Institution:
Leeds Metropolitan University

Unit of Assessment:
16: Architecture, Built Environment and Planning

a. Context

Research in Unit 16 at Leeds Metropolitan University is organised through research centres (clustering groups of subject based academic staff) that focus on providing high quality research activity and outputs across a range of disciplinary areas. Research centres support the work of the following subject groups – *Architecture and Landscape Architecture, Civil Engineering and Construction Management Planning, Housing and Human Geography, and Surveying* - with research linked closely to industry through partnerships and professionally supported activities. These centres are: *Centre for Built Environment (CeBe)* and the *Civil Engineering Research Facility (CERF)* and the *Centre for Urban Development and Environmental Managment (CUDEM – planning and human geography)*. The strength of the Unit has been recognised by the University, resulting in a strategic decision to form the *Leeds Sustainability Institute* in early 2012 (under the directorship of Gorse) to further support the work of these centres.

The research undertaken in the Unit is focused on *the production of pure and applied knowledge that contributes to the creation and management of a sustainable built environment*. The specific focus of our activities is on low carbon housing, sustainable water supplies and construction materials for the developing world, construction industry knowledge exchange and spatial planning policy. The research work that underpins this is of national and international standing. For example, peer review grades of 'tending to internationally leading' for 'research planning and practice' and tending to outstanding for both 'quality of training and experience' and 'potential benefits to society' have recently been obtained from EPSRC. As such, the unit has a portfolio of research with strong impact, with projects being undertaken in partnership with industry, local and national governments, the European Union, research charities and academics in other higher education and research organisations.

The impacts of the Unit's research stretch across the subject and spatial reach of the built environment disciplines, producing research focused on creating better and more research-informed and sustainable management of spaces and places. Our focus on the production and maintenance of more sustainable built environments is both policy leading and practice guiding (for example low carbon housing research, sustainable urban fringe research, and the commercial exploitation of patented geo-textile products) while its scale ranges from international to regional in orientation (water purification research in Africa; full scale building heat loss methodologies; thermal performance testing of dwellings; European spatial planning research; construction sector network activity, and building performance and public art strategy evaluation work). Our portfolio of research suggests that we have an evolving critical mass of activity, projects, researchers and outputs that places us in a strong position to proactively engage with research opportunities and lead research agendas. Moreover, with our emerging record we are establishing research leadership and competitive advantage in key areas of built environment research. For example, the last four revisions to part L of the Building Regulations 2002, 2006, 2010 and 2013 contained policy outcomes based on research undertaken within the Unit and is a direct result of 20 years of building performance research undertaken at Leeds Metropolitan University.

b. Approach to impact

A key aim of the Unit is to conduct research that underpins practice and policy development in the construction industry and wider built environment professions. As such, we have directed our research efforts towards a range of research and knowledge transfer projects, which attract significant industry, professional and user interest. To this end research is being undertaken in the areas of skills development, construction best practice, sustainability and teaching and learning. Through the successful capture of engagement grants (with funding from Yorkshire Forward) robust industry networks have been developed through the work of the Units *Centre for Knowledge Exchange* that allow research findings and best practice to be shared with sector professionals. Equally, research undertaken in CeBe (Bell, Gorse, Miles-Shenton, Stafford) on low carbon housing has involved collaborations with both academic and commercial partners such as UCL, Katholieke Universiteit Leuven, Ghent University and the Belgium Research Institute, National House Building Council, Building Research Institute, and EURISOL (European Mineral Fibre Trade Association). Policy analysis work undertaken in CUDEM on public art and regeneration (Strange)

has also involved extensive collaboration with the policy-making community, for example through the evaluation of the Northern Ways' public art programme as well as numerous evaluations for local authorities across the UK (for example with Edinburgh City Council, Kent County Council and Durham County Council). While work has also been undertaken with national arts organisations such as the Scottish Arts Council and The Arts Council, England.

The Unit's research is producing significant research-driven impacts that cover economic, social, policy and cultural domains. While some impacts are time-lagged and will only be apparent after the research is completed, others are more immediate. For example, our work has had impact through ***commercialising new products*** where a limited life geo-textile patent and the development of water purification system using indigenous plant extracts from Africa has been secured (Pritchard, Craven) (see below). This has meant bringing ***quality of life benefits*** to many by improving the quality of basic drinking water in Africa. Equally, our ***engagement with industry*** is strong through work with major utility and construction companies***.*** Our research is also contributing to ***better informed public policy making***, for example through providing evaluation studies of regional public art programmes and public art strategy development for local authorities (Strange); spatial plan analysis; green infrastructure analysis and evaluation (Thomas); and participation in high level national policy groups (for example those established by the Zero Carbon Hub, the Technology Strategy Board, DECC and CLG) (Bell, Gorse, Stafford). Our research is clearly characterised by a focus on ***sustainable development***. Whether that is through our contribution to low carbon economy research (by providing greater clarity of how residential homes and buildings perform in terms of their whole life environmental impact, fire resistance, and testing actual performance of building materials and systems in the field) or in providing policy analysis and evaluations on what constitutes sustainable communities, or through international construction and development work, our research is having impact. Through the *Leeds Sustainability Institute* we aim to signal and highlight the impact of our research within professional areas more widely. Institutionally we are helped in this process through the active dissemination of research via the Universities research repository; it also seeks a wider audience through news management. Frequent press releases to various media outlets generate local and national media interest in particular aspects of our work. We also publicise our work via the 'research showcase' page of our institutional website

