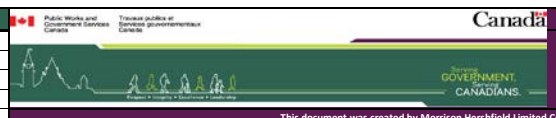
Sustainable Guidelines for Building Envelope Projects	
Project Manager:	Tchad Joiner (Project Director), James Bruce (Project Manager), Francois Nadeau (PM)
Consultant Team:	
Project Name:	**LTDLC**
Job Number:	
Address:	15/25 Eddy Street, 1 Promenade du Portage, 10 Wellington Street, Gatineau QC



This document was created by Morrison Hershfield Limited Consulting Engineers

Project Scope Description

Select "Yes", "No" or "Limited Amounts" from the dropdown menus in accordance with the below definitions.

"Fenestration Rehabilitation" Definition	Fenestration rehabilitation refers to projects that include the removal and replacement, modification and/or reinstallation of part or whole fenestration assemblies (e.g., windows, doors, skylights or other translucent/transparent assemblies). Typical projects include improvements in air leakage control, thermal performance, water ingress mitigation, fenestration end of life renewals, etc...)	**Does your project include "Fenestration"?**	Please complete the 'Fenestration' section of this tool.
		Yes	
"Wall Rehabilitation" Definition	Wall Rehabilitation refers to projects that include the removal and replacement, modification and/or reinstallation of part or whole cladding assemblies. Typical projects include improvements in air leakage control, thermal performance, water ingress mitigation, cladding end of life renewals, etc...)	**Does your project include "Walls"?**	Please complete the 'Walls' section of this tool.
		Yes	
"Roof Rehabilitation" Definition	Roof Rehabilitation refers to projects that include the removal and replacement, modification and/or reinstallation of part or whole roofing assemblies. Typical projects include improvements in thermal performance, water ingress mitigation, roofing assembly end of life renewals, etc...).	**Does your project include a "Roof"?**	Please complete the 'Roofs' section of this tool.
		Yes	

Project Identification Stage | **Project Delivery Stage**

General: Charrette and Studies Measures | **PWGSC Reporting**

Measure I.D. & Measure	Performance Impact & Intent	Performance Target Options Available	Project Target Selection	Category	Score	Deliverables	Responsible Party	Reference Standard	Comments (PWGSC)	Follow-up Action	Specification/Drawing Reference	Closeout
Category: Project Management												
Measure # 1: Integrative Project Planning and Design	**Performance Impact**: All Impact areas **Intent:** Maximize opportunities to integrate cost-effective, innovative and synergistic sustainable solutions to improve energy, water, material efficiency and improve human health during the design, construction and operation phases. Convene, as early as possible (pre-schematic design), an integrated design charrette (minimum 2 hours), that includes Public Services and Procurement Canada (PSPC), Centre of Expertise (COE) Subject Matter Experts, Consultant Team, Tenant Department Representative(s), and external consulting specialists (e.g., energy modellers, fenestration/cladding/roofing experts, Building Envelope Commissioning Authority, etc...). Consider the timing of the 'Studies' measures and their value recommended under the Discovery Phase and their value to impact the IDP meetings.	**1. Recommended Minimum** OPR + One Charrette - internal participants only (e.g. PSPC, COE + Prime Consultant) **2. Best Practice** OPR + One Charrette - internal/external participants (e.g. Consulting Area Specialists) **3. Innovative** OPR + Multiple Charrettes - internal/external participants **4. Not Applicable**	**2. Best Practice**	Project Management	3	Prepare an OPR document for the project, which includes the goals and high-level strategies (e.g. energy targets, lifespan expectations (Durability), maintenance/renewal expectations, aesthetics, construction schedule expectations, budget expectations, etc.)	Consulting Team	I) LEED BD+C V4, Integrative Process, Credit 1				Name / Position: Signature:
Category: Sites												
Measure # 2: Urban Design	**Performance Impact**: Urban Design Intent: PSPC is committed to working closely with Canada's communities and hence projects must help support the quality of life of communities with appropriate, sustainable and sensitive urban design. Project teams must illustrate through a master planning exercise a degree of compatibility with the physical characteristics of the area and environment surrounding it including: • Neighbouring land uses: including a gap analysis to promote diverse neighbourhoods (amenities, work/live/play, stormwater management), • Natural and built environment: including topography, climatic conditions, • Context: Identify the rural, suburban and urban core context. • Uniqueness of community: neighbourhood precinct and districts (including future development), • Human Scale: identify the past, present and future streetscape typologies, • Heritage: identify and protect heritage designations and significant non-heritage designated buildings / spaces • Transportation: public transit opportunities, including walking, biking, bus/train and vehicle • Public space: playgrounds, rest areas, open space Best Practice Sustainable Urban Design Options for Consideration: • Calculate a walkscore / bikescore • Integrated Public active (walking/biking) and passive (rest) spaces, • Add amenity(s) identified during study, • Full day, night and year activity or building and/or exterior space • Food trucks/vendors, outdoor event plaza / farmer's market • Incorporate stormwater management pond or similar Coordinate with Architectural design and Landscape design measures.	**1. Recommended Minimum** Master Plan, highlighting conformance with requirements: Consultant Team **2. Best Practices** Select one-two Sustainable Urban Design Options. **3. Innovative** Select 2 or more Sustainable Urban Design Options. **4. Not Applicable**	**4. Not Applicable**	Sites	0	Submit a copy of the Urban Design Master Plan.	Consulting Team	I) National Performance Standard (NPS) for Office Buildings (DRAFT)	This measures is not within the scope of the LTDLC Envelope Replacement Project. However, the project must be compatible with principles considered.			Name / Position: Signature:
Measure # 3: Architectural Design	**Performance Impact:** Architectural Design (non-technical) Intent: Building design is important to ensure an appropriate 'fit' of the building or building complex within the urban environment. The building's form and adjacent open space areas must be integrated to ensure a respectful and sustainable solution. This objective must align with the urban design requirements, and demonstrate: • A Sense of Place: enhancing and adding to the livable qualities of the neighbourhood and community, • Identifiable: Identify precincts and districts and support unique community design elements, • Massing: integrate the building(s) into the local context; • Transparent and active: orientate and integrate into the existing streetscape, • Next Generation: Incorporate a design that is flexible, adaptive, exciting, and forward looking, • Aesthetic: exciting and dynamic • Balance: design that considers solar, wind, energy, and water Best Practice Sustainable Architectural Design Options for Consideration: • Beauty: provide a narrative describing the Architect's design and how it is intended to provoke a feeling of beauty. • Integrated Artwork: focus on local artists and sustainability, • Transparent design: illustrate building systems (e.g., mechanical or structural), or activities inside building • Educational: use signs or similar engaging equipment/devices to educate public and occupants about sustainability (demonstrational strategies, e.g., Biomachine). • Blur lines between inside and outside (e.g., seasonal opening of exterior walls) • Showcase wood, reclaimed, heritage materials, or local materials. • Use materials to sequester Carbon, clean air/water, reduce urban heat island effects, etc... Coordinate with Urban / Landscape design and future interior design measures.	**1. Recommended Minimum** Architectural Design Brief, highlighting conformance with requirements: Consultant Team **2. Best Practices** Select one-two Sustainable Architectural Design Options. **3. Innovative** Select 2 or more Sustainable Architectural Design Options. **4. Not Applicable**	**2. Best Practice**	Sites	3	Submit a copy of the Architectural Design Brief	Consulting Team	I) National Performance Standard (NPS) for Office Buildings (DRAFT) ii) Real Property Sustainability Framework (Draft, v. 2015). iii) Living Building Challenge v.3.0				Name / Position: Signature:
