GreenCare

2025

Low Carbon Resilience & Environmental Sustainability Guidelines

for Health Care New Construction

Territory Acknowledgment

We respectfully acknowledge that this document was developed on the traditional, ancestral and unceded territory of the Coast Salish Peoples, including the xʷməθkwəy̓əm (Musqueam Nation), Sḵwx̱wú7mesh Úxw umixw (Squamish Nation), and səl̓ilw̓ətaʔɬ (Tsleil-Waututh Nation), who have cared for these lands and waters since time immemorial and whose stewardship continues to this day.

Across the province, health-care facilities operate on the territories of more than 200 First Nations, and Métis and Inuit Peoples live in communities throughout British Columbia, each with distinct rights, cultures and relationships to health and the environment.

The Energy and Environmental Sustainability team recognizes that climate change, environmental degradation and ecological loss are part of a colonial legacy that continues to disproportionately impact Indigenous Peoples. In learning from Indigenous knowledge—particularly land-based and place-based understandings—we strive to support health-care infrastructure that is both sustainable and grounded in reconciliation.

The intent of this document is to help foster health facilities that contribute to the well-being of all Peoples and communities, while restoring the ecosystems that sustain us—now and for generations to come.

Authors

The Low Carbon Resilience and Environmental Sustainability Guidelines for Health Care New Construction (LCRES Guidelines) were created by Energy and Environmental Sustainability (EES), a regional collaboration team across four health organizations: Fraser Health, Providence Health Care, Provincial Health Services Authority and Vancouver Coastal Health. Housed within the Facilities Management Departments of each organization, EES works to drive change for environmentally sustainable and climate-resilient care across planning, design, procurement, construction and operations.

Acknowledgment: EES acknowledges the many consultants, internal subject matter experts and departments that have created, reviewed and provided feedback to the LCRES Guidelines.

Access the LCRES Guidelines and Appendices at www.bcgreencare.ca/resource/guidelines.

For questions and support, please contact the EES team at info@bcgreencare.ca.

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PART A

Introduction & Context

Purpose

The purpose of the LCRES Guidelines is to create a clear, actionable pathway for health-sector capital project teams to design and construct low-carbon, climate-resilient and environmentally sustainable health-care facilities.

Many health organizations in B.C. have adopted planetary health as a strategic priority. This approach recognizes the deep interconnection between human health and the health of the planet. It expands the traditional duty of care from a focus on individual patients to a broader responsibility for population well-being and the ecosystems that support it. Indigenous Peoples have stewarded the land since time immemorial. A planetary health approach is a commitment to joining this stewardship.

Building a new health-care facility is a significant investment in community health. Although all construction impacts the environment, applying a planetary health lens presents both an opportunity and a responsibility to minimize these impacts. Thoughtful design can reduce the facility's ecological footprint across its entire lifecycle. New construction projects face enormous pressures to meet budget, schedule and complex requirements, including increasingly stringent environmental standards. The purpose of the LCRES Guidelines is to provide guidance for navigating complex project demands while advancing sustainability priorities.

The LCRES Guidelines provide tools and resources for major capital projects to work towards the sustainability and planetary health goals of Fraser Health, Vancouver Coastal Health, Provincial Health Services Authority and Providence Health Care.

LCRES Goals

The LCRES Guidelines often use the term "LCRES goals" and "LCRES outcomes" to refer to many beneficial attributes of the facility, that can be grouped broadly under the three categories, contained in the name Low Carbon Resilience and Environmental Sustainability.

Low Carbon: A facility that minimizes greenhouse gas emissions in its construction and operation, to mitigate against climate change.

Resilience: A facility that anticipates and adapts to a changing climate—accounting for the increasing likelihood of extreme events such as wildfire, flooding and extreme heat—while maintaining its ability to provide essential services.

Environmental Sustainability: A facility that is planned and operated in a way that acknowledges the inter-connectedness of human and planetary health, maintains a healing environment, minimizes harm to the environment and nurtures the vitality and diversity of ecological systems.

To fulfill on these over-arching goals, content in each major project phase has been organized into six Focus Areas:

Energy & Carbon, Climate Resilience, Water, Transportation, Materials, Natural Environment

Who Are These Guidelines For?

The LCRES Guidelines are a tool and resource for new construction project teams, including all owner teams, consultants and contractors who contribute to LCRES deliverables and support decision making. The LCRES Guidelines are a tool to guide the project to incorporate LCRES goals into design and construction.

Owner's Project Management Team: The LCRES Guidelines are organized as a resource for project management teams. Each Focus Area provides contextual background, defines key Actions that lead to Deliverables, and can be used as a tool for tracking progress through all project phases.

Consultants: Consultants are encouraged to review the complete content of Focus Areas aligned with their discipline and scope. Each section outlines high-level direction, best practices and priorities supplemented by detailed resources in the Appendices. Actions and Deliverables clarify expectations and outcomes tied to the consultant's work.

User Groups and Subject Matter Experts: The LCRES Guidelines provide useful background to a subject where user group input and approval is requested.

Energy and Environmental Sustainability (EES) Team Support: The EES team is available to support capital projects by interpreting government requirements, connecting project teams with additional resources and championing overarching LCRES goals. Typically, an EES representative is assigned to each project. The LCRES Guidelines are a key tool to complement this support.

Applicable Projects

Building Types: The LCRES Guidelines are intended for acute care, long-term care and large health-care facilities. Other health-care facility types including urgent-care centres, clinics, staff residences and office buildings are encouraged to apply the LCRES Guidelines where relevant and feasible.

Project Types: New construction and major redevelopment projects.

Project Delivery Methods: The LCRES Guidelines are primarily applied during the Facility Planning phase (Business Plan development). They remain relevant throughout all subsequent phases and apply across various project delivery methods, including fixed-price contracts (Design-Build, Public-Private Partnerships) as well as cost-plus and collaborative approaches (Construction Management, Alliance, and Integrated Project Delivery).

For major contracts, the EES team can provide recommended RFP language to incorporate LCRES services and deliverables appropriate to the project phase and delivery method.

How & When to Use These Guidelines

How: The content is organized according to the phases of a major capital project as described in the Facilities Management Project Delivery Guide (PDG). Content is further organized into six Focus Areas. Within each Focus Area, the LCRES Guidelines provide ***Key Considerations, Innovations, Targets, Actions*** and ***Deliverables.***

When: The LCRES Guidelines can be used at any point in the project lifecycle, although early integration is encouraged to allow for full consideration and to minimize costs.

Project Phases Outline

The Project Delivery Guide (PDG) identifies eight project phases, outlined below. For major phases, LCRES content is grouped according to six Focus Areas, each containing a common substructure.

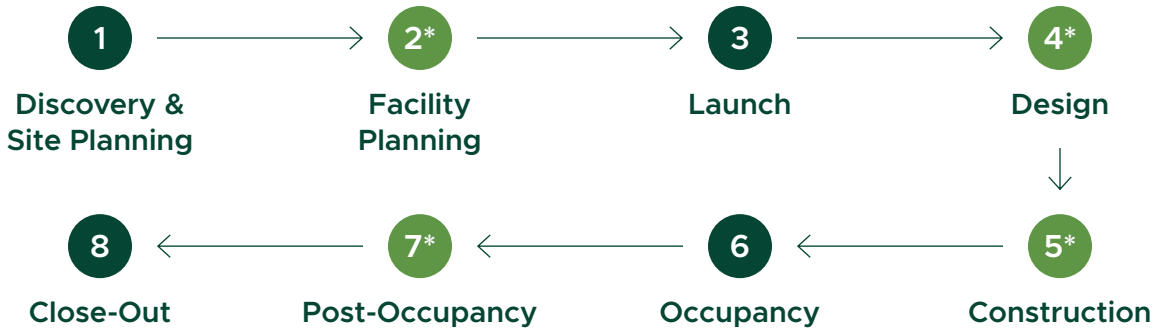
STEP 1

From the Table of Contents, navigate to the Project Phase and Focus Area of interest.

STEP 2

Locate relevant content to your role in the project.

Project Phases



Focus Areas for Major Phases*

Focus Area Substructure

Key Considerations | Innovation | Targets | Actions | Deliverables

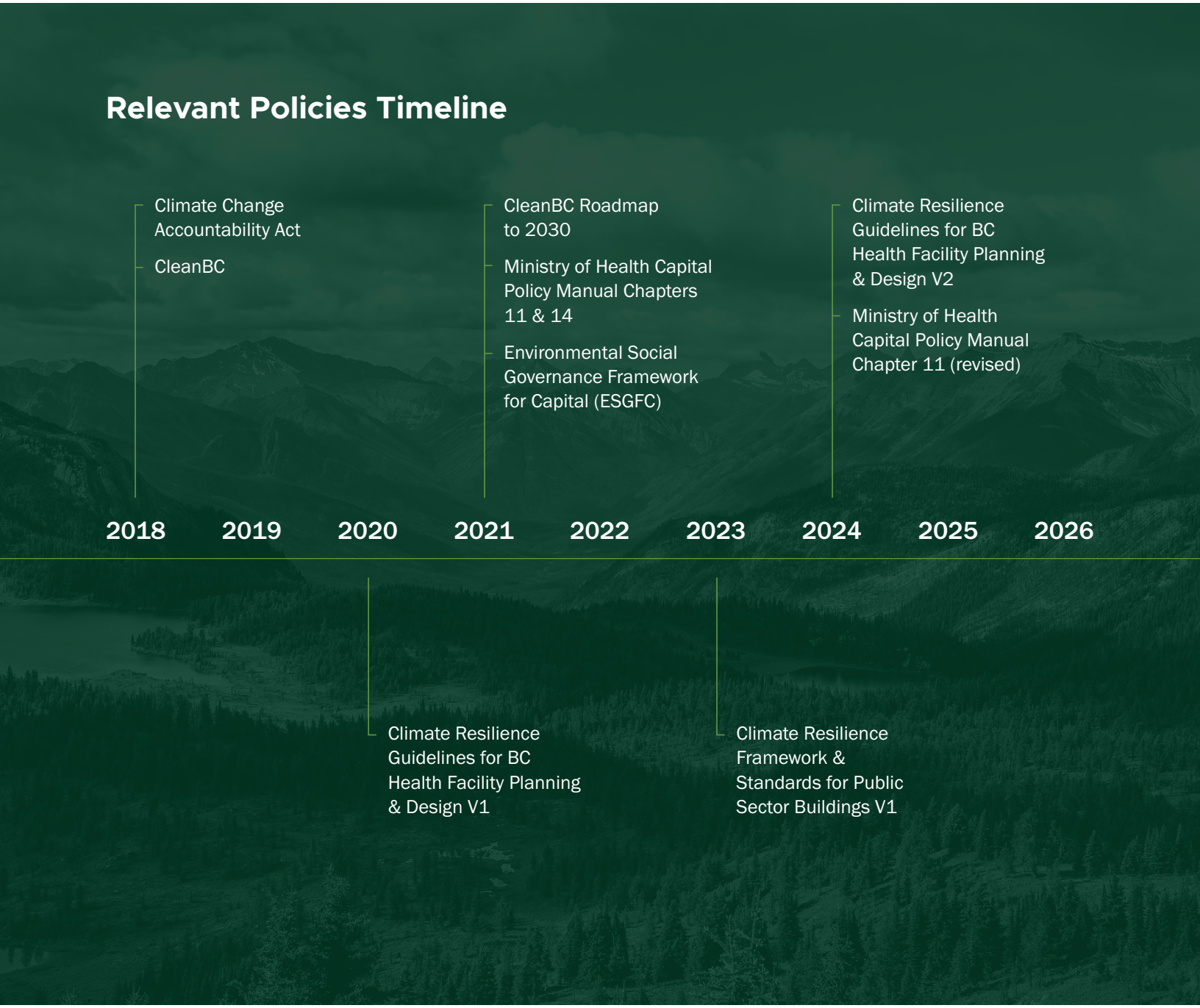
Evolution of Mandated Requirements

The timeline below shows the evolution of major provincial government and health authority requirements and guidelines that impact LCRES outcomes.

