Institution: Middlesex University

Unit of Assessment: 17 Geography, Environmental Studies and Archaeology

a. Overview

Geographical and environmental research at Middlesex is rooted in three long-established research centres within the Natural Sciences Department, namely the *Flood Hazard Research Centre* (FHRC - founded in 1970), the *Urban Pollution Research Centre* (UPRC -1978), and the *Decision Analysis and Risk Management research* unit (DARM -1998). The formation of the School of Science and Technology (S&T) in 2012 co-located these three established research teams within one department to foster the further development of inter-disciplinary research.

The particular contribution of the studies presented here lies in combining theoretical, methodological, practice and policy-related research across a range of contexts: flood risk, water management, diffuse urban pollution, sustainable urban drainage, urban ecosystem services, urban design, and public health and safety risk research. Our high-impact water, environmental and public health management research is strongly transdisciplinary and applied, demonstrating a commitment to meeting the vital challenge of translating complex science from academic thought into professional practice.

A total of 20 (14.92 FTE) members of staff are returned here. Our submission demonstrates how we have developed our existing strengths based within these Centres since 2008 as well as extended into new and emerging areas. This assessment period has seen us continue to generate a consistently high level of competitive research funding from a range of national and international sources, to achieve income *per FTE* of £256k. Along with the production of high quality published outputs, we have developed our programme of research student recruitment during this assessment period, particularly through an increase in DProfs to complement the policy and practice oriented nature of much of our research. New and emerging research areas have been developed, including GIS-based decision-support tools and increased collaboration between UPRC and FHRC in relation to sustainable urban drainage, and these developments have seen us working alongside staff with environmental expertise in the Business School (Eisenchitz and Granger) and in the School of Law (Juntti).

b. Research strategy

The strategy set out in RAE2008, revised and refocused the respective research strategies of the FHRC, UPRC and DARM research centres around four common aims. These have provided the basis for strategic growth across this REF period and progress is evident as follows:

Aim 1: Extend research collaboration. This has been pursued through active networking activities with both academic and non-academic user communities in the UK and internationally. The renewal of EPSRC funded research for the Flood Risk Management Research Consortium (FRMRC phases1 and 2) permitted us to support and extend our UK risk flood communication research, in collaboration with over 17 other professional agencies and UK universities. We have worked with key UK agencies such as the Construction Industry Research and Information Association (CIRIA), the Environment Agency for England (EA), National Resources Wales (NRW), the Scottish Environmental Protection Agency (SEPA), Defra (Department for the Environment, Food and Rural Affairs), and several water companies and Local Authorities. Internationally, success is evident by our current involvement in eight different EC FP7 consortia, as well as other international consortia. The latter includes involvement in international outreach research by our Bangladesh staff (e.g. Sultana) including research funded by the Bill & Melinda Gates Foundation on how floodplain community-based organisations cope with flood risk in Bangladesh.

Aim 2: Develop the research capacity and publication records of younger staff. A number of related mechanisms are evident here. First, a mentoring strategy between senior, mid-career and junior researchers to ensure and enhance succession. Critical to this has been the retention of several senior members of staff (e.g. Ball, Ellis, Green, Parker, Penning-Rowsell and Revitt) on fractional appointments to facilitate the process, and its success is evident in the output profiles for Viavattene, Priest and Watt. Second, the award of internal initiative grants to staff, leading to fresh research activity as reflected in the output profiles of Purchase and Jones. Third, teaching and research 'buy-out' grants for junior staff to complete and develop research activity and publications

(evident in the submission of Juntti). Fourth, the appointment of ex-PhD students to the research staff (for example Alexander at FHRC). These mechanisms have contributed to the strengthening of a strong peer support ethos, with junior staff working with senior colleagues on agreed publications as a crucial part of our research and succession planning strategies.

Aim 3: Increase external funding. Our performance in successfully obtaining competitive research grants despite an increasingly competitive funding environment has remained exceptionally strong, bringing in a total of £3.83 million across the REF period (see section d and REF4).

Aim 4: Increase numbers of doctoral students. Our doctoral student programme has continued to develop. In line with the policy and practice-oriented nature of our research contribution, we have successfully expanded our DProf programme (6 completions in the REF period)) with a further 8 nearing completion (see c below).

