

Pathway to a Net Positive Campus

UBC GREEN BUILDING ACTION PLAN

APPENDIX A INSTITUTIONAL ACTION PLAN

APPENDIX B RESIDENTIAL ACTION PLAN



THE UNIVERSITY OF BRITISH COLUMBIA
Campus + Community Planning

APPENDIX A: INSTITUTIONAL ACTION PLAN — GUIDE

This guide:

1. Outlines the structure of the institutional action plan.
2. Acts as a legend on how to read the detailed goals, targets, indicators, and actions in each component area and their path of implementation.

COMPONENT AREA	The component areas organize all goals, targets, indicators, or actions outlined in the GBAP. The 8 component areas are: energy, biodiversity, water, place & experience, materials & resources, quality, climate adaptability, and health & wellbeing.				
ACTION CATEGORY	Actions are categorized in order of importance: PA: Priority Action, A: Action, SA: Sub-action				
THE GOAL, TARGETS, INDICATORS AND ACTIONS	The goal, target, indicator, or action identified by the GBAP.				
ACTION LEVEL	The action levels correspond to the following: <ol style="list-style-type: none"> 1. Review and Research 2. Benchmark and develop metrics 3. Pilot approach or installation 4. Implement new policy or practice 5. Monitor and evaluate 				
MECHANISM	The policies, guidelines, and tools used to implement the action.	AUDP	Advisory Urban Design Panel	RFP	Request for Proposal
		BFDG	Bird Friendly Design Guidelines	SEEDS	Social Ecological Economic Development Studies
		CAP	Climate Action Plan	SP	Sustainability Process
		DB	Design Brief	DP	Development Process
		ISMP	Integrated Stormwater Management Plan	TG	Technical Guidelines
		MPDP	Major Capital Project Development Process	WAP	Water Action Plan
		PRP	Public Realm Plan	VCP	Vancouver Campus Plan
LEAD DEPARTMENT	The main department responsible for planning and achieving the action with coordination from S+E.	BOPS	Building Operations	S&E	Sustainability & Engineering
		C+CP	Campus & Community Planning	RMS	Risk Management Services
		CD	Community Development	UBC-W	UBC Wellbeing
		EWS	Energy and Water Services	UBCPT	UBC Properties Trust
SUPPORT DEPARTMENT	The department(s) that will participate and support the lead department in achieving the action.	HR	Human Resources	UNA	University Neighbourhood Association
		ID	Infrastructure Development	USI	UBC Sustainability Initiative
		PD	Planning & Design		
		PS	Project Services		
SHORT TERM 2018-2020	This action will begin between 2018-2020.				
MEDIUM TERM 2021-2025	This action will begin between 2021-2025.				
LONG TERM 2026-2035	This action will begin between 2026-2035.				

APPENDIX A: INSTITUTIONAL ACTION PLAN — PROCESS

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC policies and processes will support the achievement of the GBAP component goals and targets.							
		GBAP component goals and targets and will be communicated and easily accessible to internal and external stakeholders.							
		UBC will integrate lessons learned from each project to improve building designs.							
		UBC buildings will be evaluated as opportunities for research, innovation and continuous improvement.							
		UBC will commit to monitoring and benchmarking building performance to encourage continuous improvement on campus and in relation to industry standards.							
TARGETS & INDICATORS		Indicator: 100% of projects will conduct life cycle costing by 2025							
ACTIONS	SA	Conduct a scan of policies, guidelines and tools to identify major gaps and opportunities for organizational improvements.	1	Policy scan	S&E	ALL			
	A	Review strategies for retrofits, building and landscape renovation, and leverage available funds to optimize the delivery of GBAP.	1	n/a	ID	BOPS, S&E			
	SA	Coordinate a student Capstone or similar project that develops a post occupancy survey template based on best practices to understand the successes and challenges of UBC's buildings in the occupants' point of view.	1	POE NEW	ID	BOPS			
	PA	Explore the implementation of a benchmarking platform for energy, emissions, water and waste reporting.	1	Energy Star Portfolio Manager	EWS, S&E				
	SA	Develop a post occupancy survey template (from project improvement process).	2	POE NEW	ID				
	PA	Develop a decision-making tool template for tier 1 and 3 projects to determine project priorities.	3	MPDP	S&E	ID			
	PA	Create a GBAP requirements web page that links to all relevant policies and tools for easy accessibility by stakeholders.	3	Website	S&E				
	PA	Develop a more refined life cycle costing tool and/or am approach to be used by consultants during the building design process.	3	TG (LLC Tool)	ID	BOPS, EWS, S&E			
	PA	Ensure the Major Project Development Process achieves the process and sustainability objectives of the GBAP by improved integration of the Sustainability Process.	3	SP	S&E	ID, PS, UBCPT			
	A	Improve stakeholder involvement (by including BOPS and EWS) in Owner's Projects Requirements and review process to ensure opportunities or conflicts of site or building issues are included (from project improvement process).	3	SP	C+CP				
	SA	Review the green building process and map into the main development process. Provide detail around outcomes and deliverables required. If possible, workshops should be aligned, meaning there may not need to be separate sustainability workshops (from project improvement process).	3	MPDP	S&E				
	PA	Relate level 3 research opportunities to GBAP component goals to increase alignment of research and operations by creating a list of potential opportunities.	3	n/a	USI	S&E			
	SA	Create an annual forum which highlights lessons learned and celebrates operational achievements.	3	SP	S&E				
	PA	Evaluate current process to identify and implement strategies to consider all new building and landscape projects for integration of research level 2 and 3 potential in design, construction and post-occupancy phases.	3	n/a	USI	S&E, PT, ID			
	PA	Ensure that project design briefs (which describe UBC's project goals to consultants) are developed by an appropriate stakeholder group so that lessons learned by Building Operations are incorporated into building design.	4	MPDP, LEED Guide TG	EWS, BOPS	C+CP			
	PA	Align the UBC Technical Guidelines with GBAP requirements through an annual review and update process that fully engages stakeholders.	4	TG	BOPS	S&E, EWS			
	PA	Update the UBC Advisory Urban Design Panel requirements to include sustainability outcome requirements.	4	AUDP Requirements	S&E	PD			
	A	Improve stakeholder involvement in the Design Brief (e.g., always including BOPS and EWS) while ensuring clarity of direction and intent within the Major Capital Development process.	4	SP	PD, S&E	EWS, BOPS			
	PA	Develop short-term and long-term strategic research opportunity plans to help connect the necessity of physical facilities to the enhancement of UBC's academic mission.	4	n/a	C+CP				
	PA	Develop a program to conduct post occupancy surveys and introduce standard post-occupancy evaluation (in coordination with the Major Project Improvement Process) to better understand occupant's concerns.	4	SP	ID	S&E			
	A	Staff to systematically review projects post occupancy to understand successes and challenges in a more in depth way than current Board 4 meetings (Capstones Wi-Fi pilot is key).	4	SP	ID	BOPS			
	SA	Implement a system for regular monitoring and progress check-in of GBAP actions across all responsible departments or parties and report out annually.	5	GBAP progress monitoring NEW	S&E				
	SA	Review and update the GBAP every five years.	5	GBAP	S&E				