Measure # 4: Landscape Design	**Performance Impact: Hard and Soft Landscaping design** Intent: to establish integrated and innovative landscape architectural design for federal office buildings. Building upon the Urban Design concepts, provide design strategies that will support and enhance: Note: if landscaping is not in scope of work, consider project's future impact on landscape design. • building's function and operation as well as circulation; • user and visitor experience outside the building and on the site (human scale); • linkages and connections with the adjacent planned and future streetscapes, walking/biking paths (walkscore), transit locations and neighbourhoods, • sustainable best practices to strengthen the inter-relationship of the landscape / building with the environment via green engineering / infrastructure (e.g., storm water design), • social values applying universal accessibility best practices, including wayfinding and orientation systems (educational), benches and tables, • ensure low water, fertilizer use and maintenance solutions (native / adaptive vegetation), • biodiversity and existing ecosystems, • community cultural and historical values, Best Practice Sustainable Landscaping Design Options for Consideration: • Study Biota (past / present flora and fauna) and add into design, restoring / improving habitat • Integrated artwork (focus on local artists), rotating exterior art work shows, • Use solar to promote warm, well-lit exterior spaces, minimize heat island effects • optimize use of wind (natural ventilation of exterior spaces, reduced wind tunnel effects, etc.), • Provide 4-season exterior spaces (including winter areas), • Re-humanize public space and increase social connectivity – benches 24/7/365 use and activity. • Add elements of Urban agriculture • Education: edible landscaping, playful • Use of water: wetland, cooling, skating, stormwater management, xeriscaping • Regenerative landscaping – cleaning polluted lands • Acoustical landscaping – creating "white noise" • Exercise: integrate and promote active lifestyles / playfulness • Reconnect with nature (biophillia) • Accessibility: textured hardscape, lighting, handrails, low slopes • Vertical and elevated horizontal landscaping (terraces / roof spaces) • Urban heat island effect: increase vegetation cover and use light coloured (<29 SRI) materials. Coordinate with Urban design and Architectural design measures.	**1. Recommended Minimum** Architectural Landscape Design Brief, highlighting conformance with requirements: Consultant Team **2. Best Practices** Select one-two Sustainable Landscape Design Options. Work with Area Specialists (e.g., Horticulturalist) **3. Innovative** Best Practice + Select 2 or more Sustainable Landscape Design Options. **4. Not Applicable**	**1. Recommended Minimum**	Sites	1	Submit a copy of the Landscape Design Brief.	Consulting Team	I) Whole Building Design Guide (WBDG) - Program of NIBS	Courtyards should be for active use such as yoga. While roof decks are nice, there will be security concerns. Consider commercial area to incorporate roof terraces. Innovative item should include improved habitat for bees and butterflies. *This measure falls outside the scope of the LTDLC Envelope Replacement Program. However, any design/work completed should not inhibit future site planning work, as detailed here.			Name / Position: Signature:
Measure # 5: Wind and Solar Study & Implementation	**Performance Impact:** All Impact areas. Intent: Building upon the Urban Design, Architectural and Landscape Design measures, identify the opportunities (e.g., daylighting, natural ventilation, etc.) and impact of wind and solar access (e.g., existing and future massing of surrounding buildings, trees and other obstructions). Consider the synergies with other measures, including: Landscape design, Daylighting, Mechanical system design, interior workspace configuration, roof design (especially impact on green roof wind uplift), alternative power production, etc... Consider the requirements for resilient design or futureproofing for climate change impacts (e.g., increase power outages, passive requirements, etc...). Coordinate with Urban / Architectural / Landscape design, urban heat island / sustainable roofing measures.	**1. Recommended Minimum** Feasibility Study: Consultant Team **2. Best Practice** Feasibility Study conducted: Solar and Wind Consulting Area Experts **3. Innovative** Wall, fenestration and/or roofing design options have optimized Consultant's solar and wind recommendations, where feasible. **4. Not Applicable**	**3. Innovative**	Sites	5	Submit a copy of the Wind and Solar study indicating who it was conducted by and the relation to the project team, if any. Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference.	Consulting Team	I) NIBS Guideline 3-2006, R.1.5 Light, Solar & Other Radiation ii) LEED v2009, Energy and Atmosphere, Credit 2				Name / Position: Signature:
Measure # 6: Stormwater Management Study & Implementation	**Performance Impact:** Water use, Site/Community waterway Disturbance Intent: to control and manage on-site stormwater during peak rain, snow melt events and minimize the impact on site and community waterways. Stormwater can contain sediment, trash, debris, pesticides, fertilizers, vehicle fluid leaks and mechanical equipment waste that can pollute and impact down stream / waterway / ecosystem health. Reducing the rate and volume of stormwater that municipal systems must convey and treat significant reduces municipal infrastructure and maintenance requirements. Perform an analysis of the rate and quantity of stormwater pre and post construction leaving the site areas. Prevent sediment from entering storm sewers and receiving waterways. Perform periodic inspections of erosion control measures to ensure they are functioning as intended. PSPC requires that where feasible, all roof drains be disconnected from sanitary or combined sewers; and an assessment be conducted for storm water reuse options. Storm water design considerations may include: -Infiltration trenches, swales, ponds or new streams, -Flow restrictors on roof drains (consider impact on structural loads and membrane lifespan) -Rainwater leaders and site water disconnected from City storm water pipes, -Irrigation reuse c/w cisterns, Coordinate with Urban Design, Landscape Design and Roofing measures.	**1. Recommended Minimum** Storm Water Management (SWM) Study: Consultant Team; roof drain disconnect from storm sewer & combined (where applicable); and implement measures from study, where feasible, for flow control (i.e.) via flow restrictors, at minimum. **2. Best Practice** SWM Study: SWM Specialist (e.g. Civil, Landscape and Mechanical); and implement recommendations from study, where feasible, for improved SW quality, flow management, and infiltration, redirecting roof drains and site run-off to stormwater management ponds, bioswales, vegetated planting strips, and/or infiltration trenches (etc.). **3. Innovative** Best Practice + Implement recommendations from study, where feasible, for collection and reuse on-site (SW/rainwater harvesting) OR upgrade drainage plumbing to enable easy and redirect & connection to future collection cisterns. All roof drains disconnected from municipal systems. **4. Not Applicable**	**1. Recommended Minimum**	Sites	1	Submit a copy of the Stormwater Management Study. Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference.	Consulting Team	I) PSPC Real Property Sustainability Framework ii) LEED v2009, Sustainable Sites, Credit SSc6.1				Name / Position: Signature:
Measure # 7: Site Analysis Study	**Performance Impact:** All Impact Areas Undertake a study of the existing site and its context within the larger community considering the impact of existing and potential: -Neighbourhood development plans (including synergies with this site) -Cultural and Heritage assets -Massing -Landscaping (hard and soft spaces) -Human scale -Transportation (walking score, bicycling, bus/train) -Micro-climate effects -district energy	**1. Recommended Minimum** Narrative only: Consultant Team **2. Best Practice** Studies conducted: Consultant Team **3. Innovative** Study conducted: Third-party experts **4. Not Applicable**	**2. Best Practice**	Sites	3	Submit a copy of the study indicating who it was conducted by and the relation to the project team, if any.	Consulting Team	I) LEED for Neighbourhood Development	Links at 2nd floor level (glazed) are to be removed as part of the project. However, there is high use by occupants. This will eliminate the winter connectivity between the buildings.			Name / Position: Signature:
Category: Energy												
	Performance Impact: Energy Efficiency Intent: To optimize energy efficiency and minimize energy use required with heating and cooling of the building. Identify the existing thermal performance for the exterior walls/roofs/fenestration assemblies to establish a baseline for improvement. Identify options and limitations to improving thermal performance of the envelope assemblies, including impact on Durability (e.g., Heritage buildings), Lifecycle Cost Assessment, Structural limitations, etc... Teams are encouraged to consider options to reach Passivehouse levels of thermal performance (e.g., Wall/Roof R values > 50). Conduct an Energy Model to demonstrate energy saving options compared to the existing assemblies **(note:** this model will be used to compare and select envelope options; however, the model should be done in conjunction with planned / future	**1. Recommended Minimum** Energy Model conducted by Consultant Team **2. Best Practice** Energy Model conducted by 3rd -Party Expert (pre-design + updates throughout design phase) **3. Innovative** Best Practice + inclusion of GHG emissions (using PSPC factors) **4. Not Applicable**				Submit a copy of the energy model indicating who it was conducted by and the relation to the project team, if any.						Name / Position: Signature:

Measure # 8: **Energy Modelling**	used to compare and select envelope options, however, the model should be done in conjunction with planned / future mechanical and electrical rehabilitation options). Specific targets for wall/fenestration/roofing assemblies are outlined below in the corresponding Walls/Fenestrations/Roofing sections. This study may require a more in-depth investigation phase to determine "as-built" assemblies' insulation levels. Consider the requirements for resilient design or futureproofing for climate change impacts (e.g., increased in energy costs, increased power outages, increased passive requirements). Coordinate with Building Envelope Commissioning, Wall/Fenestration/Roofing thermal performance measures.	**4. Not Applicable**	**3. Innovative**	Energy	5		Consulting Team	i) NIBS Guideline 3-2006, R.1.4 Heat Flow Control ii) Green Globes v2.0 2015, 3.3 Energy iii) LEED NC v2009, Energy & Atmosphere, Credit 1				
Measure # 9: **Mechanical System Impact Study & Retro Mechanical Commissioning**	Performance Impact: Enhanced Indoor Environment & Comfort Intent: To review, modify and retro-commission the existing mechanical heating, ventilation and air conditioning systems To address proposed changes To the building envelope system designs. Coordinate building envelope Rehabilitation work with planned or future mechanical and Electrical work. Consider design options for passive heating, cooling and ventilation and Impact on existing design and occupant Comfort, e.g., evaluate the existing windows for natural ventilation and occupant Comfort, considering impacts on noise transfer, moisture ingress, drafts, ease of operation, etc... Coordinate with the energy model, determine the Impact of radiant heat on occupants by calculating surface temperatures for walls and fenestration assemblies.	**1. Recommended Minimum** Mechanical Impact study: Consultant Team **2. Best Practice** Mechanical Impact Study: Mechanical Design/Commissioning Specialist; and implement recommendations **3. Innovative** Conduct retro-commissioning requirements to meet ASHRAE 55 (thermal Comfort) and ASHRAE 62 (ventilation rates) + pre/post occupant comfort survey **4. Not Applicable**	**2. Best Practice**	Energy	3	Submit a copy of the mechanical study indicating who it was conducted by and the relation to the project team, if any. Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference.	Consulting Team	I) NIBS Guideline 3-2006, R.2.3 Ventilation ii) Green Globes v2.0 2015, 3.7 Indoor Environment iii) ASHRAE 55 iv) ASHRAE 62				Name / Position: Signature:
Category: Materials												
Measure # 10: **Acoustic Study & Implementation**	**Performance Impact:** All Impact Areas Intent: to identify acoustic (Sound Transmission Class or Outside Inside Transmission Class) requirements and strategies for exterior walls/roofs/fenestration assemblies (by floor and/or elevation) to control the movement of sound and disruption of occupants. Record the exterior sound levels, including peak and average levels and establish a target interior sound level for assemblies (e.g., 65, 55, 45 decibels). Design teams shall consider noise attenuation provisions, where required, for all air intakes, exhausts, mechanical rooms, cooling towers, air handling units, emergency generators and waste handling equipment to achieve compliance with noise restrictions at the property line. Consider the requirements for resilient design or futureproofing for climate change impacts (e.g., increased traffic patterns, changes of use, etc...) Coordinate with Urban design, wall/fenestration/roofing measures.	**1. Recommended Minimum** Narrative only: Consultant Team **2. Best Practice** Study conducted: Acoustic Consultant **3. Innovative** Wall, roof and fenestration assemblies have met Acoustic Consultant's recommendations for maximum acoustic levels **4. Not Applicable**	**1. Recommended Minimum**	Materials	1	Submit a copy of the study indicating who it was conducted by and the relation to the project team, if any. Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference.	Consulting Team	I) NIBS Guideline 3-2006, R.1.6 Noise & Vibration Control ii) LEED BD+C V4, Indoor Environment Credit 9 iii) Green Globes v2.0 2015, 3.7 Indoor Environment	Not a high priority. Ground floor is more transparent and acoustics are not an issue. Group felt that properly designed and installed envelope would eliminated the need for this measure.			Name / Position: Signature:
Measure # 11: **Air, Vapour and Moisture Control Study & Implementation**	**Performance Impact:** All Impact areas. Intent: to identify the requirements for control of the transmission of vapour-laden air (via air leakage and/or vapour diffusion). Identify sources of internal moisture and methods (mechanically) to manage and/or remove interior moisture. Identify the level of risk for the wall/roof/fenestration assemblies to vapour diffusion, air leakage and condensation (e.g., especially important for retained Heritage assemblies). This study may require a more in-depth investigation phase to determine "as-built" assembly construction. Illustrate existing plane of air tightness and opportunities for improvement, especially at intersections (wall/roof, wall/window, wall/foundation, penetrations, etc..). Architectural drawings should clearly detail planes of air tightness, vapour diffusion control layer, thermal layer, primary and secondary moisture management layers, and transitions. Identify the exposure, level of risk and impact on performance of exterior moisture (e.g., rain, snow, ice, below grade, etc...) for the elements within the scope of work (e.g. Fenestration, walls, roof). Design teams are encouraged to implement best practice design principles, such as: a pressure equalized "rain screen" principles and the Four D's (Deflection, Drainage, Drying and Durable Details). Existing Heritage or mass cladding assemblies should be evaluated for moisture "storage and release", reduced exposure, freeze-thaw impacts, and rates of drying. Consider the requirements for resilient design or futureproofing for climate change impacts (e.g., higher wind pressure, changes in interior moisture loads, occupancy type, higher wind and moisture loads).	**1. Recommended Minimum** Narrative only regarding design parameters: Consultant Team **2. Best Practice** Study conducted with defined risks associated with various design options: Building Envelope Specialist + recommendations implemented **3. Innovative** Best practice + supporting modelling (e.g. hygrothermal/WUFI) **4. Not Applicable**	**2. Best Practice**	Materials	3	Submit a copy of the air, vapour and moisture study indicating who it was conducted by and the relation to the project team, if any. Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference.	Consulting Team	I) NIBS Guideline 3-2006, R.1.3 Rain Penetration & Water Control ii) Green Globes v2.0 2015, 3.7 Indoor Environment				Name / Position: Signature:
Measure # 12: **Existing Materials Reuse Study**	**Performance Impact:** Material Conservation Intent: to reuse existing materials on this project or redirect materials for reuse on other projects. Undertake a study of the existing conditions during investigation and pre-demolition. Consider options for reusing parts or whole envelope systems. Evaluate the existing materials for usefulness in facilitating the new design and tie-in. Evaluate opportunities to save existing elements through careful disassembly or targeted deconstruction instead of complete demolition. Identify existing materials which have potential for future reuse: either to tie-in to the new design, be reused on another project or for donation to a charitable reuse store. Provide a demolition mock-up to better clarify which building materials are to remain in place, preventing unnecessary material removal, damage to existing elements and facilitate ease of tie-ins during construction. Coordinate with Energy Modelling and Wall/Fenestration/Roofing thermal performance measures.	**1. Recommended Minimum** Narrative only: Consultant Team **2. Best Practice** Demolition and reuse Study conducted: External Specialist (e.g. Waste Diversion, Building Envelope, Trade representative, etc.) **3. Innovative** Conduct Best Practice + Implement recommendations from CSA Z783, "Deconstruction of buildings and their related parts" **4. Not Applicable**	**4. Not Applicable**	Materials	0	Submit a copy of the Existing Materials Reuse Study indicating who it was conducted by and the relation to the project team, if any.	Consulting Team	I) Green Globes v1.0 2004, E - Resources, E.3 ii) LEED NC v2009, Materials & Resources, Credit 1 iii) CSA Z783 'Deconstruction of buildings and their related parts'	This measure was determined as not applicable, due to the condition of the precast panels.			Name / Position: Signature:

Project Delivery Stage									**Project Delivery Stage**			
General: Measures Applicable to All Envelope Projects									**PWGSC Reporting**			
Measure	**Performance Impact & Intent**	**Performance Target Options Available**	**Project Target Selection**	**Category**	**Score**	**Deliverables**	**Responsible Party**	**Reference Standard**	**Comments (PWGSC)**	**Follow-up Action**		**Closeout**
Category: Sites												
Measure # 13: **Light Pollution**	**Performance Impact:** Exterior Light Pollution Reduction Minimize the light trespass from the building and site, reducing sky-glow and improving nighttime visibility. Reduce development impact from lighting on nocturnal environments. Shield exterior lighting so they do not emit light directly to the night sky. Reduce the input power to all non-emergency interior luminaires with a direct line of sight to any openings in the envelope via automatic controls.	**1. Recommended Minimum** Fully shield all new and existing exterior luminaires with 1000 initial lamp lumens or more. **2. Best Practice** In addition to the above, install daylight sensors for all new and existing luminaires. **3. Innovative** In addition to all of the above requirements, reduce interior input power by 50% between the hours of 11:00 PM and 5:00 AM. **4. Not Applicable**	**2. Best Practice**	Sites	3	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement	Consulting Team Contractor	I) LEED NC v2009, Sustainable Sites, Credit 8				Name / Position: Signature:
Category: Energy												
Measure # 14: **Renewable Energy**	**Performance Impact:** Energy Independence **Intent:** Use on-site renewable energy systems to offset building energy costs. Following the outcome of the Wind and Solar Energy Study (General Section), further explore and implement opportunities for implementation on the building, site or adjacent community. Potential areas must be structurally capable of supporting photovoltaic (PV) systems and provide unobstructed solar access, and/or wind turbines and have unobstructed wind access. Consider options for ground mounted, off-site erection, as-well-as building integrated PV (BIPV) or building integrated wind turbines. Additional alternative energy sources included in this measure would include: Solar thermal, geothermal, low-impact hydroelectric, bio-fuel co-generation. Coordinate with Urban/Architectural/Landscape design and Energy Modelling measures	**1. Recommended Minimum** Conduct a feasibility study for building/site/community alternative power production. **2. Best Practice** Futureproofing: Where rehabilitation work can facilitate, integrate new alternative power infrastructure (e.g. roof curbs, mounting hardware and electrical feeds) for future installations. **3. Innovative** Install alternative power equipment (e.g. roof mounted PV panels, BIPV, wind turbines, etc.) **4. Not Applicable**	**3. Innovative**	Energy	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement.	Consulting Team Contractor	I) LEED NC v2009 Energy & Atmosphere, Credit 2 ii) Green Globes v2.0 2015, 3.3 Energy	This project is to set a high precedent for future projects. Design options should include, but are not limited to, the assesment for building integrated photovoltaics. Penthouses will be targeted to be covered with 25% photovoltaics where suitable.			Name / Position: Signature:
Category: Materials												