This strategy received a major boost when the University announced a new strategic emphasis upon research alongside an internal reorganisation of Schools in 2012. The creation of the new School of Science and Technology brought the three research centres within one Department, and provided further impetus to the promotion and realisation of internal synergies between staff affiliated with the FHRC, DARM and UPRC, as well as new opportunities for collaboration within and between Schools. This has led to the development of a number of new areas of research work over this REF period. These include the joint development of the SUDSloc tool (Ellis and Viavattene - see Impact Case Study REF3b), the delivery of an ecosystem services approach via the transdisciplinary ESRC/NERC funded seminar series (ISSUES - Integrating Social Science into Urban Ecosystem Services), and research into public health and safety. Work on the use of cybertechnology and social media in disaster risk awareness, warning and response has been initiated, enabling FHRC researchers to move in new directions with external partners on our EU FP7 WeSenseIt project. We have also begun the development of decision-support software in BioSciences, for example by developing the bio-indicator work of Garelick and Purchase.These emerging research areas add to our existing successful portfolio of research and knowledge exchange.

The creation of the new School of Science and Technology, the closer collaborative working between the research centres, and opportunities for cross-School collaboration have provided us with the opportunity to revisit our existing research plans and integrate these within a wider School strategy. As a result, the *strategic goals* we have set for this unit over the next five years are to:

1. Continue to increase and diversify sources of external funding;
2. Support and enhance the capacity of mid career and younger researchers;
3. Recruit new staff (internally and externally) to replace colleagues reaching retirement age;
4. Maintain existing interdisciplinary and transdisciplinary research strengths including closer collaboration with the Business School and the School of Law;
5. Increase postgraduate research student recruitment and maintain a good completion rate. We will develop mechanisms to ensure student numbers grow, by costing studentships into funding applications and continuing institutional funding for doctoral bursaries;
6. Further enhance internal and external collaborations.

c. People:

i. Staffing strategy and staff development

Our staffing strategy has been closely developed alongside our research strategy, particularly with regard to the aim of developing our younger staff members and ensuring a successful transition towards a new generation of research leadership within the UoA. This strategy is informed by the objectives of promoting an inclusive approach to staff development which enhances individual and collective research capacities, retains research leaders and junior staff with high potential, and promotes equality and diversity, in line with the Concordat to Support the Career Development of Researchers.

To meet the challenge of making the transition in research leadership and developing junior researchers, we adopted a strategy of retaining several senior staff with extensive knowledge and leadership skills on fractional contracts (Penning-Rowsell, Parker, Ellis and Revitt), and placed a strong emphasis on the mentoring of mid-career and younger research staff. The success of this strategy of active succession planning is evident in the internal promotion of Tapsell to take over

the Headship of FHRC in 2010, and the promotion of Faulkner and Garelick to Professor. Their research leadership has been further strengthened by the promotions of Lundy and Watt to Reader, and Viavattene to Senior Research Fellow. To continue the development of FHRC's on-site research overseas we have retained staff in our Bangladesh office, where Sultana received a Farmer Voice award in 2010 under the ALINe programme, for her work with community based organisations on Adaptive Learning Networks.

This successful staff development has been achieved by a structured and inclusive approach which supports all colleagues' development. Staff are required to complete an annual Research Plan where they report on outputs, research income generated and other research activities. On this basis relevant targets for the next year are identified and research allowances allocated. Staff development needs are explored with colleagues as part of the annual appraisal process and individuals are offered development packages to meet identified needs. Support is provided via senior researchers acting as mentors. Junior researchers, following supervisory training, gain experience of doctoral supervision and acquire experience under guidance from experienced Directors of Studies. There is a commitment to support staff to attend conferences, with decisions taken on a case by case basis. Staff can also apply for sabbatical leave. In addition, staff have access to the University's central research development programme which provides regular training events on subjects including writing for publication, doctoral supervision, preparing funding applications, managing research and knowledge transfer projects, and ensuring that research has impact beyond academia.