TIP

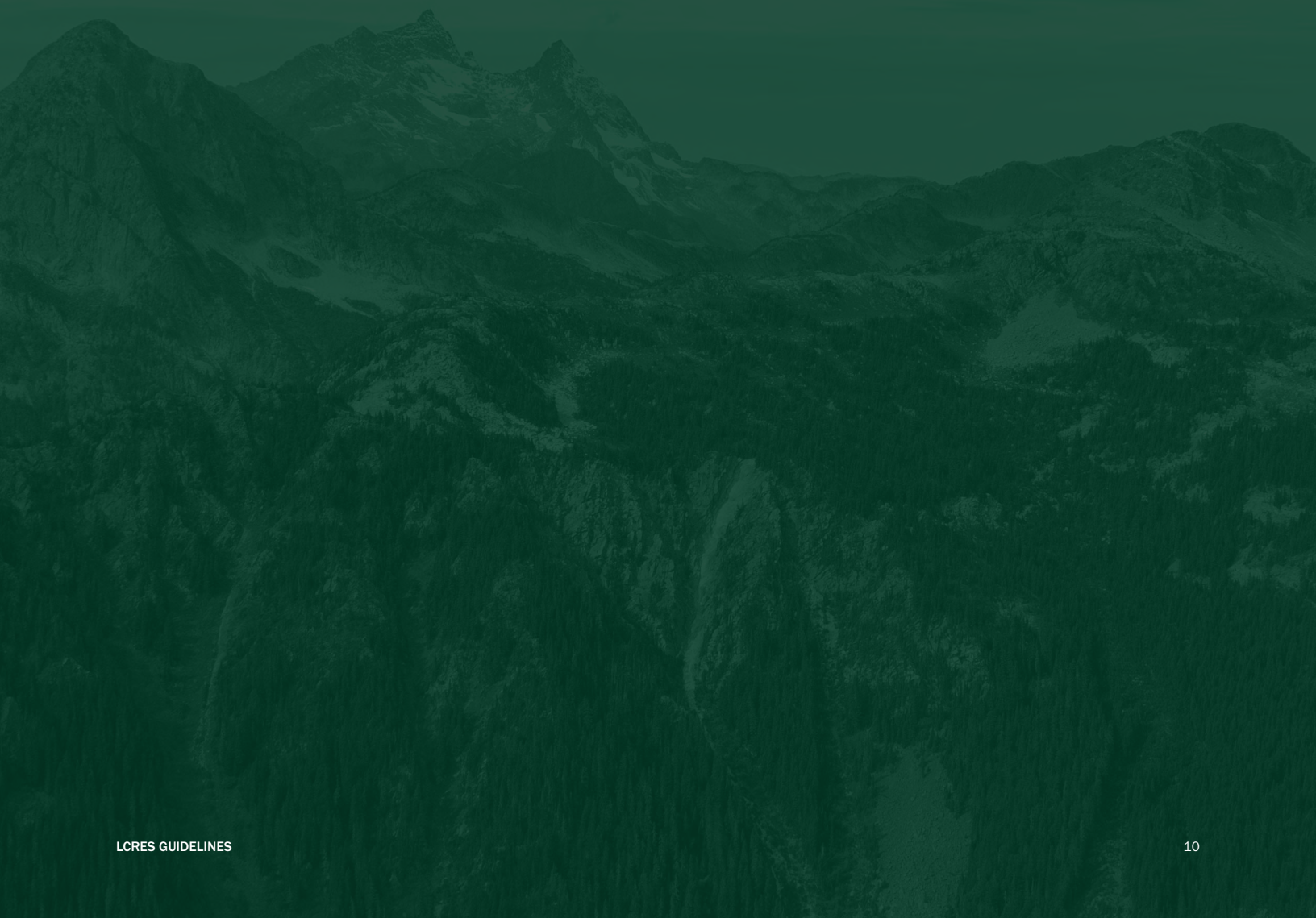
Click on each title to link to a summary description.

Relevant Policies Timeline



PART B

Project Implementation



GENERAL GUIDANCE

Collaborating with Indigenous Peoples

Indigenous knowledge, cultural teachings and community priorities are essential to creating health facilities that are responsive to place, people and the environment. EES acknowledges that construction of a health-care facility is rooted in Western models of health-care delivery, which are themselves part of a colonial legacy. The authors of the LCRES Guidelines are committed to learning and working collaboratively with Indigenous Peoples to respectfully incorporate Indigenous knowledge and ways of being, while grounding health-care facilities in the lands and communities they serve.

Across British Columbia, Indigenous Peoples—including First Nations, Métis, and Inuit—hold distinct rights, histories and relationships to the land, water and climate. Successful engagement depends on initiating early conversations through the appropriate Indigenous Health team or project representative to ensure informed and respectful collaboration.

The LCRES Guidelines are intended to support project teams in this collaborative work. Learning about the cultural, ecological and health-related histories of the land and communities is an important step in grounding the project's purpose and deepening its relevance. The goals, key considerations and innovation opportunities outlined in each LCRES Focus Area—particularly during the Facility Planning and Design phases—can support meaningful collaboration and knowledge sharing with Indigenous partners. These elements are intended to be responsive to local priorities. The EES team is available to assist project teams in applying these considerations.

Holistic Approach & Project Values

Holistic Lens

In the Facility Planning and Design sections, each of the six Focus Areas includes the following Key Consideration:

Encourage holistic thinking. Project teams are encouraged to collaboratively explore Focus Area strategies with cross-disciplinary input. This helps surface trade-offs, prioritize approaches with multiple co-benefits and align design decisions with broader project goals such as capital cost, total cost of ownership, indoor air quality, staff and patient well-being, community health and delivery of care. Co-benefits may also emerge between Focus Areas.

The LCRES Guidelines encourage creation of processes (e.g., workshops, presentations) that foster cross-pollination of ideas across disciplines and user groups, ensuring a holistic perspective is maintained throughout the project phase.

Project Values

Often, major capital projects begin by developing Value Statements that reflect the unique priorities of the project. These may originate from earlier planning stages or be developed collaboratively at project initiation. For example, in long-term care, the value of creating a home-like environment has driven significant changes in facility design. Value Statements are intended to be developed with input from all teams and disciplines.

Low carbon resilience and environmental sustainability should be included as core project values. Teams are also encouraged to consider how the project can embody the sponsoring health organization's planetary health commitments. (See: Planetary Health section.)

Green Building Certification

Green Building Certification Options

The Environment Social and Governance Framework for Capital (ESGFC) Appendix 5 and Ministry of Health (MoH) Capital Policy Manual Chapter 11, both require that projects are being designed to one of the green building standards listed below. Regardless of which standard is chosen, Business Plans shall demonstrate how the project will be designed to minimum LEED Gold or equivalent.

Eligible green building standards:

- LEED v4.1 Health Care BD+C Gold or Platinum (Canada Green Building Council)
- Passive House Standard
- International Living Future Institute (Core Standard)
- Zero Carbon Building Standard – Design (Canada Green Building Council)

Certification Comparisons & Considerations

LEED and International Living Future Institute both have a holistic scope with targets that impact all Focus Areas. This is helpful to certify and promote the many ways the health-care facility will impact the environment. It should be noted that the chosen certification platform should not be relied upon as the sole driver of LCRES goals; rather they provide a useful accountability structure for goals that are already important to the project.

In contrast, both the Zero Carbon Building and Passive House standards are narrowly focused on energy and carbon. If either of these platforms is chosen as the sole certification, the project will need to devise a project management strategy to fulfill overall LCRES goals.

Projects may wish to pursue multiple certifications, or explore additional third-party programs such as the WELL Building Standard or Salmon-Safe Certification, depending on project priorities and site context.

Budget Note: The project's EES representative should be consulted early to help guide discussions on the selection of green building certification platforms and to support budgeting and scope development for the environmental management plans required by the Ministry of Health's Capital Policy Manual.

Primer on Targets

Target setting can play a crucial role in design, especially with evolving project criteria. The LCRES Guidelines use "Targets" throughout as a shorthand for the broader and more complex process of target setting, monitoring and assessment. Such complexity is reflected in a more nuanced set of terms (including goals, objectives, metrics, and indicators), which are not defined here.

Why are Targets Important?

- **Direction and Motivation:** Targets set the benchmark for what success looks like, pushing teams to innovate and optimize the design.
- **Clarity:** Targets provide clarity for design teams to guide decision-making and align all parties toward a shared outcome.

What are Targets?

In simple terms, targets reflect goals or objectives that the project aims to achieve. Each project is encouraged to develop and adopt relevant targets for each Focus Area as appropriate, during the Facility Planning phase. There are notable differences in the types of targets, as outlined below:

- **Mandatory vs Stretch:** Some targets are mandatory (often predefined based on a regulatory requirement or by the Health Authority), while others are set as a stretch goal to achieve if possible, and may need to emerge with the design.
- **Quantitative vs Qualitative:** Most targets are easily measured, but in some cases, the meaningful intent can't be captured by a single number. For example, a target to "protect, restore and/or regenerate natural assets" may involve qualitative assessments (such as visual survey) alongside project-specific indicators like restored area.

How to use Targets?

Regardless of the specific target, these are some principles that can guide their use:

- Set targets early, in collaboration with the EES Team
  - Make qualitative outcomes explicit and measurable where possible
- Iterate if needed to refine targets
- Review targets frequently
- Monitor progress towards targets
- Report on progress towards targets
- Verify final target achievement

Primer on Project Roles

Throughout Part B: LCRES Implementation, each Action identifies a team or an individual role, that is typically responsible to lead and complete the action. All Actions will involve collaboration among the core design disciplines with ongoing discussion and input from the owner's user groups and specialized consultants.

See below for more detailed description of groups and roles involved in LCRES decision-making.

Roles Internal to Health Organization

Some teams are regional (e.g., EES) and provide a common service to all four heath organizations (Vancouver Coastal Health, Fraser Health, Providence Health Care and Provincial Health Services Authority). Others are uniquely responsible to each HO and will have unique requirements. Each HO has its own organizational structure and culture for management of new construction projects and will have differing requirements and priorities.

Roles Internal to Health Organization

TEAM OR INDIVIDUAL	DESCRIPTION
Clinical Planners	This team supports health facility planning and design, to deliver patient care.
Energy and Environmental Sustainability Team (EES)	A regional team forwarding LCRES goals, through ongoing policy development, projects and operational change management. For New Construction projects, EES will have one representative assigned to the project, supported by team members as listed below. While each EES team member is hired by one health organization, their responsibility is to all four health organizations. Roles on the EES team include: • **Sustainability Consultants:** Responsible for distinct Focus Areas (e.g., water, transportation, materials). The Sustainability Consultants are staff members of a health organization and should not be confused with the external Sustainability Consultants who are under contract for the project. • **Energy Managers:** Primary focus is on energy efficiency and carbon emissions reduction • **Climate Resilience Manager:** Focused on climate resilience policy and implementation • **Low Carbon Resilience Manager:** Focused on energy, carbon and climate resilience • **Project Managers:** Support energy and carbon projects with existing buildings
Environmental Services	This department manages housekeeping services.

Roles Internal to Health Organization

TEAM OR INDIVIDUAL	DESCRIPTION
Facilities Maintenance and Operations (FMO)	The HO department responsible for operating and maintaining facilities. FMO is integral to all LCRES areas, and especially with energy, carbon and climate resilience strategies. For Fraser Health, FMO is supported by: • **Asset Risk and Quality:** Technical Services (ARQTS): This team improves systems to monitor assets, quality control and risk. • **Engineering and Operations (E&O):** A regional team with a range of expertise to support FMO. ARQTS or E&O members may be assigned to represent FMO interests on capital projects.
Food Services	This team provides nutritious meals to patients.
Health Emergency Management BC (HEMBC)	A team operating within Provincial Health Services Authority (PHSA), HEMBC provides emergency management leadership and support to the B.C. health system, including all regional health authorities.
Indigenous Health	This team is unique to each HO, and works to addresses the health and well-being of Indigenous communities in accessing health care. For a new construction project, this team can provide guidance in establishing and maintaining a relationship with an Indigenous community. On a large project a dedicated person or team may be hired to fill this role.
Infection Prevention and Control (IPAC)	IPAC is a Canadian organization with chapters in each B.C. health organization. An IPAC representative will be assigned to each project to provide expertise and input, especially to any new building system, material or design that has an impact on the control of infectious agents in the facility.
Information and Communication Technologies (ICT); and Information Management/Information Technologies Services (IMIT, IMITS)	This team is responsible for planning and maintaining integrated communication systems to support clinical service delivery and facilities operation.
Project Manager (PM) and Project Management Team	This team is unique to the project. For these Guidelines, PM refers to the team that has the responsibility to deliver the project, on behalf of the health organization.

Roles Internal to Health Organization

TEAM OR INDIVIDUAL	DESCRIPTION
Transportation Department	A department exists in each health organization to manage parking, commuter services and EV charging. These departments have different names: • **Integrated Parking Services (IPS):** Fraser Health and PHSA sites in Lower Mainland • **Commuter Services:** Providence Health Care • **Transportation Services:** Vancouver Coastal Health • **Protection Services:** Vancouver Coastal Health (EVs and parking)
Waste Management Vendors	This is typically an outside vendor that manages waste collection and disposal for the health organization's major facilities.

Roles External to Health Organization

TEAM OR INDIVIDUAL	DESCRIPTION
Arborist	A consultant who will assess existing trees and shrubs.
Climate Resilience Consultant	This consultant has expertise in assessing climate risk and planning adaptation strategies.
Commissioning Agent (Cx Agent)	Can be an internal staff person with FMO, a vendor or third-party contractor with expertise in commissioning specific building systems.
Commissioning Authority (Cx Authority)	This is a firm hired by the project to develop the Commissioning Plan, and oversee all commissioning activities, including training and documentation of installed building equipment and systems.
Constructor/Contractor/Builder	The construction firm hired to construct the facility. This firm has the expertise to organize construction and deliver the actual facility, based on the design documents. These professionals include: • Engineers • Project Managers • Estimators

Roles External to Health Organization

TEAM OR INDIVIDUAL	DESCRIPTION
Consultant	Professionals with specialized expertise such as acoustics, hazardous waste testing, wind analysis, environmental assessment and others. Consultants may be part of the Prime firm's staff or may be hired on separate contracts by the Prime or by the Owner.
Cost Consultant/ Estimators	This role may exist on the Constructor team or is hired as third-party firm to provide costing estimates for design components and to develop the budget. Iterations of the budget will have increasing levels of accuracy as the design progresses.
Design Team	These are the core designers, often employed by or sub-contracted by the architect firm (see Prime Consultant) engaged to design the facility to meet project requirements. These professionals include (but are not limited to): • **Architects** (core and shell, interior design, landscape) • **Engineers** (geotechnical, civil, mechanical, structural, building envelope, electrical, information systems and controls)
Energy Modeller	This role creates an energy model to predict energy consumption for the facility. The modeller may be on staff with the mechanical design team, or a third-party firm under contract to the project.
Environmental Consultant	A consultant with expertise to assess site conditions and existing natural systems.
FM Procurement	Operating within PHSA, this regional team supports VCH, FH, PHC and PHSA in managing procurement and construction tenders.
Independent Energy Consultant (IEC) or Peer Reviewer	This external third-party consultant is tasked with peer reviewing the energy system design and energy model. In the past this role was included in a Design-Build or P3 project, where the targets have an energy and carbon emissions guarantee. A similar role should be defined for other project delivery methods.
Measurement and Verification (M&V) Consultant	This is an external third-party consultant tasked with verifying energy and carbon performance of the facility. Creation of the M&V Plan during the Design phase may be done by the M&V Consultant, or sometimes by the Design Team.

