The Residential Green Building Action Plan

The following pages provide an in depth description of the context and direction of all eight component areas as well as the process improvements required. In each component area, goals, selected priority actions, targets and indicators are shown with an explanation of the context and key directions.

A complete list of UBC's short, medium, and long term actions for the residential action plan is shown in Appendix B.

In the residential neighbourhoods, REAP (the Residential Environmental Assessment Program) is the key policy driver. REAP is a UBC-specific green building rating system that applies to multi-use residential and mixed-use (residential with commercial at grade) buildings. The fundamental idea behind REAP building requirements is to support the reduction of environmental impact at the building site and neighbourhood scale incrementally over time. All new residential projects, including private developments and Faculty and Staff Housing, are required to achieve a minimum REAP Gold certification.

: Wesbrook Neighbourhood

PHOTOGRAPHER: PHILIP BERTOGG

Process

COMPONENT	GOALS
01	UBC policies and processes will support the achievement of the GBAP component goals and targets.
02	GBAP component goals and targets will be communicated and easily accessible to internal and external stakeholders.
03	UBC will integrate lessons learned from each project to improve building designs.
04	UBC buildings will be evaluated as opportunities for research, innovation and continuous improvement.
05	UBC will commit to monitoring and benchmarking building performance to encourage continuous improvement on campus and in relation to industry standards.



Residential Ideas Workshop

CONTEXT

Effective and efficient process is a foundational aspect of planning at UBC.



Key Directions

It is important to leverage and build upon existing processes to ensure that sustainability objectives inform development from project inception to post-occupancy performance tracking.

The University needs to start measuring the performance of projects in the neighbourhoods, learn from data collected, and integrate new knowledge into existing policies in all component areas of the GBAP.

Tying operations into teaching, learning and research through short- and long-term strategic research opportunity plans will help connect the necessity of physical facilities to the enhancement of UBC's academic mission.

FIVE-YEAR IMPLEMENTATION PLAN - SHORT-TERM PRIORITY ACTIONS

- Develop a sustainability process for new residential construction.
- Develop a process to introduce GBAP requirements for retrofit and renovation projects in neighbourhoods.
- Create REAP credits for mandatory benchmarking, performance reviews and post-occupancy surveys.
- Create a GBAP requirements web page that links to all relevant policies and tools for easy accessibility by stakeholders.
- Update to REAP 3.1 for BC Energy Step Code alignment.
- Update to REAP 4.0 based on component area priorities in time for the development of the Stadium Road neighbourhood with stakeholder review.
- Update the UBC Advisory Urban Design Panel requirements to include sustainability outcome requirements.

Energy

COMPONENT	GOALS
01	UBC buildings and landscapes will advance the campus towards net positive energy and greenhouse gas neutrality by reducing energy demand and focusing on site-specific passive design approaches.
02	UBC buildings will have indoor thermal environments that are comfortable and enhance health and wellbeing.
03	UBC will integrate lessons learned to improve building energy performance.

CONTEXT

Buildings provide nearly 30% of regional GHG emissions¹⁷ and nearly half of emissions from the UBC residential neighbourhoods.¹⁸

To achieve improved energy performance and emission reductions along with other sustainability objectives, UBC established the Residential Environmental Assessment Program (REAP) in 2007 as a Land Use Rule.

To identify an energy and GHG reduction pathway in residential neighbourhoods, UBC developed a Community Energy and Emissions Plan (CEEP) in 2013 to set ambitious goals for energy and emission reductions. The CEEP identifies an energy and emissions reduction strategy that will result in a 90% reduction in building GHG emissions by 2050. To achieve this target, the CEEP recommends the establishment of a low-carbon Neighbourhood District Energy System (NDES), improved energy performance measures through REAP, and the implementation of a building retrofit program.

The objective of the NDES is to provide heat and hot water with reduced GHG emissions by providing low-carbon thermal energy for UBC residential neighbourhoods, including Wesbrook Place, East Campus, Acadia Park and Stadium Road. District energy is currently in phase 1 of its development, serving Wesbrook Place using temporary natural gas boilers. Phase 2 implementation will use an alternate energy source, currently contemplated as waste heat recovery from TRIUMF or interconnection with the ADES, which is expected to occur in 2024.

