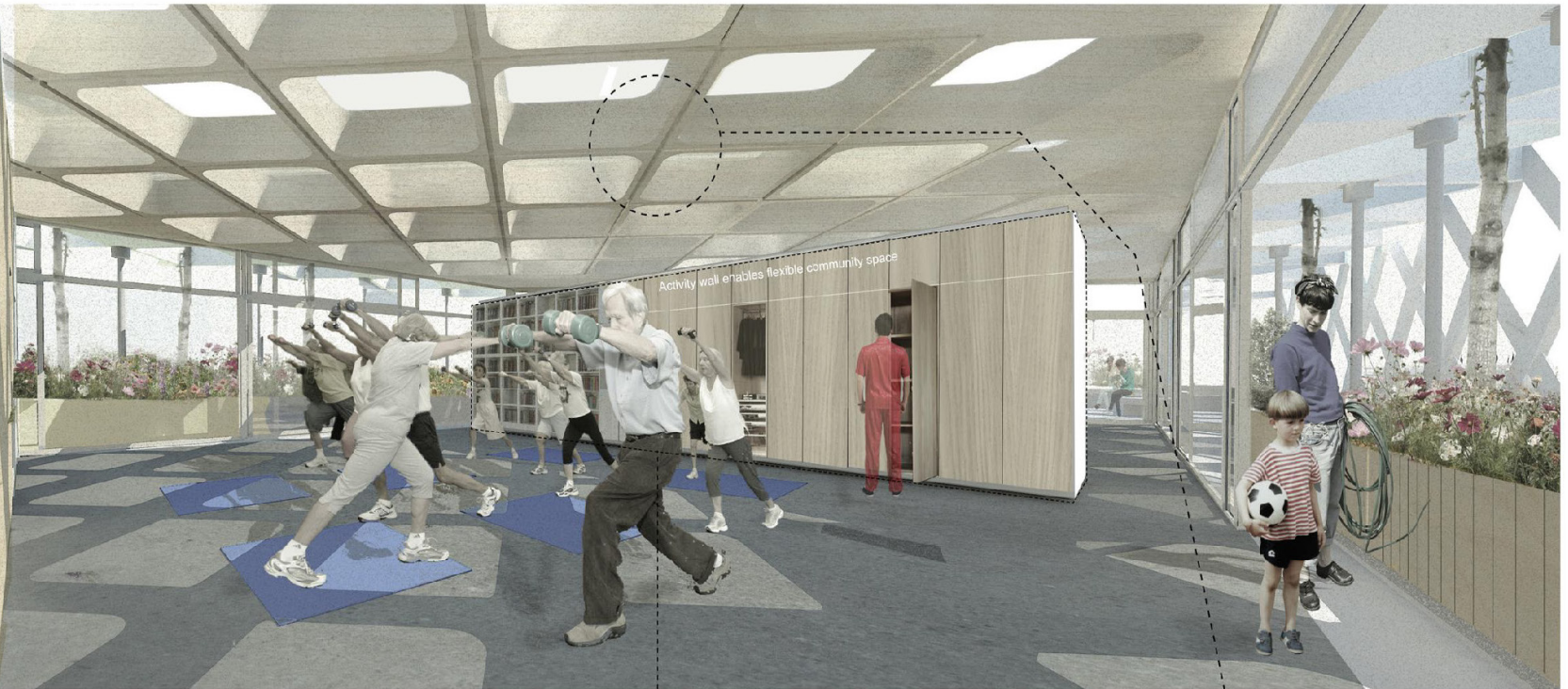




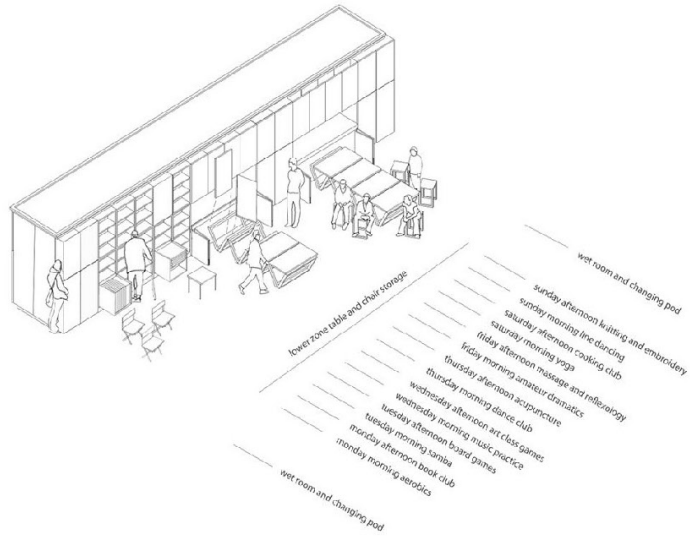


Activity Space and Storage Interface

For the building to support as many activities as possible the facility has been fitted with a storage interface. The lower zone houses tables and chairs, and other heavy objects like speaker and amplifiers etc. for music and entertainment. These are accessed via heavy duty draw units on a runner system for easy access. The upper zone is for the activities, with each club having a storage facility for equipment. Again, these are on a draw system for easy access. There are also two changing cubicles with shower facilities at each end of the interface.



Activity wall enables flexible community space



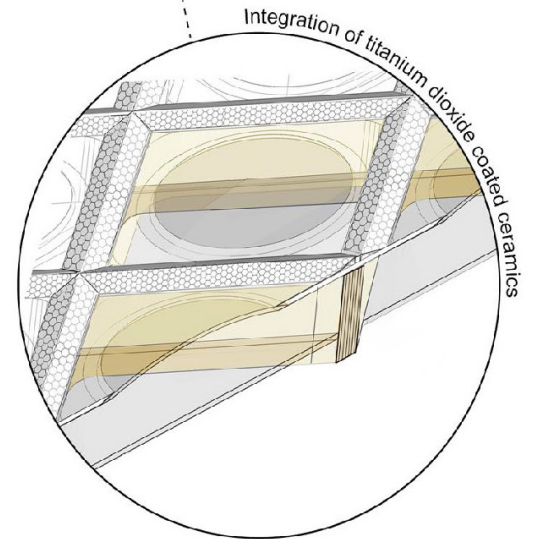
Storage Interface Axonometric drawing



Proposed Space Usage

Pollution combating building materials

Research has revealed the potential of titanium dioxide (TiO<sub>2</sub>) to remove pollutants out of the air. It is a highly versatile compound that can be used as a photo-catalyst in plastics, paints and ceramics. When exposed to ultraviolet light TiO<sub>2</sub> accelerates many chemical reactions including the breakdown of smog producing gases such as nitrogen and sulphur oxides. A typical roof of a house with roofing tiles coated in inexpensive TiO<sub>2</sub> lacquer will remove as much NO<sub>2</sub> as a car produces in a year doing 20000 km. The roof of the structure is clad externally with ceramic tiles embedded with TiO<sub>2</sub>. The non-glazed external walls are also clad in the same material, further adding to the building's ability to combat air pollution and create a pocket of clean air around the facility. The roof is a lightweight insulated construction using fished glu-lam beams supported on circular column sections. In-between are insulated pillowed light-wells, comprising an outer and inner skin of 3mm purac bio-plastic (derived from soya bean used as an alternative to ETFE). The outer skin is treated with a low e treatment to combat solar gain.

