Roles External to Health Organization

TEAM OR INDIVIDUAL	DESCRIPTION
Sustainability Consultant	Professionals with accreditation to support one or more green building certification platform and lead the process of creating Environmental Management Plans as directed by the Ministry of Health (see Ministry of Health Capital Policy Manual). Often this consultant is able to conduct whole building Life Cycle Assessments (LCA). The Sustainability Consultant is an external consultant, not to be confused with "Sustainability Consultants" who are members of the EES Regional Team. See Energy and Environmental Sustainability Team.
Trades	Contractors (electrical, mechanical, IT, controls and more) are hired to construct the facility, and often also assist the design process by providing expertise and costing.

Roles Specific to the Project Delivery Method

TEAM OR INDIVIDUAL	DESCRIPTION
Prime Consultant	This is a firm, usually an architect firm, hired to lead the design process.
Compliance Team	This is a firm hired by the Owner to develop the specifications and provide peer review throughout a Design Build project.
Construction Manager (CM)	This role is unique to Construction Management project delivery. There is no fixed price contract, as in Design-Build. The CM firm works closely with the trades to provide ongoing costing information and sometimes holds responsibility for the actual trades' contracts, to complete the project.
Alliance Workstream	The Alliance delivery method is a collaborative partnership between the Owner, Design Firm and Constructor. Work is overseen by multiple workstreams, with representation from all three groups as well as relevant consultants.

PROJECT PHASES

1 Discovery & Site Planning

2 Facility Planning

General
Energy & Carbon
Climate Resilience
Water
Transportation
Materials
Natural Environment

3 Launch

4 Design

General
Energy & Carbon
Climate Resilience
Water
Transportation
Materials
Natural Environment

5 Construction

General
Energy & Carbon
Climate Resilience
Water
Transportation
Materials
Natural Environment

6 Occupancy

7 Post-Occupancy

General
Energy & Carbon
Climate Resilience
Water
Transportation
Materials
Natural Environment

8 Close-Out

1 Discovery & Site Planning

During the Discovery phase, the need for a new facility and likelihood of funding is determined. A Feasibility Study may be conducted to determine service need, existing capacity and high-level project scope.

The Site Planning phase includes functional planning for current and future space needs for staff, equipment, patients and services. Potential sites are evaluated. Below are site considerations from an LCRES perspective that may have capital cost implications. Early-stage consideration of climate hazards and vulnerabilities ensures site selection and feasibility studies reflect long-term climate risk.

Key Consideration

Identify LCRES considerations that can impact site risk or opportunity:

- Impact on existing ecosystem/location of natural assets in situ
- Community integration: walkability, bikeability, transit connection and connection to amenities
- Climate hazards: heat waves, flooding, wildfire and extreme weather
- Indigenous land territory considerations and traditional ecological knowledge
- Energy and carbon infrastructure opportunities: leverage natural features (e.g., lakes) as a source for geothermal energy; district energy systems or micro-grid solutions for energy sharing and emissions reduction

2 Facility Planning

Facility Planning is a critical opportunity to embed LCRES goals and strategies into the Business Plan and project budget. Although timelines are often tight, this phase allows teams to explore a broad range of potential LCRES strategies and identify those best suited to the project's goals. Early involvement of the EES team can increase the likelihood of achieving LCRES goals in a cost-effective manner.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Project Managers should reach out to EES** as soon as possible to: • Initiate conversations about green building certification choice • Interpret latest government requirements • Include LCRES services and deliverables in RFP	PM

* Lead - The Lead is primarily responsible for the Action. It is up to the Lead together with the Project Manager to ensure appropriate parties are engaged and involved. This will include significant contribution from the EES and FMO teams. Refer to the Role & Responsibilities Primer for additional information.

ENERGY & CARBON

Best practice in health-care building systems design has advanced to consistently enable energy-efficient and low-carbon operation. The intent during Business Plan phase is to establish an Indicative Design that will reflect the health organization's sustainability and/or planetary health goals, meet "best for project" goals including thermal comfort, capital and operational cost consideration, while meeting or exceeding industry benchmarks and regulatory requirements for a low-carbon facility.

Key Considerations

- **Encourage a holistic lens to sustainable facility design.** That is, give priority to energy and carbon strategies that have a co-benefit to a project priority (e.g., capital cost, operating cost, indoor air quality, healing environment) including co-benefits with other Focus Area goals. Engage EES in design workshops to advise on LCRES integration and regulatory alignment.
- **Give priority to passive design strategies** (e.g., building envelope, heat wheels). Consider overall complexity and give priority to systems that will allow for ease of operability and persistence of energy and carbon savings.
- **Give priority to centralized heating and cooling systems** to maximize heat recovery, while also increasing flexibility for climate resilience, back-up and future expansion.
- **Prioritize designs that provide co-benefits for low-carbon resilience.** Include renewable energy, or future-proofing for renewable energy, where possible.
- **Consider battery storage** for participation in BC Hydro Demand Response program.
- **Consult** Appendix D: Low Carbon Resilience Design Recommendations for preferred low-carbon design strategies.
- **Consider embodied carbon impacts** of architectural design (e.g., transfer slabs), see Appendix E: Embodied Carbon.
- **Consult** Appendix C: Energy Modelling Requirements.
- **Consider green building certification requirements** for ECM bundles and emissions targets (i.e., 50 per cent reductions in carbon emissions) as it relates to MoH Capital Policy Manual Chapter 11 and ESGFC requirements.
- **Ensure appropriate budget** is included for Energy and Carbon Accountability Mechanisms, (e.g., Independent Energy Consultant, Measurement and Verification, metering, etc.).

Innovation

- **Consider new energy or carbon technologies** that may have merit for implementation, including investigation through feasibility studies.
- **Consider incorporating renewable energy** including renewable natural gas into the design.

Targets

- **Establish Energy Use Intensity (EUI) (kWh/m²) and Greenhouse Gas Use Intensity (GHGI) ($kgCO_2e/m^2$) targets** and others as decided by the project.
- **Set initial embodied carbon target** (% reduction, or $kgCO_2e/m^2$).
- **Establish compliance** with Ministry of Health minimum GHGI target.
- **Confirm energy and carbon-related points**, to meet LEED Gold minimum requirements.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Engage EES and FMO in kickoff meeting,** to review the project's energy and carbon goals, regulatory requirements and project deliverables.	PM
☐	**Develop baseline energy models** using architectural, mechanical and electrical preliminary design. Note that multiple baselines are often required, as detailed in Appendix C: Energy Modelling Requirements.	Energy Modeller
☐	**Confirm which green building standard certification(s)** will be followed for the project: • LEED Gold • Passive House Standard • International Living Future Institute • Zero Carbon Building Standard - Design See ESGFC and MoH Capital Policy Manual requirement.	PM
☐	**Select and evaluate ECMs** in consultation with FMO and EES, and prepare ECM bundle to be implemented in alignment with MoH Capital Policy Manual budget allowance.	Energy Modeller
☐	**Determine what will be in scope** for energy and carbon targets; consider electrification measures in addition to HVAC: kitchens, MDRD, laundry, etc.	Energy Modeller

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Develop initial operational** energy and carbon targets for the project.	Design Team, Energy Modeller
☐	**Conduct Whole Building Life Cycle Analysis** (LCA) for embodied carbon, and set initial target.	Sustainability Consultant
☐	**Confirm delivery model** for implementation of the project.	PM

* Lead - The Lead is primarily responsible for the Action. It is up to the Lead together with the Project Manager to ensure appropriate parties are engaged and involved. This will include significant contribution from the EES and FMO teams. Refer to the Role & Responsibilities Primer for additional information.

Deliverables

DELIVERABLE ITEM CHECK LIST	
☐	Indicative Design and Business Plan to include Low Carbon Study with corresponding Energy Model Report. Low-carbon strategies to be quantified with separate budget allocation, as required by MoH Capital Policy Manual.
☐	Life Cycle Assessment (for embodied carbon) report

CLIMATE RESILIENCE

Health facilities in B.C. must be climate resilient to ensure continuity of care and protect the health and safety of patients, staff and visitors. Achieving climate resilience requires early and ongoing assessment of facility criticality, site-specific climate hazards and the priority risks that must be addressed through planning and design. This work supports alignment with the Climate Resilience Framework and Standards for Public Sector Buildings (CRFS) and the Climate Resilience Guidelines for BC Health Facility Planning and Design.

Key Considerations

- **Consider the facility's criticality** in relation to health system operations.
- **Consider how local climate hazards** (e.g., heat, wildfire smoke, floods) may affect health services.
- **Prioritize early identification** of climate impacts and risks to inform planning decisions.

Innovation

- **Use community climate vulnerability mapping** to inform planning decisions.
- **Explore traditional Indigenous knowledge systems** to identify resilience strategies.

Targets

- **Relevant targets to be developed** by the project team.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Classify the criticality of the facility** per the Climate Resilience Framework and Standards for Public Sector Buildings.	Sustainability Consultant
☐	**Conduct** a climate hazard exposure screen.	Climate Resilience Consultant

* Lead - The Lead is primarily responsible for the Action. It is up to the Lead together with the Project Manager to ensure appropriate parties are engaged and involved. This will include significant contribution from the EES and FMO teams. Refer to the Role & Responsibilities Primer for additional information.

Deliverables

DELIVERABLE ITEM CHECK LIST	
☐	Criticality classification summary
☐	Climate hazard exposure screen

WATER

Water is an essential resource for human and planetary health, and hospital operations. How the project manages and conserves municipal supply, rainfall and natural water systems, through design, construction and operation, will have multiple impacts for planetary and human health, climate resilience and emergency preparedness.

Key Considerations

- **Encourage a holistic lens to sustainable facility design.** That is, give priority to water strategies that have a co-benefit to project priorities (e.g., capital cost, operating cost) including sustainability goals (e.g., low carbon, climate resilience, Indigenous priorities).
- **Establish a landscape design that meets targets in** Natural Environment. In the case of rainwater/ stormwater management, naturalized landscapes provide many benefits.
- **For sites with waterways,** protect the habitat of the riparian area.
- **Invite EES to design** workshops and key meetings to bring LCRES perspectives.
- **Establish water source resiliency measures** (e.g., external water truck connection).
- **Establish metering plan** for all major water systems.
- **Establish a green rainwater infrastructure** (e.g., raingarden) target.
- **Meet applicable municipal bylaws** (e.g., Metro Vancouver Pollution Prevention Bylaw).
- **Consider best practices, current gaps and opportunities** in order to develop a sustainable Water Management Plan, as required by the MoH Capital Planning Manual.

Innovation

- **Identify strategies** that are considered innovative.
- **Consider** Salmon-Safe Certification.
- **For a site that includes a waterway,** enhance the habitat quality of the waterway and riparian area.
- **Identify waterbodies connected to the project,** any local or Indigenous Nation water quality objectives (e.g., Water Quality Objectives for Burrard Inlet), and how the project will support water quality objectives.

Targets

- **Operational water use efficiency** (m^3/m^2/year) achieve relevant LEED points as a minimum, and consider 5% improvement as an aspirational target.
- **Establish a target for amount** of rainwater/ stormwater captured onsite (metric).

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Consult with EES** to initiate work on creating a Water Management Plan. See MoH Capital Planning Manual.	Sustainability Consultant
☐	**Support interest holder consultations**, as needed.	Sustainability Consultant
☐	**Within the Water Management Plan,** include strategies for all of the following categories, as appropriate to the site: • Stormwater and rainwater management (note connections/synergies with Natural Environments Management Plan) • Green rainwater infrastructure • Identification of impacts to natural waterways and management of impacts • Water Reuse • Sub-metering and water use monitoring • Water supply resilience (e.g., external water supply connection, on site water well) • Pollution prevention (reference, Metro Vancouver Hospital Pollution Prevention Regulatory Program)	Sustainability Consultant
☐	**Identify and report** on baseline, recommended and not recommended water sustainability strategies and opportunities for innovation.	Design Team
☐	**Incorporate baseline water sustainability measures** into Indicative Design.	Design Team

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Include strategies** for Construction and Operational phases, as placeholders in the Water Management Plan, to be developed later; include an estimate of cost to support developing and implementing these measures.	Design Team
☐	**Cost and budget** for strategies and innovations in the Water Management Plan.	Estimator
☐	**Reference climate hazard exposure screen** (see Climate Resilience), to identify the risk of flooding and drought.	Design Team
☐	**Develop** a Water Contingency Plan for Hospital Construction/Operation.	Design Team

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Deliverables

DELIVERABLE ITEM CHECK LIST	
☐	Water Management Plan as an appendix to Business Plan including: • Baseline water sustainability measures to be included in Indicative Design • Recommended strategies for further exploration during Detailed Design, with high-level costing • Costing of submetering for potable water system to support monitoring water use target during the buildings operation • Rainwater/stormwater management linked to natural environment targets (see Key Considerations for further details)
☐	Where appropriate, identify Pollution Prevention Plan measures to meet Metro Vancouver Hospital Pollution Prevention Bylaw.

