

BEDSIDE AND COMMUNITY: 50 Years of Contributions to the Health of Albertans by the University of Calgary Edited by Diana Mansell, Frank W. Stahnisch, and Paula Larsson

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Environmental Design: Creating Healthy Spaces and Places

Barbara Dupuis, David Monteyne, and Brian Sinclair

The primary aim of the Faculty of Environmental Design is to offer an educational process and programme through which students may acquire knowledge and skills enabling them to contribute towards a better harmony between Man and his Environment.

—proposed degree program and curriculum, 1972–3¹

The Faculty of Environmental Design—or EVDS, as it is commonly known—has a long and rich history within the sphere of public health and wellness.² In particular, the 1970s concept of “harmony” between humans and their environments, both natural and built, situated EVDS teaching, research, and practice in immediate relation to public health in Alberta and beyond. What is especially important to the faculty’s history is the deployment of design, across a nested array of scales, as a vehicle to improve communities, landscapes, buildings, and interiors, and, as a result, the quality of life for the people who work, dwell, and play in such environments. That is, in EVDS we think of health and wellness as a design problem. We include here not only the traditional definition of physical health, but mental, social, spiritual, and community health as well.³

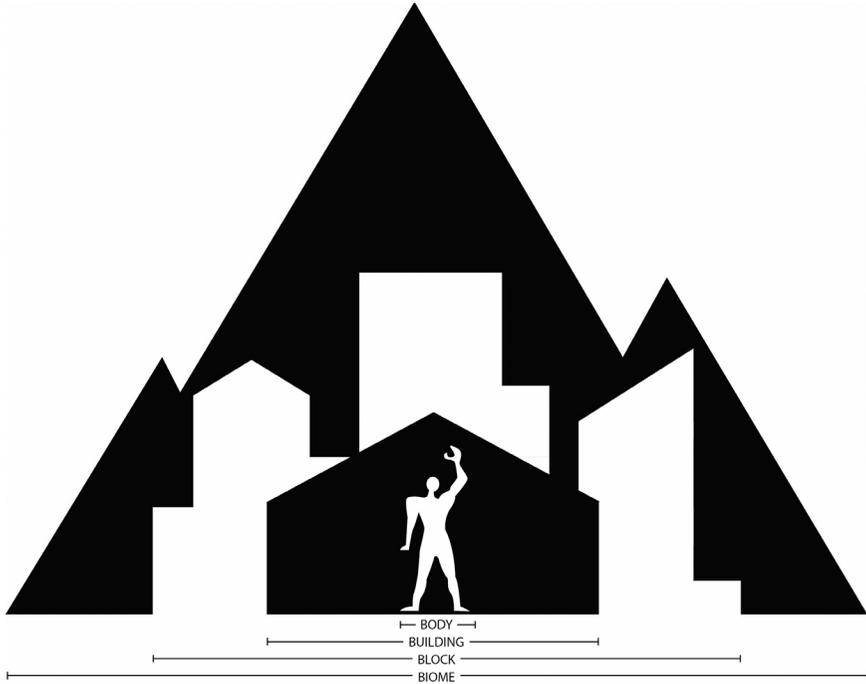


FIGURE 4. Illustration of scales in the Faculty of Environmental Design.

Over the past four and a half decades, EVDS faculty and students, independently and collaboratively, have undertaken an impressive array of design projects relating to health and wellness, and these designed and proposed interventions have spanned a range of scales, from the human to the regional. Scales are used within EVDS to demarcate the plane on which a given research project focuses its analysis and intervention, like zooming in to and out of a Google map.⁴ EVDS research could reside at any step on the map, and often bridges multiple scales. We design products, interiors, buildings, landscapes, and public areas. We plan neighbourhoods, cities, and regions. In all cases, and over all scales, we are deeply attentive to how our design and planning efforts contribute to an improved quality of life. The complexity of this endeavour has required environmental designers to adopt an interdisciplinary ethos that promotes collaboration among different professions and academic approaches. After a brief discussion of

the founding of EVDS and what we mean by “design,” this chapter then explores examples of EVDS research in sections organized by scale, specifically the scales of body, building, block, and biome (see figure 4). With this survey of faculty and student work since the 1970s, we hope to give a sense of the wide-ranging legacy of EVDS in the public-health milieu of Alberta.

Environment and Design

The character and interdisciplinary approach of EVDS was forged in 1971, at a moment in which established pedagogies and concerns in the design professions were being questioned in the face of broader social movements.⁵ The concerns raised in the previous decade by citizen protest movements, urban rebellions, and rights-based claims reverberated among architects and urban planners. These design professionals already were reacting against the rationalist tenets of modernism, just as laypeople reacted against the perceived coldness, abstraction, and psychological oppression of modernist design and urbanism.⁶ Meanwhile, the birth of an environmental movement in the early 1970s encouraged designers to think beyond the boundaries of a specific building site or city, and to consider the natural and infrastructural ecologies in which humans and nature are embedded.⁷ The founding of U of C’s new Faculty of Environmental Design certainly was influenced by a similar restructuring of the design degrees in the newly formed College of Environmental Design at the University of California, Berkeley—a hotbed of radical thinking in that era.⁸ Also in parallel, the academic social sciences spawned specializations in environment-behaviour studies such as environmental psychology and sociology of space, while the hard sciences became interested in quantifiable characteristics of indoor air quality, daylighting, and alternative forms of energy production. As an ambitious new faculty, EVDS hoped to somehow capture this zeitgeist.

For many years, EVDS offered a somewhat hybrid master of environmental design (MEDes) degrees that combined significant coursework with a thesis-like master’s degree project (MDP). In different eras, MEDes specializations have been available in everything from architecture and planning, to industrial design, urban design, and environmental science. The structure of EVDS degrees has changed in the past decade in response

to pressures from national accreditation bodies in the professions, and from institutional demands. We now offer three professional degrees in architecture (MArch), planning (MPlan), and landscape architecture (MLA). The MEDes degree continues as a post-professional, thesis-based degree for students interested in pursuing in-depth research in any of the areas of environmental design.⁹

EVDS has always been a professional faculty, its pedagogy driven by the necessity of providing professional credentials and upholding the professional standards established by provincial and national bodies. Yet human and environmental issues such as public health extend beyond the boundaries of individual professions, and EVDS has continuously promoted a diverse interdisciplinary approach to design. Over time, this has been manifest in faculty-wide courses that mix students from different degrees in philosophical debates, service learning, and community projects, and in partnerships with other faculties and agencies, such as the Faculty of Social Work, the University's O'Brien Institute for Public Health, and the City of Calgary. Interdisciplinarity represents our pioneering design approach to so-called wicked problems that bridge scales and disciplinary knowledges.¹⁰