Robust arrangements exist for ensuring equality of opportunity. Equality and diversity policies are in place at University level. Along with the provision of opportunities for less experienced researchers, maternity and paternity leave, flexible working to accommodate family, health or other circumstances, and a commitment to reintegrate staff on their return to work, are all supported by clear policies. The University has a well established and comprehensive Code of Practice for Research which enshrines the highest standards of research conduct and integrity. Its principles and practices are based on the Research Councils' Statement on Safeguarding Good Scientific Practice (2000) and the Concordat to Support Research Integrity (2012). An independent University ethics committee ensures that all our research projects maintain this level of integrity through implementation of well established approval processes. The University Ethics Committee is a sub-committee within the Academic Board structure and therefore its remit is to report to Academic Board on ethical matters within the University.

ii. Research students

We place research students at the centre of our community and strongly value their contribution to our research ethos. Across the REF period our doctoral student programme has continued to develop through a combination of internally, externally and self-funded doctoral students and the extension of DProfs. The REF period saw three PhD completions, with a further one in October 2013 and two others set for completion. To raise numbers further we have been actively increasing the number of studentships. In this respect the UoA has successfully obtained seven competitively awarded internal research studentships, of which one was externally co-funded by the EA. This average of 1.5 new internal studentships per year for the UoA reflects the University's significant investment in research studentships over the REF period. External funding was also obtained from an EPSRC-funded Doctoral Training Award (DTA) and sponsorship from the Saudi Arabian government. We have also focused on the expansion of our programme of DProf students, which has resulted in six completions in the REF period, and a further eight approaching completion. Several staff also co-supervise PhD students at external universities including the current supervision of three students with Al Farabi Kazak National University.

The University has a strong and integrated post-graduate research culture. Students are supervised by a panel of academics with clear individual and collective responsibilities for assisting the student. Staff who are new to supervision are required to attend a structured training programme before joining supervisory teams consisting of a Director of Studies (who must have supervised through to completion) and up to two other supervisors. Student progress is formally monitored bi-annually via the University's Research and Knowledge Transfer Office (RKTO). Research students receive comprehensive research training. All research students are required to undergo training in research

methods by completing at least two core modules on the University's Master's programme before being eligible to transfer from MPhil to PhD. In addition students are able to take as required, a wide range of other modules related to more specialised elements of research training, such as GIS. The RKTO also organizes generic skills training including for dealing with the media and employability skills. Additional support for those studying for Professional Doctorates is provided through the internationally leading Institute of Work Based Learning.

Students are provided with good quality study space, access to appropriate IT, and are encouraged to participate fully in the research culture of the UoA and University. They are expected to participate in all relevant internal research seminars and training workshops as well as external events, with financial support available to support this where papers are accepted for presentation. Regular internal seminars allow students to obtain feedback on their research and all research students are expected to make at least two presentations at the annual School-wide postgraduate research conference, a major event within the School's research calendar.

d. Income, infrastructure and facilities

During this REF period we maintained our successful track record of attracting high levels of competitive research income; one that was also evident in previous research assessments. Under RAE2008 income per FTE was well above the UoA average, and in the REF period total income of £3.83 million, at an average of £256k per FTE, continues this strong performance (see REF4). Our success in obtaining high levels of research income has been achieved despite an increasingly competitive environment. Although levels of UK funding have reduced, we have managed to maintain strong funding flows from the RCUK, as well as from European sources and government departments and agencies as a result of our acknowledged expertise and long-standing research relationships built up over many years of collaboration.

At the national level, RCUK funding continues to be important to us, most notably through the renewal of our major EPSRC research contract on the Flood Risk Management Research Consortium, a 4 year RCUK fellowship, and a PhD student funded by EPSRC. In addition, a wide range of other grants have been obtained including from the British Council, the Scottish Environment Protection Agency (SEPA) and industry (e.g. our project for CIRIA). As evident from the list of funded projects in REF4, our strong working relationship with the EA and Defra has remained an important funding stream for us. The EA has supported a studentship and a range of consultancy activities including Continuing Professional Development (CPD) programmes which FHRC has run successfully for 25 years.

We have also pursued a strategy of diversifying our funding base to ensure it reflects our wide range of research interests, from more theoretical concerns through to policy development and user engagement, and draws on international sources. We have been particularly successful in attracting more international and European funding. We have gained high esteem funding from the Bill and Melinda Gates Foundation and for a series of FP6/7 projects including: FLOODsite, SWITCH, ScorePP, SPICOSA, CONHAZ, CapHaz-Net, EPI Water, Theseus, ENSURE and STAR-FLOOD and RISC-KIT. This success has been built upon the well established international reputation of FHRC and UPRC in particular, and their strong integration into academic, policy and practitioner networks. This research activity has served to further improve our international collaborative networks and profile.