¹⁷ <u>Metro Vancouver. Greenhouse Gas Factsheet (2013).</u>

¹⁸ UTOWN@UBC. Community Energy and Emissions Plan (2013).



UBC is currently working on the balance between building performance and the business case for the development of the low-carbon NDES.

More recently, the Province of BC has instituted the BC Energy Step Code to define a pathway to net zero-ready buildings by 2032. The federal Pan Canadian Framework defines a similar pathway. TRIUMF – Advanced Rare Isotope Laboratory. The cooling towers at Triumf presently transfer all of the waste heat into the atmosphere. This waste heat could be used to provide thermal energy via hot water to the NDES.

ARCHITECT: CHERNOFF THOMPSON ARCHITECTS



Figure 9. An illustrative graph of UBC's greenhouse gas (GHG) emissions in residential developments and the role of the GBAP in reaching net positive operational carbon by 2050.

Pathway to Net Positive

The CEEP identifies an energy and emissions reduction strategy that will result in near zero building GHG emissions by 2050. To achieve this target, the CEEP recommends the establishment of a low-carbon Neighbourhood District Energy System (NDES), improved energy performance measures through REAP, and the implementation of a building retrofit program. In 2015, the BC Utilities Commission approved the establishment of phase 1 of a low-carbon energy utility—the UBC NDES. Phase 2 planning is in progress and will include a fuel switch from temporary natural gas energy centres to a renewable 60% energy centre in 2024. The CEEP targets a 100% renewable energy centre by 2040. To achieve improved performance and consistency with other BC jurisdictions, REAP 3.1 energy targets will be aligned with Step 2 of the BC Energy Step Code targets. Step 2 calls for an EUI of 130 kwh/m²/yr and a TEDI of 45 kwh/m²/yr.

Costing studies commissioned by UBC and the Province of BC demonstrate that BC Energy Step Code targets are cost effective for developers to Step 3 of the code (*Table 6*). The implications of the Step 2 target for REAP considers impacts on future demand and a utility rate for the NDES. The studies identified positive paybacks up to Step 3 of the code, on a life cycle costing basis (net-present value, including energy cost savings).

		UBC	STUDY	BC HOUSING STUDY
TYPOLOGY	STEP CODE LEVEL	LOW	HIGH	AVERAGE
LOW RISE	STEP 1	0.0%	0.0%	0.0%
	STEP 2	0.0%	0.1%	0.5%
	STEP 3	0.5%	1.1%	0.6%
	STEP 4	2.3%	4.1%	2.6%
HIGH RISE	STEP 1	0.0%	0.0%	0.0%
	STEP 2	0.4%	0.9%	0.4%
	STEP 3	0.5%	1.4%	0.8%
	STEP 4	2.3%	4.1%	2.4%

Table 6. Incremental capital costs based on costing studies by UBC and the Province of BC.

Key Directions

To ensure residential development is on a pathway to achieving net positive energy and GHG emissions, the GBAP's priority actions focus on the alignment of REAP with the BC Energy Step Code. This includes the implementation of an energy benchmarking monitoring program intended to provide feedback on the realized performance of REAP energy targets and the NDES. Improving the understanding of design measures to maintain thermal comfort under future climate conditions is an emerging priority. A key objective is to achieve GHG reductions across the energy demand and supply spectrum at the lowest total cost of ownership.

FIVE-YEAR IMPLEMENTATION PLAN - SHORT-TERM PRIORITY ACTIONS

- Undertake a study to identify envelope and mechanical design options that achieve comfortable indoor environment under predicted future climate conditions, with priority emphasis on passive approaches where feasible.
- Review feasibility of developing and implementing REAP requirements for existing buildings.
- Implement an energy benchmarking system as part of an ongoing monitoring program.
- Develop GHG intensity targets to ensure cost-effective pathways to zero GHG emissions for buildings connected or not connected to the NDES.
- Develop energy efficiency education programs, including a quick-start for strata councils, to support building owners and residents in partnership with the UNA.
- Mandate incremental energy use intensity (EUI) and thermal energy demand intensity (TEDI) building targets that align with BC Energy Step Code requirements and support the development of the NDES renewable energy centre by 2024.
- Mandate whole building airtightness testing and energy modelling in alignment with BC Energy Step Code by 2018 and set airtightness targets by 2020.
- Develop a program to inform building owners of energy performance through benchmarking reporting by 2020.