APPENDIX A: INSTITUTIONAL ACTION PLAN — ENERGY (E)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC buildings will advance the campus towards net positive energy use and greenhouse gas neutrality by reducing energy demand and focusing on site-specific passive design approaches.							
		UBC buildings will have indoor thermal environments that are both comfortable and energy efficient.							
		UBC will integrate lessons learned to improve building energy performance.							
TARGETS & INDICATORS		Target: New institutional buildings will meet incrementally reduced energy targets to be Net Zero Ready by 2030.			S&E	EWS			
		Target: Reduce average building thermal energy use intensity for campus buildings by 50% to 75 kwh/m2/yr by 2050.			S&E	EWS			
		Target: Reduce the performance gap between modelled and metered energy use in institutional buildings by 75% within three years of occupancy by 2020.			S&E	EWS			
ACTIONS	PA	Review and revise Indoor Thermal Environment TG to reflect future climate conditions.	1	TG	EWS	S&E			
	PA	Identify passive and mechanical design requirements for buildings of different uses and space criteria that achieve comfortable indoor environments under predicted future climate conditions.	1	Consultant Study	S&E	EWS, ID, BOPS			
	SA	Complete a Capstone Study to inform the steps required to develop a district cooling strategy.	1	Capstone Study	EWS	S&E			
	A	Conduct a SEEDS project audit of institutional buildings to develop a process for mechanical retrofits.	1	SEEDS	EWS				
	SA	Develop a sliding EUI target for science labs that accounts for equipment, space program and energy use intensity.	2	TG	EWS	S&E			
	SA	Develop a strategy to set EUI targets for existing buildings .	2	TG	EWS	S&E			
	A	Benchmark institutional buildings and upload information to Portfolio Manager to rank UBC's progress (requires new resources).	2	LEED Guide	S&E	EWS			
	SA	Coordinate with ongoing Major Project Improvement Process to adopt outcome-based metrics for buildings.	2	SP	S&E	PS, S&E			
	A	Develop minimum requirements for overall building envelope thermal performance in the TG's (and modelling guidelines).	2	TG	S&E	EWS			
	SA	Complete further research or consultant work to inform the development of a district cooling strategy across scales.	2	Capstone Study	EWS	S&E			
	PA	Develop cost-effective low-carbon cooling strategies (including consideration of district cooling) to address thermal comfort needs at UBC.	3	Cooling strategy NEW	EWS	BOPS			
	A	Develop requirements for PV ready buildings to take advantage of future cost effectiveness.	3	TG	S&E	EWS			
	A	Require a low carbon equivalent alternative energy source to the ADES where a building project is granted a variance from connecting.	4	CAP	C+CP	EWS			
	PA	Establish mandatory incremental energy use intensity (EUI), thermal energy demand intensity (TED), and consider development of thermal demand (W/m2) and GHG Intensity (kgCO2e/m2/yr) targets for new construction projects.	4	TG	EWS	S&E			
	PA	Require whole-building airtightness testing in alignment with BC Energy Step Code.	4	TG					
	PA	Develop and implement a Smart Building Strategy and revise Monitoring Based Commissioning and Commissioning Technical Guidelines with results from the Smart Commissioning pilot projects.	4	TG	S&E	EWS			
	A	Revise energy modelling guidelines that will be required to improve the accuracy of building energy models and align with Step Code.	4	TG	EWS	S&E			
	A	Mandate comfort modelling of spaces in Tier 1,2,3 projects so that teams can develop and implement mitigation strategies.	4	TG					
	SA	Based on previous actions, develop requirements for cooling strategies and incorporate into policy .	4	TG	S&E				
	PA	Develop a strategy and implement policies and procedures during building design to improve operability, and maintainability as well as reduce the cost of ownership of energy-related systems in new construction projects: <ul style="list-style-type: none"> Implement a process for managing operational staff input in the design and specification of energy-related building systems (e.g., HVAC, lighting, envelope, etc.) (underway) Ensure adequate access to operational and maintenance equipment through review using BIM 3D walkthrough Ensure that the value engineering step in the design development project phase includes technical review by staff so that optimal design is achieved (notification system under development by infrastructure development) Review and amend priority energy equipment (e.g. chillers, heat pumps) specifications to reflect operational and maintainability concern Ensure that the shop drawing review step is included in construction project phase (notification system under development by infrastructure development) 	4	SP, TG	ID, BOPS	EWS, UBCPT			
	SA	Explore operational data analytics software applications for asset management, total cost of ownership decision making and predictive maintenance.	4	Software NEW	EWS	BOPS			
	A	All new major projects to be PV ready.	4	TG	S&E	EWS			
	SA	Establish process to calibrate models after occupancy.	5	TG	EWS				
	SA	Provide ongoing feedback on building energy performance to SHHS and other ancillaries .	5	n/a	EWS				
	A	UBC to participate in the further development of the Step code for Part 3 buildings with the province.	5	Partnership	S&E	EWS			
	A	Learn from existing pilots and broaden strategy to use operational data analytics for smart commissioning in new buildings.	5	TG	S&E	BOPS			