The silver birch is now recognised for its ability to remove pollution for urban environments. A tree with a trunk with a diameter of 15 cm or more removes approximately 30kgs of noxious gases associated with lung disease, such as Nitrogen Dioxide (NO<sub>2</sub>) and Sulphur Dioxide (SO<sub>2</sub>), without any negative effect on the tree. Moreover, perhaps even more important is that they remove larger particulates, which are even more damaging to human health. These particles that measure 2.5 µm (PM2.5) to 10 µm (PM10) are small enough to penetrate deep into the lungs causing asthma and other health conditions such as lung cancer. The birch tree captures these particles on its fine hairs that project from its leaves. A study by Lancaster University showed that if the area of tree canopy is equal to area of a building, it will reduce the amount of particulates falling on the building by as much as 50%, in effect creating a clean air zone around the building.

The scheme includes a therapeutic garden as part of the holistic care offered by the centre. As well as the garden being a focus of activity and a calming environment, the plants have been chosen for their restorative value for cancer patients (see description). Taken in tea or in a juiced form, they can relieve the side effects of the cancer or the chemotherapy treatment. Others shown have demonstrated. In clinical trials, that they can reduce the likelihood of the cancer returning, or slow the rate of growth of the tumour. There are some of the herbs that also aid recovery by bolstering the immune system and oxygenating the blood.

The 'Space for Regeneration' is designed to retain as much of the existing park as possible and all off the mature trees. An existing tree is incorporated into the centre of the new private courtyard, allowing the building to be visually camouflaged by both existing trees and newly planted silver birch.



Blood Root		Research shows oxidant anti-neoplastic activity when taken as an herbal remedy it is excellent in tea, particularly soothing for lung bleeding, common in lung cancer.
Dang-Seng Root		Increases levels of both white blood cells and red blood cells, as a result it can be extremely helpful to patients undergoing chemotherapy and radiotherapy treatments
Milk Thistle		It has been shown to be capable of protecting the liver during chemotherapy treatment. Taken in tea, research has shown that it is particularly effective in reducing chemotherapy side-effects.
Chaparral		Boosts the immune system, it is used in tea may stop metastases and can reduce tumour size. It is especially effective as an anti-oxidant and an anti-microbial, it has very low toxicity
Cat's Claw		An adjuvant and powerful immuno-stimulant, this plant is used in tea and enhances the white cells cleanup process (phagocytosis). Helps reduce the side effects of chemo and radiotherapy.
Echinacea		Another brown immune system booster, it garners a reputation for its abilities to increase the levels of certain immune white cells in the body. It is very effective in tea.
Peppermint		Ingested as a tea, it is particularly effective in opening airways for lung cancer patients it also has a very calming effect in the stomach, reducing the side effects of chemo-therapy.
Wheatgrass		One shot gives you the chlorophyll of some 12 or more kilograms of brocoli. It acts as a blood purifier, and liver and kidney cleansing agent. Ideal for patients undergoing chemo therapy
Feverfew		In trials has been seen to be more effective at killing cancer cells than many manmade cancer drugs. It is effective in tea and excellent to reduce nausea caused by chemotherapy.
Cat's Claw		Used in Echinac and other herbal remedies and teas, it is a cleanser and aids healthy tissue regeneration. There is some suggestion from research that it helps normalise damaged cells and tissue.



## 8. Introduction - Site Description



Fig. 08\_ Aerial view of site

Fig. 09\_ View into square

The chosen site for the competition is a historic square on the western edge of the city centre of Krakow. This square contains a number of medical buildings including, two cancer treatment centres that form part of the Marie Curie cancer facility. As with the Maggie Centres in the UK, the site was chosen to be in proximity to the medical buildings. The square has a civic quality; used by the general public and patients attending the Marie Curie centre. The buildings that form the square are consistently of 5 storeys in height (see fig 8 & 9), some with mansard roofs, other with standard pitched roofs. They generally date from the late 19th century in the European neo-classical style. These buildings look directly onto the square. There are a number of mature trees that provide a degree of shade from the sun in the summer.

This context was an important design generator for the competition and is discussed in the research question section.



## 9. Research Context



Fig. 10\_ Newcastle  
Maggie Centre

Fig 11 Aspirational  
interior of Newcastle  
Maggie Centre

The research team considered the brief, and began to formulate an approach and develop a number of research questions. There were parts of the schedule of accommodation in the brief that were shared by Maggie Centres; the scale of the building was also comparable. We arranged to visit a recently completed Maggie centre in Newcastle, at the Freeman Hospital by Ted Cullinen Architects (see fig 10); this insight proved invaluable and helped us to hone the research questions and the design approach. These questions were further developed through a literature review and some primary research (to be discussed in next section on the research questions and methodology).

### Background to Competition

The development of medicine over the last half-century has been nothing short of astonishing. Advances in diagnosis, regenerative medicine, and pharmaceutical and surgical innovations have transformed healthcare, whereby a far greater percentage of people in the developed world are living into old age than ever before, surviving diseases that were once considered to be terminal. Despite this undoubted success, there remains aspects of modern healthcare that are far less successful. Current models are often process-driven, with medical practitioners principally focusing on the diagnoses of illnesses, reparative interventions with medicines and surgery, and the return of the patient to society as quickly as possible, Sternberg (2009); Ulrich (2001); Jencks (2002). Often, the broader wellbeing and care experience of a patient is overlooked; however, psychological and environmental factors are increasingly being acknowledged as contributing to the speed and quality of patient recovery. The anxiety that accompanies illness and diagnosis can

automatically trigger stressors that slow down the patient's recovery and abilities to fend off diseases. The inextricable link between mind and body has been recognised by medical practitioners for thousands of years; however, the importance of holistic care is often been forgotten in modern healthcare.

The PI (Jones) has a close association with the research problem: both his parents were diagnosed with cancer and received the treatment in environments that were alien, unsettling, and disorienting, lacking windows, daylight, visual stimuli, legibility and a human scale. During and after their treatment they both suffered from apathy, fear, and depression. It was not just the treatment, it was the whole experience, particularly the de-humanising environment where the treatment took place (see fig 12). The environment where they received support and advice about their conditions was marginally better, although still located in the hospital; these spaces remained, however, very institution and clinical. The principal motivation of Charles and Maggie Jencks for the Maggie Centres was to provide an alternative non-clinical environment for support for cancer patients. This interest was motivated by modern thought, where health is an expanded concept, seen as a connection between mind, body and spirit.



*Fig. 12\_ Photo taken by researcher of very poor-quality waiting area to radiography suite, located in the basement of a NE hospital*

*\*patients often have to wait here for hours at a time waiting for a treatment slot, especially if there is a fault with the radio-therapy machine.*

***“Health is a state of optimal, physical, mental and social well-being, and not just merely the absence of disease and infirmity”***

(World Health Organisation 2012).