A basic understanding of how we define the idea of "design" is essential to understanding the work presented below. Often, when people think of design they think of the final outcome:¹¹ a consumer product, a functional building, or a new neighbourhood. We in the U of C Faculty of Environmental Design define design as more than the end result; rather, it also encompasses the process used to frame a problem and develop solutions. The design process involves several stages, including defining the issues to be addressed, researching the issues and their contexts, brainstorming, drafting options, prototyping the possibilities, testing or consulting end-users, and revising through many iterations to get the best fit between human and environment at the appropriate scale for a particular project. Design provides a forum for generating innovative ideas, only a few of which will survive scrutiny and be turned into potential solutions. The process can span multiple iterations, prototyping and testing the fit between the users and the design, with end-users providing critical feedback on the strengths and weaknesses of the design. This step is essential to fine-tuning solutions. A design that seems appropriate in theory might require testing of different sizes or various materials to suit a spectrum of

users. This is also where designers can test the ease of manufacturing the product. Overall, design is a process that explores many options leading to well-considered outcomes that best meet user needs.¹²

Design is also a process that results in many hypothetical iterations and possible scenarios. In an EVDS education, students are typically asked to hone their design skills in relation to hypothetical situations and clients. Occasionally, students are involved in real-world projects that get built or manufactured, but for the most part we rely on the students' education to inform their approaches to designing healthy human environments as future professionals. The breadth of EVDS work presented in this chapter was derived from two main sources. First, faculty members and emeriti were interviewed about the connections between their research and health, broadly defined.¹³ Second, EVDS's collection of student MDPs and EVDS 702 class projects were assessed for apposite content. MDPs were capstone projects that utilized the skills which students developed during their degree to investigate and present new knowledge on a topic. EVDS 702 was a long-standing advanced-practice course—it combined all EVDS students into interdisciplinary teams to tackle real-world case studies. Selected examples of germane MEDEs and PhD research were also included.¹⁴ As with any teaching, it is partly a leap of faith to conclude that the principles of EVDS have been carried by our students into their professional lives, but we remain confident that the legacy of EVDS research and practice has had significant and positive impacts on the health of Albertans.

Body: Projects at the Human Scale

The human body is the starting point for design at any scale. In EVDS, we are concerned about the healthy interface between humans and their world, whether that means a better chair, a safer stair, or a sustainable transportation system. Some design work focuses on things we use with our hands, or other appendages, that are meant to be manipulated by individuals. Within this theme, our attention is drawn most notably to the dimensions, operations, limitations, and opportunities of the human being. At the scale of the body, EVDS has been most active in the field of industrial design, where the production of tools and other objects is focused particularly on meeting the needs of the individual. For example,

Professor Barry Wylant has generated several new designs for medical devices.¹⁵ In the late 1980s, a joint project between the Faculty of Environmental Design and the Faculty of Medicine also resulted in the production of a commercially-viable sleep apnea mask and pump. The device ensured positive air pressure required to keep the throat open at night, thereby allowing for more comfortable sleep. Versions of the device remain on the market today.¹⁶

When the body is healthy, EVDS has worked in a preventative capacity, designing solutions that lessen the chance of damage to or decline of physical health. This is seen especially in the field of physical ergonomics, which seeks to design the everyday products we use in ways that makes them complement the human anatomy and reduce stress associated with poor working or living conditions. Injury mitigation plays a role, as researchers search for ways to lessen musculoskeletal injuries from repetitive work such as manual assembly. The field uses a design process focused on continued testing and refinement of layouts or shapes to allow for the best fit between an individual and a product.¹⁷ Material choice is also important, in part to create rugged products capable of withstanding vigorous use, and in part to deploy materials that better conform to the human body. EVDS faculty and students have thus performed ergonomic analyses and redesigned many products to improve their interface with the body.¹⁸ Specific projects have included the design of a birthing chair for easier labour; ergonomic analysis and redesign of an adjustable microscope stand to improve scientists' working posture; and ergonomic analysis and redesign of a police car to improve the health of officers (see figure 5). The common theme of all these projects is physical comfort: re-working established designs to make repetitive or strenuous tasks more user-friendly.

When the physical body needs assistance—to move in space, for instance—design also plays key roles. Barrier-free design, for example, is an approach used to create products and environments that accommodate, and diminish the implications of, physical limitations. Faculty and students have designed diverse products, from a hand-powered vehicle for the mobility impaired, to an assisted chair rise for the elderly.¹⁹ These designs work to lessen the impact age or bodily injury has on everyday quality of life. Such innovations permit individuals to realize more physical comfort and enjoy expanded freedom.

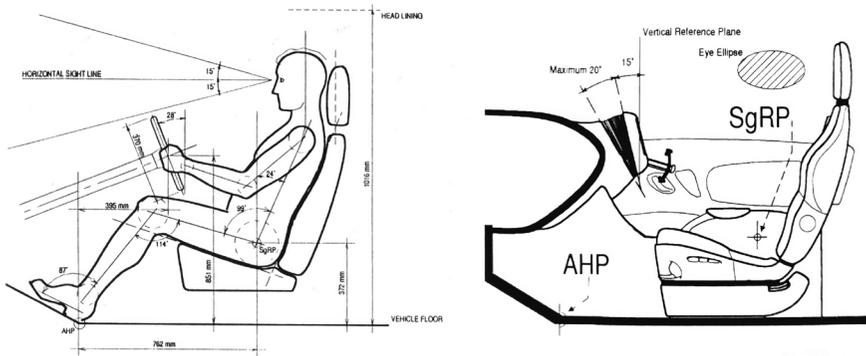


FIGURE 5. Seating configuration of patrol vehicle, 1995.

While ergonomics is often thought of as a physical pursuit, a second type of ergonomics, called cognitive ergonomics, is concerned with mental activity and making products and processes clearer for people to understand and use, and to support users emotionally. This sub-discipline of the faculty strives to make user interfaces simple but functional, and to provide a level of comfort with technologies that might otherwise be alienating or confusing to users, such as the elderly. Within this theme, other factors of personal well-being emerge, including mental health and social connection with others. Social support systems are important to the maintenance of health. Early in the faculty's history, Professor Ron Wardell undertook research in usability, making devices clear for people to understand and use.²⁰ He also researched topics in emotional design, questioning how products could assist people in coping with difficult emotions like grief. Wardell supervised student projects relating to the redesign of a user interface on a neonatal incubator;²¹ designing a product for cancer survivors that encouraged social support and exercise;²² and investigating why we “love” and emotionally attach to certain products.²³ These projects examine the role of objects in human connection and support networks, and propose vital questions: Can products change how you feel? Can they make it easier to connect in a time of need?

During the 1990s, Wardell also developed “ergonomics plans” for institutions, including the University of Calgary, the City of Calgary, and

the Alberta oil fields.²⁴ The explosion of ergonomics research in that decade followed upon the insights of earlier environment-behaviour studies. Continuing under other names and themes, ergonomic research remains central to workplace wellness initiatives, design for aging-in-place, and other public health concerns. These kinds of ergonomic issues have also been relevant at a larger scale, as architects work to design buildings and interiors with a similar purpose—supporting human comfort and fostering good health.

