GREEN BUILDING STANDARDS

Minimizing Impacts, Maximizing Results

Alberta Infrastructure

DESIGN & TECHNOLOGY SERIES **07**

Alberta Infrastructure's (AI) Technical Design Requirements (TDR) require minimum LEED v4 Silver certification following the Building Design & Construction (BD+C) or Interior Design & Construction (ID+C) paths for all new buildings and major renovations. Where the scope of work does not justify LEED certification, teams should assess their project for the most feasible sustainable outcomes. Technical Services Branch (TSB) has developed Green Building Standards (GBS, "Standards") to facilitate this assessment.

GBS identifies a minimum level of design, construction, and process requirements (e.g. LEED options) for all new construction and renovation work as well as recommended stretch goals that project teams can attempt to achieve. The Standards are organized into four categories, aligned with AI's four project tiers (see sidebar).

GBS combines the Government of Alberta's (GoA) experience and best practices as knowledgeable owner with adapted portions of Harvard University's Four-Tiered Green Building Standards[1]. Based on components and systems that have proven to be reliable, functional, and efficient, with acceptable life cycle costs, GBS builds upon the 2016 TDR and will be updated as required. An associated *Deliverables Checklist* contains templates for documentation, deliverables, and guidance on review requirements.

GBS applies to all capital projects and should be referenced in all Requests for Proposals for new projects and major renovations, and in contracts for design consultants and construction managers. GBS supports AI as an internationally recognized leader in green design and construction and are an essential component of the Province's commitment to sustainability, including the Climate Leadership Plan, methane (GHG) emission reduction, and the ending of pollution from coal-fired electricity generation[2].

Priorities of the Four-Tiered Approach include:

Integrated Design

In order to help project teams in the vetting and setting of sustainability goals and objectives, AI has identified different levels of formal integrated design requirements for projects, depending on the scope of work.

Life Cycle Costing (LCC)

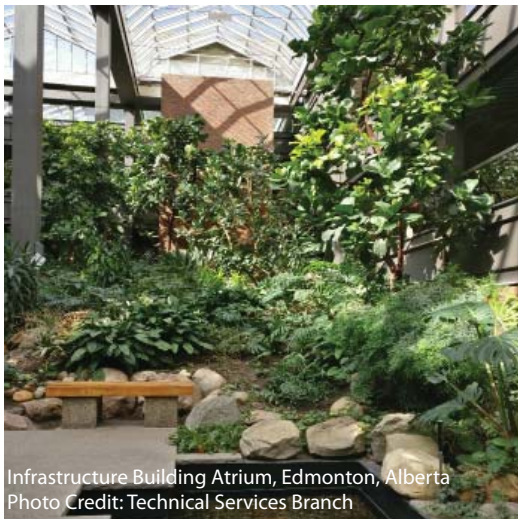
Design decisions impact the total cost of ownership. Varying levels of LCC analysis are required for projects depending on their scope of work. Responsible LCC includes an analysis of applicable utility rebates, grants, stimulus funding, or other alternative funding sources. Include building operators in LCC and value engineering reviews.

Energy Modeling/GHG Calculations

In order to assist project teams in creating energy efficient designs that yield reduced or zero greenhouse gas emissions, AI has identified different levels of scope-appropriate building energy simulation for projects.

Prescriptive Requirements

Environmental performance is prescribed according to project size and scope. New construction and major renovations (Tier 1) must register and achieve Silver certification using the US Green Building Council's LEED v4 BD+C rating system, including mandatory credits. All projects are encouraged to pursue higher levels of energy efficiency and sustainable design using recognized performance standards as design minimums.



Infrastructure Building Atrium, Edmonton, Alberta
Photo Credit: Technical Services Branch

A Four-Tiered Approach to Green Buildings

Tier 1: All new buildings, major additions and full building, full scope retrofits (building envelope, electrical, interior modifications, HVAC, etc.) over $5M. Unless Living Building Challenge certification is being pursued, minimum LEED v4 BD+C Silver certification, including the mandatory credits identified by AI, is required. A net zero feasibility assessment is strongly recommended.