APPENDIX A: INSTITUTIONAL ACTION PLAN — WATER (W)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		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.							
		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.							
TARGETS & INDICATORS		Target: Reduce the water use intensity on campus by 16% in 2025 and 24% in 2030 (relative to a 2017 baseline), resulting in total water consumption remaining at or below 2017 levels despite growth.		TG, WAP	S&E	EWS			
		Target: Meter and report water consumption for individual buildings on campus so that by 2024, 95% of building water consumption is metered and reported as identified in the Water Action Plan Metering and Monitoring Strategy.		TG, WAP, LEED Guide	EWS	S&E			
		Target: Maximize rainwater management using low-impact development on building sites that are more than 300m from cliffs.							
		Indicator: Increase infiltration, retention and detention of rainwater on campus.		ISMP	S&E	C+CP			
ACTIONS	SA	Study performance of existing water reuse initiatives (e.g., BRDF toilets, The Nest irrigation, CK Choi irrigation) to help inform policy.	1	n/a	S&E	EWS			
	SA	Conduct student project to investigate the pros and cons of green roofs based on current technology and study existing precedents on campus (e.g., CIRS, The Nest, Gage).	1	SEEDS	S&E	EWS, SEEDS (CD)			
	PA	Undertake research project(s) to evaluate more climate-resilient alternate landscape planting palettes that do not require permanent potable water irrigation systems, in conjunction with classification of campus landscape types for different priority levels.	1	SEEDS	PD	S&E			
	PA	Investigate opportunities to reduce cooling tower water use in existing and new buildings.	2	TG	BOPS	S&E			
	PA	Develop criteria for green roof and blue roof projects based on rainwater management capacity, co-benefits, life cycle costs, and maintenance and operation considerations.	2	SEEDS, VCP	S&E	EWS			
	A	Develop a strategy to coordinate public realm with building landscape rainwater management and ensure adequate funding is provided and design is coordinated in order to meet campus wide rainwater management objectives.	2	LEED Guide, PRP, TG	PD	S&E			
	PA	Implement water metering requirements into (building) policy in alignment with the Water Action Plan.	4	TG	S&E	EWS			
	PA	Review and update plumbing fixture efficiency requirements for new buildings and retrofits to current leading practice.	4	TG	S&E	BOPS			
	PA	Update landscape design standards and associated irrigation design standards.	4	WAP, biodiversity strategy, Campus Design Guidelines, LEED Guide	S&E	EWS			
	PA	Develop guidelines for alternative water supply sources and systems in buildings (e.g., rainwater harvesting or water reuse systems) and on-site storage in buildings.	4	WAP, TG, VCP	S&E	EWS			
	PA	Require all tier 1,2,3a projects to achieve the equivalent to LEED v4 Rainwater Management credit, Option 2.	4	LEED Guide, TG	S&E				
	A	Implement policy to promote low-impact development and green infrastructure rainwater management strategies for buildings and landscapes further than 300m from the cliffs through the use of the UBC ISMP toolkit.	4	PRP, VCP	S&E	EWS, PD			
	PA	Promote the use of seasonal rainwater features in policy which do not use potable water.	4	VCP, TG	C+CP	BOPS			
	PA	Integrate emergency water supply objectives into the design of energy systems and storage in buildings.	5	WAP	S&E	EWS			

APPENDIX A: INSTITUTIONAL ACTION PLAN — MATERIALS AND RESOURCES (M)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC will prioritize the use of building materials that have net positive environmental impacts.							
		UBC will support marketplace transformation by designing buildings with materials that are not harmful to human and ecological health.							
		UBC will support the development of the circular economy by promoting the adaptation, reuse and recycling of materials and products during a building's lifetime.							
		UBC will support the development of the circular economy by promoting the adaptation, reuse and recycling of materials and products during a building's lifetime.							
TARGETS & 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.				S&E			
		Target: Require all new buildings to be Zero Waste Ready by 2035.				S&E			
		Target: Divert 100% of construction and demolition waste from landfill by 2035.				S&E			
		Indicator: Embodied carbon is calculated for all construction projects.				S&E			
ACTIONS	PA	Review the incremental reduction in environmental impact of building materials by review of LEED v4, LBC and LCA studies as well as other best practices and study of market readiness.	1	LEED Guide, TG		S&E			
	SA	Identify opportunities to engage research for innovative materials and approaches to resources(e.g., low carbon, carbon absorption).	1	n/a		S&E			
	PA	Review current operational waste recycling infrastructure guidelines to maximize adaptability over time and improve diversion rates (e.g., location, access, frequency, size, etc.).	1	TG		S&E			
	PA	Review current metrics and benchmarks for construction waste in order to reduce total amount of waste produced (current policy is by percent diverted from landfill). Consider project size, structure, and typology.	1	Metrics & monitoring		S&E			
	SA	Review campus capacity to store and manage a portion of building materials and products that are currently considered waste in order to develop an recommendation for reuse on campus.	1	n/a		ID			
	SA	Review best practices for red lists of harmful building materials and together with consideration for market supply to help develop policy.	1	n/a					
	PA	Investigate opportunities to research and develop an incremental baseline and metric for embodied carbon in building materials.	2	TG		S&E			
	PA	Undertake staff and faculty engagement to develop a targeted and realistic approach to the use of life cycle assessments for new construction projects (based on experience gained with Brock Commons Tallwood House full life cycle assessment and life cycle cost pilot).	2	LEED Guide, TG		USI			
	SA	Develop a strategy to incentivize use of off-site prefabrication (intention is to improve control and quality, co-benefits: reduce disruption on campus, speed up construction and eventually reduce costs).	2	TG		S&E			
	PA	Review and sign the Declaration of Transparency (for building materials) to help support market transformation.	2	Declaration of Transparency		ID			
	PA	Create a UBC prioritized red list of harmful building materials based on best practice review and developed with stakeholder engagement and regard to market supply. Building materials that are potentially harmful to occupants when installed should have a high priority with those that are harmful in their manufacture having a lower priority.	2	UBC Red List NEW		S&E			
	PA	Develop guidelines for building design adaptability and deconstructability.	2	TG		ID			
	A	Review the costs and benefits of certified wood and update policies with stakeholder engagement (e.g., FSC, CSA and SFI).	2	n/a		S&E			
	A	Prioritize components for reuse (e.g., furniture, partitions, equipment etc.) by examining spaces that are regularly retrofitted.	2	Reuse It/SERF programs		ID			
	PA	Develop guidelines for making building material choices through research (level 2) that are informed by health impacts based on a review of best practices, market supply, and stakeholder engagement (i.e., list commonly used building materials considered harmful to health in the sourcing, manufacturing, installation, occupancy or end-of-life phase).	2	TG		S&E			
	PA	Develop a process for piloting and monitoring innovative building products in design and construction practices that reduce life cycle impacts.	3	n/a		S&E			
	PA	Mandate the incremental reduction of environmental impact in building materials through pilots and best practice review.	4	LEED Guide, TG		S&E			
	A	Set incremental construction waste reduction targets out to 2025.	4	TG					
	PA	Introduce a mandated UBC Red List of harmful building materials into policy which has implementation increments over time.	4	UBC Red List NEW		S&E			
	PA	Implement policies for reduced embodied carbon in buildings, starting with a requirement to report embodied carbon, followed by incremental reductions.	4	TG		S&E			
	SA	Amend current recycling infrastructure guidelines to maximize adaptability over time (e.g., location, access, frequency, size, etc.)	4	TG		S&E			
	SA	Reduce barriers to re-use of UBC materials by non-UBC or private users (current procurement protocol make it onerous and time-consuming, so users will often look for easier ways to bypass the official protocol).	4	Procurement protocol		ID			
	SA	Re-instate or enhance the Reuse-It/SERF programs - they need resources and space to implement and manage.	4	Reuse It/SERF programs		ID			
	SA	Incentivize design strategies that decrease the generation of waste materials during construction.	4	TG		S&E			
	A	Require material transparency for building materials (e.g. environmental product declarations).	4	TG, RFP		S&E			
	SA	Update policies and processes to promote the use of wood from sustainably managed forests (co-benefits: aesthetic appeal natural material, regional product, renewable product).	4	TG, VCP		S&E			
	PA	Create an integrated policy for building materials including considerations of: reduced environmental impact, healthy materials requirements and life cycle analysis.	4	Building materials policy NEW		S&E			