TARGETS AND INDICATORS

Target: New residential buildings will meet energy targets to be Net Zero Ready by 2032 in alignment with the BC Energy Step Code.

Indicator: Increase energy efficiency of existing residential buildings through standards and programs.



Central achieved REAP gold Plus and uses passive design features such as increased insulation to reduce energy demand. **ARCHITECT:** RAMSEY WORDEN ARCHITECTS

Water

COMPONENT GOALS

01

UBC will practise responsible water management and use at the building and site scale by advancing water conservation and efficiency, exploring alternative water supply and treatment solutions and building water supply resiliency.

02

UBC will use a low-impact development approach to rainwater management at the site scale to mitigate risk and respect the natural hydrology of the campus.



Kitchen in Faculty and Staff housing featuring low flow plumbing fixtures and Energy Star appliances to reduce water use

CONTEXT

In the Lower Mainland of BC there exists a relative abundance of water. However, there are still times when water supplies are low or deficient.

With the impacts of climate change, even more frequent periods of drought in future summer months as well as more frequent intense and severe rainfall in the winter are expected. UBC will be a leader in conserving water and will improve rainwater management by managing this valuable resource and supporting the regional water balance between water use and rainfall.



Wesbrook Neighbourhood **PHOTOGRAPHER:** PHILIP BERTOGG

Pathway to Net Positive

Although the University has made great strides in increasing water use efficiency, it is committed to continual improvements in monitoring and research to better understand how water is used, the potential for water reuse strategies, the role UBC should play in the greater region in the event of water emergencies, and how best to adapt to increased droughts brought on by climate change. The GBAP will align with and integrate building and landscape guidance called for in the (concurrent) Water Action Plan.

Rainwater management will be envisioned, designed and built as a holistic system of low-impact development with green roofs and at-grade solutions combined for new building projects and, where possible, for renewals. Low-impact development (LID) recommendations for UBC include: reduced hard surfaces, thicker top soil, climateadaptive landscapes, bioswales, French drains and rain gardens. On building sites more than 300 meters from the cliffs, the opportunity to use LID will be optimized; a more cautious approach is required closer to the cliffs to mitigate the risk of cliff erosion.

Key Directions

GBAP priority actions focus on a water metering and benchmarking strategy and the development of landscape and irrigation design standards. Landscape and irrigation design standards will be updated to incorporate droughtresistant plantings and more suitable trees. Irrigation will be tailored to specific plant requirements across the campus to ensure responsible water use.

Rainwater management priority actions include improving LID site rainwater management to help mitigate the risk of floods and cliff erosion on campus as well as developing criteria and guidelines for the use of green and blue roofs.

FIVE-YEAR IMPLEMENTATION PLAN - SHORT-TERM PRIORITY ACTIONS

- New residential projects to achieve the same rainwater management requirements as institutional projects by 2020.
- Institute a residential building benchmarking program for water consumption.
- Develop a water metering strategy (building and suite level) for residential buildings; consider a visualization concept that concurrently educates users.
- Develop building landscape and associated irrigation design standards for upcoming neighbourhoods based on low impact development.
- Develop a strategy that coordinates building landscape rainwater management with rainwater management in the public realm.
- Develop criteria and guidelines for green roof and blue roof projects, based on rainwater management capacity, co-benefits, maintenance and operation considerations for residential building typologies.
- Promote the use of seasonal rainwater features in policy which do not use potable water and consider the life cycle costs for strata owners.

TARGETS AND INDICATORS

Target: Maximize rainwater management using lowimpact development on building sites that are more than 300 m from cliffs.

Indicator: Increase infiltration, retention and detention of rainwater in the neighbourhoods.