Tier 2: Partial renovations or fit-outs over $1M to existing facilities with replacement of one or more systems (e.g. lighting, finishes, HVAC, etc.). Projects must comply with select LEED v4 credits if work affecting those systems is in scope. LEED v4 (BD+C or ID+C) certification is encouraged where sufficient in-scope system components make LEED practical; a LEED feasibility section is required in the initial design submission.

Tier 3*: Renovations under $1M to specific systems with an energy impact (e.g. air handling unit or lighting replacement).

Tier 4*: Limited or no energy and GHG impact (e.g. interior renovations affecting only finishes and furnishings).

*Tier 3 and 4 projects must meet select LEED v4 credits if work affecting those systems is within scope.

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Eastgate Office Building, Edmonton, Alberta
Photo credit: Technical Services Branch

Non-LEED Projects

When a formally defined methodology is not followed, there is a risk that the sustainability goals and outcomes of the project may be vaguely described, difficult to validate and of uncertain environmental and economic value.

GoA uses the LEED rating system as a benchmark for achieving sustainable projects. GBS determines the applicability of LEED based on project scope, type, and budget. Where LEED certification is not pursued (e.g. Tiers 2, 3, 4), TSB requests that the owner and consultant team still review and complete a LEED scorecard. This scorecard serves as a "Sustainability Plan" that identifies and tracks each targeted green initiative in an accountable manner.

Some LEED credits are recommended or required by GoA regardless of certification, as they have proven to be of significant value to the Province. Following LEED processes and procedures provides a standardized set of rules for project teams to follow and results in consistent, predictable outcomes and a meaningful comparison of LEED and non-LEED certified projects. This information can then be used to identify problems, trends or opportunities for "deeper greening" initiatives.

Metering and Ongoing Verification of Performance

AI has identified scope-appropriate levels of metering and sub-metering for various projects. Effective measurement, verification and corrective measures facilitate efficient building operations, energy use and engagement of building occupants.

Close-Out Documentation/Operations and Maintenance Readiness

To capture critical project data and ensure building managers have the necessary tools to reduce facility emissions, GBS identifies various levels of Close-Out Documentation/O&M Readiness for projects.

Other Options

For Tier 1 projects, GBS provides guidance for Living Building Challenge (LBC) certification and Net Zero energy. Before the end of Schematic Design, evaluate LBC certification as an alternative or in addition to the LEED requirement. If applicable, include the analysis in the project Request for Proposals (RFP). Projects are not required to pursue LBC certification but must demonstrate that its potential was evaluated:

- Review applicable GBS with team during conceptual design.
- Evaluate each LBC credit and petal. Implement viable components, especially those that align with GBS, regardless of whether full LBC certification is pursued.
- Complete the "Tier 1 - LBC Feasibility" tab in the *Green Building Standards - Deliverables Checklist* and explain where credits cannot be achieved, as appropriate.

Before the end of Schematic Design, evaluate the feasibility of pursuing net zero energy and determine the renewable energy generation potential of the site. Consider including net zero energy performance in the RFP or Owner's Project Requirements (OPR) as a stretch goal. Net zero energy or on-site renewables are not mandatory but must be evaluated using the following criteria:

- Use Province-wide benchmarks to develop an energy target for the project in Energy Use Intensity (EUI - expressed in ekWh per square meter per year),
- Complete an analysis for renewable potential to determine what the site and project roof are capable of generating and compare to the energy target, and
- While project teams may pursue more enhanced strategies for developing the EUI and site generation potential of the project, teams are only required to complete the Tier 1 - Net Zero Feasibility tab in the *Green Building Standards - Deliverables Checklist*.

TSB maintains a sample scorecard with consolidated data from all successful LEED projects. The scorecard illustrates how often each credit is achieved, and is particularly useful in determining credits that are infrequently or never met. Further action can then be taken to decide if these credits are of value to the owner, if there are specific barriers preventing their attainment, and what actions may be necessary to earn them.

The Technical Design Requirements for Alberta Infrastructure Facilities, Green Building Standards, and associated checklists can be found in TSB's Technical Resources Centre at:

http://www.infrastructure.alberta.ca/992.htm

Information Sourced From:

1. https://green.harvard.edu/search?search_api_views_fulltext=green%20building%20standards
2. http://www.infrastructure.alberta.ca/Content/docType486/Production/TechDesignRequirements.pdf

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