

LIVING CITIES

Vision and Method for Regenerative Design

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- 10 THE VANCOUVER OLYMPIC VILLAGE EXPERIENCE: Engaging Innovation and Leading Edge Design ROGER BAYLEY-Roger Bayley Inc.

This lecture will explore how a contaminated industrial site in the heart of a city was transformed into the Millennium Water Olympic Village project. The presentation will detail the creative process used to bring together the team of five architectural firms and more than 40 engineering and service companies to develop a common vision for a sustainable community that pushed the boundaries of green building design. 42 EMBEDDED RIGIDITIES AND MOMENTS OF CHANGE: Space, Institutions and the Evolutionary Potentials in Urban Form ANDRÉ SORENSEN-University of Toronto/Cities Centre

This lecture will examine institutional sources of inflexibility and rigidity in urban form, such as regulatory frameworks, zoning systems, property rights and development charges. Understanding patterns of inflexibility provides a window for understanding spaces and moments of openness to change and transformation.

64 LARGE BUILDING ENERGY SYSTEMS—RELATIONSHIPS TO DISTRICT ENERGY MANAGEMENT: Cogeneration, Energy Storage and Demand/Load Coupling KEVIN STELZER—B+H Architects

> The presentation will demonstrate how buildings do not operate in isolation, and pursues understanding of urban interconnectivity. The unique energy demands

of individual buildings can afford the opportunity to optimize energy distribution within cities. Urban energy management can offer great economies of scale as well as energy load diversification across integrated energy loops. Creative use of proven technologies including cogeneration, energy storage and demand/load coupling can help us utilize waste heat for the betterment of the energy performance of our urban environments.

84 SCALE AND SCALABILITY

AZAM KHAN—Autodesk Research

City visualization will be explored by focusing on a building visualization platform. In turn, the presentation will offer a methodology that scales from a single building to a full city, conceptualizing relevant dimensions for the complex topic of cities, living and sustainability.

114 SOFTWARE TOOLS FOR ENGINEERING AND DESIGN EXPLORATION IAN KEOUGH-Buro Happold

The presentation includes a focus on custom software tools created for engineering complex structures. Recent Buro Happold projects will be illustrated as examples of the process by which a tool is conceived, constructed, and utilized. In a second part, specialized software tools created for design exploration will be detailed. These tools allow for investigation of design concepts through parametric modeling, iterative analysis, and visual programming.

146 PLANETARY CITIES: Ecology and Design for Tomorrow MITCHELL JOACHIM—Terreform One/

New York University

This presentation will focus on developing innovative solutions and technologies for local sustainability in energy, transportation, infrastructure, buildings, waste treatment, food, water and media spaces.

PREFACE

There is little dispute over the position that architecture must respond to the environmental crisis and pursue stewardship as a central theme in its theory and practice. At the same time, there is widespread skepticism that the present spate of accredited buildings actually represents the only or even the best way of achieving the goals of a carbon-neutral and environmentally responsible architecture.

Living Cities: Vision and Method provided an opportunity for architects and experts from other academic fields to discuss and debate alternate courses for the future of the North American city as it faces the need to achieve its post-carbon state. Most importantly, the conversation took place in a school of architecture, in front of graduate and undergraduate students who will be the ones most responsible for charting the course of architectural research and practice in the future. While the discussion is still divergent and complex, it will only be refined by exposure and persuasive argument. For this reason we owe a great debt of gratitude to the sponsors, organizers and participants in the Living Cities colloquium.

Rick Haldenby FRAIC O'Donovan Director, Waterloo Architecture

The papers within this publication are drawn from the colloquium Living Cities: Vision and Method, held at the School of Architecture at Waterloo in Cambridge, Ontario, on January 20th and 21st, 2011. Waterloo Architecture presented the event in partnership with the Resource Positive Envelope Design group and Okanagan College, supported by the Asia-Pacific Partnership on Clean Development and Climate and by Environment Canada. The event was oriented towards urban designers, architects, technologists and members of the public interested in the future of sustainable built environments. International designers and critics presented lectures and workshops focusing on design of sustainable future cities. The colloquium examined experimental and visionary projections of future urban forms that pursue social and environmental viability.

THE CONNECTING THREAD

In a very short period of time, the Resource Positive Envelope Design (RPED) project has produced a wealth of activities and resources that have the potential to change the way we think about architecture.