## 10. Research Questions

The research questions have been formulated from the competition design brief and better articulated through undertaking a literature review and engaging in phenomenological research with building users and staff at the Newcastle Maggie Centre.



Fig. 13\_ Use of natural light Newcastle Maggie Centre

- 1.** How can the design proposal help encourage an active and social community to improve user well being?
  - 2.** How can the design proposal preserve and enhance the place making qualities of square?
  - 3.** What methods can be employed (both natural and man made) so that facility minimises pollution, and helps to create a localised clean air environment for the building users?
  - 4.** How can the architectural qualities within the scheme improve the well being of the users of the facility?
-



## 11. Research Methods



Fig. 14\_ Natural materials in  
Newcastle Maggie Centre

This research project is a case study that utilises mixed methods. The methods have been used in combination to be able to answer the question that have been derived from the design brief.

- Inscriptive methods, including: site analysis and surveys to establish site measurements, and the physical and environmental conditions of the site.
- Secondary analysis of papers, report, books, exhibitions and building precedents on topics related to the research questions
- Phenomenological research through interviewing patients about their *lived experience* and perceptions of medical environments.
- Computer and physical modelling, and drawing, (in combination) used to develop and test design solutions.



### Taxonomy

- Conceptual design iterations
- Drawing
- Model-making
- Construction methods
- Spatial analysis
- Participatory activities
- Text-based research
- Phenomenology
- Theoretical research
- Fieldwork
- Photography
- Topographic survey
- Design research
- Trial and error experimental design processes
- Design-led research
- Historical research
- Typology research
- User experience
- Diagramming
- Interviews/user consultation
- Scale modelling
- Digital fabrication methods
- Site analysis/study
- Visiting similar building types



## 12. Question 1

How can the Maggie Centre concept be expanded to help facilitate an active and social community to improve user well-being?

### Method

Secondary analysis of papers, report, books, exhibitions and building precedents, on topics related to the research questions.

Phenomenological and participatory research through interviewing patients about their lived experience and perceptions of medical environments.

A literature review was undertaken on the research regarding Maggie Centres. We also reviewed literature on the support and care of cancer patients both in the UK and abroad. This gave the research team a better insight into the Maggie Centre concept and an understanding of the issues and shortcoming of the care and support of cancer patients.

We engaged in phenomenological-type research by visiting a number of support facilities, including Maggie Centres, Dundee, Edinburgh, Cheltenham and Newcastle. Due to its proximity, the research team visited the Newcastle Maggie Centre on several occasions, and met with the centre manager, Karen Verril, who was happy for one of the research team (Adam Graham) to interview her regarding the Maggie Centre concept and the facility that she managed. She is an advocate of the Maggie movement, but gave us some useful insights as to how the concept could perhaps be expanded, particularly in relation to increasing the type and diversity of activity offered. We were also introduced to users of the centre, who were happy to be interviewed; in total we spoke to 15 users.

The interview with patients focused on the following questions:

1. Why do you come to the centre?
2. What role do Maggie Centres play in your journey through cancer?
3. What do you think of the physical environment, the architecture etc. Is this aspect of the facility important to you?
4. Is there any additional services/activities that a Maggie centre could offer to improve the facility?

\* the literature review and the phenomenological research was useful in exploring other research questions, but is presented here in more detail to avoid duplication.

### Opportunities borne out of the literature review in relation to Question 1.

The literature review highlighted some interesting themes that could be explored around this research question. New thought suggests that cancer treatment has to be considered holistically and move beyond medicine. Cancer recovery and extension of life requires effective medicine in the first instance, but also recognition of the patient's well-being, their outlook, stress levels and physical and mental fitness, Moore et al (2016). Related to this is an interesting report from Macmillan that questioned current practice regarding advice to cancer patients. Professor Jane Maher, the Chief Medical Officer for Macmillan, argues that we must bust the myth that patients should rest up during cancer treatment. This anachronistic advice often results in patients becoming detached and drifting into depression and anxiety that can have a significantly adverse effect on their response to treatment. Exercise, interaction with others, hobbies, communal activities, and even continuing to work can significantly improve recovery, reducing impact on cancer treatment. The amount of pain relief required, and the physical side-effects, such as bone thinning, muscle wastage and heart damage are also reduced, Nielson et al (2017). Exercise is known to significantly improve mood and reduces depression and anxiety, Nabkasorn et al (2006). The literature review of journal papers and books that refer to clinical studies on exercise and physical and mental well-being reinforces Maher's assertion. (see bibliography and references section)



nobody could object to patient-centred, high-quality architecture and design within the healthcare sector- that Maggie Centres undoubtedly provide- there is concern that their focus on support and advice perhaps, unintentionally, fixates patients on their illness, creating an all-encompassing pastime that is difficult to escape from. Critics suggest that Maggie Centres should instead concentrate on establishing *purpose* (other than the purpose of fighting cancer) focusing on the aspects of life outside the condition, to improve the quality of life and patient outlook. This position was supported by a number of the users of the Maggie Centres that were interviewed who said that they really enjoyed the activities put on at the centre, but that the layout and scale of the building prevented a more extensive and diverse programme of activities. Perhaps more focus on activities and exercise would appeal to men, who currently only account for 25% of the building users as they tended to gravitate to more task-based activities (Verril ,2015)

A literature review on exercise, for instance, and cancer revealed that it reduces the likelihood of the disease returning; and the side-effects of the treatment. It can also speed up recovery after treatment. At least 20 studies referred to in the literature review suggest that people with breast, colorectal, prostate, ovarian and lung cancer that do regular physical exercise reduce their risk of cancers returning by up to 30%; these studies are available in the references section.

Despite an overwhelming appreciation of Maggie Centres by users, and society in general, they have received some criticism in recent years by a number of commentators, including sociologist and medics. Fitzpatrick (2006) argues that while