The research-driven benefits of the Unit's research are extensive. For example, CERF's civil engineering's international development work in Malawi has helped develop cheaper and more sustainable ways of providing clean drinking water from village wells (Pritchard, Craven). Its work in this area has been supported by the Water Research Fund for Southern Africa (WARFSA) and WaterNET to undertake research and development towards meeting the 2015 Millennium Development Goals. This has involved working with people (villagers, chiefs & community leaders) in rural villages in Malawi over the past seven years. The impact has been highlighted in the JBM: 2010 Good Practice annual report: *"The research work being carried out is innovative and sustainable and will lead to measurable improvements in water quality that use low cost techniques and natural resources"*. Data from this work has recently been fed into a major publication, funded by the World Bank, which will be used to develop policy. CERF's UK based work has also led to the development of low cost, limited life geotextile products for use in road construction and civil engineering generally. The development of new forms of concrete and mortar that utilise soils from contaminated land sites, which have undergone thermal treatment, is also currently being investigated. The benefits in terms of environmental issues for the reuse of thermally desorbed soil (TDS) as a cement replacement are twofold; firstly by directly using a waste material as oppose to disposal to landfill; and secondly, more indirectly by using less cement.

Equally, the work undertaken by CeBe has had considerable impact in the development of low carbon housing (Bell, Miles-Shenton). The group has provided input directly as a member of the policy team for the last two Building Regulations Part L reviews (2002, 2006, 2010 and 2013). They have conducted some 6 major projects for the Department for Communities and Local Government in support of building regulations since 2003. Their work on the Stamford Brook project was able to measure robustly for the first time the extent of thermal bypassing in party walls, a mechanism that was not accounted for in energy modelling until this work was undertaken. The latest national standard is being modified on the strength of this research. The work of the group has identified the existence of a considerable gap between designed energy/carbon performance and that which exists in reality. Their research has demonstrated that the gap is not one that can be attributed to

use but is the result of design, modelling and construction failings at the systems level.

c. Strategy and plans

Our university has a clear mission to be a catalyst for social and economic progress in and for our region, nationally and internationally, through research and enterprise (Theme 3, Strategic plan – see http://www.leedsmet.ac.uk/strategicplan/Leeds-Metropolitan_Strategic-Plan_2010-2015.pdf for full details) and that mission is central to our work in Unit 16. To facilitate this, and future research impact, the research centres along with the Leeds Sustainability Institute, have a forward research plan designed to help map research growth that is both achievable and sustainable. These plans outline the key research objectives, the resources required, and the outcomes and outputs to be achieved. Our intention is to continue the upward trajectory of our research. We will pursue high quality planning and built environment research with quality outputs that underpins our core strategic aim to pursue work that contributes to the creation and management of a more sustainable built environment. In addition, our research will be designed to further enhance our external profile, reputation and impact through providing research support to the construction industry and built environment professions. The unit has placed significant investment into a range of research and consultancy projects which attract significant industry and professional interest. This is evidenced by the considerable amount of project work undertaken since 2008 for UK central government and UK based industry, totalling over £2,000,000. Researchers directly engage with end users, not only through project work but through their participation on professional advisory boards, panels and committees, including for example the Building Research Establishment and Chartered Institute of Building (Research and Innovation panel), the Construction Sector Network and the Royal Town Planning Institute.

As described in section (A), in 2012 the research work undertaken across the Unit was recognised as a key component of the University's research programme resulting in a decision to form a research institute (*Leeds Sustainability Institute*) as an umbrella home for the Unit's research activities. Further investment and research restructuring has increased the number of experts and capability within the sustainability and built environment field. The Institutes' research on low carbon housing and sustainability has drawn together expertise in *Sustainability: People and Places; Sustainable Infrastructure; Building Efficiency and Building Design; Sustainable Business Practice and Energy Generation.* The resultant critical mass has contributed to a drawing together of research and research users dramatically increasing the ability of the Unit to spread its reach and deepen the impact of its work. Through the research networks that the Institute brings together, researchers, business leaders, government bodies, professional associations and community groups are closely aligned and connected. In pursuit of our strategy we set ourselves the following strategic objectives: to continue the process of strengthening and improving the quality of the research outputs of individual staff members; to maintain a team of research active staff within each research centre and to use the Leeds Sustainability Institute as the vehicle through which research activity, outputs and impact is transmitted to our research partners, users and beneficiaries; to further develop the value (financial and academic) and range of external research income, with clear plans for dissemination of research projects and their impacts; to establish a strong 'community of researchers' and vibrant research environment; and, to continue to develop research collaborations nationally and internationally exploiting, in particular existing links with institutions and partners across Europe, in Africa and South East Asia.

d. Relationship to case studies

In selecting our case studies, we have tried to ensure that the range of work contained in the Unit is reflected. Our case studies demonstrate the differential scale and reach of the research undertaken within the Unit. As such, our case studies demonstrate a clear alignment and connection with our work, with their scale and reach ranging from global actions (*Reducing waterborne diseases from shallow wells in the developing world*), national policy development (*Improving the as-constructed energy performance of dwellings through building forensics*) and local and regional community interventions (*Public art, culture and the regeneration of place*). What unites them is their focus on the challenge of creating more sustainable places, communities and economies.