The process of securing funding is led by the individual Research Centres with the support of the School and the RKTO. The RKTO ensures all staff are made aware of funding opportunities, assists the application process and provides high quality post-award support. Combinations of more senior and junior researchers are built in order to provide opportunities for more junior researchers to participate in funded research projects. All our funding applications are internally reviewed and must be discussed with senior colleagues before submission. This provides an important quality control process. Proposals also undergo ethical scrutiny.

Infrastructures and Facilities

The University has invested over £200 million in developing the Hendon campus as its single site, starting in the period of RAE2008 and continuing throughout the REF period. This makes the campus one of London's largest and most impressive HE facilities, providing an environment conducive to research and teaching.

The School of Science and Technology is served by high quality facilities. Researchers within this UoA benefit from access to specialist infrastructure including state-of-the-art organic, inorganic and Class II microbiological laboratories located in the recently completed Hatchcroft Building, each of which is supported by a team of dedicated technicians. This permits researchers direct access to a wide range of analytical instrumentation including liquid chromatography (LC)-mass spectrometry (MS), LC-MS/MS, ion trap time of flight (ToF)-MS, triple quadruple-MS, matrix-assisted laser desorption/ionization-ToF-MS, gas chromatography-MS and flame ionisation detection, inductively coupled plasma optical emission spectroscopy and MS and graphite and flame atomic emission spectrometry (equipped with a hydride generator). The running costs of these laboratories are met through a combination of dedicated research funding and ring-fenced University funding. All research staff and students from this UoA are provided with good quality office space, equipment and administrative support**.** Our largest research centre, FHRC, has its own offices, administration staff and a specialist library.

The University Campus also comprises the state-of-the-art Sheppard Library, which provides access to 40,000 journals, a considerable expansion since 2008 reflecting increased University investment. The University also has an e-repository (http://eprints.mdx.ac.uk/) of over 9000 items, for our published outputs, which was one of the first established in the country. Seminar and conference facilities have improved as the Hendon campus has been extensively developed to provide attractive venues for our growing programme of events. These facilities can accommodate large conferences with appropriate break out rooms. Major investment in research infrastructure has also included the opening of the RKTO in 2008, as a 'one-stop shop' that supplies a valuable resource for research active staff in relation to research funding, managing research projects, knowledge transfer activities, legal and Intellectual Property Rights issues and doctoral student support. The Director of Knowledge Transfer, based in the RKTO, also carries the brief for impact.

e. Collaboration and contribution to the discipline or research base

Interdisciplinary and transdisciplinary approaches are central to our research, which combines theoretical, methodological, practice and policy oriented research across a range of contexts, as is apparent in our submitted outputs. This contribution to applied environmental research is realized through active collaboration with a wide range of academic and non-academic partners with a strong emphasis placed upon impact on end users, practitioners and policy-makers (see impact template). Our activity is organized through three research centres:

- *Flood Hazard Research Centre* (Faulkner; Green; Parker; Penning-Rowsell; Priest; Sultana; Tapsell; Viavattene; and Alexander): research here focuses upon environmental management and natural hazards, specialising in the socio-economic analysis of flood risk management and related policy.
- *Urban Pollution Research Centre* (Ellis; Garelick; Jones; Lundy; Purchase and Revitt)**:** research on all areas of urban environmental pollution, including air, water, soil and sediment with a strong focus on the urban water environment.
- *Decision Analysis and Risk Management* (Ball and Watt): research into the development and application of decision-making and risk management strategies in public health, occupational safety and the environment.

Research staff routinely work together, as shown in the joint authorship of many of the submitted outputs. This is particularly evident in the fields of water and flood management and well exemplified by the EU SWITCH and ScorePP projects, which involved close working between UPRC and FHRC staff (Green, Lundy, Revitt, Viavattene). Our EPSRC-funded research for the FRMRC (phases 1 and 2) permitted us to extend the scope of our UK flood risk research to engineering. The central publication from phase one of FRMRC, *Flood Risk Science and Management* (2010, Blackwell-Wiley) edited by Faulkner (FHRC) and Garry Pender from Heriot-Watt University, included contributions from other FHRC staff and exemplifies the broader contribution to geographical and environmental research by staff submitted here. Our interdisciplinary approach – running from water engineering to social science - is also reflected in collaboration with other Schools across the University, including Business (Granger, Eisenschitz submitted here) and Law (Juntti submitted here). In addition, there are a number of emerging initiatives with Art and Design (Tapsell), Computer Science in relation to Visual Analytics in Risk Communication (Tapsell and Alexander) and the development of bio-indicators (Garelick and

Purchase).