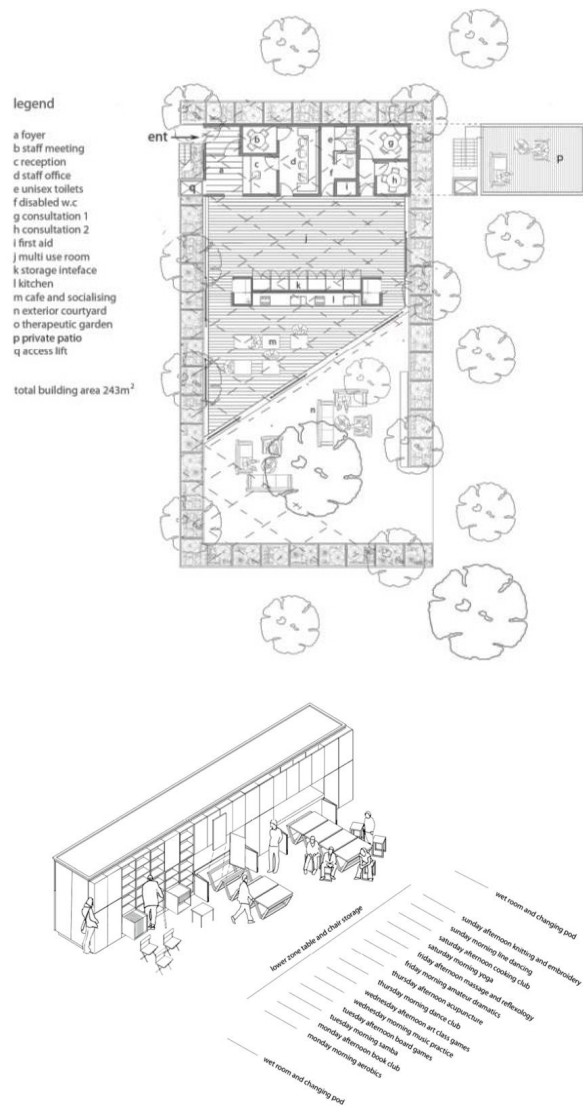


Fig. 15\_ Plan of facility and axonometric of storage unit

Exercise does not have to be highly aerobic; indeed, with some cancers it should be avoided, especially during treatment. However, it is recommended that all sufferers should do gentle exercise for at least 30 mins/day, such as dancing or walking- assuming they are well enough. More strenuous exercise is encouraged if the patient is fit and capable. Only 20% of cancer patients recognize the value of exercise in their treatment and recovery (Keum, et al 2016).

### The proposition

Based on the research undertaken, the competition entry looked to expand the concept of the Maggie Centre by focusing on developing an active community. We proposed a multi-functional space, as well as the maintaining the essential traditional functions of these facilities, including consultation rooms and a café space. A sizeable portion of the building footprint was taken up by the multi-use space that facilitated activities. We proposed a purpose-built, fixed furniture unit as a storage interface; to enable the running of as many activities as possible. The lower units house tables and chairs in stacking units and fold-out equipment, as well as heavy items such as amplifiers and speakers for music and entertainment. The upper units belong to clubs set up by the patients. These are also on draw systems for easy access. There are changing cubicles and shower facilities at each end. A notional weekly timetable of activities is set out on the lower left-hand image.



Fig. 16\_ older people  
working on community  
garden

### External space

The brief did not ask for a garden, but we felt that although the square provided space and was an *aesthetic* amenity, it was unlikely to bring people together and it did not belong to the centre. A garden as a community resource had more potential. Soga et al (2017) argues that during difficult personal circumstances, such as cancer diagnosis and treatment, a situation can be mitigated through the act of gardening- also leading to social interaction and common purpose. Stress is reduced through gardening by breaking the concentration/fixation, with the illness.

### The garden

As well as having a therapeutic and environmental value, the garden is seen as a fundamental component in developing a social and active community at the facility. Gardening, especially through using raised planters, is a low impact activity. We thought that the garden could be a form of *eco-therapy* as an intervention that improves mental and physical health and general wellbeing by supporting people to be active outdoors. According to Soga et al (2017), spending time working gently in a garden environment with friends, or sitting absorbing the tranquility of nature, goes part way to taking back some of the control when going through cancer treatment- and in helping to create something beautiful or delicious, or by making the world a better place.

***“observing nature and participating in physical activity in green spaces play an important role in positively influencing human health and wellbeing”***

*Pretty et al (2011)*





Blood Root

Research has shown consistent anti-neoplastic activity when taken as an herbal remedy; it is excellent in tea and soothing for lung bleeding, common in lung cancers



Dang-Seng Root

Increases levels of red blood cells and is extremely helpful to patients undergoing chemo-therapy



Milk Thistle

Has been shown to be capable of protecting the liver during chemotherapy. Taken in tea research has shown that it reduces the side-effects of cancer treatment.



Chaparrel

Boost the immune system and research suggest that it can reduce metastases. It is a very powerful anti-oxidant and is anti-microbial



Echinacea

Another immune booster very effective in tea. Used since ancient times for its healing properties



Peppermint

Ingested in tea, it is particularly effective in opening airways for lung cancer patients and is very calming for the stomach reducing the side effects of chemo



Wheatgrass

One shot gives more chlorophyll than 12 kilos of broccoli. It cleans the blood and cleanses kidney and the liver which are damaged during chemo.



Feverfew

In trials it has been seen to be more effective at killing cancer cells than some established cancer drugs. It is very effective in tea and reduces the effects of chemo.



Cat's Claw

Used in teas and other herbal remedies it cleanses and aids healthy tissue regeneration. It helps normalise damaged cells and tissues.



Astragalus

A powerful immune system to be used in tea, enhances white cell clean-up process (phagocytosis). Also reduces the effects of chemotherapy.

## Therapeutic Garden- developing active community

Gardening is recognised as an important activity in fostering community spirit, especially when it becomes a project for the common good. As part of the garden the researchers suggested a therapeutic section where certain plants could be grown by the building users that can be incorporated into teas and juices. These plants are known to boost patients' immune system, increase their energy levels (by oxygenating the blood) and for their calming quality (both mental and to relieve the physical symptoms of cancer treatment) and perhaps most important can reduce the cancer from returning. A number of papers in the literature review highlighted the value of juices and infusions for helping with cancer therapies. Importantly, they are not known to compromise or react with cancer treatment. The plants were also chosen for the Polish climate. In discussion with the Newcastle Maggie Centre Manager, Karen Verrill, she welcomed this type of initiative believing that there are multiple benefits in terms of exercise and building *community spirit* through developing a sense of focus. She also thought that a project to grow therapeutic plants would receive special attention from the participants, as they often demonstrate more commitment to projects that were for the common good. ▣

## 13. Question 2

How can the new facility preserve and enhance the place making qualities of square?

### Method

Inscriptive methods, including site analysis and surveys to establish site measurements, and the physical and environmental conditions of the site.

Secondary analysis of papers, report, books, exhibitions and building precedents on topics related to the research questions.

Computer and physical modelling, and drawing, (in combination) used to develop and test design solutions.

The research team used three methods in combination to explore the notion of place. The principal method adopted was secondary analysis of text in relation to place, where we referred to the writing on place-making by authors such as, Duany, Trancik, Norberg Schulz, Jan Gehl and Jane Jacobs. We also referred to a number of academic journals concerned with place. From this reading, attitudes were developed as to how best to integrate the building into an historic square and use the facility to build the place characteristics. The other methods referred to were used as part of the design process to generate design concepts and test the proposals on the site.

Place-making is fundamental to good cities. Places are for people; they are dynamic environments that grows and transform lived experience, Proshansky (1976). Fundamentally, a place represents a bond between people and their landscapes, as a result of them being sociable, accessible and engaging environments to inhabit. People want to visit places, because they have identity, and offer up things to do; they are comfortable, clean and used, Auge (1992). People can meet up with friends and family, and while away the day watching the world go-by. There is formed through a strong and profound relationship between buildings and spaces.