APPENDIX A: INSTITUTIONAL ACTION PLAN — BIODIVERSITY (B)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC will develop highly functioning landscapes at the building and site scale to contribute to biodiversity and natural ecosystem processes.							
		UBC will engage campus teaching and research opportunities to enhance biodiversity management capacity.							
TARGETS & INDICATORS		Target: Require 100% compliance to UBC Bird Friendly Design Guidelines for Buildings for new institutional buildings by 2020.			S&E	BOPS			
		Indicator: Increase opportunities to provide habitat for bird, pollinators and other species.			C+CP				
ACTIONS	PA	Review and research national and international best practices, incorporate findings into guidance for current development projects, and use findings to provide background for policy development to provide guidance for metrics at a building and landscape scale. (Include a review of Canada's goals based on the Convention on Biological Diversity, Sustainable Sites Initiative (SSI) and Strategic Directions for Biodiversity Conservation in the Metro Vancouver Region).	1	SEEDS	C+CP	SEEDS (CD)			
	SA	Research best practices and identify opportunities for potential incorporation of BCSPCA AnimalKind Standards and integrated pest design strategies at UBC.	1	SEEDS	S&E				
	PA	Engage a consultant(s) to conduct site assessments to identify and assess the ecological assets, endangered and vulnerable species, and environmentally sensitive areas on a campus or neighbourhood scale. Site assessment reports will be used to inform individual projects.	1	Foundational assessment	PD				
	PA	Establish partnerships between research and operations through participation in CBIRD (Campus Biodiversity Initiative: Research and Demonstration) and related Level 1 and 2 SEEDS projects.	1	SEEDS, CBIRD	S&E	BOPS, PD, SEEDS (CD)			
	PA	Identify and monitor key biodiversity metrics at the site and building scale to determine baseline conditions and rates of change based on research studies and crowd-sourcing (e.g., YardMap, eBird, BirdVis, iTree, etc.)	2	metrics & monitoring	S&E				
	PA	Develop a set of principles for landscapes and green roofs that consider the following: 1. Ability to adapt to climate change 2. Ability to attract pollinators 3. Reduction of invasive species 4. Microclimate suitability (sun, shade, etc.) 5. Ability to support passive solar strategies (e.g., provide shade, reduce wind) 6. Campus character zones and irrigation zones (green or brown areas) 7. Regional biodiversity priorities.	2	Principles and guidelines NEW	C+CP	BOPS			
	A	Determine bird friendly strategy for retrofit projects.	2	BFDG, TG	S&E	PD			
	PA	Determine site-specific biodiversity requirements for each development project based on the neighbourhood-wide site assessments and principles identified above.	2	Design brief	UBCPT, PS	PD, S&E			
	SA	Install (or use existing) technology in buildings to engage occupants in biodiversity monitoring (e.g. building monitors).	3	n/a	S&E				
	SA	Install pilot projects and monitor for effectiveness and engagement (pilot projects are currently underway at the Library Gardens, Beaty Biodiversity Museum and CIRS).	3	Pilot	S&E				
	A	In order to reduce the number of bird collisions with buildings, further develop the Bird-Friendly Design Guidelines and introduce mandatory policy.	4	BFDG, TG	S&E	PD			
	A	Implement policy that promotes the design of active and passive opportunities between humans and natural environments (e.g., views out of buildings, green walls, green roofs, trails, bike paths, water features, viewpoints, etc.) by updating policies and occupant participation in building design working groups.	4	VCP	CD	PD, S&E			
	PA	Based on review of the Library Gardens SSI pilot project, investigate the adoption of the Sustainable Sites Initiative as the required rating system for significant landscape projects.	5	Pilot review	C+CP				
	PA	Reflect the CBIRD vision and values in policy development.	5	TG, VCP, PRP, NP	S&E, PD, SEEDS (CD)	C+CP, BOPS			
	SA	Partner with other campuses to monitor and harmonize biodiversity metrics.	5	Partnership	S&E				

APPENDIX A: INSTITUTIONAL ACTION PLAN — HEALTH AND WELLBEING (HW)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC will enhance the mental, physical and social dimensions of wellbeing by making them integral to building and landscape design decisions.							
		UBC researchers, community stakeholders and building occupants will be engaged in a meaningful and ongoing way to inform building and landscape design decisions around health and wellbeing.							
		UBC will become a leader in enhancing wellbeing through the built environment within the context of higher education in Canada.							
ACTIONS	PA	Review research and best practices for physical, mental and social health and wellbeing in buildings.	1	n/a	UBC-W	USL, S&E			
	SA	Review the LEED Ergonomics Pilot Credit for Office Environments for consideration in the LEED Guide.	1	LEED					
	PA	Identify metrics for health and wellbeing (e.g., temperature, indoor air quality, daylight levels, acoustic levels, views to exterior, number of indoor plants, etc.) and develop targets and performance measures.	2	Metrics & monitoring	S&E	UBC-W			
	PA	Develop health and wellbeing guiding principles for building design that promote physical, mental and social wellbeing (e.g., incorporating social or contemplative space, designing spaces that allow inclusion, incorporating universal design principles, promoting ease of use, incorporating ergonomic principles, developing daylighting requirements, considering acoustic requirements, etc.)	2	n/a	S&E	UBC-W, USI, C+CP			
	SA	Develop a strategy for formalizing health and wellbeing space planning (e.g. end of trip facility) in buildings and landscapes.	2	Health and wellbeing building strategy NEW	ID	UBC-W			
	PA	Develop a strategy for all projects to include considerations of ergonomics, universal access requirements, and how users of different sizes and abilities will interact with the environment (e.g., conduct table top drawing simulations or mock-ups, analyze risks, and engage building occupants for feedback).	2	Ergonomics strategy NEW	HR				
	PA	Test the WELL Building Standard against existing building (e.g., Earth Sciences Building) in a pilot study and identify WELL Building Standard credits and best practices that are aligned with UBC priorities.	3	Pilot	USI, S&E	UBC-W			
	SA	Participate in WELL for higher education pilot.	3	WELL					
	PA	Coordinate with UBC's Wellbeing Strategy in collaboration with UBC Wellbeing to guide how building and landscape design can nurture physical, mental and social dimensions of health and wellbeing.	4	Health and wellbeing building strategy NEW	UBC-W	S&E			
	A	Coordinate with the Transportation Plan to ensure bike storage, change room and shower facilities are installed to encourage active transportation.	4	VCP, LEED Guide	S&E				
	SA	Integrate best practices established for ergonomics into policies.	4	n/a	HR				
	PA	Incorporate health and wellbeing strategies into policies and design briefs for building and landscape projects.	4	TG, DB	S&E	UBC-W			
	A	Benchmark to measure progress in health and wellbeing as part of the standard Post Occupancy Evaluation process under development.	5	Metrics	ID				
	PA	Establish relationships with off-campus partners to advance the connection between research and practice for health and wellbeing in buildings.	5	Partnership	UBC-W	S&E			
	A	Contribute to bodies of knowledge and research that investigate the relationship between wellbeing and the built environment. In particular share UBC's innovative approach and findings with other organizations and institutions involved in the healthy universities movement (e.g., the other five Canadian universities that signed the Okanagan Charter).	5	Partnership	UBC-W	USI			
	SA	Engage faculty to research impacts of buildings, landscapes and space features on health and wellbeing and publish findings as appropriate.	5	Faculty study	UBC-W	USI			