Building: Projects at the Architectural Scale

At this point, we expand from the realm of the human body into the spaces that host our everyday lives—namely architecture. As Canadians, we spend close to 90 per cent of our time indoors, making the design of healthy environments particularly vital.²⁵ Building interiors are not neutral containers of everyday life—they can significantly impact human health. Building scientists look at the interior of buildings to study how they contribute to physical and emotional health. Architectural design is a complex activity that requires diverse needs, processes, and products to be brought into harmony. Architectural topics in health, which the faculty historically has focused on, include indoor air quality, daylighting, and the mitigation of allergens inside buildings. Individual sensitivities can become a social problem if entire communities experience poor and unhealthy housing, schools, or workplaces.²⁶ Moreover, the health qualities of a building often parallel its broader impact, and EVDS has a long tradition of sustainable-design research promoting architecture that does less damage to the natural environment. Finally, in this section we also explore how certain building types or user needs have been consistent topics for architectural inquiry in EVDS.

One way to measure the quality of environment at the building scale is to study indoor air quality. For the past three decades, EVDS researchers have investigated the effect of moulds, fungi, and cigarette smoke on human health, and have sought to mitigate these effects. This work was often completed in partnership with doctors or hygienists looking for the causes of particular symptoms. For several decades, Professor Tang Lee has been the primary EVDS researcher on the topic of indoor air quality. In 2001, his expert testimony led to the closure of Calgary's Court of

Appeals building. Lee and his epidemiology collaborators could demonstrate that the chronic illnesses and sensitivities among many of the judges who worked in the building were a direct result of mould growing within the structure. Hence, Lee diagnosed the courthouse with “sick building syndrome,” a designation that has received increasing currency in environmental design circles since the 1980s.²⁷ Student work on indoor air quality also contributed to this legacy of intervention, by proposing the creation of a hypoallergenic centre for extremely sensitive patients.²⁸

Our experience of architecture can be influenced by a number of factors: atmosphere, pattern, visual cognition, lighting, interior design, and so on. The thrust of environmental psychology research, which influenced EVDS in its formation, is that individuals or groups can be emotionally, socially, and even physically affected by their built environments. A facet of healthy architectural interiors is the quality of lighting. Numerous EVDS students have worked on projects aimed at optimizing daylight in buildings,²⁹ and on how to make residential lighting more sustainable.³⁰ This research focus continues today because well-lit rooms cause less eye strain and are easier to work in, while daylighting also reduces energy usage.

Indeed, in an era marked by depleting resources and increasing pollution, architects are being charged with the creation of responsible and sustainable buildings. Since its founding in 1971, EVDS has been a leader in an area now commonly referred to as “green building.” Sustainable design directly affects the health of humans. As we require and extract precious resources, we generate emissions that impact our health. The fewer emissions we produce, the cleaner, too, are our life-support systems of air, water, and land. Creating buildings that have efficient environmental-control systems (such as heating or cooling) means a lower-impact building, with fewer emissions, and a better carbon footprint. As far back as 1977, EVDS students proposed energy-efficient townhouses for Calgary, which featured solar collecting units, a shelterbelt, and south-facing orientation.³¹ The search for energy-efficient and alternative-energy homes continues today. These concerns are also represented at the Solar Decathlon, a biennial competition sponsored by the United States Department of Energy that challenges teams to “design, build, and operate solar-powered houses that are cost-effective, energy-efficient, and attractive.”³² EVDS has participated in three of these competitions—in 2009, 2011, and 2013—with the houses they designed and constructed each time scoring in the top ten of

finalists. The Calgary teams have been interdisciplinary, with architecture and environmental design students working side by side with others from business and engineering, and from the Mount Royal University and the Southern Alberta Institute of Technology. The 2011 house, designed in consultation with Aboriginal communities, survives as a cultural meeting place on the University of Calgary campus too.³³

EVDS research into environmentally responsible architecture also encompasses the heating and cooling systems used to maintain a comfortable interior. For thirty years, Professor Jim Love's interest in sustainable building design has focused on climate-control systems for architecture in winter cities.³⁴ He consulted as an energy engineer on buildings like the University of Calgary Child Development Centre and Canmore's Lawrence Grassi School, which have been touted as models in the national challenge to achieve carbon-neutral buildings by 2030.³⁵ In line with these cutting-edge sustainability practices, new lines of inquiry have recently arisen as environmentally beneficial design solutions. Having buildings adapt to users, rather than forcing users to accommodate to rigid spaces, is centrally connected to health and wellness, as well as sustainability. Research undertaken by Professor Brian R. Sinclair and his students on "Open Building" includes work on building customization, prefabrication, modularity, and design-for-disassembly—practices that allow buildings to be modified over time, to accommodate users comfortably without requiring demolition.³⁶ Adapting and reusing what is already available, instead of rebuilding, keeps the carbon footprint low. Meanwhile, the new world of sensors and robotics has opened the possibility of "responsive architecture," buildings that can learn to adjust lighting, temperature, energy use, or other systems automatically according to the presence of specific users. Professors Branko Kolarevic and Vera Parlac work in this area with their students.³⁷

The long list of EVDS student projects on sustainability at the architectural scale are varied; a few examples include investigation into the public's awareness of how energy efficiency affects them;³⁸ a feasibility study for building a multi-use centre that would utilize waste heat from a compressor station;³⁹ a design for a research and farming complex that utilizes waste heat and carbon dioxide from a gas plant;⁴⁰ and proposals for net-zero-energy housing for wide public adoption.⁴¹ These projects answer