TRANSPORTATION

Health-care facilities are committed to fostering a healthier environment and enhancing community well-being by championing sustainable transportation through dedicated infrastructure and advocating for improved transportation networks. The strategic prioritization of low-carbon and active modes of transportation aims to reduce environmental impact and promote the health of staff, medical staff, visitors and the wider community. By embedding these principles into planning and operations, health-care facilities and campuses will become more accessible, vibrant and seamlessly connected spaces.

Key Considerations

- **Adopt a comprehensive transportation lens:** Consider and plan for all modes of transportation, moving beyond a singular focus on vehicle parking demand.
- **Design for current and future potential accessibility:** Thoroughly assess current and future transportation accessibility to the facility for all users, considering both existing and planned municipal infrastructure, highlighting the specific barriers and opportunities to shift users to active and low-carbon modes.
- **Consider long-term operational expenses:** Ensure that ongoing maintenance and operational costs associated with all planned transportation infrastructure and programs are considered and that long-term operational benefits are a part of design considerations.
- **Prioritize connectivity:** Ensure seamless and safe connections within the health-care facility campus and to external transportation networks (including active transportation routes and public transit).
- **Encourage a holistic lens to sustainable facility design:** Give priority to transportation strategies that have a co-benefit to a project priority (e.g., capital cost, operating cost, health and well-being) including sustainability goals (e.g., energy and carbon, climate resilience). Invite EES to design workshops and key meetings to bring LCRES perspectives.
- **Consider best practices, current gaps and opportunities** in order to develop a sustainable Water Management Plan, as required by the MoH Capital Planning Manual.

Innovation

- **Create integrated storage facilities:** Remove all site-level barriers to active transportation by providing welcoming, convenient and full-service commuter services and end-of-trip facilities (i.e., Vancouver General Hospital Commuter Centre).
- **Strategically locate end-of-trip facilities:** Instead of clustering showers and lockers in a remote corner, integrate smaller, conveniently located "mobility hubs" near key staff entrances or departments with high cycling/walking rates. Consider satellite facilities to reduce travel time within the building after commuting.
- **Bike parking integration within the building footprint:** Explore opportunities to integrate secure bike parking within the ground floor or lower levels of the building, providing direct, weather-protected access from external bike paths. Consider visual prominence to encourage cycling.
- **Multi-modal arrival zones:** Design arrival zones that clearly prioritize and seamlessly integrate pedestrians, cyclists and public transit users. This could involve dedicated drop-off areas close to entrances, clear wayfinding from transit stops, and direct, accessible pathways for cyclists.
- **Vertical circulation prioritization for active modes:** Design stairwells that are inviting, well-lit and centrally located to encourage walking between floors. Consider wider stairs with shallow risers and visual enhancements.
- **Consideration for future mobility trends:** During space planning, allocate flexible spaces that can be adapted for emerging active and clean transportation technologies or services in the future (e.g., scooter parking, larger e-bike charging infrastructure).
- **Visual connections to external active transportation networks:** Orient key building features or windows to provide visual connections to external bike paths or pedestrian routes, reinforcing the integration of the facility with the surrounding active transportation network.

Targets

- **Relevant targets to be developed** by the project team

Actions

ACTION ITEM CHECK LIST		RESPONSIBLE
☐	**Establish regulatory alignment:** Confirm current and future regional and municipal government transportation plans, bylaws, and standards to ensure compliance.	Design Team

Actions

ACTION ITEM CHECK LIST		RESPONSIBLE
☐	**Establish strategic alignment:** Identify and align transportation planning with the health organization's strategic priorities, including sustainability and accessibility goals relevant to the region.	Design Team
☐	**Create a comprehensive Transportation Management Plan** (TMP) with clearly defined goals for mode share, accessibility and sustainability.	Sustainability Consultant
☐	**Integrate Universal Design principles:** Design all transportation-related infrastructure adhering to universal design principles to ensure accessibility for people of all ages, abilities and needs, consistent with British Columbia's accessibility standards.	Design Team

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Transportation Management Plan

MATERIALS

Choosing healthy materials in health-care facilities is essential to support patient recovery and protect staff well-being, through minimizing exposure to harmful chemicals. Thoughtful material selection can improve indoor air quality, reduce toxic emissions, and create safer, more healing environments.

Waste management, if not done correctly, is a safety, fire, pest, infection and fiscal risk to a health-care facility and its contractors, staff and patients throughout its operational life.

Key Considerations

- **Consider health and environmental impacts** of materials selection and utilization.
- **Choose low-toxic and sustainably-sourced materials**, where possible, to build, furnish, finish and equip the building.
- **Consider health and environmental impacts** of how waste is managed.
- **Prioritize infrastructure within the facility** for reuse, repair, re-purposing and recycling, to minimize landfill and incineration.
- **Design to facilitate the zero waste hierarchy** (see Zero Waste Hierarchy of Highest and Best Use 8.1 - Zero Waste International Alliance), in order to remove waste from the system.
- **Encourage a holistic lens to sustainable facility design.** That is, give priority to waste and materials strategies that have a co-benefit to a project priority (e.g., capital cost, operating cost, indoor air quality, healing environment) including sustainability goals (e.g., low carbon, climate resilience, healthy materials). Invite EES to design workshops and key meetings to bring LCRES perspectives.
- **Consider best practices, current gaps and opportunities** in order to develop a sustainable Water Management Plan, as required by the MoH Capital Planning Manual.

Innovation

- **If the project scope includes deconstruction,** develop a comprehensive deconstruction plan. This should outline the material inventory, timeline of activities, storage logistics, and destinations for material reuse. Additionally, implement a tracking system to monitor progress and material flow.
- **Identify space in design for infrastructure** to accommodate future waste management opportunities, such as: on-site food waste management systems using compost for adjacent garden.

Targets

- **Construction diversion** (minimum 50%, aspirational 90%).
- **Deconstruction reuse** (minimum 20%, aspirational 50%).
- **New building materials meet 90%** of Chemicals of Concern LEED requirements, for selected material categories.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Collaborate early with EES and user groups** (clinical, waste management, FMO) to develop Materials Management Plan.	Sustainability Consultant
☐	**Develop targets** for construction and deconstruction waste diversion, referring to Appendix G: Deconstruction Materials Reuse and Recycling and municipal by-laws.	Sustainability Consultant
☐	**Identify % and type of materials** that will be free from chemicals of concern, to be included in the project target. Refer to Appendix H: Chemicals of Concern: Construction Interiors.	Sustainability Consultant
☐	**Follow guidance:** • Appendix F: Waste Management Space Design Guidelines • Appendix G: Deconstruction Materials Reuse and Recycling • Appendix H: Chemicals of Concern: Construction Interiors	Sustainability Consultant
☐	**Engage with municipality** to determine construction waste bylaws.	Sustainability Consultant
☐	**Confirm green building** certification requirements.	Sustainability Consultant

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Materials Management Plan, as Appendix to Indicative Design
☐	Include Deconstruction Plan and Salvage Assessment, as appropriate
☐	Building material manual with chemicals of concern selection tracking sheet

NATURAL ENVIRONMENT

Natural environments that protect biodiversity and restore and regenerate natural habitats are vital for human and planetary health. Nature-based solutions along side greenhouse gas emissions reduction strategies ensure a holistic approach to mitigating negative impact on the environment. By prioritizing green infrastructure (whether natural, enhanced or engineered) in health care, facilities become better prepared for extreme weather events. Increasing opportunities to connect with the natural environment has multiple benefits to staff, patients and the community.

Key Considerations

- **Consider that efforts to protect the natural environment** are directly tied to reconciliation with Indigenous Peoples. Connecting the project to the land's history and uplifting Indigenous ways of knowing and being in relation to the land should be priorities.
- **Prioritize natural resources and ecosystems** as "natural assets" for the valuable services they provide to communities.
- **Encourage place-based planning and design** that considers the facility within its broader environment so that green corridors can be continued rather than disrupted and municipal and regional green infrastructure goals are included.
- **Consider how the natural environment is an essential part of patient healing** and might be integrated into not just infrastructure and views, but also delivery of care (e.g., rehab and LTC programming).
- **Consider how spaces to enjoy the natural environment** can contribute to staff well-being, further supporting recruitment and retention strategies.
- **Consider best practices, current gaps and opportunities** in order to develop a sustainable Water Management Plan, as required by the MoH Capital Planning Manual.

Innovation

- **Include therapeutic uses** in Natural Environment Management Plan (i.e., food gardens for mental health and rehab programs).
- **Include consideration for staff wellness** in Natural Environment Management Plan (i.e., physician garden).
- **Include co-benefits** with energy efficiency, climate resilience, water management, health and well-being.
- **Pursue** Salmon-Safe Certification.

Targets

- **100%** native and drought resistant plantings.
- **10%** of tree canopy cover on urban sites OR in line with city/regional canopy cover targets.
- **25%** of tree canopy cover on rural sites OR in line with city/regional canopy cover targets.
- **At least one type** of natural asset on site is protected, restored and/or regenerated.
- **At least two types** of enhanced green assets are included on site.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Confirm regional government** natural environment related plans/strategies/ targets.	Design Team
☐	**Conduct site assessments** to identify green infrastructure including unique natural assets (e.g., wetlands, mature trees, waterways, wildlife habitats) or biodiversity in the area.	Environmental Consultant
☐	**Analyze the site's connectivity** to existing green corridors and plan to maintain or enhance these connections to support biodiversity.	Environmental Consultant
☐	**Conduct a preliminary assessment** of the potential impacts of the proposed facility footprint and infrastructure on the identified natural assets. Consider both direct impacts (e.g., habitat loss) and indirect impacts (e.g., changes in drainage patterns, noise pollution).	Environmental Consultant
☐	**Develop a Natural Environment Management Plan** including costs that need to be considered for studies/implementation.	Environmental Consultant
☐	**Brainstorm how the natural environment** can be integrated into the facility design and the delivery of care (e.g., therapeutic gardens, views of nature from patient rooms, outdoor rehabilitation spaces).	Design Team

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Plan to maintain an undeveloped buffer area** around waterways, if waterways are present on site. Consult BC Riparian Management Area Guidebook.	Environmental Consultant

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Natural Environment Management Plan, as Appendix to Indicative Design

3 Launch

A capital project officially launches when the Project Plan and budget are approved by Treasury Board. At this stage, the project team is assembled and a charter is established. The project delivery method is confirmed, and the EES team should be informed so an EES representative can be assigned. This representative will support the inclusion of LCRES content in procurement documents.

Since some time typically passes between Business Plan approval and design initiation, codes and technologies may evolve. This is a key opportunity to revisit and update the Business Plan to reflect current best practices, industry developments and LCRES goals.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Collect all relevant** standards and guidelines for the data room.	EES
☐	**EES to provide orientation** to the Project Team, regarding over-arching LCRES goals.	EES
☐	**Initiate creation of Value Statements** for the project, when applicable.	PM
☐	**Describe services and deliverables** from all Focus Areas, with appropriate language for the project delivery method, to include in the RFP.	EES