Non-places, by way of contrast, have no attachment to human beings. Negative externalities within the environments, such as pollution, noise, speed, anti-social behaviour, etc. disrupt peoples' experience of location. They force the public to move on, in search of more amenable environments.

### The approach to place

A principal concern of the research project is to develop the place characteristics of the facility, as

it contributes to the city and also as a facility. Our strategy aim was to develop a sense of place through:

- developing opportunities for user-interaction (discussed in Q1);
- connecting the facility to the square and the city;
- maintaining and enhancing the place characteristics that already exist, especially green infra-structure.





Fig. 17\_ Perspective of courtyard space, and street view

### Developing place-making for the project

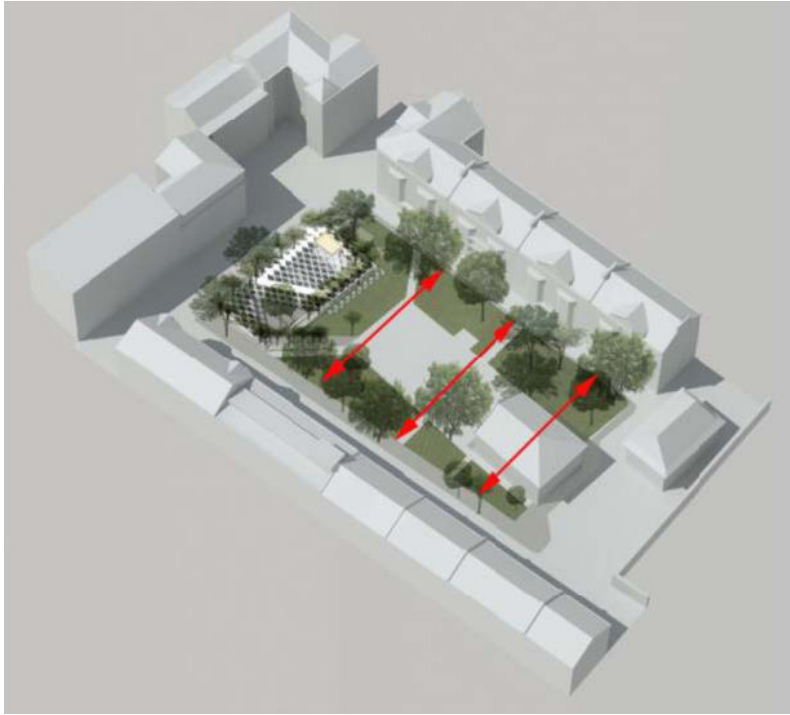
Trancik (1986) argues that a locality only becomes a place when it is given contextual meaning i.e. when it is derived from cultural or regional identity; when they become an extension of the community. Developing identity requires a sense of ownership of buildings and external spaces. Medical buildings are more likely to be classified as non-places, as there is no place-identity; they are regarded as alien to people. Few patients would wish to stay in hospitals if staying at home is a feasible option, Nuffield Research (2017).

The square is currently used by the residents of Krakow, but the competition organisers suggest that it was more of an aesthetic space, than a place-as it not particularly used as a community asset. A fundamental strategy for the scheme, therefore, was to develop it for the community through the facility, forming a relationship with the square. This was done by allowing the interior of the building to open up with use of sliding screens, so that the activities could spill out onto the square, especially in the summer months. Special events for fundraising and community gatherings could enliven the square. This strategy also responded to the brief which asked for the facility to be inclusive and not just be a destination for people who are ill, but open to family and friends and the extended support structure.

The buildings that often fail to establish place-making qualities are not active on the ground floor, Duany (2013). Instead they form a barrier with no potential to animate associated external spaces such as a street or a square. Visual and physical accessibility is essential for a *place* to develop, both through buildings and space between them. It is proposed that the facility be open throughout the day and also in the evenings to cater for those people who continue to work while

undergoing their cancer treatment. Even where the building is forced to close down to the street (see fig 17), we looked to at least enable people to see what was going on inside. This approach is in line with one of the Maggie Centre design principles, which looks to break the stigma associated with cancer. Blinds are integrated into the window units for when the building users needed a degree of privacy.

To further enhance the place-making qualities, the research team proposed opening up the garden to the public, centred around an existing mature oak tree. The building forms a mini-square that acts as a intermediary between the interior of the facility and the main square. Whoolley (2003) argues that place-making and urban quality depends on the creation and protection of green spaces in cities for amenity and recreation. Maintaining the greenery within the square was an important design constraint, as the research team recognises its role in place- identity. It is universally accepted that we need contact with nature in our daily lives, and that it is certainly improves our quality of life, particularly in urban areas. This is reflected in a significant uplift in house prices for houses located next to urban parks.



*Fig. 18\_ Showing unimpeded movement across site and facility located on short side of the square*

A number of other winning entries- despite having design merit- were potentially compromising to the place-characteristics of the square, by removing important existing vegetation and also reducing the square's usability. A number located the building centrally and thus disturbed existing desire-lines and established routes across the square and important green space for recreation. Our proposal was placed on the short western-edge of the square and this enable us to incorporate a mature tree, which formed the centre piece of the garden. This approach minimised the impact of the building on the existing infra-structure. It follows Behrens and Watson (date) assertion that the structuring of public places in a system of hierarchy and legibility is critical for place-making to occur.

Significant natural features are recognised as an important component of place-making, especially when the public have formed attachments with this nature. The square is surrounded by buildings where people work and live. Fundamental to the quality of the square are the trees and shrubs. It is recognised that removing significant fauna from the city can reduce peoples' place-attachment, Jen Gehl (2010). Our scheme actively looks to enhance the greenery within the square. Therefore, any trees that had to be removed would be replaced, as well as additional trees being planted. We also recognised that because the square is flanked with tall buildings, the roof of our building would be visually important, in effect it acts as a fifth elevation. A large uninteresting roof in place of greenspace would compromise the square, particularly having a negative impact on the view. We conceptualised the roof as a device that would enable trees to grow through it at the perimeter, and due to its construction, it would be semi-permeable. Fig 18 shows the buildings location how it maximises the square useability. ■

## 14. Question 3

What methods can be employed (both natural and man made) so that the facility minimises pollution, and helps to create a localised clean air environment for the building users?

### Method

Secondary analysis of papers, report, books, exhibitions and building precedents on topics related to the research questions.