Materials & Resources

COMPONENT GOALS

01	UBC will prioritize the use of building materials that have net positive environmental impacts.
02	UBC will support marketplace transformation by designing buildings with materials that are not harmful to human and ecological health.
03	UBC will support the development of the circular economy by promoting the adapta- tion, reuse and recycling of materials and products during a building's lifetime.

CONTEXT

UBC has policy in place to reduce the environmental footprint in its material choices, the handling of these materials and the waste products generated during construction and occupancy (REAP). To work towards the materials and resources component area goals, policy will need to be implemented incrementally over the GBAP time frame to update materials credits to current practice and improve over time.

Pathway to Net Positive

By shifting material choices based on environmental and health impacts, UBC can continue to reduce the negative environmental and health impacts of the University's buildings and play a significant role in moving the marketplace towards net positive impacts.



The entrance sequence features a glulam structure, the beams an columns are locally manufactured. **PHOTOGRAPHER:** PHILIP BERTOGG



The Yu Building is clad in brick which is a highly durable material **ARCHITECT:** PERKINS+WILL

Key Directions

The GBAP will require material transparency through environmental product declarations and will prioritize materials with reduced environmental impact and low levels of embodied carbon. The GBAP will develop an approach to identifying and eliminating building materials considered harmful to health based on reviews of best practices and a market supply analysis.

FIVE-YEAR IMPLEMENTATION PLAN - SHORT-TERM PRIORITY ACTIONS

- Develop guidelines for building materials considered harmful to health in their use or manufacture, based on best practice review, stakeholder engagement and consideration of market supply.
- Require incremental reductions in environmental impact of building materials, based on pilots, best practice review and market readiness study.
- Implement design service life requirements for new construction projects.
- Create an integrated policy for building materials that considers reduced environmental impact, healthy material requirements and life cycle analysis.

TARGETS AND INDICATORS

Target: Eliminate 100% of UBC-identified building materials in new construction that are known to be detrimental to human and ecological health by 2035.

Target: Require all new buildings to be Zero Waste Ready¹⁹ by 2020.

Target: Divert 100% of construction and demolition waste from landfill by 2035.

¹⁹ Buildings fully meet the most recent version of the Recycling Infrastructure Guidelines for UBC Buildings and the UBC Technical Guidelines related to waste and recycling requirements.

Biodiversity

COMPONENT GOALS

UBC will develop highly functioning landscapes at the building and site scales to contribute to biodiversity and natural ecosystem processes.

02

01

UBC will engage campus teaching and research opportunities to enhance biodiversity management capacity.



CONTEXT

Biodiversity is the richness of plant and animal species, their ecosystems, and the ecological processes that sustain them.

Ecological processes cross scales beyond the boundary of a building site. Enhancing biodiversity by nurturing natural systems provides for a range of ecological services: local and global climate regulation, water supply retention, erosion and sediment control, hazard mitigation, pollination, habitat functions, waste decomposition and treatment, human health and wellbeing, food and renewable non-food products, and cultural benefits. The natural systems of UBC are a critical component of the University's identity and support community health and well-being.

The neighbourhood areas of campus are comprised of both private and public landscape areas. Thoughtful master planning of these landscape areas offers the greatest potential to maintain or re-establish the natural systems that are essential to the health of environments. As owner of the public realm, and planner and regulator of campus neighbourhoods, the University can achieve a systems-based approach to incremental landscape development within the framework of private sector development.

Through REAP and the neighbourhood plans, UBC has set out requirements related to biodiversity. Requirements for drought-tolerant and -adapted landscapes are mandated in REAP. Elements like greenways (connection to larger habitat areas), green edges, tree retention and parks, and bird-friendly design guidelines for buildings are integrated into existing neighbourhood plans.

The forests around UBC are valuable ecological assets **PHOTOGRAPHER:** PHILIP BERTOGG PHOTOGRAPHER: PHILIP BERTOGG

Pathway to Net Positive

A net positive approach involves nurturing UBC's natural systems that provide for a range of important ecological services, which are typically undervalued. The Green Building Action Plan supports and is expected to integrate with an emergent Biodiversity Strategy for the campus as a whole. This strategy will identify principles, objectives and metrics that will inform site-specific building and landscape requirements for integration in updates to the GBAP. The strategy will leverage partnerships with Metro Vancouver and City of Vancouver to ensure alignment with their biodiversity strategies.