APPENDIX A: INSTITUTIONAL ACTION PLAN — QUALITY

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC buildings and landscapes will have the resilience to respond to both anticipated and unpredictable changes in climate.							
TARGETS & INDICATORS		Target: Achieve 100% compliance with the Technical Guidelines by 2025 (compliance allows for approved variances).			ID	C+CP			
		Target: Achieve 100% compliance to UBC sustainability submission requirements by 2020 (compliance allows for approved variances).			S&E	C+CP			
		Target: Major projects track and achieve their sustainability design brief goals by 2020 (subject to approved changes during design process).			S&E				
ACTIONS	A	Investigate opportunities to develop a soft landing process for institutional projects	1	Staff study	S&E				
	PA	Review and investigate opportunities to apply international climate resilience standards, such as the RELi resilience standard to projects.	1	Staff study	S&E				
	PA	Undertake a Greenest City Scholars study of the RELi resilience standard to identify the credits and best practices that align with UBC priorities.	1	Greenest City Scholar	USI, S&E				
	PA	Extract requirements from LEED that align with UBC priorities and move into UBC policy.	2	TG	S&E				
	A	Develop a strategy to update policy that will reduce noise from science building ventilation systems.	2	TG	C+CP				
	A	Develop templates OPR's for typical building uses.	2	TG	EWS, BOPS	C+CP			
	PA	Develop review process for Owners Project Requirements.	2	TG					
	A	Review LEED Implementation Guides every 5 years for policy alignment.	4	LEED Guide	S&E				
	PA	Introduce a tier system for buildings which clarifies GB requirements for new buildings, renovations, fit-outs and upgrades.	4		S&E				
	PA	Require LEED documentation to be submitted to UBC at design, construction, and final review stages.	4	LEED Guide, TG	S&E				
	PA	Develop a strategy to conduct a full review of the UBC Technical Guidelines to ensure clarity and eliminate redundancies. Consider making the Technical Guidelines a Board approved policy (linked with project improvement process).	4	MPDP, TG	BOPS	S&E			

APPENDIX A: INSTITUTIONAL ACTION PLAN — CLIMATE ADAPTATION (CA)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		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.							
ACTIONS	PA	Review current research and best practices for climate adaptation strategies in buildings.	1	n/a	S&E	USI			
	PA	Identify climate adaptation research opportunities for buildings and landscapes on a local, regional and global scale.	1	n/a	S&E USI	ID, PD			
	PA	Conduct vulnerability assessments of campus buildings, landscapes and infrastructure at periodic intervals.	1	Vulnerability NEW	ID				
	SA	Partner and participate in local, regional processes to develop resilience and adaptation requirements (e.g. LEEDv4).	1	Partnership	S&E	USI			
	PA	Identify metrics for buildings and landscapes to establish baseline and develop targets for climate adaptability.	2	Metrics	S&E				
	PA	Integrate early guidance on climate adaptation measures into project design briefs.	3	TG	S&E				
	SA	Install pilot installations and projects and monitor for effectiveness and engagement.	3	Pilot	S&E				
	PA	Coordinate with the campus-wide Resiliency Initiative and climate adaptation strategies, as they evolve based on vulnerability assessments, evaluations and best practice review, by implementing policies on a building and landscape scale that respond to key climate change impact areas (e.g., increased temperature, variable weather patterns, increased flood events, increased smoke, increased peak events, etc.)	4	Resiliency Initiative NEW	S&E				
	A	Revise LEED Implementation Guide to include climate adaptation credits as they develop.	4	LEED Guide					
	PA	Incorporate aspects into building and landscape designs to serve campus-wide emergency response preparedness in coordination with key departments, including Infrastructure Development and Risk Management Services.	4	TG	RMS, ID	S&E			
	A	Integrate climate adaptation principles early in the design process to inform design and budget.	4	Design brief	S&E				
	PA	Update GBAP once the Resiliency Initiative is adopted.	5	Resiliency Initiative NEW	S&E				
	PA	Benchmark buildings to measure progress in climate adaptation measures.	5	Metrics					

APPENDIX A: INSTITUTIONAL ACTION PLAN — PLACE AND EXPERIENCE (PE)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC buildings and landscapes will provide opportunities for collaboration, innovation and community development to reflect the social and environmental sustainability aspirations of the University.							
ACTIONS	SA	Review place-making plans of other successful universities and municipalities for best practices.	1	n/a	C+CP				
	PA	Identify short- and long-term student-led initiatives that contribute meaning and memory associated with buildings and landscapes.	1	Staff study	C+CP				
	PA	Review the Public Realm Plan goals and guidelines for better coordination and compliance of building landscapes.	1	PRP	C+CP				
	PA	Establish GBAP Place and Experience component goals in coordination with C+CP to help express a project's social, environmental and economic sustainability goals.	1	n/a	C+CP				
	SA	Audit existing policies to identify gaps in place and experience guidance.	2	VCP	C+CP				
	SA	Engage in setting the budget early in the process to leverage existing resources and donor funding and to determine budget needs for place and experience component goals.	2	SP	PD				
	A	Update Campus Plan (and other policies) to reflect the importance of GBAP Place and Experience component goals at building and site scale.	4	VCP	C+CP				
	PA	Integrate heritage considerations early in the design through mandatory "Statements of Significance" for existing buildings.	4	VCP, TG	C+CP				
	PA	Analyze and improve existing design and development processes for strengths and weaknesses in integrating the GBAP Place and Experience component goals in project design objectives.	4	SP	C+CP				
	A	Assess design actions have met place and experience objectives across the campus.	5	n/a	C+CP				
	A	Develop criteria for measuring the success of place and experience in UBC's buildings and landscapes.	5	n/a	C+CP				