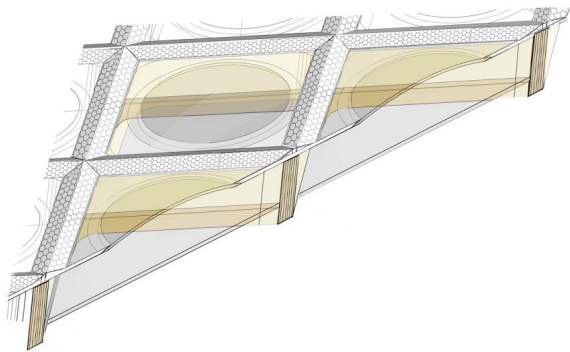
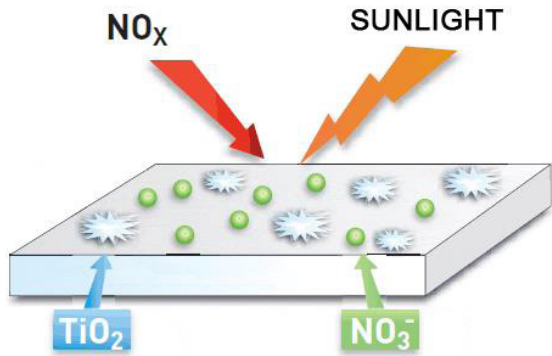


Fig. 19\_ Turning poisonous nitrous oxide to harmless nitrates

Fig. 20\_ Showing purac pillows

Krakow's air pollution is amongst the worst in the western world; a principal concern of the competition organisers was to produce a sustainable building that was non-polluting and helped to ameliorate the problem of pollution at a local level around the facility. The research team undertook a literature review of natural and manmade technologies used in building applications that could be used to reduce the amount of pollution, both within the building and locally. This is a small building and could only affect a limited improvement in air-quality; however, the competition organisers saw this building, if built, as an opportunity to speculate a number of solutions that could be used in other building projects.

Increasingly, building materials are being developed to absorb pollutants from the air, particularly those that sequester carbon dioxide and other greenhouse gases. Here, the design team focused on the benefits of titanium oxide (TiO<sub>2</sub>) as a potential to remove carcinogenic pollutants from the atmosphere. This chemical is very versatile, acting as a photo-catalyst that can be used in plastics, paints and ceramics. When exposed to UV light, TiO<sub>2</sub> accelerates the breakdown of smog polluting gases, such as NO<sub>2</sub> and SO<sub>2</sub> (see fig. 19). 100m<sup>2</sup> of roof tiles coated in an inexpensive TiO<sub>2</sub> lacquer will remove as much NO<sub>2</sub> as a car produces per 20000 Km, (Folli et al 2014). We decided to use it externally, integrated into ceramic tiles. The non-glazed walls, both internally and externally, are clad in either tiles or painted with TiO<sub>2</sub> paint.

The roof is a lightweight insulated construction using filched glulam beams on a circular column section. In between are insulated pillowed lightwells comprising an outer and inner skin of 3mm PURAC bioplastics. The design team researched alternatives to ETFE which is material often used for

inflatable pillow structures. ETFE is a fluorine-based plastic- which is generally regarded as a non-polluting substance. It is, however, environmentally damaging in its production. PURAC is a polymer substitute derived from fermenting carbohydrates (principally soya beans). It is non-polluting and bio-degradable when treated in an industrial composting plant once removed from the building when it is at the end of its useful life (see fig 20).

### Natural solutions

The design team also proposed natural methods to reduce pollution in an around the facility, in combination with manmade solutions, as described. A principal design strategy was to explore mechanisms to avoid removing existing trees on the square, while introducing new trees as pollution absorbers. A number of the winning entries removed mature trees through their choice of building location. Our design solution was to plot the existing fauna on the site and position the building accordingly. One reason for designing the lattice roof was to enable trees to grow through the structure and be incorporated as building components; working in effect as part of the building facades. Our research suggested that the Silver Birch was the best at absorbing pollution. A tree with a trunk with a diameter of 15cm removes approximately 30Kgs of noxious gases, associated with respiratory diseases, such as Nitrogen Oxide (NO<sub>2</sub>) or Sulphur Dioxide (SO<sub>2</sub>), Summers (2013). This is without any apparent negative effect on the tree. Moreover, they also remove larger particulates, which are even more damaging to human health. These particles measure 2.5 uM (PM<sub>2.5</sub>) to 10uM (PM<sub>10</sub>) and are small enough to penetrate deep into the lungs causing asthma and other health conditions such as lung cancer. The birch tree captures these particles on its fine hairs that project from its leaves. A study



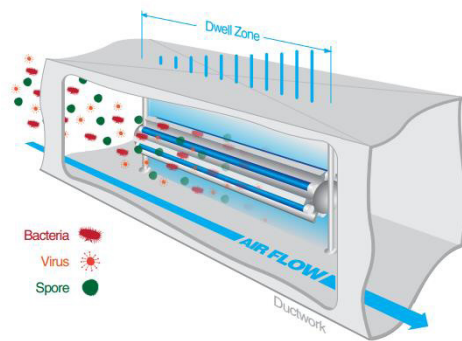
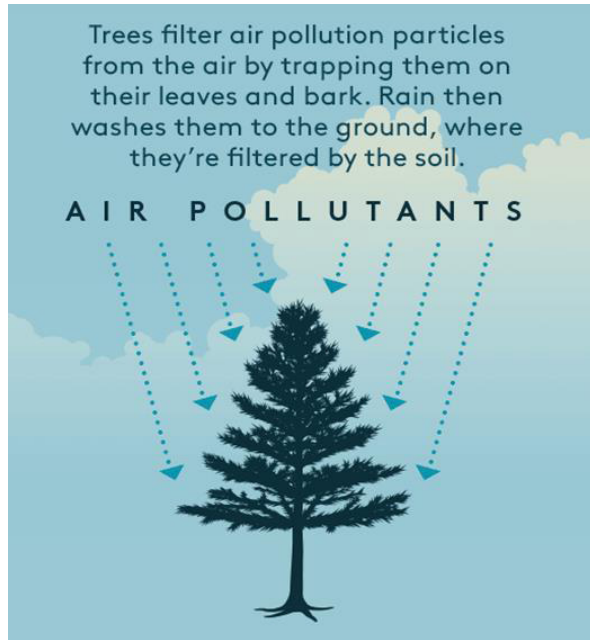


Fig. 21\_ Showing plasma screening system for pathogens

from Lancaster University showed that if the area of the trees canopy is equal to the area of the building (if they are in proximity to it) will reduce the amount of particles in the air by 50%, in effect creating a clean air zone around the building.

The positioning of the building on the site was in part decided through mapping the movement of the sun, using REVIT to see its effects on internal temperatures. The existing trees were used for solar shading and we proposed the introduction of new trees along the perimeter of the building to help keep the building cool. In the summer months this would facilitate a 40% heat reduction. The existing trees could be best utilised on the short side of the square along with the birch trees introduced as pollution absorbers.

**Clean internal air**

Poor internal environmental conditions- particularly in deep-plan facilities that utilise mechanical ventilation and artificial lighting, in lieu of natural air and daylight- are very common in medical buildings, particularly in Poland. When combined with synthetic materials and finishes- chiefly specified for ease of cleaning maintenance and cost (e.g. vinyl coverings and polystyrene ceiling tiles), the internal environments can compromise the health of building users. Pollutants from these materials, and their associated cleaning products, can linger in unventilated zones, inhaled by the patients and staff causing symptoms such as: headaches, irritation of the eyes, nose, and throat, skin diseases, fatigue, dizziness and nausea. The research team are committed to a natural palette of materials, avoiding finishes with volatile organic compounds (VOCs) that breakdown over time, releasing dangerous pollutants into the internal environment. In the winter months, when the windows are likely to be closed, a heat recovery unit

system is proposed that will ensure clean fresh air into each room, while minimising heat loss. The research team have sourced an additional safeguard to the system by proposing a plasma screening system incorporated into the HRU (see fig 21). The Plasma kills all pathogens; this innovative technology is particularly important to protect the building users that may have compromised immune systems through their cancer treatment.