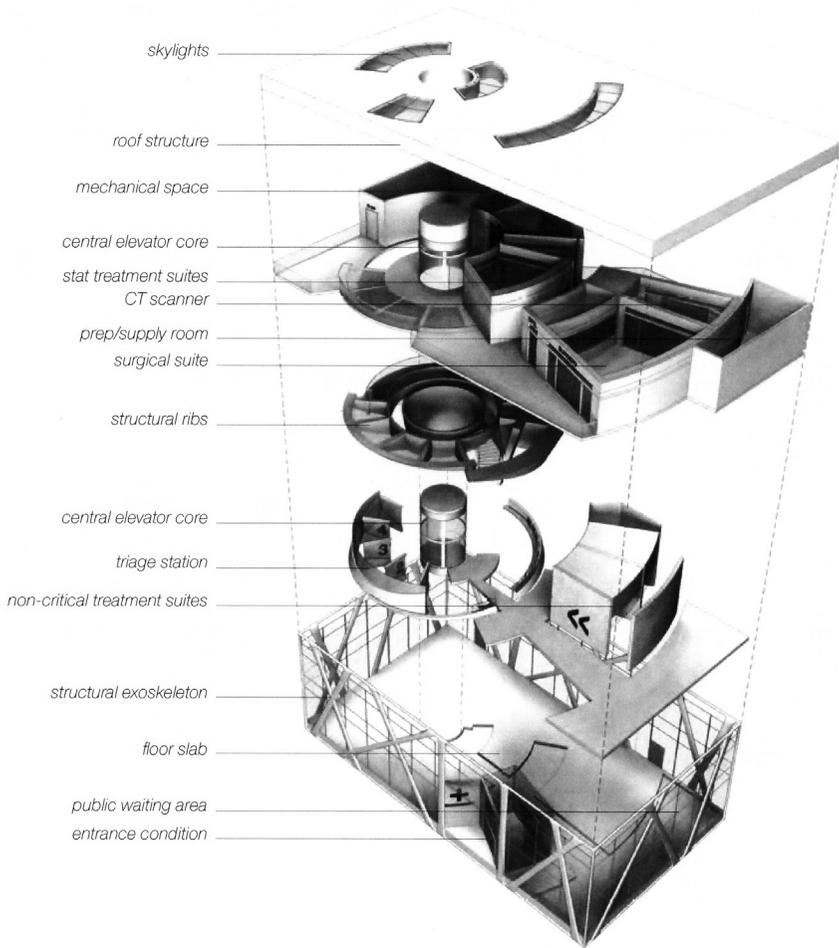


FIGURE 6. Exploded rendering of emergency care configuration, 2012.

to the need for designing innovative solutions that tackle the environmental consequences of current industry and building practices in Alberta.

Certain building types are associated closely with health and wellness. No review of health in EVDS would be complete without discussing the work we have done in hospital and health-care design: buildings can be designed to lessen the anxiety and strain patients and their families feel during a stressful health situation. Making large hospitals complexes welcoming and easy to navigate for patients while simultaneously balancing

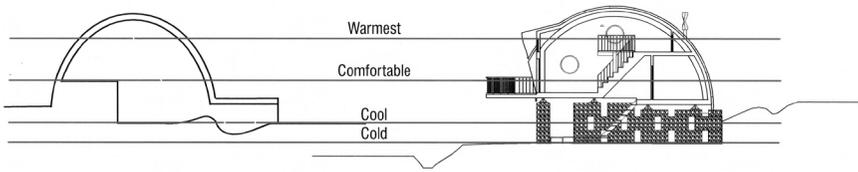


FIGURE 7. Comparison of temperature differentiation in culturally sensitive housing for Northern Canada, 2011.

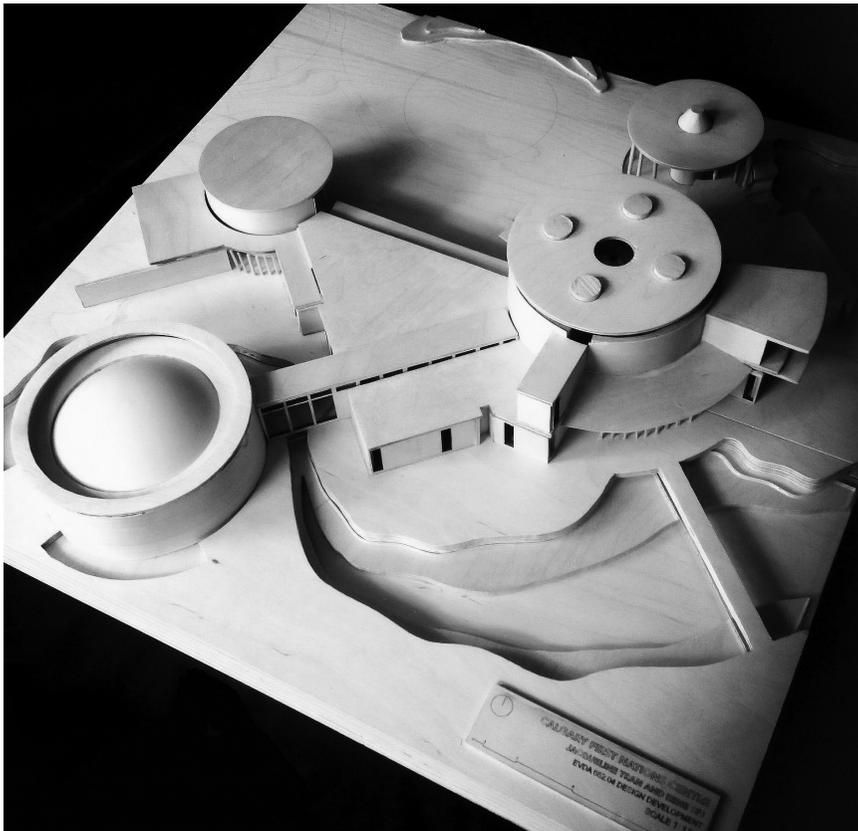


FIGURE 8. Model of proposed Calgary First Nations Centre, 2013.

the need for hospitals to be efficient and healthy workplaces for staff is a constant challenge. Decades of student work on this problem has included programming studies and proposals for community health centres;⁴² a design for a laser eye surgery clinic;⁴³ the sensitive design of buildings for palliative care, hospices, kid-friendly paediatrics wards, and dental offices;⁴⁴ making sure long-term-care facilities are places of inclusiveness and belonging;⁴⁵ and investigating how architecture can be sensitive to death, bereavement, and healing.⁴⁶ The common theme running through this work across the history of EVDS is a focus on human well-being, comfort, and care, whether child or adult, staff or patient (see figure 6).

Culturally sensitive housing represents another building type significant to public health, which has been studied extensively within EVDS. Housing is best designed to reflect people's heritage and traditions—and accommodate their diverse values and ways of living. Acknowledging that humans can live in different ways provides designers with a stepping stone to broaden their perspectives on what “should” be. Culturally sensitive housing can bring a sense of peace and home to people who feel out of place, especially to members of minority populations. Student work in this area has included a number of design solutions for remote housing in the North,⁴⁷ housing for dependent seniors in Native communities,⁴⁸ and designs for northern Canadian Indigenous communities (see figure 7).⁴⁹

These solution-focused projects strove to accommodate diverse ways of being in sometimes harsh climates. An extension of this work has been designs for culturally sensitive community centres, such as those produced in a recent architecture studio course (see figure 8).

For special-needs groups such as the elderly, architectural design solutions can make a significant contribution to healthful quality of life. Student work on design solutions for the needs of the elderly has exploded in the twenty-first century, as demographics have changed in Alberta.⁵⁰ Students have designed a self-contained senior-citizen housing complex;⁵¹ a day centre that provides support and connection for rural seniors;⁵² interactive housing for seniors;⁵³ supportive housing options that allow retirement in a rural context;⁵⁴ and have investigated how environmental designers can evaluate supportive living facilities for seniors.⁵⁵ These projects emphasize that seniors require caring, supportive environments to flourish in their “golden years.”