Measure # 15: **Building Durability Plan**	**Performance Impact:** Material Durability Intent: To minimize material use and waste over the life of a building resulting from material selection or failure of the building components. Develop and implement a Building Durability Plan, in accordance with the principles of CSA S478-95 (R2007) - Guideline on Durability in Buildings for the components within the scope of the work AND the major structural elements of the project. Teams are encouraged to include the design principles outlined in CSA Z782 'Guideline for Design for Disassembly and Adaptability in Buildings', and consider preventative maintenance strategies and implementing maintenance/renewal plans. Design and construct the building envelope assemblies with the intent that the predicted service life (PSL) of the assemblies and their components is at least: -Fenestration: 25 year full service life and at least 15 years prior to major rehabilitation. -Walls: 50 year full service life and at least 30 years prior to major rehabilitation. -Roofs: minimum 20 year full service life. Coordinate with Life Cycle Analysis, Building Envelope Commissioning, Wall/Fenestration/Roof Innovation and Sustainable Roofing measures.	**1. Recommended Minimum** Develop and implement a Building Durability Plan (meet PSL targets) **2. Best Practice** Recommended minimum + engaged Building Envelope Specialist for design review + exceed PSL targets (where practical) **3. Innovative** Best Practice + implement design for disassembly and adaptation principles + develop a maintenance/renewal plan **4. Not Applicable**	**1. Recommended Minimum**	Materials	1	Submit Durability Plan, complete with predicted service lives for design options. Best Practice/Innovation: Include design reviews and field review reports from independent Building Envelope Specialist + Maintenance Plan Submit Quality Assurance Plan and manufacturer's service life and/or warranty information to support Durability Plan.	Consulting Team Contractor	I) Green Globes v2.0 2015, 3.5 Materials & Resources ii) LEED NC v2009, Regional Priorities, Credit 1 iii) National Performance Standard (NPS) for Office Buildings (DRAFT) iv) CSA S478-95 (r2007) v) CSA Z782 'Guideline for Design for Disassembly and Adaptability in Buildings'				Name / Position: Signature:
Measure # 16: **Building Envelope Commissioning**	**Performance Impact:** All Impact Areas Intent: To identify building envelope commissioning requirements in the project documents and provide third-party review and verification that the Owner's project requirements (OPR's) and expectations will be met or exceeded for all components within the scope of the rehabilitation project. Consultant teams are encouraged to engage a Commissioning Authority or undertake the Commissioning tasks early in the project design stage (e.g., before schematic design) and throughout the Construction phase and post-occupancy phases, including any require testing, maintenance staff training and operations manuals (This is considered Enhanced Commissioning). Project teams are encouraged to include off-site and on-site testing of premanufactured/assembly or site installed components of the wall assembly to ensure that the performance targets are met and installer errors are identified and corrected. Testing could include: air leakage (qualitative / quantitative), vapour diffusion, adhesion of membranes and sealants, water penetration, thermal performance and continuity (thermographic scans), etc.... Refer to applicable ASTM and CSA Standards. A good resource is NIBS - Guideline 3, Annex U: Testing Procedures for the Exterior Enclosure. Coordinate with Building Durability and Wall/Fenestration/Roofing Innovation measures.	**1. Recommended Minimum** Fundamental Commissioning: Building Envelope Commissioning Authority + Agent engaged (Construction Document Design Phase + Construction Phase) **2. Best Practice** Fundamental Commissioning Plus: Building Envelope Commissioning Authority + Agent engaged (Concept/Schematic Design Phase + Construction Phase) + Testing **3. Innovative** Enhanced Commissioning: Best Practice + Testing + maintenance plan **4. Not Applicable**	**3. Innovative**	Materials	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. This will include: -documented Owner's project requirements, -Basis of design document (document outlining various design options), -Design review reports, -Commissioning specifications, -Material Verification forms, -Material Performance verification forms, -Operations and maintenance plan (enhanced) -Post-occupancy review reports (enhanced) Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	I) NIBS Guideline 3-2012 ii) CSA Z320-11 iii) ASTM E2813 iv) National Performance Standard (NPS) for Office Buildings (DRAFT) v) ASHRAE Guideline 0				Name / Position: Signature:
Measure # 17: **Life-cycle impact Reduction**	**Performance Impact:** All Impact Areas Intent: To minimize the environmental impact of the rehabilitation work through life-cycle assessment of material choices. Identify the environmental effects with a Lifecycle Assessment tool (LCA) and lifecycle cost (LCC) of the proposed rehabilitation work options at the conceptual design phase, to ensure design options consider impact of material choices. Where applicable, include design options for reusing parts or whole systems, as the existing systems offer the lowest LCA, but maybe not the lowest LCC. Establish a bassline design in which to review results of proposed optional designs approaches. Coordinate with Existing Material Reuse Study, Wall/Fenestration/Roofing Thermal Performance and Innovation measures.	**1. Recommended Minimum** LCC + LCA using Athena Impact Estimator (or similar): demonstrate the Greenhouse Gas (GHG) impact for the Preferred Option. **2. Best Practice** LCC + LCA using Athena Impact Estimator (or similar): demonstrate the Greenhouse Gas (GHG) Impact for each scenario.; including a baseline, Option 1, Option 2... The Preferred Option should illustrate a minimum 10% reduction in GHG over baseline. **3. Innovative** In addition to the above, demonstrate reduction in two other environmental impact categories by 10% (no other categories can increase by 5%). **4. Not Applicable**	**3. Innovative**	Materials	5	Submit Life Cycle analysis and Life Cycle costing reports demonstrating requirements of the selected performance target.	Consulting Team Contractor	I) LEED BD+C V4, Materials & Resources, Lice-Cycle Impact Reduction ii) Green Globes, v1.0 2004, E.2 Minimal Consumption of Resources iii) National Performance Standard (NPS) for Office Buildings (DRAFT) iv) Real Property Sustainability Framework (Draft, v. 2015)				Name / Position: Signature:
Measure # 18: **Construction Waste Management**	**Performance Impact:** Resource Efficiency Intent: To divert construction and demolition debris from disposal in landfills and incineration facilities. Redirect recyclable recovered resources back to the manufacturing process and redirect reusable materials to appropriate sites. Create a waste management plan, referencing findings from the Existing Materials Reuse Study. Describe the diversion strategies planned for the project, including the haulers, recyclers, whether dismantling of assemblies will occur and what material types are required to be recycled or reused (e.g., local markets or other innovative opportunities). Indicate whether materials will be separated on-site or commingled (mixed bins). Where commingled bins are used, have the recycling facility identify how they will process the material and confirm it is in-line with end-uses as required by LEED (for diverted materials). Where commingled bins are not used, the contractor shall verify how each receiving facility will process the material and confirm it is in-line with end-uses as required by LEED (for diverted materials). Consider opportunities to coordinate and optimize waste collection, diversion and reuse of materials with local community developments and projects. Coordinate with Architectural Design, Life cycle analysis and Existing Material Reuse study measures.	**1. Recommended Minimum** Minimum 75% Diversion. Typically will involve recycling of easily separated wood, drywall, metals, rubble and cardboard. If 75% can not be achieved, provide a narrative outlining the reasons and methods that will be used to offset the impact of landfill waste. **2. Best Practice** 85% Diversion. Typically will involve, in addition to the above, dismantling of major demolition assemblies for recycling. **3. Innovative** 95% Diversion. Typically will involve, in addition to the above, material packaging and pallets will be returned to suppliers. Any additional material types will be assessed for recycling or reuse opportunities prior to being disposed of in a landfill. **4. Not Applicable**	**1. Recommended Minimum**	Materials	1	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Include a Waste Reduction Plan, coordinated with a hazardous waste report. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report (e.g. Waste management tracking sheets, final waste diversion report, etc.). Inclue a Waste Reudction Action Plan.	Consulting Team Contractor	I) LEED NC v2009, Materials & Resources, Credit 2 ii) Green Globes v1.0 2004, E -Resources, E.5 iii) LEED BD+C V4, Materials & Resources, Construction & Demolition Waste Management	Measure determined to be unlikely to achieve 75% or above due to the previous investigation work into diverting the existing panels. The team was encouraged to communicate the intent of construction waste management to the Prime Consultant in the TOR.			Name / Position: Signature:

Measure # 19: Environmental Product Declarations	**Performance Impact:** Material Transparency Intent: to encourage the use and selection of healthy materials that have verified their life-cycle impact information. Materials can contain chemicals that are harmful to human and ecological health. Teams are required to research and select products with reported and verified EPD (Environmental Product Declarations) or HPD (Health Product Declarations), and minimize the use of products on the Red List (Living Building Challenge) or Precautionary List (Perkins + Will Architects). EPD's support the transition from a "single-attribute" approach to a more comprehensive reporting structure. **RED LIST** Alkylphenols, Asbestos, Bisphenol A (BPA), Cadmium, Chlorinated Polyethylene and Chlorosulfonated Polyethlene, Chlorobenzenes, Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs) Chloroprene (Neoprene), Chromium VI, Chlorinated Polyvinyl Chloride (CPVC), Formaldehyde (added), Halogenated Flame Retardants (HFRs), Lead (added), Mercury, Polychlorinated Biphenyls (PCBs), Perfluorinated Compounds (PFCs), Phthalates, Polyvinyl Chloride (PVC), Polyvinylidene Chloride (PVDC), Short Chain Chlorinated Paraffin, Wood treatments containing Creosote, Arsenic or Pentachlorophenol Volatile Organic Compounds (VOCs) in wet applied products	**1.Recommended Minimum** Research all products and minimize use of those on the Red List or Precautionary List. **2. Best Practice** Recommended Minimum + 10 major products (by cost) with EPD's or HPD's **3. Innovative** Recommended Minimum + > 10 major products (by cost) with EPDs or HPDs **4. Not Applicable**	**1. Recommended Minimum**	Materials	1	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specificationsection and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement.	Consulting Team Contractor	i) LEED NC v4, Materials & Resources, Credit Building Product Disclosure and Optimization - EPD ii) http://living-future.org/redlist iii) http://transparency.perkinswill.com/Home/PrecautionaryList				
Measure # 20: Recycled Content in Construction Materials	**Performance Impact:** Material Efficiency Select materials which have been manufactured using recycled materials. Recycled content is the sum of postconsumer recycled content plus one-half the pre-consumer recycled content, based on cost. This measure applied to permanently installed building products, excluding mechanical, plumbing, electrical, (MEP) and specialty equipment as well as items purchased for temporary use on the project.	**1. Recommended Minimum** 10% of all construction materials by cost. **2. Best Practice** 20% of all construction materials by cost. **3. Innovative** 30% of all construction materials by cost. **4. Not Applicable**	**1. Recommended Minimum**	Materials	1	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	i) Green Globes v1.0 2004, E- Minimal Consumption of Resources, E.2 ii) LEED NC v2009, Materials & Resources, Credit 4 iii) LEED BD+C V4, (Materials and Resources, Environmental Product Declarations)				Name / Position: Signature:
Measure # 21: Regionally Manufactured Materials	**Performance Impact:** Materials Efficiency Reduce raw material usage by selecting materials which have been manufactured locally using localized materials. Regionally manufactured materials are produced within 800km of the project job site (if shipped by truck) and 2400km (if shipped by rail or boat). Both distances are measured as-the-crow-flies. Regionally extracted materials are produced within 800km of the manufacturer extraction location (if shipped by truck) and 2400km (if shipped by rail or boat).	**1.Recommended Minimum** 30% of all construction materials manufacturer locally, by cost. **2. Best Practise** 20% of all construction materials manufactured and extracted locally, by cost. **3. Innovative** 30% of all construction materials manufactured and extracted locally, by cost. **4. Not Applicable**	**2. Best Practice**	Materials	3	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	i) Green Globes v1.0 2004, E - Resources, E.2 ii) LEED NC v2009, Materials & Resources, Credit MRc5				Name / Position: Signature:
Measure # 22: Sustainably Harvested Wood	**Performance Impact Area:** Materials Efficiency Wood certifications are awarded to forest managers who adopt environmentally and socially responsible forest management practises. The wood custody is tracked and subsequent wood product manufacturers are able to confirm which products are made with certified wood. Use lumber and timber panel products which originate from certified and sustainable sources (certified by the CSA (Canadian Standards Association), the FSC (Forestry Stewardship Council), or the SFI (Sustainable Forestry Initiative), avoiding supporting poor forest management practises and the use of tropical hardwoods.	**1. Recommended Minimum** 50% CSA, FSC or SFI wood for all permanently installed wood components (minimum). **2. Best Practice** 100% FSC or SFI wood for all permanently installed wood components. **3. Innovative** 100% FSC or SFI wood for all permanent and temporarily wood components (formwork, bracing, scaffolding, guard rails). **4. Not Applicable**	**1. Recommended Minimum**	Materials	1	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	i) Green Globes v1.0 2004, E - Resources, E.2 ii) LEED BD+C v2009, Materials & Resources, Credit 7				Name / Position: Signature:
Category: Enhanced Indoor Environment												
Measure # 23: Construction IAQ Management Plan	**Performance Impact:** Enhanced Indoor Air Quality To reduce indoor air quality problems resulting from construction or renovation work and promote the comfort and well-being of construction workers and building occupants.	**1. Recommended Minimum** Physically separate areas that will be occupied from areas under construction. Protect materials stored on site from moisture damage. Replace all HVAC filtration after the final cleaning and construction completion. **2. Best Practice** In addition to the above requirements, install and replace filtration media to prevent dust and contaminants from entering the building HVAC systems. **3. Innovative** Implement a construction indoor air quality (IAQ) plan which details measures for HVAC protection, limiting sources of contaminants (fuel storage, exhaust), limiting dust migration and both interior and exterior housekeeping practises. **4. Not Applicable**	**3. Innovative**	Indoor Environment	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	I) LEED v2009, (Indoor Environmental Quality, Credit 3.1) ii) Green Globes v2.0 2015, 3.7 Indoor Environment iii) Sheet Metal and Air Conditioning Contractors National Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).				Name / Position: Signature:
Measure # 24: Volatile Organic Compounds (VOC's)	**Performance Impact: Enhanced Indoor Air Quality** Intent: to reduce indoor air quality problems, and worker/occupant health, resulting from the use of materials with high Volatile Organic Compounds (VOC's). Use the South Coast Air Quality Management District (SCAQMD) Rule #1168 and Rule #1113 (or equivalent) as a reference for VOC limits for all adhesive, sealants, paints and coatings. Confirm products used meet SCAQMD (or equivalent) g/L limits for all categories as determined by the definitions found under each rule. The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside, and inclusive, of the primary and secondary weatherproofing system, such as waterproofing membranes, air-resistive barriers and water-resistive barriers. Coordinate with Indoor Air Quality measure.	**1. Recommended Minimum** Meet VOC limits for all products used on the interior of the building. **2. Best Practice** In addition to the above, meet VOC limits for products used outside the building. **3. Innovative** In addition to the above, perform periodic toolbox inspections to ensure only compliant products are being used. **4. Not Applicable**	**1. Recommended Minimum**	Indoor Environment	1	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	I) Green Globe v2.0 2015, 3.7 Indoor Environment ii) LEED NC v2009, Indoor Environmental Quality, Credits 4.1 & 4.2				Name / Position: Signature:
Measure # 25: IAQ Testing Post Construction	**Performance Impact:** Enhanced Indoor Air Quality Confirmation Intent: To reduce indoor air quality problems after construction ends. Off-gassing resulting from construction or renovation work can be mitigated by providing fresh air to "flush" the space of contaminants. Flush-out or test interior areas of the building that were under construction during and after completion of work. All interior finishes must be install prior to the flush-out or testing. Maintain an internal temperature of 16°C and relative humidity no higher than 60%. Air testing reference: the United States Environmental Protection Agency Compendium of Methods for the Determination of Air Pollutants in Indoor Air to confirm contaminant concentrations do not exceed the following levels: Formaldehyde: 27 ppb, Particulates (PM10): 50 micrograms/m3), Total Volatile Organic Compounds: 500 micrograms/m3, Carbon Monoxide (CO): 9 ppm	**1. Recommended Minimum** Flush-out the interior spaces using the building HVAC system during construction + for a minimum of 72 hours with 100% outdoor air. Set ventilation to highest levels during non-work hours. **2. Best Practice** Flush-out the interior spaces using the building HVAC system during construction + for a minimum of one week with 100% outdoor air. Set ventilation to highest levels during non-work hours. **3. Innovative** Perform IAQ testing after construction and prior to occupancy (minimum one test per ventilation system and at least one per floor) **4. Not Applicable**	**1. Recommended Minimum**	Indoor Environment	1	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	I) LEED NC v2009, Indoor Environmental Quality, Credit 3.2 ii) Green Globes v2.0 2015, 3.7 Indoor Environment iii) US EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air (Standard Order Number: PB90200288)				Name / Position: Signature:

Project Delivery Stage									Project Delivery Stage			
Walls: Measures Applicable to Wall Projects									**PWGSC Reporting**			
Measure	**Performance Impact & Intent**	**Performance Target Options Available**	**Project Target Selection**	**Category**	**Score**	**Deliverables**	**Responsible Party**	**Reference Standard**	**Comments (PWGSC)**	**Follow-up Action**		**Closeout**
Category: Energy												
Measure # 26: Thermal Performance	**Performance Impact:** Energy Efficiency Intent: To optimize Energy Use and minimize the impacts associated with energy production, distribution and use. Following from the Energy Modelling (General Section), the design team must evaluate the thermal performance of the existing and new wall assembly and improve, where feasible the thermal performance of the wall assembly (e.g., considering LCA, LCC, etc..). Continuous insulation is required, where possible, with minimal thermal bridging. Passive energy efficiency is encouraged on all projects. Consider impact of orientation on thermal performance requirements. Coordinate with Energy modelling measure.	**1. Recommended Minimum** New assemblies exceed existing thermal performance (e.g. Between existing and NECB 2015) **2. Best Practice** New assemblies meet NECB 2015 prescriptive values **3. Innovative** New assemblies exceed NECB 2015 prescriptive values by at least 10% **4. Innovative, Level II** Any of above + Monitoring of thermal performance with in-situ sensors **5. Not Appplicable**	**3. Innovative, Level II**	Energy	7	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement.	Consulting Team Contractor	I) National Performance Standard (NPS) for Office Buildings (DRAFT) ii) Real Property Sustainability Framework (Draft, v. 2015).	Consider different performance level for each orientation of each building. Consider instrumentation to monitor performance. Various key locations could include in-situ sensors to measure performance. Level of risk is low and not expensive. Get feedback information for the next building, learning feedback enabled. Allows for preventative maintenance of building envelope systems.			Name / Position: Signature:
Category: Innovation												
Measure # 27: Wall Innovation Measure # 1	**Performance Impact:** Any Impact area Teams are encouraged to explore opportunities for innovative ideas (multiples are encouraged). The team may submit all strategies related to walls, which are not listed elsewhere in this toolkit. The additional proposed measure is to be submitted to PSPC for review and confirmation that the strategy is worthy of the innovative points available here. The selected and approved innovation measure(s) shall be documented in the "Comments" box, under the Reporting Section. Strategies may include: -Carbon sequestering cladding. *For example, carbon dioxide is sequestered from the atmosphere as a tree grows. When timber is used to product building products, the carbon is stored in the timber for the life of the product.* -Air cleaning cladding. *For example, a titanium dioxide layer that is applied to painted aluminum which acts as a catalyst in the presence of UV, breaking down smog molecules into their harmless constituents.* -Water cleaning or PH balancing cladding. *For example, use of Limestone or ceramic/clay cladding systems.* -Water capture, storage and reuse. For example, cladding systems that capture water at different levels, rather than at base of wall. -Vegetated walls and cladding. *For example, exterior green walls.* -Dynamic cladding. For example, claddings that change shape to provide shaping or rain capture. -Design for disassembly and deconstruction. *For example, designing building components to be efficiently dismantled at the end of their life.* -Solar wall (perforated dark coloured wall to pre-heat air).	**3. Innovative** To be determined by the team and reviewed by PSPC **4. Not Applicable**	**3. Innovative**	Innovative	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Teams must outline the alternative strategy and why it is considered an alternative innovative. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement	Consulting Team Contractor	I) PSPC Real Property Sustainability Framework & National Performance Standard (NPS) for Office Buildings (DRAFT) ii) LEED v2009 & V4 iii) Green Globes iv) BOMA	Design for disassembly and deconstruction was indicated as the innovation selection. For example, designing building components to be efficiently dismantled at the end of their life.			Name / Position: Signature:

Project Delivery Stage									Project Delivery Stage			
Fenestration: Measures Applicable to Fenestration Projects									**PWGSC Reporting**			
Measure	**Performance Impact & Intent**	**Performance Target Options Available**	**Project Target Selection**	**Category**	**Score**	**Deliverables**	**Responsible Party**	**Reference Standard**	**Comments (PWGSC)**	**Follow-up Action**		**Closeout**
Category: Sites												