Natural systems are a critical component of the University's identity and support the place and experience component. The biodiversity that these systems support is part of community health and wellbeing and helps to sustain mental and physical health. The ability of natural systems to help UBC adapt to climate change is an additional co-benefit.

Key Directions

Priority actions for biodiversity focus on ensuring that major residential project address ecological assets identified in neighbourhood site assessments, developing principles for landscapes and green roofs, and improving bird-friendly design guidelines.

Updated credits in REAP Version 4 and future neighbourhood plans will be based on review of best practices and guidelines, such as the Sustainable Sites Initiative. Specifically, the GBAP will provide guidance for landscapes and green roofs that consider the ability for the planted installations to support regional biodiversity priorities and provide other co-benefits.



FIVE-YEAR IMPLEMENTATION PLAN - SHORT-TERM PRIORITY ACTIONS

- Require all major projects to address a neighbourhood-wide site assessment that identifies important ecological assets, endangered and vulnerable species and environmentally sensitive areas.
- Establish partnerships between research and operations through participation in CBIRD (Campus Biodiversity Initiative: Research and Demonstration) and related Level 1 and 2 SEEDS projects.
- Develop a set of principles for neighbourhood landscapes and green roofs that consider the following: ability to adapt to climate change, ability to attract pollinators, microclimate suitability (sun, shade, etc.), ability to support passive solar strategies (e.g., provide shade, reduce wind), irrigation zones (green/brown areas), and regional biodiversity priorities.
- Further develop UBC Bird Friendly Design Guidelines for Buildings and create a mandatory policy in order to reduce the number of bird collisions with buildings.

TARGETS AND INDICATORS

Target: Require 100% compliance to UBC Bird Friendly Design Guidelines for Buildings for new residential buildings by 2025.

Indicator: Increase opportunities to provide habitat for birds, pollinators and other species.

Note that, based on foundational studies and data gathering identified in the GBAP actions, further targets and indicators will be integrated into future updates of the GBAP.

Health & Wellbeing

COMPONENT	GOALS
01	UBC will enhance the mental, physical and social dimensions of wellbeing by making them integral to building and landscape design decisions.
02	UBC researchers, community stakeholders and building occupants will be engaged in a meaningful and ongoing way to inform building design decisions around health and wellbeing.
03	UBC will become a leader in enhancing wellbeing through the built environment within the context of higher education in Canada.

CONTEXT

UBC's neighbourhood environments, both built and natural, play a vital role in the physical, mental and social wellbeing of all students, staff and faculty.

Well-designed spaces can work to promote physical activity, enable social connections, improve productivity, learning, and overall health, and foster equity.

Bicycle parking outside the Westbrook Community Centre accommodates a healthy mode of transportation **PHOTOGRAPHER:**

PHILIP BERTOGG

Pathway to Net Positive

A system-wide holistic and proactive approach that champions wellbeing is currently in development through UBC Wellbeing. UBC Wellbeing is a collaborative effort that aims to make the University a better place to live, work and learn.

Prioritizing health and wellbeing is foundational to the success of individuals and the overall community at UBC and provides co-benefits to the biodiversity and place and experience components.

Key Directions

The GBAP will coordinate guidance for how building and landscape design can nurture the social dimensions of wellbeing. Wellbeing principles, objectives and metrics, rooted in this strategy, that will inform site-specific building and landscape requirements will be integrated into the GBAP.



FIVE-YEAR IMPLEMENTATION PLAN - SHORT-TERM PRIORITY ACTIONS

- Identify metrics for health and wellbeing in residential buildings (e.g., temperature, indoor air quality, daylight levels, acoustic levels, views to exterior, number of indoor plants, etc.).
- Update bicycle storage requirements in policy through stakeholder engagement and recommendations made in the study Making Spaces: Bicycle Storage in Multi-Unit Residential Buildings on the University of British Columbia Campus.²⁰
- Update REAP to include health and wellbeing credits.
- Develop amenity spaces that respond to community needs and are flexible and adaptable over time.