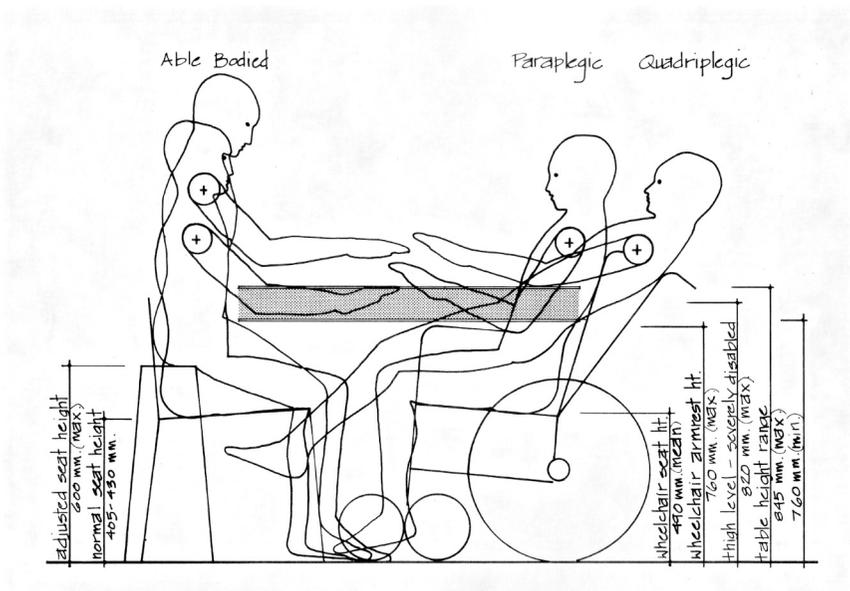


FIGURE 9. Design considerations for differing mobilities, 1983.

Barrier-free design also emerges here as we endeavour to design rooms and buildings that are accessible to everyone. Students have worked to determine the design requirements of less-mobile individuals, including those in wheelchairs.⁵⁶ Everything from doorways and bathroom stalls, to transit platforms and public spaces, must be designed to accommodate all mobilities (see figures 9 and 10).

Thinking more broadly of the scale of neighbourhoods and cities, student work also has included studies in barrier-free design for accessibility at the University of Calgary itself;⁵⁷ considerations to take when proposing a public transport policy for the physically disabled;⁵⁸ and a proposed plan for barrier-free transportation in Red Deer.⁵⁹ For those unable to drive, this type of inclusive transportation enhances quality of life, while refining traditional designs to be accessible for everyone.

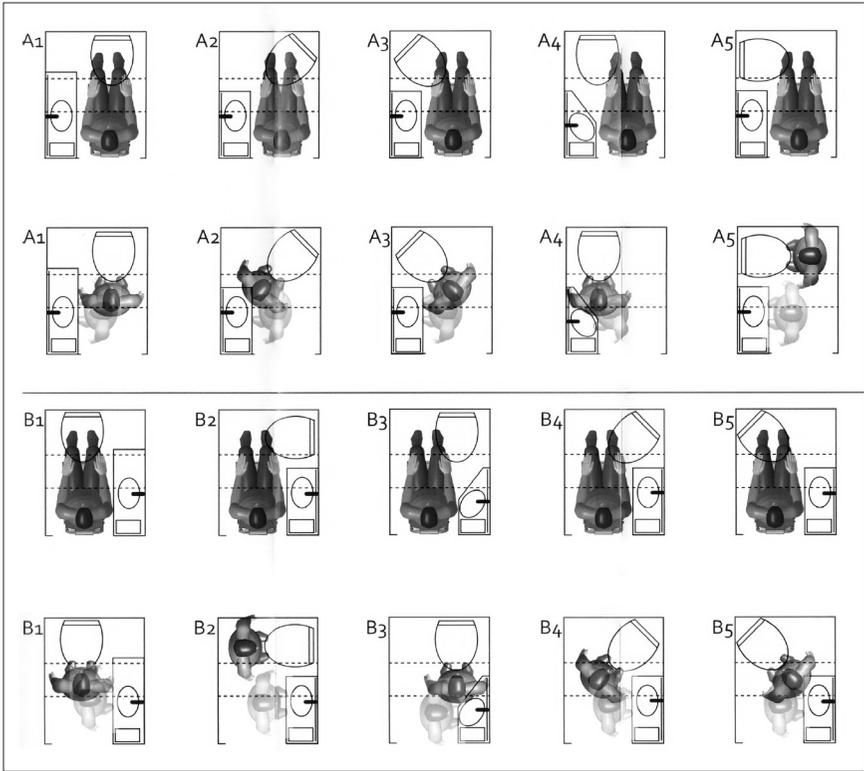


FIGURE 10. Sample of washroom design configurations, 2012.

Block: Projects at the Neighbourhood and City Scale

Zooming out on the architectural-mapping perspective, we arrive at the scale of the city block. At this scale, projects address the built fabric of the city and demonstrate concern for the public-health needs associated with the development of communities and cities. Urban planning can include physical aspects, policy concerns, social qualities, and cultural diversity. Urban design tackles the health aspects of streets and spaces between buildings. Working at the scale of the neighbourhood and city, EVDS projects have aimed to improve the quality of life in towns and cities of Alberta, within Canada, and well beyond. Key themes over the years have

included active transportation, safety, uneven access to housing and public space, and the importance of planning for urban resilience.⁶⁰

Active-transportation research in environmental design has shown that a component of well-being in urban areas is access to services via multiple modes of transportation. For example, walkability is the measure of how easily the built environment accommodates walking as a primary form of transportation. It takes into account the block pattern (whether grid, curvilinear, or other), block size, number of intersections, pedestrian crossings, and sidewalk amenities. Professors Beverly Sandalack and Francisco Alaniz Uribe have pursued research on this subject with in Calgary, rating the city's communities for their ease of walking.⁶¹ Designing for pedestrian and bicycle accessibility means linking pathways and destinations in a meaningful and coherent way. The thought behind this research is that increased walkability allows more opportunities for a person to engage in physical activity through the day. A well-designed neighbourhood can make it easy and enjoyable to walk to lunch with a co-worker, or to complete errands without a car.

Beyond the sidewalk system, a well-developed path system also allows for rollerblading, skateboarding, or biking as means of active transport and recreation.⁶² Supporting the health of Albertans through active transport has been a persistent concern for EVDS students, going back to a 1975 design of bike and ski paths for the University of Calgary (see figure 11).⁶³ Students have also designed path networks for the towns of Banff⁶⁴ and Strathmore;⁶⁵ examined pathway policies in Calgary;⁶⁶ proposed how to make Calgary's pathway network safer for multiple user groups;⁶⁷ and how to integrate bicycles on public transport.⁶⁸ These proposals seek to expand residents' active-transportation options and give them an outlet for physical activity, promoting public health as a quotidian concern.