APPENDIX B: RESIDENTIAL ACTION PLAN — GUIDE

This guide:

1. Outlines the structure of the residential action plan.
2. Acts as a legend on how to read the detailed goals, targets, indicators, and actions in each component area and their path of implementation.

COMPONENT AREA	The component areas organize all goals, targets, indicators, or actions outlined in the GBAP. The 8 component areas include: energy, biodiversity, water, place & experience, materials & resources, quality, climate adaptability, and health & wellbeing.		
ACTION CATEGORY	Actions are categorized in order of importance: PA: Priority Action, A: Action, SA: Sub-action		
THE GOAL, TARGETS, INDICATORS AND ACTIONS	The goal, target, indicator, or action identified by the GBAP.		
ACTION LEVEL	The action levels correspond to the following: <ol style="list-style-type: none"> 1. Review and Research 2. Benchmark and develop metrics 3. Pilot approach or installation 4. Implement new policy or practice 5. Monitor and evaluate 		
MECHANISM	The policies, guidelines, and tools used to implement the action.	AUDP Advisory Urban Design Panel CEEP Community Energy Efficiency Plan DRC Development Review Committee NP Neighbourhood Plan REAP Residential Environmental Assessment Plan SEEDS Social Ecological Economic Development Studies	
LEAD DEPARTMENT	The main department responsible for planning and achieving the action with coordination from S+E.	C+CP Campus & Community Planning CD Community Development EWS Energy and Water Services ID Infrastructure Development S&E Sustainability & Engineering UNA University Neighbourhood Association UBC-W UBC Wellbeing	
SUPPORT DEPARTMENT	The department(s) that will participate and support the lead department in achieving the action.		
SHORT TERM 2018-2020	This action will begin between 2018–2020.		
MEDIUM TERM 2021-2025	This action will begin between 2021–2025.		
LONG TERM 2026-2035	This action will begin between 2026–2035.		

APPENDIX B: RESIDENTIAL ACTION PLAN — PROCESS

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC policies and processes will support the achievement of the GBAP component goals and targets.							
		GBAP component goals and targets and will be communicated and easily accessible to internal and external stakeholders.							
		UBC will integrate lessons learned from each project to improve building designs.							
		UBC buildings will be evaluated as opportunities for research, innovation and continuous improvement.							
		UBC will commit to monitoring and benchmarking building performance to encourage continuous improvement on campus and in relation to industry standards.							
ACTIONS	SA	Conduct a scan of policies, guidelines and tools to identify major gaps and opportunities for organizational improvements.	1	Policy scan	C+CP				
	SA	Develop a process and/or tool through which C+CP can collect feedback from project teams.	1	Feedback tool NEW	C+CP				
	SA	Review existing development process for residential buildings to identify opportunities to add sustainability process steps.	1	Review	S&E	ID			
	SA	Hire Work Learn student to conduct study of REAP 3.0 (e.g. to analyze credit achievement, credit balance and out-of-date information and make revision recommendations).	2	REAP	C+CP				
	PA	Develop a strategy of GBAP requirements for retrofit and renovation projects in neighbourhoods.	2	GBAP	S&E				
	PA	Create REAP credits for mandatory bench-marking, performance reviews and post-occupancy surveys.	2	REAP	S&E				
	PA	Create a GBAP requirements web page that links to all relevant policies and tools for easy accessibility by stakeholders.	3	Website	S&E				
	SA	Review and revise existing REAP research credit with a prioritized list of applicable topics.	3	REAP	S&E				
	PA	Develop a sustainability process for new residential construction.	4	Residential Sustainability Process NEW	S&E	PD			
	PA	Update to REAP 3.1 for BC Energy Step Code alignment.	4	REAP	S&E				
	PA	Update to REAP 4.0 based on component targets and actions in time for the development of the Stadium Road neighbourhood with stakeholder review.	4	REAP	S&E	C+CP			
	A	Review REAP submission deadlines and introduce a penalty for missed deadlines (e.g. bond)	4	REAP	C+CP				
	PA	Update the UBC Advisory Urban Design Panel requirements to include sustainability outcome requirements.	4	AUDP	S&E	C+CP			
	SA	Implement a system for regular monitoring and progress check-in of GBP actions across all responsible departments or parties and report out annually.	5	GBP	C+CP				
	SA	Review and update the GBP every five years.	5	GBP	S&E				