TARGETS AND INDICATORS

Note that, based on foundational studies and data gathering identified in the GBAP actions, further targets and indicators will be integrated into future updates of the GBAP.



Red Barn Community Centre Playground provides a play area essential to family health and wellbeing **PHOTOGRAPHER:** PHILIP BERTOGG

²⁰ Smith, C. Making spaces : Bicycle storage in multi-unit residential buildings on the University of British Columbia Campus. (2017).

Quality

COMPONENT GOALS

01

UBC buildings and landscapes will be durable, reliable and resilient.

CONTEXT

Quality is defined as that which makes a building reliable, durable, resilient, comfortable, dependable, and a contributor to the UBC brand.

UBC intends to continue to build innovative neighbourhoods that support a strong sense of community and, through their development, contribute financially in a significant way to the University endowment.

Quality construction for neighbourhood buildings is required through REAP and the neighbourhood plans. REAP mandates sustainability requirements that improve the quality of life for

residents, such as the requirement for low-emitting materials on the interior of buildings. The neighbourhood plans have requirements for the exterior appearance and cladding materials of buildings that are aesthetically appropriate and have attributes of increased durability compared to typical multi-unit residential buildings.

Key Directions

UBC will work to ensure new buildings are built to a level of quality that reflects an optimum total cost of ownership for UBC as well as owners and renters of units. UBC intends to improve the branding of REAP and its link to quality building.

REAP will provide verified energy performance by instituting Energy Step Code requirements, including mandatory energy modeling and air tightness testing, along with energy commissioning. This will provide residents with comfortable buildings and owners with reduced energy costs and assurance that energy systems are functioning properly.

UBC supports quality construction in the neighbourhoods to provide superior housing for faculty, staff, students and residents, and this reflects well on the University's reputation.

FIVE-YEAR IMPLEMENTATION PLAN — SHORT-TERM PRIORITY ACTIONS

- Create a branding strategy for REAP to increase awareness of UBC's sustainable buildings.
- Work with real estate agents to ensure all buyers are aware of sustainability benefits associated with buildings.

TARGETS AND INDICATORS

Target: Achieve 100% compliance with REAP Gold requirements by 2020.

Note that additional quality targets and indicators will be integrated into future updates of the GBAP.





Above + Left: Wesbrook neighbourhood's REAP certified buildings help provide quality to residents through sustainable design.

PHOTOGRAPHER: PHILIP BERTOGG

Climate Adaptation

COMPONENT GOALS

01 02

UBC buildings and landscapes will have the resilience to respond to both anticipated and unpredictable changes in climate.

UBC will engage with researchers in a meaningful and ongoing way to inform building policy and guidelines around climate adaptability.

CONTEXT

Through historic evidence and future modelling we know that temperatures will continue to rise as a result of climate change.

For the Lower Mainland, modelling predictions indicate that there will be long-term warming, more extreme weather events, changing precipitation patterns and rising sea levels.²¹ These changes mean an increased risk of flooding, damage from storms and overheating during summer highs. Changes to the design, construction and renovation of buildings and landscapes will be required to adapt to these future impacts. Without action, UBC's livability and economic prosperity goals are at risk. Climate adaptation could be achieved through a change in approach to different aspects of building design, including: building form and orientation, building envelope, roof design, glazing design, internal layout, interior environment, service infrastructure, exterior spaces and the relationship between indoor and outdoor space. A change at UBC is that building will need to be designed for human comfort in the higher temperatures expected in our region over the building's lifetime.

Pathway to Net Positive

The broader UBC Resiliency Initiative will develop principles, objectives and metrics to guide adaptation in buildings and landscapes and address policies and guidelines that respond to risk across scales—building, neighbourhood, campus and region. UBC will partner with regional partners, including Metro Vancouver and the City of Vancouver, to coordinate strategies.

Climate adaptation actions can provide multiple or synergistic benefits. For example, improved building envelopes can have multiple benefits, including reduced thermal heat transfer, reduced energy costs, reduced GHG emissions and improved thermal comfort. However, this must be balanced with the potential for increased cooling needs in future warmer temperatures resulting from these tight building envelopes. Adaptation actions intersect with other components, including water and energy. For example, water conservation is a climate adaptation strategy that helps to reduce impacts from hotter, drier weather in future summers. For buildings, design measures such as shading, orientation, glazing and ventilation help to reduce energy demands and provide thermal comfort in hotter, drier summers.