In addition to physical health, well-being encompasses the social support systems people need to thrive, such as safe communities, mental-health support, and social inclusion. Well-being in cities encompasses safety and the prevention of crime—people will not walk where they do not feel safe. For instance, mixed-use communities can impact how safe a person feels while walking alone, because these communities accommodate activities day or night. Safe cities offer more accessibility to public space and recreational opportunities. While the concept of “crime prevention through environmental design” has been a significant sub-theme

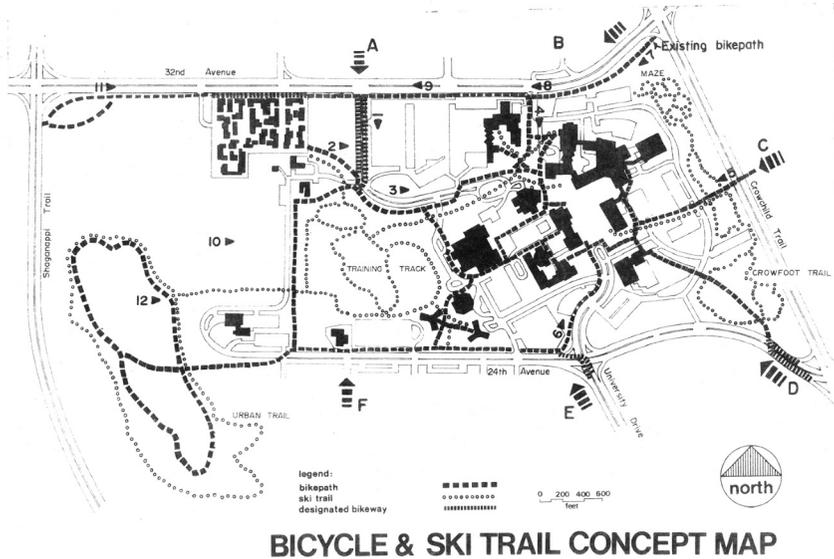


FIGURE 11. A proposed network of trails for active transport on the U of C Campus, 1975.

of environment-behaviour studies and urban planning practice in the United States since the early 1970s, this type of research did not appear in EVDS until the 1990s, perhaps related to urban growth and economic fluctuations in Calgary.⁶⁹ Professor Noel Keough has undertaken a project called “Safer Calgary,” which addresses aspects of urban safety such as traffic, workplace, and youth issues, and public spaces including playgrounds.⁷⁰ Student work has comprised research into crime prevention and community safety audits in specific neighbourhoods;⁷¹ investigation into urban form and pedestrian accidents;⁷² and a study of the geography of crime and prostitution in Calgary.⁷³ Investigating the current state of the urban environment allows proposals for improvements to benefit the safety of all citizens who use public spaces.

The geography of poverty in Alberta is also an issue of concern for EVDS.⁷⁴ Shortages of rental and other forms of affordable housing can cause systematic family stress or homelessness. Our faculty and students have worked on homeless-shelter design and the politics of siting in Calgary.⁷⁵ Beginning in the late 1980s, and increasing in the past decade or so of

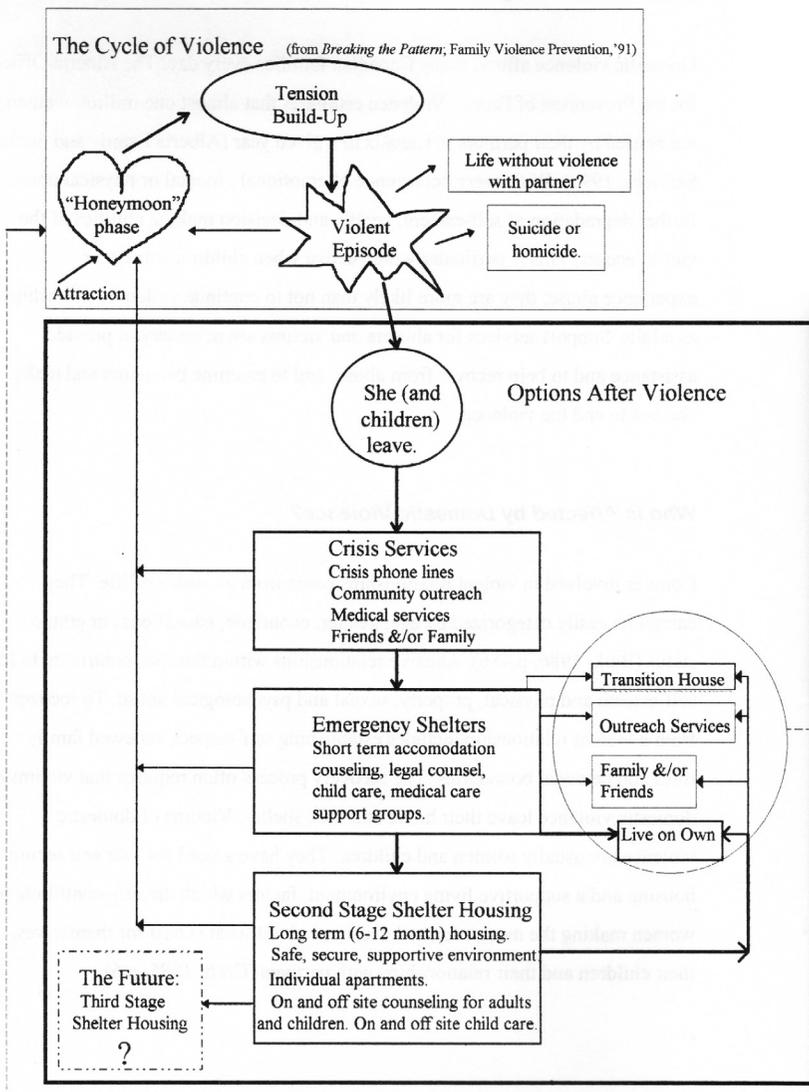


FIGURE 12. Options other than violence, 1996.

Calgary's growth, students have also focused on specific types of shelters: a youth emergency shelter,⁷⁶ a homeless shelter for a voiceless group,⁷⁷ and second-stage housing for victims of domestic abuse (see figure 12).⁷⁸

These projects propose sensitive housing solutions for groups not normally accommodated by traditional options, a temporary but important place where individuals or families can begin to restore their physical, mental, or economic health. In terms of affordable housing, student projects have included: investigating the growing issues of home affordability in Calgary,⁷⁹ assessing the quality of an existing low-income housing project,⁸⁰ finding ways to break down barriers to affordable home ownership,⁸¹ investigating the use of public-private partnerships to create more affordable housing,⁸² and creating an affordable-housing strategy for the town of Strathmore.⁸³ These EVDS projects proposing and promoting affordable housing hoped to offer a sense of security to people who face daily challenges in their attempts to maintain healthy lives.