The intent was not merely to design new kinds of buildings, communities and cities, but to design a new meaning for these structures that is predicated on a new relationship with the environment. To fully realize this goal would require a lifetime of work, but it begins with the comprehensive exploration of architecture that is presented here. This exploration occurred through technological research, visionary designs and experimental installations that were founded on ongoing discussions, a willingness to share and a spirit of cooperation.

It was precisely this spirit of cooperation that allowed the project to accomplish so much. Over the course of the project, the project team held two conferences, the Mini-Summit on the Future of Architecture and Living Cities: Vision and

Method; participated in the Buildings and Appliances Task Force of the Asia-Pacific Partnership; organized a Green Building Exchange in Busan and Seoul, South Korea, and Shanghai, China, that included some of Canada's top architects and engineers; developed an extensive curriculum for sustainable construction management: carried out research in interactive and responsive design; built a detailed database of green buildings in a variety of countries; deployed networks of wireless sensors to measure building performance in Penticton, Canada, Busan, South Korea, and Tianjin, China; and conducted an international student competition with over 200 entries—all in the space of 12 months. Moreover, it is a measure of the cooperative spirit of the project that all participants in these activities have agreed to share their materials freely and openly through the project website at resourcepositive.com.

In addition, the project was able to forge key relationships with partners and organizations from around the world. For example, project funding was used to help Roger Bayley travel to Tianjin and work with the Sino-Singapore Tianjin Eco-City project, where they are now planning a Canadian Sustainable Centre for Innovation. Discussions with Sun Central led to the deployment of an extensive series of light quides in Okanagan College's new Centre of Excellence in Sustainable Building Technologies and Renewable Energy Conservation as well as the participation of project researchers in the Core Sunlighting Solutions Research Network, which is part of the Canada-California Strategic Innovation Partnership. Project members were also invited to participate in the inaugural meeting of the Sustainable Building Network organized by the International Energy Agency in Paris, France. Closer to home, project members also helped to form the pan-Canadian College Sustainable Building Consortium.

Because the project generated such a tremendous amount of material, it has produced not one, but two publications. The first is *Explorations in Regenerative Design*, which documents the innovative research and design projects conducted by project members. The second is *Living Cities: Vision and Method*, which examines experimental and visionary projections of future urban forms. What ties these two publications is precisely the need to redefine the built environment. In both cases, this information is provided in digital form in order that it be freely and easily available to all.

The most powerful legacy of the project, however, may be the network of connections and partnerships that were built around the world.

Throughout the project we have had considerable moral, and financial, support from a variety of federal and provincial ministries and departments, for which we are very appreciative. Through their ongoing work with the Asia Pacific Partnership, Amanda Kramer and her team at Environment Canada provided the vision and impetus as well the major funding for the project. Elizabeth Tang and Glen Webb in particular at Canada Mortgage Housing Corporation provided and constant guidance and support as we built partnerships in other countries. Paul Irwin and his team with the government of British Columbia were a major sponsor and supporter of our Green Building Exchange, which would have been impossible without their help as well as that of their representatives in the countries we visited. Here we would particularly like to thank K. S. Kim and Injun Paek in Korea, and John McDonald and Sylvia Sun in Shanghai.

All of the work carried out during the project was very much a collaboration of friends and colleagues. Once again I had the privilege of working with David Covo of McGill University and Philip Beesley of the University of Waterloo and I look forward to doing so again. Their insights and collaborative approach were essential to the success of this work. Similarly, Davis Marques of Ryerson University was indispensable to the technical aspects of the project. Brian Lee of MGH Consulting contributed his expertise in wireless sensors. Alan Maguire of George Brown College helped ground the project in the real world. Robert MacDonald was instrumental in building our web presence and this publication.

Finally, all those associated with the project owe their gratitude to the team at Okanagan College, who worked tirelessly to keep the project on track and on budget. As project manager, Michele McCready brought order out of chaos and she was ably assisted by Patti Boyd, Jennifer Heppner, Carla Whitten and Margaret Johnson. I would also like to thank Dean Yvonne Moritz, former Dean Dianne Crisp and Vice President of Education Andrew Hay for their support and patience for this project.

The issues raised by the Resource Positive Envelope Design project will not be solved overnight or by a single project, but the future of our planet depends on us addressing them now. In this sense, this project provided a critical first step in the right direction.

Douglas MacLeod

Associate Dean of Science, Technology and Health, Okanagan College