National and international collaborations and networks Our research is characterized by its high and increasing level of collaboration with academics from other institutions. This trend is readily apparent in FHRC's participation within a number of European research networks, for example via the EC-funded FLOOD*site*, CapHaz-Net, CONHAZ, ENSURE and RISC-KIT projects. On these transdisciplinary networks, social and physical scientists worked together, for example on coastal management issues under the EC SPICOSA and Theseus projects. Elsewhere, researchers in this UoA have collaborated with other hazards experts (on the ENSURE, EPI Water, CONHAZ, and FRMRC projects), with computer scientists on WeSenseIT, and with lawyers and public administrators on STAR-FLOOD. UPRC staff are similarly involved in several multi-disciplinary research and practitioner networks including the EU COST DARE network, the ISSUES urban ecosystem service network, and SUDSnet. The international scope of our activity is further exemplified by collaborations with scientists in Kazakhstan (Lundy), Canada (Granger), China (Green, Penning-Rowsell), Spain (Faulkner) and Bangladesh (Sultana). Academic collaboration and leadership is also strongly developed in the UK. Faulkner (2004-2012) was on the Management Committee of the EPSRC-funded FRMRC, with responsibilities for 'consortium integrating activities'. Tapsell was an invited member of the Steering Committee for the Natural Environment Research Council's Flood Risk from Extreme Events (FREE) programme, 2008-2010, and her collaboration with researchers at Lancaster University (and others) resulted in an ESRC prize in 2013 for 'outstanding impact in public policy'.

Research collaborations with government departments and industry A defining feature of much of our research activity is the presence of strong research collaboration with industry and government agencies both in the UK and internationally. In the UK this includes research for the EA, Defra and for CIRIA as well as large consultancy companies e.g. Arup, HR Wallingford (on the Surface Water Flood Warning Scoping Project) and ACO Technologies (mitigation of car park runoff). A key dimension of this type of industry and government research collaboration is the strong pathway to impact it provides (see impact template 3a). For example findings of the EU funded FLOODsite research project (2004-2009) led to the development and application of our Flood Warning Benefits Pathway (FWBP) model, and this was subsequently adopted by the EA for estimation of the benefits of flood warnings within their Long-Term Investment Strategy. Working in conjunction with CH2M Hill (formerly Halcrow), the FHRC (Parker, Priest) is currently developing the FWBP model into a predictive tool capable of estimating the future economic and other benefits of flood warnings and other non-structural flood measures.

Collaborative research working with government agencies is evident across the UoA. DARM's collaboration with the Risk and Regulation Advisory Council of the Department of Business, Innovation and Skills on the management of risks to the public, has led to commissioned reports by Lord Young (2010) and Professor Löfstedt (2011), with findings currently being implemented. DARM's report entitled *Managing risk in play provision - implementation guide*, was launched at the House of Commons in October 2013. As members of Defra's Expert Committee on Non-Agricultural Diffuse Pollution, UPRC researchers provide advice to OfWat, participate in practitioner networks and provide expert witnesses (e.g. Ellis to the Thames Tunnel Commission). The international dimension of our work is also evident here. FHRC gave advice to the Government Office for Science's FORESIGHT project on Global Environmental Migration, on population movement in response to climate related hazards in Bangladesh. FHRC's Bangladesh office collaborates, works for and/or gives advice to, a wide range of international and national end-users and agencies (e.g. UNDP, World Bank, GIZ). Other examples include Green's close working with the Organisation for Economic Co-operation and Development (OECD) on future flood losses in coastal cities.

Contributions to learned societies professional associations and other bodies Submitted staff contribute to a wide range of learned societies. The Founding Director of FHRC, Penning-Rowsell, was recognised with the award of the RGS Back Award 2011 ('for research contributing to national and international flood policy'), and he was also a committee member of the British Hydrological Society and Landscape Research Group, and a trustee of the Landscape Design Trust and National Flood Forum; Tapsell is an appointed member of the Joint Defra/EA Flood and Coastal Erosion Risk Management R&D Programme Theme Advisory Group for 'Incident Management and Community Engagement'; Garelick is the elected secretary of the Chemistry and the Environment

Division of the International Union of Pure and Applied Chemistry (IUPAC), Chair of the Divisional Subcommittee on Chemistry of Environmental Compartments, and the divisional representative of the IUPAC Committee on Chemistry and Industry (COCI). Purchase is a member of the QAA's subject benchmark statement representative review group, covering curriculum revisions in earth and environmental sciences.