While quality housing is essential to human health, defining and improving the quality of public spaces is also an important component of social well-being. Providing opportunities for community engagement allows for our spaces to be more welcoming to all Albertans, both new and established. Welcoming immigrants, the homeless, and otherwise marginalized individuals and groups into public space ensures our urban areas are open to all, and provides a space to seek respite and healing. Professor Catherine Hamel investigates how fear and past trauma impact new arrivals' experience of spaces in Alberta, and how architecture and public space can contribute to healing.⁸⁴ Similarly affecting has been the work of Professor Marc Boutin, who led the design of Poppy Plaza along Memorial Drive, which uses light and a material palette to evoke an emotive experience attuned to the memorialization of Calgary's military personnel.⁸⁵ Student work in the broad area of inclusive and engaging public space includes planning for ethnic diversity, and for queer space,⁸⁶ and proposing community services for immigrant women.⁸⁷ Related projects have explored the idea of the sacred in built environments in the search for cultural healing through design.⁸⁸ These projects act to raise the level of discourse around the importance of inclusive public space in Alberta, helping diverse groups to engage with a sense of place.

A particular type of public space related to well-being in the city is the park,⁸⁹ which provides access to fresh air and natural surroundings and

is a place for exercise and recreation. Designing parks that can be used by people of all cultures, ages, and physical abilities allows these spaces to be truly in the public good. First off, park areas must be conserved in developing communities so that citizens have equal access to salubrious green space. In the early 1970s, EVDS faculty members were central to the movement that preserved Calgary's Nose Hill as an enormous natural Prairie grassland park, the conservation of which has shaped the city's subsequent growth around and beyond Nose Hill. Throughout the faculty's history, EVDS students have also been greatly interested in the design of different types of urban parks. Among many examples across different eras, student teams proposed upgrades to the recreation facilities at the William Pearce Water Conservation Area along the Bow River;⁹⁰ the development of a waterfront park as part of the Heritage Canada Mainstreet Program for downtown revitalization in Peace River;⁹¹ and a wildlife-management framework for Medicine Hat's urban parks.⁹²

All of these projects are concerned with a healthy interface between the urban and natural spheres, referring to the physical and emotional benefits accessing nature as justification for planning and design decisions. Students also have worked on projects that posit the restorative aspects of gardening—for instance, through the implementation of community gardens, or the deployment of gardens as part of a therapy program for troubled youth.⁹³ Public parks and gardens contribute to citizens' well-being, but also to the health of the city as an ecological system.

People living in cities affect the landscape in several ways; EVDS research into healthy urban ecologies has long focused on waste and water management. Waste materials are generated every day by people across Alberta. Diverting garbage before it reaches landfills, and mitigating the effects of product packaging, are some of the ways EVDS faculty have sought to conserve the quality of the Calgary and Southern Alberta environment.⁹⁴ Student work on urban waste management has encompassed the following topics: reducing the garbage produced on the University of Calgary campus;⁹⁵ evaluating and improving upon Stony Plain's waste-management strategy;⁹⁶ and working toward a zero-waste framework in Calgary.⁹⁷ These projects look at waste and garbage in order to ask: How can we reduce, reformat, and adapt to new ways of disposing? A large contributor to landfills is construction and demolition waste produced by our ever-growing cities. Professor Josh Taron works in partnership with

the City of Calgary to track construction waste and to find novel alternatives to wholesale building demolition, which would assist in improving the sustainability of our building practices.⁹⁸

Water is an essential resource for humans and the ecosystems. City water needs to be potable, as well as clean for animals, plants, and recreational uses. Urban water quality raises questions of cleanliness, supply, consumption, and stormwater management. Significantly, as Calgary's 2013 flood disaster demonstrated, the landscape also impacts the city in significant ways. The process of environmental design can allow us to develop solutions for how we plan cities and rebuild them after a crisis. Before disaster happens, planning can help mitigate potential harmful effects. In 2013, EVDS hosted the Make Calgary Resilient Symposium in cooperation with the Institute for Public Health. The speakers were international thought-leaders whose lectures and workshops generated ideas for making Calgary more prepared for, and adaptable to, natural disaster. The list of EVDS student projects on the theme of planning for water goes back several decades, and has focused on stormwater management within Calgary;⁹⁹ the implications of low-impact development in watersheds;¹⁰⁰ water-management planning in urban creeks;¹⁰¹ and water quality and conservation strategies for specific sites.¹⁰² Of course, as soon as we begin to consider resource management in our urban ecosystems we must think beyond the city. Water, wildlife, and other key issues for health and environmental design require a broader view as well—at the scale of the region.¹⁰³

Biome: Projects at the Regional and Ecosystem Scale

When human settlements endeavour to manage ecological systems, they necessarily begin planning at a regional scale. At this scale, EVDS projects extend to the non-urbanized areas of the province. While this is true for water management, it is equally so for other resources and species. The green spaces of urban parks often extend far into the countryside, as with Fish Creek or Elbow Valley.¹⁰⁴ Urbanization increases human contact with wildlife far outside municipal boundaries (and also within them). EVDS research has assessed the impact on, and proposed healthful solutions for, human interactions with regional environments. For example, a watershed or drainage basin is an area of land where surface water (rain, snow,

ice) converges to a point at lower elevation. In Alberta, our watersheds are our essential life-support systems, and managing them is important to our health, and the health of the other species. Urban development demands a lot of water, while water is also tied to the livelihood of agriculturalists.¹⁰⁵ A significant recent research project run by Professors Mary-Ellen Tyler and Mike Quinn has addressed water-planning science and policy in the Calgary region.¹⁰⁶ Students have proposed similar holistic approaches to regional water management, such as an irrigation plan using Calgary's secondary sewage effluent,¹⁰⁷ as well as various frameworks to improve and integrate land use and water management.¹⁰⁸

As within cities, EVDS has been involved in the design of parks and recreation spaces at the regional scale. Regional park spaces connect the public with rural ecology, and often provide a way to preserve special areas of the landscape and wildlife habitat. These parks can offer opportunities for public education and interpretation about healthy environments. They also offer a multitude of healthy activities like hiking, canoeing, skiing, and snowshoeing. One of the challenges of designing regional recreation spaces is planning for different uses during summer and winter seasons. Going back several decades, students working on the theme of regional parks have proposed wildlife observation sites and facilities for Kananaskis Country, interpretive centres and trail designs to allow for education of the public on wildlife habitat, a hazardous-waste-management plan for Jasper National Park, and recreation plans to make regional parks accessible to commuters and locals alike, for numerous sites and seasons (see figure 13).¹⁰⁹ These proposals link the sustaining power of nature with the impact humans have on it—balancing development and conservation while promoting an understanding of healthy environments.