## 15. Question 4

How can the architectural qualities of the building enhance the well-being of the users of the facility?

### Method

Secondary analysis of papers, report, books, exhibitions and building precedents on topics related to the research questions.

Computer and physical modelling, and drawing, (in combination) used to develop and test design solutions.

Phenomenological research through interviewing patients about their lived experience and perceptions of medical environments.

This building is extremely simple, and only 250m<sup>2</sup>, in accordance with the Maggie Centre brief. Despite its modest scale and simple programme, the research team looked to use the architecture to maximise well-being, through the devices and building components at their disposal. Initially, a comprehensive literature review was conducted, searching for rigorous empirical studies that link the design of medical environments with healthcare outcomes. This review found a growing body of evidence- including randomized controlled trials- to support the power of the medical environment in patient wellbeing and recovery. It is now widely recognized that well-designed physical settings play an important role in making hospitals less stressful; they promote healing for patients and provide better places for staff to work. We concentrated on secondary data that had scientific merit and resisted reliance on intuition, as this is often a criticism directed at designers. If there was a chance of our scheme being built, then being able to refer to evidence-based design would be more likely to result in a commission, if asked to present at interview. We did, however, engage with some 'softer' phenomenological research to gain insights from the users of the Newcastle Maggie Centre; these insights proved very useful in tackling this research question.

### Research context to the question

Medical facilities are often criticised for being alien and unfamiliar environments for patients, invariably lacking windows, daylight, visual stimuli, legibility and a human scale. Hospitals tend to operate metaphorically as *medical factories*, where patients are treated like machines that need to be fixed, Sternberg (2004); Ulrich (1984). They are not holistically regarded as environments for wellbeing to positively aid recovery, Ruga (1989); Sternberg (2009);

Ulrich, (1984,2004). They are driven by a reductionist worldview of eliminating infection as a primary driver, coupled with operational efficiencies in the performance of medical staff and the protection of expensive equipment, Patterson (2017); Sternberg (2009) Ulrich 1984). Experientially, the size and layout of such facilities can be unfamiliar, Unsettling and disorienting. Environmental psychologists argue that humans are genetically conditioned to treat such unfamiliar situations with caution, leading to an increase in stress hormones, blood pressure and heart rate, Hidayetoglu et al, (2017). This stress compromises the patients' ability to recover, affecting wound healing and are often compounded by the visual appearance of hospitals, which elicits foreboding in some patients and visitors. A deficit of visual stimulation, patient autonomy, or connection to the natural diurnal rhythms of the day can result from a process-driven clinical approach to healing environments (see fig 22), Sternberg, (2009).

We recognise that this is not a hospital, although support facilities and hospitals are often handled architecturally in the same way. Indeed, they are almost always located within hospitals buildings. One of Maggie Jenck's principal ambitions was to take cancer support facilities out of hospitals, because she saw the support and medical environments as being fundamentally different. The research team reflected on the findings of the literature review when considering this question.





Fig. 22\_ Hermetically sealed,  
artificially light hospital ward



Fig. 23\_ Beautiful viewed  
favoured by Hippocrates as part  
of the healing process

### The importance of the environment

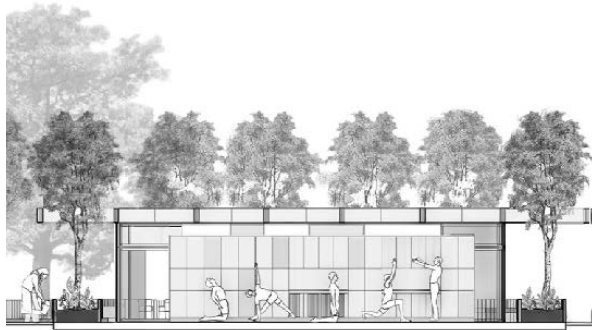
There is nothing new in considering the environment in the treatment of patients; however, in a targets-driven culture this approach bears re-affirmation. Around 400 B.C., Hippocrates was using the environment as a fundamental part of the healing process. He suggested certain types of environments as medicine; his documented methods of healing advocated soothing places for recovery to put the mind and body in a state of calmness, complemented by contact with nature, particularly the sun and fresh air. He also championed mental stimulation via enriching views of the landscapes (see fig 23).

The research team are not diminishing the importance of medical intervention; this aspect of care is of primary importance- we argue that medicine and the environment are not dichotomous. Increasingly, theorists are advocating the environment as a support to medicine. Modern commentators, such as Sternberg (2009) and Ulrich (2004), are standard bearers for the power of the environment for healing. An alternative approach supported by the literature review, suggests that the connection to the outside world through large windows; access to nature through therapeutic gardens and roof top terraces; natural materials; light and airy; and naturally ventilated spaces, are fundamentally important to wellbeing and recovery. This has been supported by medical trials undertaken by Ulrich as far back as the 1980s that show an uplifting view of a natural scene from a patients' bed reduces the need for pain relief and speeds up recovery. This is in sharp contrast to looking across a ward or out of a window onto a manmade scene. The Maggie Centre movement argues that their facilities are important as part of recovery through their emphasis on well-being.

There were aspects of the Newcastle Maggie Centre that were not so positively received especially the use of raw concrete internally:

*'The concrete was a surprise- it seemed very masculine and foreboding. Some parts are out of character'. (anon.user)*

The positives that were mentioned by the users about the centre concerned the *'...quality of light'* and the *'...use of natural materials'*. Several wished for a better view with more contact to nature, but as Maggie Centres reside in the hospital precinct this was not possible. We took this feedback and criticism on board and looked to develop a facility that maximised natural light utilising a contemporary and natural material palette. Being within a square with plenty of greenspace, we opened the facility to maximise the contact to nature. This project deviated



from the Maggie model as it was not located in the hospital grounds but adjacent in the square.

### Natural Light

We started with the roof as a unifying element that enable us to integrate nature (discussed in question 2) and to allow a diffused natural light into the facility. Natural light affects human beings both psychologically and physiologically, Ruga (1989). Several studies have illustrated the significance of light in alleviating depression, reducing fatigue, increasing alertness and re-establishing natural rhythms, Ulrich et al (2004); Boute et al (2014); Bernhofer et al (2014). All of the above are essential for cancer patients. Two significant studies have shown that exposure to natural bright light, extremely effective in reducing depression, Beauchemin &Hays, 1996; Benedetti et al, 2001. We therefore used our (Revit) computer model to develop the roof to maximise the natural light, but without glare, particularly into the centre of the plan. Light from above is three times stronger than from the side. The purac cushions in the roof creates a softened light. Each skin allows 60% of available light through, our computer model available light through (see fig.24), our computer model demonstrated a lighting level in the region of 2000 lux, this combined light from above and from the side; an overcast sky is approx. 4-5000 lux. Wide overhangs prevented glare and overheating.