As investments are made in UBC's buildings, it is imperative that designs, retrofits, operations and maintenance respond to adaptation needs. The cost of no action, both from future retrofit and public safety perspectives, could be much higher than proactively planning infrastructure to be resilient to future climate.



Yu Building courtyard allows cross ventilation for all suites which helps to keep units cool in summer **ARCHITECT:** PERKINS+WILL

Key Directions

UBC requirements for residential development in REAP will ensure buildings and landscapes adapt to a changing climate by using the most up-to-date climate data to guide building design and retrofits. Priority actions focus on review of best practice for adaptation and identifying and conducting vulnerability assessments of residential infrastructure, including buildings, landscaping and stormwater infrastructure. GBAP actions will be integrated with an emerging campus Resiliency Initiative, when available, which will develop principles, objectives and metrics to guide adaptation in buildings and landscapes. Additional guidance in the water and energy component areas address specific approaches to climate adaptation.

FIVE-YEAR IMPLEMENTATION PLAN - SHORT-TERM PRIORITY ACTIONS

- Review current research and best practices for climate adaptation strategies in residential buildings.
- Identify climate adaptation research opportunities for buildings and landscapes on local, regional and global scales.
- Conduct vulnerability assessments for neighbourhood buildings and infrastructure.
- Coordinate with the campus-wide Resiliency Initiative for climate adaptation strategies, as they evolve, by implementing policies on a building and landscape scale that respond to key climate change impact areas.
- Implement policies (REAP updates, neighbourhood plans) for climate adaptability in the neighbourhood built environment.

TARGETS AND INDICATORS

Based on foundational studies and data gathering identified in the GBAP actions, further targets and indicators will be integrated into future updates of the GBAP.

Place & Experience

COMPONENT GOALS

01

UBC buildings and landscapes will provide opportunities for collaboration, innovation and community development to reflect the social and environmental sustainability aspirations of the University.

CONTEXT

UBC already has ambitious and successful place-making policy and is looking for improvements and synergies with other themes to carry through to new neighbourhoods.



UBC Campus and Community Planning is responsible for long-range and current planning, which includes regulating development that supports the University's strategic directions through planning initiatives and day-to-day activities.

Pathway to Net Positive

Place and experience is a component of the GBAP that specifically promotes architectural and landscape designs that outwardly express social and environmental sustainability aspirations of UBC. This component area is emerging in nature. Examples of strategies might include:

- Celebrating natural systems (e.g., greenway water feature on the east side of Wesbrook Place).
- Using locally appropriate materials (e.g., use of wood at Sail).
- Fostering social connection and cohesion through the design of exterior or interior spaces (e.g., exterior courtyards at Dahlia and Magnolia).
- Building elements that tell a story and learning landscapes.
- Exposing building systems creatively.

Wesbrook Community Centre provides and gathering and recreational space for residents **PHOTOGRAPHER:** PHILIP BERTOGG



Outside amenity space encourages social interaction at Nobel House Staff & Faculty housing

PHOTOGRAPHER: COURTESY VILLAGE GATE HOMES

Key Directions

Design has a role to play in telling the sustainability story of the building and landscape and communicating their unique identities. Design can also express human and ecological wellbeing by teaching about the processes or systems within the building or by expressing their presence. Expression can also be more abstract and creative, which communicates sustainability in a less literal manner (e.g., through art installations or playful demonstrations). It is important that buildings and landscapes serve the larger aspiration of producing positive, memorable and personally relevant experiences, especially given the potentially limited time students are in attendance.

FIVE-YEAR IMPLEMENTATION PLAN - SHORT-TERM PRIORITY ACTIONS

 Establish GBAP place and experience component goals for buildings and landscapes in coordination with Campus and Community Planning during neighbourhood development (e.g., component goal: the design of the building and landscape expresses elements of UBC's social and/or environmental sustainable design initiatives).

TARGETS AND INDICATORS

Note that targets and indicators may be integrated into future updates of the GBAP.