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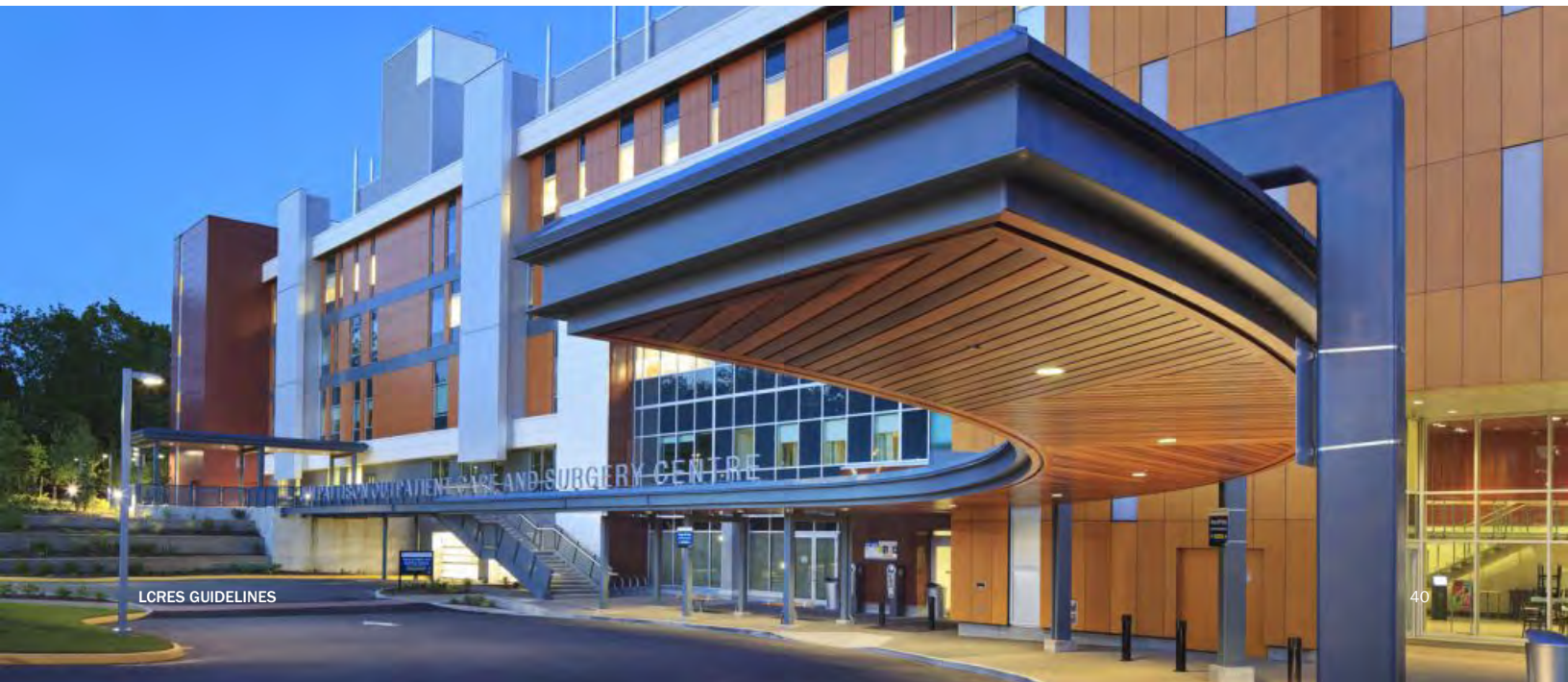
4 Design

The Design phase begins with procurement of consultants and moves through Schematic Design, Design Development, Contract Documents and Construction Procurement. "Key Considerations" and "Innovations" outlined in each Focus Area should be fully explored during Schematic Design when the strategic direction of the project is established. While specific decisions (e.g., on materials and systems) are refined in Detailed Design, the framework and intent for those decisions is set early in this phase. Creating an enhanced Commissioning Plan is essential in order to achieve targeted energy performance.



ENERGY & CARBON

The health-care facility's energy intensity and carbon footprint are a result of all aspects of design including architectural, structural, M&E, lighting, controls, etc., and require a "systems thinking lens". Key tools are the Energy Model, and the Life Cycle Assessment for carbon, to track target achievement.

Key Considerations

- **Encourage a holistic lens to sustainable facility design.** That is, give priority to energy and carbon strategies that have a co-benefit to a project priority (e.g., capital cost, operating cost, indoor air quality, healing environment) including sustainability goals (e.g., water conservation, climate resilience, healthy materials). Invite EES to design workshops and key meetings to bring LCRES perspectives.
- **Develop HVAC design to balance:** energy efficiency, low carbon, climate resilience, cooling plant sizing and demand reduction strategies. Consider overall complexity and give priority to systems that will allow for ease of operability and persistence of energy and carbon savings.
- **Consider LCRES Guidelines'** preferred low carbon and electrification strategies, as outlined in Appendix D: Low Carbon Resilience Design Recommendations.
- **Consult** Appendix C: Energy Modelling Requirements.
- **Confirm regulatory targets** (MoH Capital Policy Manual, ESGFC, Step Code) as well as developing project-specific targets for energy and carbon. Consider project leadership direction, and achieve as close to net zero GHG emissions as possible.
- **Ensure energy and carbon accountability is built into the project scope**. The specific roles and processes may vary depending on the project delivery method. These may include updated energy models, independent energy consultant or peer reviews, a measurement and verification (M&V) plan and scope, a metering matrix, and enhanced commissioning. See Appendix B: Guidance for Low Carbon Accountability Mechanisms for further guidance. Early engagement at Schematic Design with utility partners (BC Hydro and Fortis) to confirm funding opportunities and associated reporting requirements is critical.

Innovation

- **Use BC Hydro/Fortis study support for ECMs**, to assess upgrades for energy/carbon savings, energy storage, demand response, renewable energy or other innovations.

Targets

- **Re-evaluate EUI and GHGI targets** set in Business Plan.
- **Monitor energy and carbon targets** through design, to set final project targets.
- **Determine** final embodied carbon target.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Engage EES to identify services, roles and deliverables,** to be included in RFP scope for Prime Consultant, Construction Management, Commissioning Authority or separate contracts as they relate to the Project Delivery Method.	PM
☐	**Confirm approach to accountability mechanisms** and engage energy/carbon consultant expertise needed (e.g., Energy Modeller, Measurement and Verification, Independent Energy Consultant or peer review) and engage as early as possible. See Appendix B: Guidance for Low Carbon Accountability Mechanisms.	PM
☐	**Confirm chosen green building certification** platform(s).	PM
☐	**Review Business Plan** for completeness, and any gaps, changes or opportunities with respect to updated regulatory guidance and user requirements.	Design Team, Energy Modeller
☐	**Develop and update Energy Model at key milestones.** Develop energy model baseline(s) to determine MoH Capital Policy Manual, green building certification, municipal or other minimum requirements for energy and carbon reductions. See Appendix C: Energy Modelling Requirements.	Energy Modeller
☐	**Conduct climate risk sensitivity analysis,** using dynamic energy model, to test HVAC design with future heat dome weather file, and one unit out of service. See Appendix C: Energy Modelling Requirements.	Energy Modeller

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Create load shedding plan** for extreme heat dome event and electrical outage.	Design Team
☐	**Confirm or develop Energy Conservation Measures (ECMs),** to achieve energy and carbon project targets, and to account for regulatory targets and MoH Capital Policy Manual dedicated budget allowance.	Design Team
☐	**Develop and set** energy (EUI, kW/m^2), operational carbon (GHGI, $kgCO_2e/m^2$) and embodied carbon ($kgCO_2/m^2$) targets for the project. Targets should take into consideration benchmarking data provided by EES and achieve as close to net zero as possible.	Energy Modeller, Design Team
☐	**Prepare and update** Energy Model and associated report to reflect ECMs at design milestones (i.e., schematic design, 30%, 70%, IFC).	Energy Modeller
☐	**Review design drawings and specification** at design milestones and prepare Energy Management reports.	Independent Energy Consultant
☐	**Initiate "directed" embodied carbon approach,** with Design Team and Procurement team. See Appendix E: Directed Approach to Embodied Carbon.	Sustainability Consultant
☐	**Conduct LCA** for embodied carbon at design milestones (i.e., schematic design, 30%, 70%, IFC). See Appendix E: Directed Approach to Embodied Carbon.	Sustainability Consultant
☐	**Confirm M&V** and monitoring-based commissioning systems are included in design: Metering Matrix, Energy Management Information System (integrated with BAS).	Design Team
☐	**Create** Energy and Emissions M&V Plan.	M&V Consultant
☐	**Create Commissioning Plan,** to include monitoring-based commissioning and building envelope commissioning. Cx Plan to include involvement of FMO, to understand HVAC systems.	Cx Authority
☐	**Create post-occupancy monthly energy Cx Plan** for optimization, for one to two years post-substantial completion, for complex systems.	Design Team, Energy Modeller

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Complete BC Hydro and Fortis New Construction studies** to evaluate ECMs, and submit completed workbooks to utilities. Confirm associated incentives agreement funding requirements.	Design Team, Energy Modeller
☐	**Create Temporary Site Energy and Carbon Plan** to reduce carbon emissions, and clarify utility cost recovery process.	Constructor

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Energy Management Reports at key milestones, (e.g., Schematic Design; 30%, 70% and 100%)
☐	Temporary Site Energy and Carbon Plan to reduce carbon emissions
☐	Measurement and Verification Plan, updated at Milestones
☐	Monitoring-based Commissioning Plan included in Commissioning Plan
☐	Life Cycle Assessment for carbon reports, at Schematic Design and updated with IFC drawings
☐	Final BC Hydro and Fortis study report submissions
☐	Funding Agreements for BC Hydro and Fortis New Construction programs

CLIMATE RESILIENCE

The Design phase is critical for embedding climate resilience into building systems. Project teams must collaborate across disciplines to identify, track and document resilience measures that meet provincial and health-care-specific climate-resilience requirements, supporting risk reduction and long-term adaptability. Applying systems thinking enables the integration of resilience measures with energy, sustainability and health equity, amplifying co-benefits across disciplines.

Key Considerations

- **Identify and prioritize climate impacts and risks** to building systems (e.g., mechanical, electrical, plumbing, envelope).
- **Identify applicable minimum** climate-resilience standards.
- **Identify climate-resilience measures** necessary to reduce risk to an acceptable level.
- **Prioritize climate-resilience measures** that offer co-benefits for sustainability, energy and carbon, and health equity.

Innovation

- **Integrate passive design and nature-based solutions** that mitigate risks and promote wellness.
- **Apply low-carbon resilience principles** by ensuring that all climate-resilience measures also minimize carbon emissions and support long-term sustainability goals.
- **Highlight intersections** between climate resilience, sustainability and energy and carbon to support coordinated implementation and amplify co-benefits.

Targets

- **Review targets** set during Business Plan.
- **Revise and confirm targets** through Design.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Perform** a climate risk assessment.	Climate Resilience Consultant
☐	**Identify applicable minimum** climate-resilience standards and any additional resilience strategies.	Climate Resilience Consultant
☐	**Develop and maintain** a tracking mechanism for climate-resilience measures through design iterations.	Climate Resilience Consultant

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Deliverables

DELIVERABLE ITEM CHECK LIST	
☐	Climate risk assessment report
☐	Tracking spreadsheet for climate-resilience measures
☐	Design milestone reports (e.g., 50%, 90%)

WATER

Water is an essential resource for human and planetary health, as well as hospital operations. How the project manages and conserves municipal supply, rainwater and natural water systems, through design, construction and operation, will impact planetary and human health, climate resilience and emergency preparedness.

Key Considerations

- **Encourage a holistic lens to sustainable facility design.** That is, give priority to water strategies that have a co-benefit to a project priority (e.g., capital cost, operating cost) including sustainability goals (e.g., low carbon, climate resilience).
- **Invite EES to design** workshops and key meetings to bring LCRES perspectives.

Innovation

- **Identify strategies that are new,** or may have advanced in the industry, since Business Plan approval, that are now achievable.
- **Implement process** for Salmon-Safe Certification.
- **Design facility to protect waterbodies** connected to project, according to local or Indigenous Nation water quality objectives (e.g., Water Quality Objectives for Burrard Inlet).
- **In the case that the site includes a waterway,** design landscape to enhance the habitat quality of the waterway and riparian area.

Targets

- **Review targets** set during Business Plan.
- **Revise and confirm targets** through Design.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Consult with EES,** to review any gaps or new information, relevant to the Water Management Plan.	Sustainability Consultant
☐	**Apply and track** how strategies from the Water Management plan are applied to facility design.	Design Team
☐	**Support** interest holder engagement.	PM
☐	**Confirm** water efficiency target for facility.	Sustainability Consultant
☐	**Confirm** sub-metering strategy.	Design Team
☐	**Confirm** water supply redundancy strategy (e.g., external water connection, or on-site well).	Design Team
☐	**In the case that the site includes a waterway,** confirm methods to protect the existing waterways and riparian area within project scope.	Environmental Consultant
☐	**Confirm** nature-based measures for storm and rainwater management and link to Natural Environments Management Plan.	Environmental Consultant

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Deliverables

DELIVERABLE ITEM CHECK LIST	
☐	Updated Water Management Plan
☐	Water sustainability strategies tracking spreadsheet
☐	Inclusion of water management strategies in design documentation

TRANSPORTATION

Health-care facilities are committed to fostering a healthier environment and enhancing community well-being by designing and advocating for infrastructure that not only meets current need, but actively shapes a future for optimal health and resilience. By strategically prioritizing design that removes barriers and improves access to low-carbon and active modes, health-care facilities and campuses can reduce environmental impact and significantly improve the health and general well-being of staff, medical staff, visitors and the wider community.

Key Considerations

- **Consider the community transportation networks** and entry points for all active and low-carbon modes and ensure that there is smooth integration and safe and secured pathways for users (i.e., to transit stops, cycling networks).
- **Prioritize safe, secure, accessible and convenient end-of-trip facilities:**
  - **Bicycle parking:** Detail secure, covered, bicycle parking facilities with ample capacity, considering various bike types (including e-bikes, adaptive cycles).
  - **Showers and change rooms:** Design accessible, well-maintained shower and change room facilities with adequate space, privacy and secure locker storage for staff and medical professionals who cycle or walk to work.
  - **Locker Storage:** Detail secure and appropriately sized lockers for staff, ensuring equitable access for those without dedicated office space. This might include centrally located locker banks or other secure storage options.
- **Encourage a holistic lens to sustainable facility design.** That is, give priority to transportation strategies that have a co-benefit to a project priority (e.g., capital cost, operating cost, health and well-being) including sustainability goals (e.g., energy and carbon, climate resilience). Invite EES to design workshops and key meetings to bring LCRES perspectives.
- **Consider the interaction of different transportation modes**—pedestrians and cyclists, cyclists and vehicles to ensure safe, clear and seamless interactions for all.