Fig. 24\_ Lattice roof for ventilation and natural lighting



### Contact to Nature

Our research suggested that patients with overwhelming conditions such as cancer, need to be distracted, finding activities that take them away from the condition. Our research suggests that the most successful positive distractions are those that have been important for millions of years. Contact with nature, task-based activities, finding fulfilment and happiness. Contact to nature has been recognized as being fundamental to well-being, Honeyman, (1975). Ulrich (2004), makes the point that the reason why nature has a de-stressing capacity is because it resides in our evolutionary history. Ancient man viewed fertile nature as potential for food and water; physical nourishment (over-time) became mental nourishment through association. Accordingly, modern humans may be predisposed to restorative natural landscapes, while having a negative response to manmade, psychologically hard landscapes. In clinical trials it was shown that contact with nature reduced participants' blood pressure and heart rate, Ulrich and Simons (1986).

It has been accepted for several decades, through recording brain electrical activity and heart rate, that views and connection with nature puts the body and mind in a more relaxed state, than views of urban environments, Kaplan and Kaplan (1989). An influential study from Ulrich (2001) showed that contact with nature reduced the need for drugs for pain relief. Such is its power as a de-stressor that trials by Heerwagon (1990), showed a marked improvement in patient relaxation when there was a mural of a natural scene in a waiting area of a hospital versus a blank wall. Windowless environments are particularly damaging for well-being (Collins, 1975), even for short periods and can lead to anxiety and panic attacks. We recognise that, unlike hospitals,

users of the building can vote with their feet and leave if the environment is not conducive. But with healthcare buildings- especially support facilities that are often located in the depth of a hospital plan with little or no access to nature or natural light- can trigger the sub-conscious, affecting well-being, Sternberg (2010).

The design of the facility looked where possible to open it up to nature; this is in part discussed in Q1 and Q2. We have looked to integrate nature into the façade system and used sliding doors to open the facility onto the square and the garden. We also made provision for a roof garden for more private contemplation, see fig. This was deliberately located amongst the canopy of the trees, partly for seclusion but to also surround the user with nature.

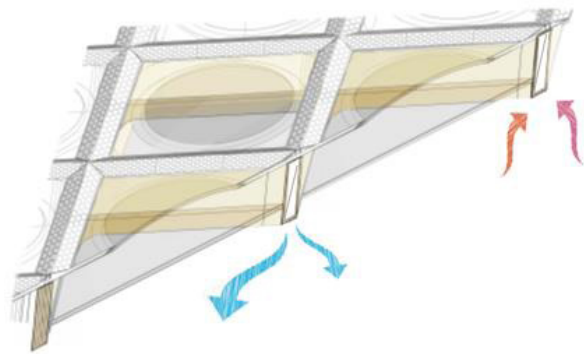


Fig. 25\_ Diagram showing use of hollow steel sections at perimeter used to intake stale air and replace with pre-warmed fresh air by use of heat recovery unit.

### Natural Ventilation

There are numerous studies about poor air quality and its effects on well-being in healthcare buildings, (Sundell (2004); Atkinson et al (2009); Seaton et al (1995); Daisey et al (2003). Good ventilation was particularly important for this facility as this was listed as a key driver of the competition organisers. According to the literature and the feedback from the building users, natural ventilation within the healthcare environment is considered far more preferable than mechanical ventilation. Air conditioning continues to be routinely specified in hospitals and other medical buildings, Drahota et al (2012). In recent years, however, views have changed-it has been criticized for spreading disease, and its contribution to *sick building syndrome* and energy inefficiencies. User autonomy is increasingly being regarded as important; the scheme as proposed looked to facilitate natural ventilation throughout, again by use the roof, (see fig 25) and the sliding doors that comprise the facades. In the winter when the building needs to be closed due to low temperatures externally there is a heat-recovery system that operates through the roof (see Q2).

### Natural Materials

The importance of natural materials in terms of air quality has already been discussed in Q2; however, they are also important for their association to nature. In the discussions with the building users at the Newcastle Maggie Centre, there was universal appreciation of the use of natural materials in the centre and a belief expressed that hospitals should use a natural palette. The users couldn't always articulate why they liked natural materials, although they describe them as calming, reassuring, familiar and even homely. The research team incorporated birch faced ply on many of the surfaces, both roof and walls

throughout the building, recognising its softness. This was contrasted with white walls decorated with paint incorporating titanium oxide (discussed in Q2). The floor was finished in linoleum, which is derived from linseed oil. ■

## 16. Dissemination

The project has been extensively disseminated, with several principal architectural websites, including: Dezeen, Archdaily, Architizer, Pinterest, Bustler and Architecture room, all showcasing the winning entries. The project is still available on many of the above, several years after the competition announcement. The competition organiser advised the research team that our entry had been viewed 8000 times from their website alone, and the combined dissemination numbers from the other website that they have advertising contracts is in the region of 50000 views through these agencies providing alerts and sending out emails to subscribers as news bulletins. The coverage was truly global.





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## 18. Illustrations

Fig. 01 \_Concept sketch of facility

Fig. 02 PI after presentation Barbados Government, Civatech and Project-C\_

Fig. 03 View of health tourism facility Designed by Jones at Harrison Point Barbados for Barbados Government\_

Fig.04 Bradley Lowery as a mascot with ex-Sunderland professional footballer Jermaine Defo

Fig. 05 Design for Bradley Lowery has utilising ideas of wellbeing developed in Maggie Centre Competition\_

Fig. 06 Visit to Edinburgh Maggie Centre \_

Fig. 07 The clean air approach taken in the competition being developed for the Bradley Lowery House.\_

Fig. 08 Aerial view of site

Fig. 09 View into square

Fig. 10 Newcastle Maggie Centre\_

Fig. 11 Aspirational interior of Newcastle Maggie Centre

Fig. 12 Very poor-quality waiting area to radiography suite, located in the basement of a NE hospital

Fig. 13 Use of Natural light Newcastle Maggie Centre

Fig.14 \_Natural materials in Newcastle Maggie Centre

Fig.15 Plan of facility and axonometric of storage unit\_

Fig.16 Older people working on community garden\_

Fig.17 perspective of courtyard space, and street view\_

Fig.18 \_Showing unimpeded movement across site and facility located on short side of the square

Fig.19 Turning poisonous nitrous oxide to harmless nitrates \_

Fig.20 Showing purac pillows\_

Fig.21 Showing plasma screening system for pathogens\_

Fig.22 Hermetically sealed, artificially light hospital ward\_

Fig.23 \_Beautiful viewed favoured by Hippocrates as part of the healing process

Fig.24 Lattice roof for ventilation and natural lighting\_

Fig.25 Diagram showing perimeter intakes of stale air to replace with pre-warmed fresh air from HRU