Given the centrality of user engagement to much of our research activity, senior members of this UoA have been involved regularly with select committees, advisory boards and professional associations. Green has acted as specialist advisor on water management to the House of Commons Environment, Food and Rural Affairs (EFRA) select committee on inquiries into flooding, the Floods and Water Bill, and price and quality in the water industry. Penning-Rowsell was a member of the Scientific Committee for Floodrisk2012 and for the Foresight Flooding China (Taihu Basin) project, and he and Tapsell were invited members of the Cabinet Office S & T Advisory Group for the Pitt Review of the 2007 summer floods. Revitt is an advisor to OfWat, and with Ellis, sits on the Expert Committee on Non-Agricultural Diffuse Pollution as well as being a steering board member of the Better Thames Network. Ellis was also the first UK member of the Syndicat Interdepartemental pour L'Assainissement de L'Agglomeration Parisienne (SIAAP), a Senior evaluator to the EU 6th Framework Programme and is an Associate Scientific Adviser to the British Council. Granger is Chair of the Research and Strategy Group, Institute of Economic Development, acts as Scientific Advisor to the Homes and Community Agency and International Urban Development Association (INTA), and is regeneration and planning advisor for the Hong Kong Research Council. Faulkner is an elected expert for the Earth System Science and Environmental Management (ESSEM) domain for the EU's COST office (Cooperation in Science and Technology).

Journal editorships Our policy is to encourage and support involvement with journals at all levels. Examples of membership of editorial boards include Ball (*Energy and the Environment*, and *the Journal of Playwork Practice),* Granger *(Journal of Innovation and Entrepreneurship)*, Faulkner (*Journal of Flood Risk Management* and *Land Degradation and Development)* and Penning-Rowsell (*Regional Environmental Change* - and he is also editor of *Environmental Hazards)*. Across the REF period several members of this UoA have acted as guest Editors on special volumes of various journals, for example Faulkner (*Land Degradation and Development*); Lundy (*Science of the Total Environment*); Garelick and Jones (*Reviews of Environmental Contamination and Toxicology*).

Co-operation and collaborative arrangements for postgraduate training, research-based CPD and knowledge transfer UoA members actively contribute to post-graduate training in research methods and other Masters courses, including training for new research student supervisors. FHRC has run regular bespoke CPD courses for over 900 professionals at the EA (e.g. Foundation in Flood Risk Management, Flood Forecasting, Warning and Response and Asset Condition Assessment). Two new CPD courses on techniques for flood benefit appraisals have been developed for both new and experienced end-users of our revised Multi-Coloured Manual, and bespoke courses developed for LAs, SEPA, the Rivers Agency in Northern Ireland and the Office of Public Works in the Republic of Ireland. International knowledge transfer includes two EU TEMPUS projects, working collaboratively to support universities in Russia (EU NETWATER; as project partner) and Kazakhstan (EU I-WEB; with members of this UoA project co-ordinating). In these latter programmes, we work closely with industry, governmental and non-governmental partners to develop Masters and PhD programmes in integrated water resource management.

Senior staff in this UoA have externally examined PhDs in the UK, Europe, and internationally (for example Chalmers, Sweden; Hong Kong Baptist University; University of Sheffield; Heriot Watt University, University College Dublin). External course evaluations include the EDDLC (Economic Development Distance Consortium at Dundee University); Plymouth University; the Norwegian University of Life Sciences; and the University of Brighton. One staff member is on the professional panel of the QAA for the Environment area. External conferences were organised at the Royal Society (for FRMRC); symposia for Analytical and Risk considerations (42nd IUPAC congress); and external seminar programmes at Simon Fraser University, Canada. Keynote addresses include those by Purchase (Bioremediation); Lundy (Stormwater Risks); Faulkner (Dispersive Soil Erosion); Garelick (Chemistry Bridging Innovation); and Ellis and Revitt (multiple).