Innovation

- **Design all cycling facilities** with built-in expandability and futureproofing, allowing for seamless increases in capacity (i.e., modular bike room design, adaptable storage solutions to proactively accommodate growing adoption and demand).
- **Adaptive lighting systems for walkways:** Implement smart lighting along pathways that adjusts brightness based on pedestrian presence and ambient light levels, enhancing safety and energy efficiency.
- **Bi-directional EV charging capabilities:** Investigate the potential for using EV batteries as temporary energy storage for the facility during peak demand or power outages (vehicle-to-grid technology).

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Update and coordinate** implementation of Transportation Management Plan.	Sustainability Consultant
☐	**Detailed pathway design:** Develop detailed layout for pedestrian and bicycle pathways, clearly specifying materials (slip-resistant, durable), widths (meeting universal design standards), slopes, turning radii and integration with landscaping and the site.	Design Team
☐	**Create a clear and detailed circulation plan** that prioritizes the safe and efficient movement of pedestrians, public transit riders and active transportation users throughout the facility and its connections to the surrounding area.	Design Team
☐	**Integration with building entrances and exits:** Design accessible transitions between pedestrian and bicycle pathways and building entrances/exits, ensuring weather protection and clear visibility, and clearly delineated loading and unloading zones to minimize conflicts.	Design Team
☐	**Bike parking details:** Determine the exact location, type (racks, lockers) and capacity of bicycle parking areas. Consider security features and ease of access. Explore options like vertical bike racks to optimize space. Ensure adequate ventilation in bike parking areas if enclosed.	Design Team
☐	**Shower and locker room design:** Develop preliminary floor plans for shower and locker facilities, ensuring adequate space, privacy, accessibility (including accessible stalls and benches) and ventilation. Consider the flow of users and separation of wet and dry areas.	Design Team

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**EV Charging station infrastructure:** Detail the location, number and accessibility of EV charging stations considering future demand and local regulations. Ensure clear signage and user-friendly access.	Design Team
☐	**EV Charging station installation:** Provide detailed electrical plans for EV charging station installation, including wiring, conduit, safety features and signage. Integrate EV charging infrastructure with the building's electrical system, considering load management and future capacity.	Design Team
☐	**Wayfinding and signage:** Develop a comprehensive wayfinding system that clearly directs users to all transportation options (transit stops, bike parking, EV charging, pedestrian paths) using accessible formats and multilingual options where appropriate.	Design Team
☐	**Lighting and security:** Detail appropriate lighting levels along all pathways, in parking areas (including bike parking) and around end-of-trip facilities to ensure safety and security, especially during evening and night hours. Integrate security features like surveillance where necessary.	Design Team
☐	**Landscaping and aesthetics:** Integrate landscaping that enhances the pedestrian and cycling experience (e.g., shade trees, visual interest) while ensuring clear sightlines and safety.	Design Team
☐	**Interest Holder Engagement:** Continue to engage with appropriate interest holders.	Design Team

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Updated Transportation Management Plan

MATERIALS

Space is the key factor to enable a strong reuse, repair, recycling and safe waste management strategy.

Key Considerations

- **Allocate appropriate space** for collection, storage and removal of waste streams throughout the facility.
- **Design such that haulers** can easily access the site and pick up waste.
- **Design to enable waste flows** through the building.
- **Ensure compliance** with storage regulations (see CSA Z317.10 21).
- **Encourage a holistic lens to sustainable facility design.** That is, give priority to waste and materials strategies that have a co-benefit to a project priority (e.g., capital cost, operating cost, indoor air quality, healing environment) including sustainability goals (e.g., low carbon, climate resilience, healthy materials).
- **Invite EES to design** workshops and key meetings to bring LCRES perspectives.

Innovation

- **Creating space for additional waste streams** to be added in clinical areas, space for storage and sterilization of reusables and space for new technologies for waste management to be held on the loading dock.

Targets

- **Review targets** set during Business Plan.
- **Revise and confirm targets** through Design.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Consult** Appendix F: Waste Management Space Design Guidelines. Identify all waste management flows and processes, and appropriate bins.	Sustainability Consultant
☐	**Update and incorporate** Materials Management Plan.	Sustainability Consultant
☐	**Confirm flows and processes** with contracted waste management service provider.	Design Team
☐	**Consult with EES** on materials selection, specification process and user-group engagement.	Design Team
☐	**Reference** Appendix H: Chemicals of Concern: Construction Interiors for guidance on selection of interior finishes and furnishings.	Design Team
☐	**Ensure interest groups** (Clinical, IPAC, Facilities) are aware and have the opportunity for input on materials selection.	PM
☐	**Create a streamlined RFP approach,** so the bidding teams will know what are the sustainability requirements for the project. These requirements can be tiered based on budget impacts. Include in Prime and Constructor contracts: • Construction and demolition waste management expectations • Design for operational waste management • Safer materials specification and procurement process	Sustainability Consultant

* Lead - The Lead is primarily responsible for the Action. It is up to the Lead together with the Project Manager to ensure appropriate parties are engaged and involved. This will include significant contribution from the EES and FMO teams. Refer to the Role & Responsibilities Primer for additional information.

Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Updated Materials Management Plan
☐	Space allocated in drawings for Waste Management Plan
☐	Furnishing and finishings specifications with criteria for low-toxic, safer materials
☐	Procurement process includes requirement of EPDs/LCA's for targeted materials

NATURAL ENVIRONMENT

During Design phase, consider how landscaping can work to protect and regenerate natural habitats, reduce demand for heating and cooling, enhance storm water management and improve health and healing of occupants. By incorporating green infrastructure for site and building design, whether natural, enhanced or engineered, facilities will be better prepared for extreme weather events. Green infrastructure can support food as medicine initiatives as well as rehabilitation programming.

Key Considerations

- **Consider nature-based solutions** for heating and cooling needs, storm water management and resilience to extreme weather.
- **Prioritize green spaces for staff well-being** and patient healing, including areas of respite, therapeutic gardening, medicine gardens and nature walks.
- **Consider landscaping** that increases local biodiversity and reduces need for exterior water use.

Innovation

- **Partner with local conservation organizations,** Indigenous communities and citizen scientists to develop a shared vision for biodiversity on and around the health-care campus.
- **Move beyond traditional landscaping** to fully integrate green infrastructure (green roofs, living walls, bioswales, permeable pavements, urban wetlands) as functional elements of the building and site design.
- **Undertake a tree inventory and management plan** in order to maximize safety during construction and ensure tree health over time.
- **Include therapeutic uses** in natural environments design strategies (i.e., food gardens for mental health and rehab programs).
- **Include consideration for staff wellness** in natural environments design strategies (i.e., physician garden).
- **Include co-benefits with energy efficiency**, climate resilience, water management, health and well-being.
- **Maximize LEED credits** related to enhancing the natural environment and pursue Salmon-Safe Certification.

Targets

- **Review targets** set during Business Plan.
- **Revise and confirm targets** through Design.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Update and implement** Natural Environment Management Plan.	Sustainability Consultant
☐	**Design facility landscaping and green spaces** so that they complement regional government and health authority plans/strategies/targets.	Design Team
☐	**Confirm prior site assessments** on green infrastructure including unique natural assets. Undertake additional assessments as needed.	Environmental Consultant
☐	**Maintain connectivity to existing green corridors** and/or design to enhance biodiversity on site.	Design Team
☐	**Discuss opportunities and trade-offs** of green spaces across design disciplines.	Design Team
☐	**Incorporate design elements** that maximize access to and views of nature for patients, staff and visitors.	Design Team
☐	**Design specific spaces** for therapeutic interaction with nature (e.g., healing gardens, food gardens, sensory pathways).	Design Team

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Design green spaces with native plant species** to support local ecosystems and attract pollinators. Consider creating habitats for wildlife where appropriate.	Design Team
☐	**Design green spaces with consideration of nature-based solutions** for drought, flooding, extreme heat and other extreme weather events.	Design Team

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Updated Natural Environment Management Plan
☐	Natural Environments design strategies tracking spreadsheet

5 Construction

During construction, the Project Management team manages Change Orders and responds to design updates. Third-party consultants review milestone drawings and reports to ensure LCRES targets are met, including certification requirements and performance targets for energy, operational and embodied carbon. Construction activities generate emissions and waste, so clear strategies should be in place to minimize these impacts. Commissioning is essential to validate energy performance, especially for HVAC systems and envelope components.

ENERGY & CARBON

The procurement and construction phases are often subject to changes and inconsistencies in implementation. In some project delivery methods, such as Public-Private Partnerships (P3), Design-Build (DB) and Alliance, performance on energy and carbon targets may be tied to contractual guarantees. Regardless of the delivery model, a robust and independent monitoring system should be in place throughout the construction period to identify and address issues promptly. This should be followed by a thorough commissioning process that reflects the complexity of delivering a high-performance, energy-efficient facility.

Key Considerations

- **Implement reporting requirements** from Appendix B: Guidance for Low Carbon Accountability Mechanisms and Appendix C: Energy Modelling Requirements.
- **Ensure meters are fully commissioned and tested,** in preparation for monitoring-based commissioning of energy plant.
- **Fully customize, test and use** fault detection and diagnostic software, as part of monitoring-based commissioning process.

Innovation

- **Conduct final Life Cycle Assessment** for carbon, based on as-built drawings and materials purchased, to determine target achieved.

Targets

- **Monitor energy and carbon targets** through construction.
- **Monitor embodied carbon target** through construction.
- **Verify achievement of embodied carbon target** with as-built documentation.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**During construction,** implement Temporary Power Plan to reduce carbon emissions.	Constructor
☐	**At each submission of documents,** track deviations to design, as reflected in updated Energy Model, that will impact projected energy and carbon targets.	Independent Energy Consultant
☐	**Monitor construction materials procurement,** to confirm compliance with embodied carbon plan; repeat LCA with as-built drawings.	Sustainability Consultant
☐	**Create "calibrated" energy model,** as basis for M&V.	Energy Modeller
☐	**Implement Cx Plan.** Include FMO operators in commissioning, as much as possible.	Cx Authority
☐	**Confirm metering and data acquisition systems** are tested and calibrated, to implement Measurement and Verification Plan and monitoring-based Commissioning Plan.	Cx Authority

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Energy Management Reports at milestones
☐	Final Energy Management Report following substantial completion
☐	Updated M&V Plan
☐	Commissioning Reports: Building Envelope, HVAC Functional Testing, HVAC Integration Testing; Metering, BAS and Data systems

CLIMATE RESILIENCE

During construction, climate resilience measures must be tracked and verified to ensure they reflect the design intent. Documenting as-built conditions and coordinating with commissioning processes supports long-term facility performance in a changing climate.

Key Considerations

- **Confirm construction adheres** to climate-resilience measures identified in design.
- **Coordinate across disciplines** to track implementation.

Innovation

- **Pilot real-time monitoring** of site climate conditions to inform future climate-resilience planning.

Targets

- **Monitor targets** as relevant.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Verify implementation** of climate-resilience measures during construction.	Climate Resilience Consultant
☐	**Update tracking mechanism** with any changes or substitutions.	Climate Resilience Consultant
☐	**Document** as-built climate-resilience measures.	Climate Resilience Consultant

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Updated tracking spreadsheet with as-built confirmation of climate-resilience measures
☐	Construction phase narrative summary

WATER

During Construction phase, the project will fulfill on design intent and in particular be mindful of the impacts of construction on water supply and natural water systems.

Key Considerations

- **During construction, disruption to the site** may increase the possibility of erosion and contamination leaving the site with rainwater runoff. Additionally, potable water may be used in construction activities. All activities need to be assessed for environmental risks and appropriate mitigation applied.
- **Implementing the design for water conservation strategies** during construction will support the facility to meet targets during operation.

Innovation

- **Identify strategies** that are new, or may have advanced in the industry for mitigation of construction impact on waterways.
- **Pursue** Salmon-Safe Certification.
- **Monitor runoff from the site** to track if quality meets local or Indigenous Nation water quality objectives (e.g., Water Quality Objectives for Burrard Inlet).
- **In the case that the site includes a waterway**, monitor waterway quality before, during and after construction. If quality changes during construction, take action to mitigation impacts.

Targets

- **Monitor targets,** as relevant.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Consult with EES**, to review any gaps or new information, relevant to the Water Management Plan.	Constructor
☐	**Contractor to implement** all Construction-related water management activities.	Constructor
☐	**Commissioning** of metering.	Cx Authority

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Fully functioning water management tools, systems and equipment
☐	Documentation and training on water conservation features
☐	Fully commissioned water metering and data collection system
☐	Completed Water Management Plan for handover

TRANSPORTATION

Low-carbon and active modes of transportation are prioritized during the Construction phase and construction activities are planned in a way that minimizes disruption to transportation while increasing efficiencies with infrastructure construction and installation.

Key Considerations

- **Consider all impacts that construction activities** will have on flow and access to transportation routes and infrastructure, especially with consideration to pedestrian and bicycle routes.
- **Ensure that construction activities are planned** in a way that integrated the eventual permanent transportation infrastructure that the health-care facility aims to provide (‘dig-once’ principle, design temporary pathways and routes to become permanent).