Whether inside or outside of parks, the general health of regional ecosystems must be monitored to help keep our life-support systems (and those of all species) in good working order. Monitoring ecological health and proposing improvements to the design of human interfaces with the environment have been significant research areas for EVDS.¹¹⁰ The research associates with the faculty's former Miistakis Institute translated academic research and knowledge for practical application in land and resource management using geographic information systems (GIS) and other tools for tracking the conservation and human use of landscapes.¹¹¹ Professor Cormack Gates focused on conservation design, and how

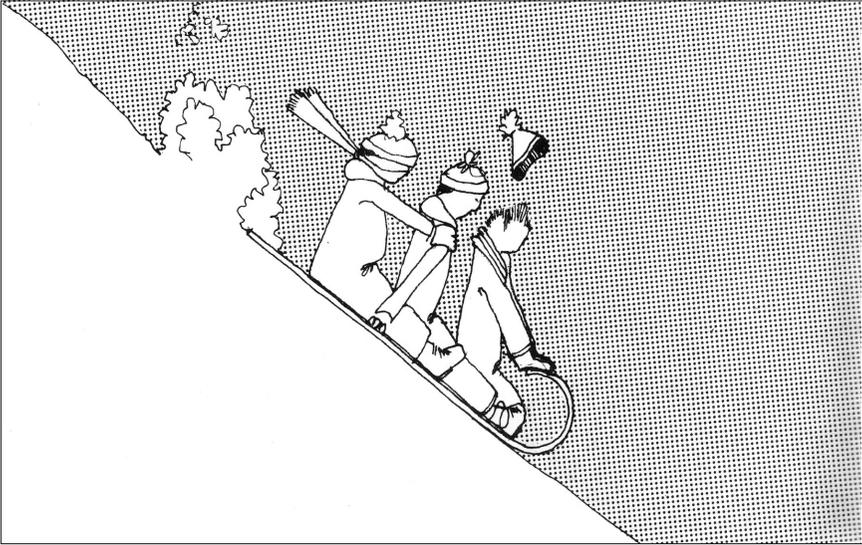


FIGURE 13. Winter recreation area proposed at Hastings Ridge, 1981.

restoring grassland and other natural areas affects the health of wildlife such as bison, pronghorn, and rattlesnakes.¹¹² Student work has focused on creating computer databases and public participation systems for monitoring ecological integrity,¹¹³ restoring grassland in Southern Alberta,¹¹⁴ and assessing the effect of resource extraction on habitat in Northern Alberta.¹¹⁵ Projects that monitor and measure the cycles of environmental impact assist with targeting conservation actions.

Studying the holistic impact of how we develop resources such as oil, gas, and coal was for many years the focus of Professor Bill Ross, a pioneer in environmental impact assessment (EIA).¹¹⁶ EIA is a process (like the design process) used to weigh the pros and cons of resource development before action is taken. The impact-assessment process can also be completed following development to determine if projects are causing unintended consequences to the local environment. Responsible resource development balances economic needs with the preservation of life-support systems like clean air, water, and soil. For instance, students conducted a coal-development impact study for the Nordegg/Rocky Mountain House area, to understand the social and economic impacts of resource

development there.¹¹⁷ Recently, the Faculty of Environmental Design and Mount Royal University were awarded a research grant to investigate the landscape impacts of hydraulic fracturing development on surface water, acknowledging that quality of water will affect quality of human health.¹¹⁸

Finally, understanding and conserving the health of Alberta's wildlife is of central concern to EVDS research today. Tracking and monitoring the health of large fauna can tell us more broadly about the health and balance of the ecosystem. These animals are known as "indicator species," and Professor Marco Musiani uses tracking techniques with wolves and caribou to assess overall ecosystem health in Alberta.¹¹⁹ As with EIA work, this knowledge can be used to inform development related to oil and gas, to ensure we don't overload the delicate balance of the ecosystem. Professor Paul Galpern works toward effective pollinator conservation, looking at how landscape context (i.e., human intervention) has influenced pollinator health and populations.¹²⁰ Another important aspect of EVDS research has been managing human-animal and animal-vehicular interactions for the health and safety of all parties. Student projects with this focus span beaver-management alternatives for an Alberta ranch,¹²¹ modeling pronghorn antelope populations in Southern Alberta,¹²² and minimizing human-wildlife interactions in high-traffic corridors.¹²³ Management projects such as these involve big data and tracking, using vigilance to monitor the state of the ecosystem, and proposing interventions when necessary.

Conclusions

The engagement of different minds and diverse ideologies in creative problem-solving becomes a unifying experiential medium for interdisciplinary training . . . oriented to developing an understanding of the systemic relationships among environmental constituencies or to suggesting innovative social and physical models for environmental change.

—William Taylor Perks, "Architecture Manifesto," 1971¹²⁴

The research and practice undertaken in the Faculty of Environmental Design highlights how Albertans can plan for and provide ergonomic objects, healthy buildings, inclusive spaces, and livable cities. Environmental design is an innovative and potent process the faculty has used to investigate and intervene in the complex, interdisciplinary, and sometimes wicked problems that we confront with increasing frequency in our society. Through design, we have seized opportunities to expand our thinking and forged new pathways or models for health and wellness in Alberta. At all scales, design is an iterative process that requires thoughtful refinement, rigorous scholarship, and sensitive fine tuning.

Over almost fifty years, EVDS has worked at multiple scales and contributed a wide array of solutions for keeping Albertans healthy. But designing and planning sustainable places that facilitate health is not just a local issue. The spheres of EVDS activity and influence have been—and still are—far greater than just Calgary and Alberta. Many of our faculty members and students have worked across the globe to help other nations tackle challenging health-and-welfare issues such as slums, disaster planning and recovery, and environmental protection. For instance, EVDS students have done significant research on disaster planning abroad, which can inform our practice in Alberta.¹²⁵ Affordable housing and homelessness are also issues that prove to be acute all over the world. In rapidly urbanizing places, there is often inadequate infrastructure in place to accommodate people in shelters. Informal settlements and temporary housing situations can happen for a number of reasons beyond economic and demographic imperatives, such as inadequate planning and policy, outdated legislation, and corrupt public administration.¹²⁶ Professors Sasha Tsenkova and Brian R. Sinclair work to identify and mitigate these challenges, and provide clear protocols and policy options for providing essential services like medicine and education to citizens who live in informal situations.¹²⁷ Recent student work on healthful housing and urban well-being around the world has spanned from Brazil to Morocco to the Johannesburg townships in South Africa.¹²⁸

As we can glean from these examples, there are global connections across all scales, and these require an integration of research into a collective body of knowledge that informs and directs healthy policy and professional practice in design. Research, practice, and policy are often separate arenas. By eliminating the gaps between these spheres, EVDS has sought

to create a more holistic framework for transitioning the knowledge gained through research into effective environmental design practice. Orienting EVDS students to capture the essence of health and sustainability is a hallmark of education in the faculty. Undergraduate and graduate students learn there are many facets to health, and as a professional faculty we have taken responsibility for training the next generation of leaders who will design more sustainable societies. We facilitate research abroad, to learn from other global leaders in health and sustainability. Measuring and revising the impact that our spaces and places have on the health of humans and nature is an important approach that the Faculty of Environmental Design has been dedicated to since its founding, as shown by the wide spectrum of impressive projects described in this chapter. There is no question that our future research, teaching, and service will continue to tackle complex health and wellness issues in Alberta and beyond, related to the different yet interrelated scales of the environment: body, building, block, and biome. *Design matters!*

NOTES

In April 2019 the school changed its name from the Faculty of Environmental Design to the School of Architecture, Planning and Landscape.

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