APPENDIX B: RESIDENTIAL ACTION PLAN — ENERGY (E)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC buildings will advance the campus towards net-positive energy use and greenhouse gas neutrality by reducing energy demand and focusing on site-specific passive design approaches.							
		UBC buildings will have indoor thermal environments that are comfortable and enhance health and wellbeing.							
		UBC will integrate lessons learned to improve building energy performance.							
TARGETS & INDICATORS		Target: New residential buildings will meet energy targets to be Net Zero Ready by 2030 in alignment with the BC Energy Step Code.			S&E				
		Indicator: Increase energy efficiency of existing residential buildings through standards and programs.			S&E				
ACTIONS	PA	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.	1	GBAP	S&E	EWS ID			
	SA	Review potential applying the ASHRAE 100 standard for existing building retrofits.	1	REAP	S&E				
	SA	Review options for applying British Columbia Building Code (BCBC) energy standards for existing building retrofits.	1	REAP	S&E	DS			
	SA	Review feasibility of establishing process to calibrate energy models after occupancy.	1	n/a	S&E	EWS			
	PA	Review feasibility of developing and implementing REAP credits for existing building retrofits.	2	REAP	S&E				
	SA	Work with Corix to define TEDI and DHW targets required to support a low-carbon neighbourhood district energy system (NDES).	2	REAP	S&E				
	PA	Develop GHG intensity targets to ensure cost-effective pathways to zero GHG emissions for buildings connected or not connected to the NDES.	2	CEEP	S&E	EWS			
	PA	Implement an energy benchmarking system as part of an ongoing monitoring program.	2	REAP	S&E				
	SA	Identify cost-effective energy conservation measures (ECMs) that support British Columbia Building Code (BCBC) energy standards for existing building retrofits.	2	REAP	S&E				
	SA	Develop a strategy that provides funding to support research projects on building energy performance.	2	Funding strategy NEW	S&E				
	SA	Support development of energy efficiency programs in PT buildings.	2	GBP					
	PA	Develop energy efficiency education programs, including a quick-start guide for strata councils, to support building owners and residents in partnership with the UNA.	2	Energy efficiency education NEW	UNA	S&E			
	SA	Facilitate UNA access to MV Strata Energy Advisor Program.	2	n/a	S&E	UNA			
	SA	Identify opportunities to establish BC Energy Step Code Step 4 and Passive House pilot projects.	3	REAP	S&E				
	SA	Based on the outcomes of the studies above, develop cost effective cooling strategies to address thermal comfort needs across building and district levels at UBC.	3	REAP	S&E				
	PA	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.	4	REAP	S&E	EWS			
	PA	Mandate whole building airtightness testing and energy modelling in alignment with BC Energy Step Code by 2018 and set airtightness targets by 2020.	4	REAP	S&E				
	SA	Review and update residential appliance energy requirements in REAP.	4	REAP	S&E				
	SA	Develop REAP Energy and Atmosphere credits or design measures that address thermal safety and comfort under current and future climate conditions.	4	REAP	S&E				
	PA	Investigate minimum requirements for overall building envelope thermal performance as appropriate for REAP.	4	REAP	S&E				
	PA	Require new buildings to address thermal comfort considering future climate.	4	REAP	S&E				
	SA	Develop a mandatory REAP credit to establish and share an Energy Star Portfolio Manager account with S&E.	4	REAP	S&E				
	SA	Establish an energy reporting requirement in lease agreements by 2018.	4	Lease agreements	S&E				
	SA	Create a mandatory REAP credit requiring building level energy sub-metering of DHW (to benchmark TEDI and DHW consumption).	4	REAP	S&E				
	PA	Develop a program to inform building owners of energy performance through benchmarking reporting by 2020.	4	Energy efficiency education NEW	S&E	UNA			
	SA	Implement a retrofit permitting process that includes energy requirements.	4	REAP	S&E	DS			
	PA	UBC to participate in the further development of the Step code for Part 3 buildings.	5	n/a	S&E				

APPENDIX B: RESIDENTIAL ACTION PLAN — WATER (W)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		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.							
		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.							
TARGETS & INDICATORS		Indicator: Increase infiltration, retention and detention of rainwater on campus.			S&E				
		Indicator: Maximize rainwater management using low impact development on building sites that are more than 300m from cliffs.							
ACTIONS	PA	Explore opportunities to incorporate leading water management practices into the Stadium Road Neighbourhood redevelopment through the Whole Systems Infrastructure approach.	1	n/a	S&E	EWS			
	SA	Conduct a life cycle costing study and develop a strategy to design alternatives to water features that use potable water including retrofits with a SEEDS project.	1	SEEDS	S&E	EWS, SEEDS (CD)			
	SA	Review and research plumbing fixture and appliance standards and REAP credits to achieve best possible water use efficiency performance within market constraints.	1	REAP	S&E				
	PA	Institute a residential building benchmarking program for water consumption.	2	Benchmarking	S&E	UNA			
	PA	Develop a water metering strategy (building and suite level) for residential buildings. Consider a visualization concept that concurrently educates users.	2	REAP	S&E				
	PA	Develop criteria for green roof and blue roof projects based on rainwater management capacity, co-benefits, maintenance and operations considerations for residential building typologies.	2	NP	S&E	EWS			
	PA	Develop a strategy that coordinates building landscape rainwater management with rainwater management in the public realm.	2	NP, REAP	C+CP				
	PA	Develop building landscape and associated irrigation design standards for upcoming neighbourhoods based on low impact development.	2	NP, REAP	S&E				
	SA	Update REAP credits to reflect water metering strategy.	4	REAP	S&E				
	PA	Require all new construction projects detain the 10-year, 24-hour storm volume and discharge at the 2-year, 40-hour pre-development rate on site or at a designated centralized facility using low-impact development and green infrastructure strategies by 2018. New residential projects to achieve the same requirements as institutional projects by 2020.	4	REAP	S&E	C+CP			
	PA	Implement policy to promote low-impact development and green infrastructure rainwater management strategies for buildings and landscapes further than 300m from the cliffs through the use of the UBC ISMP toolkit.	4	NP, REAP	S&E	C+CP			
	SA	Establish a policy for rainwater management within the roads and public realm in new neighbourhoods.	4	NP	S&E	EWS			
	PA	Promote the use of seasonal rainwater features in policy which do not use potable water and consider life cycle costs for strata owners.	4	NP, REAP	C+CP				
	SA	Include recommendations in policy to celebrate rainwater harvesting and/or conveyance.	4	NP	S&E	P+D			
	PA	Integrate emergency water supply objectives into the design of energy systems and storage in buildings.	5	NP, REAP	S&E	EWS			

APPENDIX B: RESIDENTIAL ACTION PLAN — MATERIALS & RESOURCES (M)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC will prioritize the use of building materials that have net positive environmental impacts.							
		UBC will support marketplace transformation by designing buildings with materials that are not harmful to human and ecological health.							
		UBC will support the development of the circular economy by promoting the adaptation, reuse, and recycling of materials and products during a building's lifetime.							
TARGETS & 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.			S&E				
		Target: Require all new buildings to be Zero Waste Ready by 2020.			S&E				
		Target: Divert 100% of construction and demolition waste from landfill by 2035.			S&E				
ACTIONS	PA	Review the introduction of incremental reduction in environmental impact of building materials by review of LEED v4, LBC and LCA studies as well as other best practices and study of market readiness.	1	UBC Red List	S&E	USI			
	SA	Review current metrics and benchmarks for construction waste in order to reduce total amount of waste produced (current policy is by percent diverted from landfill). Consider project size, structure, and typology.	1	Benchmarking	S&E				
	SA	Review certified wood costs and benefits and with stakeholder engagement update policies (e.g., FSC, CSA and FSI).	2	REAP	S&E				
	SA	Develop a strategy to incentivize use of off-site prefabrication (intention is to improve control and quality, co-benefits: reduce disruption on campus, speed up construction and eventually reduce costs).	2	Off-site prefabrication strategy NEW	S&E				
	PA	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.	2		S&E				
	PA	Require incremental reductions in environmental impact of building materials, based on pilots, best practice review and market readiness study.	4	UBC Red List	S&E				
	A	Set incremental construction waste reduction targets out to 2025.	4	REAP	S&E				
	A	Introduce a mandated UBC Red List of harmful building materials into policy which has implementation increments over time.	4	REAP	S&E				
	A	Implement in policy requirements for embodied carbon in buildings starting with requirement to report on embodied carbon and moving on to incremental reductions.	4	REAP	S&E				
	SA	Update policies and processes to promote the use of wood from sustainably managed forests (co-benefits: aesthetic appeal natural material, regional product, renewable product).	4	REAP	S&E				
	PA	Implement design service life requirements for new construction projects.	4	REAP	S&E				
	SA	Introduce a REAP credit for developer to submit capital retrofit plan.	4	REAP	S&E				
	PA	Create an integrated policy for building materials that considers: reduced environmental impact, healthy material requirements and life cycle analysis.	5	Materials policy NEW	S&E				