Targets

- **Monitor targets,** as relevant.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Plan the construction** of active and low-carbon transportation infrastructure in a logical sequence that minimizes disruption and allows for timely completion. Consider when bike parking or pathways might be most needed for early occupants or staff and provide adequate notice, re-routing and wayfinding.	Constructor
☐	**Test all electric vehicle charging stations** to ensure they are functioning correctly and safely.	Cx Authority
☐	**Prioritize the safety and movement of pedestrians and cyclists** near the construction zone with clear barriers, signage and temporary alternative pathways, when necessary.	Constructor

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Deliverables

DELIVERABLES ITEM CHECK LIST
No report required

MATERIALS

By supporting reuse and recycling of excess construction materials, the project conserves landfill space, reduces air pollution from incineration and lowers energy and carbon emissions by removing the need for net new materials for the project.

Key Considerations

- **Minimizing the environmental impact** of construction.
- **Planning for on-site** sorting and storage is key to success.
- **Budget with contingency** to explore better materials and innovative waste management solutions.
- **Consult** Appendix G: Deconstruction Materials Reuse and Recycling.

Innovation

- **If deconstruction of an existing building will take place,** develop plan to identify and manage on-site reuse opportunities, as well as off-site market for used materials.

Targets

- **Monitor waste diversion target** through construction.
- **Monitor deconstruction target,** if relevant, through construction.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Fulfillment of Materials Management Plan** and chosen green certification requirements.	Sustainability Consultant
☐	**Established verification process** of disposal vendors to ensure transparent and appropriate construction waste management.	Sustainability Consultant
☐	**Implement** deconstruction, reuse and recycling plan, if deconstruction will take place.	Sustainability Consultant
☐	**Confirm bylaw requirements** for construction waste diversion.	PM
☐	**Confirm expectations** with constructor, to meet diversion targets.	PM
☐	**Confirm reporting system** is in place with defined update frequency with project team.	Constructor
☐	**Include Indoor Air Quality** (IAQ) management during construction.	Constructor
☐	**Ensure IPAC approval** of all furnishings during commissioning.	Design Team
☐	**Update a materials tracker log** identifying materials suitable for reuse, salvage, recycling or which require landfill disposal.	Sustainability Consultant
☐	**Determine frequency of waste diversion report** with waste management team and the contractor. Develop calibration plan with hauler to verify data and identify reporting processes.	Constructor

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Regular construction waste diversion reports
☐	Weekly IAQ management reports during active construction
☐	Weekly updates of the reuse log if items salvaged for reuse
☐	A final report outlining material selection and rationale for use of any chemicals of concerns to inform future projects
☐	Completed material tracker log of materials reused, recycled and final location, if applicable.
☐	Completed log of where recycled materials ended up
☐	Updated Materials Management Plan for handover

NATURAL ENVIRONMENT

During construction, the natural environment will be disrupted. Take care to protect the natural environment and ensure that staff, patients and visitors can still benefit from green spaces during redevelopments at existing facilities.

Key Considerations

- **Minimize air, light and noise pollution during construction.** Use pre-fabricated and right sized building materials to reduce waste during construction.
- **Use erosion control measures** during construction and monitor effectiveness.

Innovation

- **Monitor construction impact** on the natural environment.
- **Maximize LEED credits** related to enhancing the natural environment and pursue Salmon-Safe Certification.

Targets

- **Monitor targets,** as relevant.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Implement** Natural Environment Management Plan.	Constructor
☐	**Implement** all Construction-Natural Environment management activities.	Constructor

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Fully functioning systems and equipment to support Natural Environment Management Plan and enhancement of natural environment
☐	Completed Natural Environment Plan for handover

6 Occupancy

During the Occupancy phase, the project team confirms operational readiness and manages the move-in process. Final deficiency inspections are completed, and responsibility is formally transferred to Clinical Leads and Facilities Maintenance and Operations (FMO). This is a major milestone, as the facility begins delivering services.

7 Post-Occupancy

Post-Occupancy continues through the warranty period. During this time, Operations and Maintenance manuals are delivered, contractors are paid out and system performance is validated under real operating conditions. Key LCRES elements such as energy use and mechanical system efficiency will require seasonal commissioning and adjustment. This is also a critical time to identify issues, troubleshoot systems and resolve deficiencies. Where possible, lessons learned should be documented and evaluations conducted to inform future projects.

ENERGY & CARBON

The first one to two years, post-occupancy, is a critical time to ensure complex systems are optimized to achieve highest energy performance. It is also a critical time to ensure operators are fully trained and supported to operate, understand and monitor HVAC systems for energy performance.

Key Considerations

- **Implementation of M&V Plan** developed during design, for verification of project targets. Consider Accountability Mechanism. See Appendix B: Guidance for Low Carbon Accountability Mechanisms.
- **Implementation of seasonal energy Commissioning Plan** may be required depending on the complexity of the mechanical system.
- **Confirm Energy Management Information System** is customized to the actual installed HVAC system, with relevant alerts, trends and operator training completed.

Targets

- **Verify achievement** of energy and carbon targets, with M&V.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Complete M&V process** to establish actual facility energy/carbon performance. If targets were not met, implement remedial measures. Target achievement may be integral to financial reward or penalty.	M&V Consultant
☐	**If applicable, implement** seasonal energy Commissioning Plan, to include Designers, IEC, Controls Contractor, vendor and operators.	Independent Energy Consultant
☐	**Prepare** final document submission to BC Hydro and Fortis.	EES
☐	**Conduct Post-Occupancy Evaluation** at one year and two years, to evaluate achievement of project goals, with respect to patients, staff and user group satisfaction.	PM

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Final M&V Report
☐	Final IEC (Independent Energy Consultant) Report
☐	Payout of BC Hydro and Fortis incentives

CLIMATE RESILIENCE

Post-Occupancy monitoring and performance verification provide a critical opportunity to evaluate climate-resilience measures and validate functionality. Routine maintenance and data collection support continuous learning and timely adaptation to evolving climate conditions.

Key Considerations

- **Consider operational readiness** for extreme climate events.
- **Prioritize ongoing maintenance** of climate-resilience measures.

Innovation

- **Use post-occupancy data** to refine climate-resilience design guidance for future projects.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Develop maintenance plan** for climate-resilience measures.	Climate Resilience Consultant
☐	**Monitor building performance** during climate events.	Climate Resilience Consultant
☐	**Engage operations staff** in climate risk awareness training.	Climate Resilience Consultant
☐	**Compile and submit** a climate-resilience report to the health organization and Climate Action Secretariat.	Climate Resilience Consultant

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Maintenance and monitoring plan
☐	Post-Occupancy climate performance summary
☐	Final climate resilience report with supporting documentation

WATER

The new facility will be designed to conserve municipal water supply, as well as protect and manage natural water systems. It is important that operational staff are well-informed and have processes in place for ongoing maintenance and monitoring of internal and external water management systems.

Key Considerations

- **Water sustainability measures** require monitoring and maintenance to meet targets and support human and planetary health.

Innovation

- **Integrated pest management plan** for landscape that avoids harmful pesticides.
- **Landscape management plan** that minimizes fertilizer use.
- **Monitor rainwater/stormwater** runoff quantity and quality.
- **Maintain** Salmon-Safe Certification.
- **Promotion and story telling** about the water's role in healing and well-being.

Targets

- **Verify achievement of water targets,** as appropriate.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Translate operational aspects** of Water Management Plan into Standard Operating Procedures.	FMO
☐	**Verify water consumption** against project target, with monthly and annual metered data.	FMO
☐	**Verify rainwater/stormwater** target achievement.	FMO
☐	**Coordinate training for staff** on water conservation and rainwater/stormwater management infrastructure.	FMO
☐	**Update Water Management Plan annually,** with record of water consumption, daily and monthly profiles, and commentary on trends.	FMO

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Standard Operating Procedures (SOP) for water sustainability strategies in Water Management Plan
☐	Staff training modules on water conservation, water use monitoring and maintenance of infrastructure for rainwater/stormwater management
☐	Annually updated Water Management Plans

TRANSPORTATION

Staff, medical staff, visitors and volunteers are able to access the site by all modes of low-carbon and active transportation with seamless flow and ease. The transportation infrastructure at the facility level makes choosing sustainable transportation modes easy and convenient.

Key Considerations

- **All transportation infrastructure and components** are effectively handed over to the relevant operational teams.

Innovation

- **Conduct a facility-level post-occupancy survey** and regularly monitor use of transportation infrastructure to determine level of satisfaction and identify areas in need of expansion or upgrading.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Provide clear and consistent wayfinding signage** to direct people to bike parking, showers, lockers, EV charging stations and public transit connections.	Design Team
☐	**Provide information** on local cycling routes, transit schedules and carpooling options.	Transportation Department

Actions

ACTION ITEM CHECK LIST		RESPONSIBLE
☐	**Establish a schedule for regular inspection and maintenance** of all active and low-carbon transportation infrastructure, including pathways (clearing debris, snow and ice removal), bike parking (checking security and condition), showers and lockers (cleaning, repairs), and EV charging stations (functionality, software updates).	FMO, Transportation Department
☐	**Ensure that Transportation Department interest holders** receive all relevant documentation for equipment handover (i.e., EV charging station warranties, etc.)	PM
☐	**Include considerations for cyclists and pedestrians** in emergency evacuation plans.	HEMBC
☐	**Be prepared to adapt and potentially expand** the infrastructure based on user demand and evolving transportation trends (e.g., increasing EV adoption, popularity of e-bikes).	Transportation Department, Site Leadership

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Deliverables

DELIVERABLES ITEM CHECK LIST
No report required

MATERIALS

Patients and staff are occupying a facility equipped with healthy, low-toxic materials which support recovery and well-being.

Waste seamlessly flows through the facility, and is segregated and stored as per best practice and regulations.

Key Considerations

- **Waste infrastructure** is set-up to enable correct segregation by end-users.
- **Waste is visible to staff and patients** and is often their benchmark of environmental sustainability commitments of an organization.
- **The materials selected support the needs** of the end-users while considering the environment and well-being.

Actions

ACTION ITEM CHECK LIST	LEAD*
☐ **Confirm with housekeeping and waste management teams** that all designed waste infrastructure is in place.	PM

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Deliverables

DELIVERABLES ITEM CHECK LIST
☐ Waste moves through the facility efficiently, with removal on a routine schedule determined by waste contract management.

NATURAL ENVIRONMENT

Staff, patients/clients and visitors are benefiting from green space views and access to green infrastructure. Clinical programs are utilizing the natural environment as part of their delivery of care.

Key Considerations

- **Natural environments require monitoring and maintenance** to receive their full benefit.

Innovation

- **Promotion and story telling** about the natural environment's role in healing and well-being.

Targets

- **Verify achievement** of natural environment targets.

Actions

ACTION ITEM CHECK LIST		LEAD*
☐	**Translate operational aspects** of Natural Environment Plan into Standard Operating Procedures (SOP).	FMO
☐	**Documentation and training** on natural environment features and benefits.	FMO
☐	**Update Natural Environments Management Plan annually,** with records of conditions of natural assets, enhanced assets and engineered assets, biodiversity survey information, staff engagement and opportunities for enhanced natural spaces based on interest holder input.	FMO

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Deliverables

DELIVERABLES ITEM CHECK LIST	
☐	Annual Plan updates that include monitoring information

8 Close-Out

The Close-Out phase includes confirming that all deliverables and performance criteria have been met. The Project Sponsor signs off, concluding the role of the Project Management team. This phase typically includes a Lessons Learned review and one or more Post-Occupancy Evaluations (POE), which assess how the facility performs and how users experience it, especially where new technologies were introduced. Capturing these insights is essential for improving future delivery of low-carbon, climate-resilient and environmentally sustainable facilities.

Actions

	ACTION ITEM CHECK LIST	LEAD*
☐	**Engage EES in the development of Lessons Learned,** to be generated by consultants regarding their process, as well as by the owners' project team.	PM
☐	**Commission separate POEs** for any novel technology or process that was introduced.	EES

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REFERENCE DOCUMENTS

Government Regulations & Policy

Climate Change Accountability Act (2018)

Through the Climate Change Accountability Act (CCAA), the Government of British Columbia requires all Public Sector Organizations (PSOs) to meet portfolio-wide greenhouse gas (GHG) emissions reduction targets of 40 per cent by 2030, 60 per cent by 2040, and 80 per cent by 2050, relative to a 2007 baseline. These targets apply to emissions from site energy use, fleet vehicle fuels, paper consumption and refrigerants. In addition to mitigation, the CCAA also requires PSOs to manage the risks that can reasonably be expected to result from a changing climate, supporting an integrated approach to climate action across the public sector.

CleanBC (2018)

The CleanBC strategy set a more stringent GHG emissions reductions target for PSO buildings, increasing the target to 50 per cent (from 40% in the CCAA) by 2030. CleanBC strategy also set a requirement for PSO fleet emissions, to reduce GHG emissions by 40 per cent by 2030.

CleanBC: Roadmap to 2030 (2021)

The CleanBC Roadmap set out provincial intentions in 2021, to reduce carbon emissions in all areas of the economy. For new construction, the intent was to add a carbon pollution standard to the BC Building Code, to support a transition to zero-carbon new buildings by 2030. Changes to the BCBC will be phased in over time (2024, 2027, 2030).

Climate Preparedness and Adaptation Strategy (2022)

This strategy outlines a broad range of actions for 2022-2025 to address climate impacts and to build resilience across B.C. The strategy indicated work was underway to create new climate-resilience design standards and guidance for PSO buildings to prepare for and manage risks due to climate change. This was realized with the issuance of the ESGFC.

Environmental, Social and Governance Framework for Capital (2021)

The Environmental, Social and Governance Framework for Capital (ESGFC) outlines requirements for major building projects that receive 50 per cent or more funding from provincial sources including new buildings, major additions or major reconstruction of an existing building. The ESGFC provides requirements in four priority areas: Labour Objectives, CleanBC, Mass Timber and Child Care. While new construction projects need to abide by all four pillars, the CleanBC requirements are detailed below as they have impacts for all six LCRES Focus Areas.

The CleanBC requirements are contained in Appendix 5 and Appendix 6. Note that Appendix 6 is the Climate Resilience Framework and Standards for Public Sector Buildings, issued separately and described below. Project teams should reach out to EES for a full copy of the ESGFC at info@bcgreencare.ca.

Appendix 5: CleanBC Climate Resilience and GHG Reduction Requirements

This document includes an expansion of climate objectives for public sector buildings to achieve increased policy ambition and demonstrate public sector leadership on GHG emissions reduction, and to address the increasing impacts a changing climate will have on buildings. The document specifies measures for reducing reliance on fossil fuels and focusing on clean energy, including requirements for electrical vehicle infrastructure. In addition, capital project business cases will demonstrate the project is being designed to one of four eligible green building standards. The design will meet LEED Gold or an equivalent standard as a minimum.

Appendix 5 provides detailed direction, in the following sections:

- **Designing for Climate Resilience**
- **Green Building Standard**
- **Greenhouse Gas Emissions Standard for Buildings**
- **Electric Vehicle Ready Building Standard**

Climate Resilience Framework and Standards for Public Sector Buildings (2023)

The Climate Resilience Framework and Standards (CRFS), also issued as Appendix 6 to the Environmental, Social and Governance Framework for Capital (ESGFC), outlines a structured, multi-step approach for implementing climate-resilient design across Public Sector Organizations (PSOs). Although not publicly posted, project teams can request a copy by contacting the Energy and Environmental Sustainability (EES) team at info@bcgreencare.ca.

Project teams must apply the CRFS during the business planning phase, using the framework to identify and prioritize climate risks and to apply the minimum climate-resilience standards required to address those risks.

These minimum standards are developed for new buildings and are organized according to climate risk categories.

Ministry of Health Capital Policy Manual

The Ministry of Health Capital Policy Manual sets out planning requirements for health organizations, to align Ministry of Health and Treasury Board requirements, as a basis for approving new capital projects.

Chapter 11: Low Carbon, Climate Resilience and Sustainable Health Facilities (2024)

Chapter 11 outlines minimum requirements to be developed during the Business Plan phase, for new construction and major redevelopment projects in the following areas:

- **Energy Modelling and GHG reduction targets:**
  - Develop LEED Gold Baseline energy model, plus two enhanced options:
    - Option 1: Low-Carbon Building: an enhanced version of the baseline, with additional low-carbon design features with an incremental cost of up to 3 per cent of construction costs. Note that this option should match the ESGFC requirement to reduce GHG emissions by 50 per cent, relative to the LEED Gold Baseline.
    - Option 2: Net Zero-Carbon Building: a further enhanced design to reduce site-level emissions to net zero carbon.
- **Embodied Carbon:**
  - Conduct a Life Cycle Assessment (LCA) of the Indicative Design. Determine lowest cost pathway to GHG emission reduction.
- **Climate Resilience:**
  - Follow requirements in Climate Resilience Framework and Standards for Public Sector Buildings
- **Environmental Sustainability:**
  - Complete assessments and create management plans, including:
    - Sustainable Water Management Plan
    - Sustainable Materials Management Plan
    - Sustainable Transportation Management Plan
    - Natural Environment Management Plan
- **Green Building Standards Certification:**
  - Design to seek certification to one of the following standards:
    - LEED v4.1 Health Care BD+C Gold (Canada Green Building Council)
    - Passive House Standard
    - International Living Future Institute (Core Standard)
    - Zero Carbon Building Standard – Design (Canada Green Building Council)

Chapter 14: Use of Wood in Health Care Facilities (2021)

Chapter 14 requires that wood be considered as the primary building material in the design of new or significantly renovated health-care facilities, when possible, under the Building Act, BC Building Code, and other applicable municipal by-laws. This is in support of the Wood First Act (2009).

Local Government Policy

Municipal by-laws are distinct and fast-changing. A few areas where municipal requirements relevant to LCRES goals go beyond provincial requirements are listed below. This is not an exhaustive list:

- EV chargers and EV-ready parking stalls (various municipalities)
- Control of waste effluent: Metro Vancouver Hospital Pollution Prevention By-Law No. 310
  - Note that all acute hospitals in Metro Vancouver have created a Pollution Prevention Plan
- Green Buildings Policy for Rezoning (City of Vancouver)
- BC Step Code Level, as chosen by the municipality. Generally, health-care facilities must meet Step Code Level 2.

Health Organization Requirements, Policy & Guidance

Planetary Health

Many health organizations in B.C. have adopted planetary health goals. The LCRES Guidelines provide guidance on how to action many of the priorities identified in a planetary health approach as applied to new construction projects.

Below are excerpts from actual planetary health strategies for the four lower mainland health organizations. The title for each strategy is a link to the health organization's webpage with additional details.

Fraser Health Planetary Health Strategy Report Final 2023-2028

Planetary health had been identified as a key strategic priority for Fraser Health (FH). The Fraser Health Planetary Health Strategy encompasses the following areas of focus:

1. Reduce the impact of our services on the planet
2. Create a climate-resilient health system
3. Live our anchor mission by reinforcing the connection between planetary health and healthy communities
4. Cultivate a culture and system of environmental sustainability

Goals (with associated Areas of Action) were also identified in the strategy specific to facilities, including the following:

- Assess and reduce our greenhouse gas emissions
- Reduce air pollution
- Use resources efficiently and decrease health system waste
- Ensure our health system can withstand changing climate conditions and extreme weather events

Providence Health Care Planetary Health Strategy 2024-2029

Planetary Health aligns with PHC's Mission: Forward Strategic Plan. PHC's Planetary Health Strategy outlines the following strategic directions:

- Reduce our impact
- Build our capacity
- Develop our resilience

Goals were also identified in the strategy specific to facilities, including the following:

- Reduce Greenhouse Gas (GHG) emissions
- Achieve net zero unnecessary waste
- Improve water performance
- Care for the natural environment
- Improve PHC infrastructure to withstand climate shocks
- Ensure PHC operations are robustly prepared for disaster response and recovery

Provincial Health Services Authority (Under Development)

PHSA's Planetary Health Strategy is currently under development and is considering integration of the following goals:

- Reducing PHSA's organizational Scope 1, 2 and 3 greenhouse gas emissions
- Promoting sustainable practices in both operations and clinical areas
- Mitigating organizational disruption to Earth's natural systems through projects, education and training
- Improving the social, structural, environmental and Indigenous determinants of health
- Supporting climate adaptation and resilience work
- Supporting provincial planetary health initiatives

Vancouver Coastal Health Planetary Health Strategy 2024-2029

Planetary health was identified as one of four pillars in VCH's Strategic Framework, along with Indigenous Cultural Safety, Anti-Racism, and Equity, Diversity and Inclusion.

VCH's Planetary Health Strategy aims to "reduce health-care emissions and achieve zero unnecessary waste; create a climate-resilient system able to withstand acute shocks and chronic stressors; and support communities in both mitigating and adapting to climate change impacts".

Dedicated actions are also identified in the strategy specific to Facilities Infrastructure and Land Use, including the following:

- Design, construct and operate low-carbon, climate-resilient and environmentally sustainable facilities; smart energy and water design and demand management; exploring therapeutic incorporation of nature into facilities; avoid unnecessary waste and toxic chemicals, and minimize necessary waste and toxins
- Foster accessible green space, protect and support ecosystems and natural buffers
- Support active travel, car sharing, carpooling and invest in ultra-low and zero emission vehicle and cycling infrastructure

Facilities Management: Low Carbon Resilience and Environmental Sustainability Policy (2025)

The Facilities Management: Low Carbon Resilience and Environmental Sustainability Policy (POLICY #BCD-12-11-40000), was adopted by Vancouver Coastal Health and Providence Health Care. This policy focuses primarily on Facilities Management and its work through planning, design, procurement, construction and operations to advance the following core objectives:

- Reduce energy use and carbon emissions
- Manage climate risk and enhance climate resilience
- Advance environmental sustainability across all areas of operation
- Promote a culture of leadership, innovation and partnership
- Promote Truth and Reconciliation and Health Equity
- Embed a planetary health lens in service, policy planning and decisions

Climate Resilience Guidelines for BC Health Facility Planning and Design (2024)

This guideline presents the process to evaluate climate risks and identify resilience measures for health facility capital projects. Distinct activities progress through project stages. This guideline is aligned with the provincial Climate Resilience Framework and Standards (CRFS) and provides additional guidance for health-care facilities. While the focus is on new and major redevelopment and major renovation projects, consideration is also given to retrofits and minor projects.

Fraser Health: Technical Design Requirements (2024)

The Technical Design Requirements (TDR) sets out minimum requirements for the design of Fraser Health new construction, renovations and asset replacements projects. The TDR is constantly growing and providing more detailed direction in many areas that impact LCRES goals, for example specifications for:

- Energy efficient HVAC systems
- Building envelope minimum requirements
- Lighting
- Flooring materials

The TDR identifies some newer technologies that are not approved, or that need sign-off from the FMO Executive Director. All new construction planning and design development needs to involve FMO representation and input.

Vancouver Coastal Health: Owner's Project Requirements (2024)

The Owner's Project Requirements (OPR) sets out minimum requirements for the design of Vancouver Coastal Health for new construction, renovations and asset replacements projects. This includes the Owner's preferences, site specific requirements and technical specifications.

Abbreviations

ABBREVIATION	DESCRIPTION
BAS	Building Automation System
CSA	Canadian Standards Association
Cx	Commissioning
ECM	Energy Conservation Measures
EES	Energy & Environmental Sustainability Team
ESGFC	Environmental Social & Governance Framework for Capital
EV	Electric Vehicle
FH	Fraser Health Authority
FMO	Facilities Management & Operations
GHG	Greenhouse Gas Emissions
HEMBC	Health Emergency Management British Columbia
HO	Health Organization

Abbreviations

ABBREVIATION	DESCRIPTION
HVAC	Heating, Ventilation, Air Conditioning
IAQ	Indoor Air Quality
IEC	Independent Energy Consultant
IFC	Issued for Construction
IPAC	Infection Protection & Control
LCA	Life Cycle Analysis
LCRES	Low Carbon Resilience
LTC	Long Term Care
LEED	Leadership in Energy & Environmental Design
M&V	Measurement & Verification
MoH	Ministry of Health
OPR	Owner's Project Requirements
P3	Public-Private Partnerships
PM	Project Manager
PHC	Providence Health Care
PHSA	Provincial Health Services Authority
POE	Post Occupancy Evaluation
PSO	Public Sector Organization
RFP	Request For Proposal
TDR	Technical Design Requirements
VCH	Vancouver Coastal Health Authority

Version Control

VERSION	DATE ISSUED	SUMMARY OF CHANGES
LCRES 1.0	**21 March, 2022**	Original
LCRES 2.0	**30 July, 2023**	Changes throughout, including Introduction, Project Planning (replacing Detailed Design), Project Delivery Method (replacing Procurement), performance targets, energy modelling, embodied carbon. Climate resilience and LEED sections have been updated to reflect new Provincial standards.
LCRES 3.0	**20 March, 2024**	Updates to Introduction, Climate Resilience and Transportation sections to align with new ESGFC and revised Ministry of Health Capital Policy Manual regulations; New content under Environmental Sustainability and Natural Environments; Added sub-section: Construction and deconstruction waste; Updated Appendices D, L and M.
LCRES 4.0	**3 December, 2025**	New format orienting content to project phases. New section on Territory Acknowledgement, Planetary Health, updated references and standards.

PART C

Appendices

APPENDICES LINKS

The following appendices provide more detailed guidance on LCRES topics important to new construction projects. Click on the links below to access the documents. Appendices will be updated and new ones added as they become available. Visit bcgreencare.ca/resource/guidelines/ to access the complete list.

Appendix A Glossary of Terms

Appendix B Guidance for Low Carbon Accountability Mechanisms

Appendix C Energy Modelling Requirements

Appendix D Low Carbon Resilience Design Recommendations

Appendix E Directed Approach to Embodied Carbon

Appendix F Waste Management Space Design Guidelines

Appendix G Deconstruction Materials Reuse and Recycling

Appendix H Chemicals of Concern: Construction Interiors

Appendix I Climate Resilience Guidelines for BC Health Facility Planning and Design V2.0

REFERENCES

For convenience, regulatory documents and guidance from health organization departments that are key to LCRES Focus Areas are also saved on the Greencare website. Below is a sample list, but please visit bcgreencare.ca/resource/guidelines/ for a current list.

- Facilities Management: Low Carbon Resilience and Environmental Sustainability Policy
- IPS Bike Facility Design Guideline
- Design Requirements for ED Ambulance Drop-off Bay Final
- Electric Vehicle Charging Station (EVCS) Guidelines
- Ministry of Health Capital Policy Manual Chapters 11 and 14
- VCH EV Charging Stations Operation Manual

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