APPENDIX B: RESIDENTIAL ACTION PLAN — BIODIVERSITY (B)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC will develop highly functioning landscapes at the building and site scale to contribute to biodiversity and natural ecosystem processes.							
		UBC will engage campus teaching and research opportunities to enhance biodiversity management capacity.							
TARGETS & INDICATORS		Target: Require 100% compliance to UBC Bird Friendly Design Guidelines for Buildings for new residential buildings by 2025.		NP, REAP	S&E				
		Indicator: Increase opportunities to provide habitat for birds, pollinators and other species.		NP, REAP	C+CP				
ACTIONS	PA	Require all major projects to address a neighbourhood-wide site assessment that identifies important ecological assets, endangered and vulnerable species and environmentally sensitive areas.	1	Staff project, consultant study	PT	PD, S&E			
	PA	Establish partnerships between research and operations through participation in CBIRD (Campus Biodiversity Initiative: Research and Demonstration) and related Level 1 and 2 SEEDS projects.	1	SEEDS	S&E	PD, SEEDS (CD)			
	PA	Develop a set of principles for landscapes and green roofs that consider the following: ability to adapt to climate change, ability to attract pollinators, reduction of invasive species, microclimate suitability (sun, shade etc.), ability to support passive solar strategies (e.g. provide shade, reduce wind), campus character zones and irrigation zones (green/brown areas) and regional biodiversity priorities.	2	NP, REAP	PD	S&E, SEEDS (CD)			
	PA	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.	4	NP, REAP	S&E	PD			

APPENDIX B: RESIDENTIAL ACTION PLAN — HEALTH & WELLBEING (HW)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC will enhance the mental, physical and social dimensions of wellbeing by making them integral to building and landscape design decisions.							
		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.							
		UBC will become a leader in enhancing wellbeing through the built environment within the context of higher education in Canada.							
ACTIONS	SA	Review research and best practices for social, psychological and physical health and wellbeing in residential buildings.	1	n/a	UBC-W				
	SA	Develop a SEEDS project to survey available and desired amenities and make recommendations.	1	SEEDS	S&E	SEEDS (CD)			
	PA	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.)	2	n/a	UBC-W				
	PA	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".	4	Development handbook; REAP					
	PA	Update REAP to include health and wellbeing standards.	4	REAP	S&E	UBC-W			
	PA	Develop amenity spaces that respond to community needs and are flexible and adaptable over time.	4	REAP	S&E				

APPENDIX B: RESIDENTIAL ACTION PLAN — QUALITY

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC buildings and landscapes will be durable, reliable and resilient.							
TARGETS & INDICATORS	PA	Target: Achieve 100% compliance with REAP Gold requirements by 2020.	2	REAP, DRC, AUDP	S&E				
	PA	Create a branding strategy for REAP to increase awareness of UBC's sustainable buildings.	2	REAP branding strategy NEW	S&E	CD			
ACTIONS	SA	Hire a consultant to develop a comprehensive branding strategy for the REAP program.	2	REAP branding strategy NEW	C+CP	CD			
	SA	Design a plaque for REAP certified buildings.	2	REAP	S&E	CD			
	SA	Revise promotional material to highlight stakeholder benefits of REAP certified buildings (owners, residents, developers, public, UNA).	2	REAP	S&E	CD			
	A	Increase the cost of REAP applications to help recover costs.	4	REAP	S&E				
	PA	Work with real estate agents to ensure all buyers are aware of sustainability benefits associated with buildings.	5	Partnership	S&E				

APPENDIX B: RESIDENTIAL ACTION PLAN — CLIMATE ADAPTATION (CA)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		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.							
ACTIONS	PA	Conduct vulnerability assessments which includes neighbourhood buildings and infrastructure.	1	Vulnerability assessment NEW	ID				
	PA	Review current research and best practices for climate adaptation strategies in buildings.	1	n/a	S&E	USI			
	PA	Identify climate adaptation research opportunities for buildings and landscapes on local, regional and global scales.	1	Staff project/study	S&E/ USI	ID, PD			
	PA	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	4	Resilience Initiative NEW	S&E				
	PA	Implement policies (REAP updates, NP) for climate adaptability in the neighbourhood built environment.	4	REAP, NP	S&E				
	PA	Incorporate aspects into building and landscape designs to serve campus wide emergency response preparedness in coordination.	4	Emergency response preparedness guidelines NEW	S&E	RMS, ID			
	PA	Increase public engagement and awareness around local climate change impacts and adaptation measures.	5	n/a	CD, UNA				

APPENDIX B: RESIDENTIAL ACTION PLAN — PLACE AND EXPERIENCE (PE)

COMPONENT AREA	ACTION CATEGORY	COMPONENT GOALS, TARGETS, INDICATORS AND ACTIONS	ACTION LEVEL	MECHANISM	LEAD DEPARTMENT	SUPPORT DEPARTMENT	SHORT TERM 2018-2020	MEDIUM TERM 2021-2025	LONG TERM 2026-2035
COMPONENT GOALS		UBC buildings and landscapes will provide opportunities for collaboration, innovation and community development to reflect the social and environmental sustainability aspirations of the University.							
ACTIONS	PA	Establish GBAP Place & Experience component goals for buildings and landscapes in coordination with C+CP 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).	1	Policy scan	C+CP				
	A	Investigate a strategy for creating community grants for projects that excel in creating place and experience.	1	Feedback tool NEW	C+CP				
	A	Improve REAP credits to better reveal sustainability initiatives to building occupants and visitors.	4	Review	S&E				
	A	Create a REAP credit to increase education and awareness around green buildings (e.g. green building tours).	4	REAP	C+CP				