Measure # 28: Reduce Bird Collisions	**Performance Impact:** Habitat Friendly Design Birds crash into glass because they are attracted to the reflections of the landscape (trees, sky, clouds, etc.) on the glass surface, greenery inside the building, or a landscape on the other side of the building as viewed through two windows on opposite facades. Bird-friendly buildings have small expanses of glazing. However, this would not allow for daylighting to be utilized and reduce occupant views to the exterior. When large expanses of glazing or curtain wall systems are desired, the glazing itself should be specified with low-reflectivity (0 to 10%). Opaque, etched, stained, frosted glass, and glass block are also good options to reduce or eliminate bird collisions. In addition, reflections can be avoided by providing awnings, overhangs, sunshades or glass treatments.	**1. Recommended Minimum** Ensure the design does not create fully glazed or transparent passageways that allow an unobstructed view from one side to the other. **2. Best Practice** In addition to the above, ensure façade material above 40 feet is not reflective (mostly transparent) to deter bird collisions. **3. Innovative** In addition to the above, provide visual markers (features or patterns) that are no more than 11 in. (28 cm) apart, up to at least 39 ft. (12 meters) above grade. Examples are mullions, fritted glass, decorative grilles and louvers or artwork. **4. Not Applicable**	**3. Innovative**	Sites	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	I) Bird Friendly Development Guidelines, City of Toronto Green Development Standard, March 2007 ii) Green Globes v2.0 2015, 3.2 Sites				Name / Position: Signature:
Category: Energy												
Measure # 29: Thermal Performance	**Performance Impact:** Energy Efficiency Intent: to optimize Energy Use and minimize the impacts associated with energy production, distribution and use. Following from the Energy Modelling (General Section), the design team must evaluated the thermal performance of the existing and new fenestration assemblies and improve, where feasible (e.g., LCA, LCC, Heritage, etc..) the thermal performance of the fenestration assemblies. Passive energy efficiency is encouraged on all projects. Minimum Design team requirements: -Calculate the thermal performance (including thermal bridging and frame effects of fenestration assemblies) and compare the thermal performance to the prescriptive values in the NECB 2015 for Zone 6. -The window to wall ratio shall be calculated and optimized, where possible, to 40% or less. -Fenestration percentage and performance by elevation should be illustrated with design approach. -Only thermally broken frames shall be used. -NRFC 500 condensation resistance value evaluation Consider options to use fiberglass and wood elements in fenestration design and minimize the use of spandrel panels. Coordinate with Energy modelling measure.	**1. Recommended Minimum** Meet minimum design team requirements + all new assemblies exceed existing thermal performance (e.g. Between existing and NECB 2015) **2. Best Practice** Recommended Minimum + New assemblies meet NECB 2015 prescriptive values **3. Innovative** Recommended Minimum + New assemblies exceed NECB 2015 prescriptive values by at least 10% **4. Innovative, Level II** Any of above + Monitoring of thermal performance with in-situ sensors **5. Not Applicable**	**3. Innovative**	Energy	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement	Consulting Team Contractor	I) PSPC Real Property Sustainability Framework & National Performance Standard (NPS) for Office Buildings (DRAFT) ii) LEED v2009 & V4 iii) Green Globes iv) BOMA				Name / Position: Signature:
Category: Enhanced Indoor Environment												
Measure # 30: Controlled Natural Daylight	**Performance Impact:** Increased Natural Daylight Following the outcome of the Solar & Wind Study (General Section), the fenestration assemblies must be designed to manage and optimize solar access, daylighting; while minimizing the negative effects of high solar gain and glare. Design teams shall include strategies for optimizing glazing sizes (by elevation), interior blinds (static/time/occupant controlled), external shading systems, daylight management through interior light shelves, window films / coatings and impact on daylight harvesting and interior light levels. Elements such as: Interior blinds and daylight harvesting may be beyond the scope of the project; however, they should be reviewed for temporary measures and coordinated with future tenant fit-up or Mechanical / Electrical work.	**1. Recommended Minimum** Evaluate existing and new window sizes (by elevation) to increase daylighting and provide a means of controlling glare daylighting. **2. Best Practice** Recommended Minimum + Select glazing, shading devices and/or light shelves/fins to optimize interior daylight levels. **3. Innovative** Provide photochromic or electrochromic glass for one or more collaborative work spaces along the exterior perimeter of the building. **4. Not Applicable**	**2. Best Practice**	Indoor Environment	3	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	I) NIBS Guideline 3-2006, R.1.5 Light, Solar and Other Radiation ii) LEED NC v1.0, Indoor Environmental Quality, Credit 8.1	Many stakeholder feel that floor to ceiling glazing is unnecessary. Thermal performance could be improved with no loss of natural daylight or views impacted.			Name / Position: Signature:
Measure # 31: Pollutant Source Control	**Performance Impact:** Enhanced Indoor Environment Incorporate permanent entryway systems at exterior to interior access points to reduce the amount of contaminants tracked into the occupied spaces. Open grates and grilles or other entryway systems that have a recessed collection area are most effective.	**1. Recommended Minimum** Provide walk-off or roll-out mats at least 3 meters (10 feet) long in the primary direction of travel at regularly used entrances. **2. Best Practice** Provide 3 meters (10 feet) of permanently installed grates, grilles, or slotted systems that allow for cleaning underneath at all regularly used entrances. **3. Innovative** Provide an entrance vestibule into regularly used entrances complete with 3 meters (10 feet) of permanently installed grates, grilles, or slotted systems that allow for cleaning underneath. **4. Not Applicable**	**2. Best Practice**	Indoor Environment	3	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	I) LEED NC v2009, Indoor Environmental Quality, Credit 5				Name / Position: Signature:
Category: Innovation												
Measure # 32: Fenestration Innovation Measure # 1	**Performance Impact:** Any Impact area Teams are encourage to explore opportunities for innovative ideas. The strategies in this section are not exhaustive, hence two strategy cells have been included to award teams for implementing innovative sustainable strategies. The team may submit strategies related to fenestration, which are listed elsewhere in this toolkit. The additional proposed measure is to be submitted to PSPC for review and confirmation that the strategy is worthy of the innovative points available here. The selected and approved innovatin measure(s) shall be documented in the "Comments" box, under the Reporting Section. Strategies may include: -Double facades. For example: new glass skin outside existing envelope. -Electrochromic glass (shading of glass surface via electric sensors (manual)) -photochromic glass (shading of glass surface via sun intensity) -Translucent glass (daylighting) -Self-cleaning glass -Design for disassembly and deconstruction (designed with cladding for easy removal/replacement/adaptation).	**3. Innovative** To be determined by the team and reviewed by PSPC **4. Not Applicable**	**3. Innovative**	Innovative	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Consulting Team Contractor	I) PSPC Real Property Sustainability Framework & National Performance Standard (NPS) for Office Buildings (DRAFT) ii) LEED v2009 & V4 iii) Green Globes iv) BOMA	The schematic design report (GRC) highlighted many innovative glazing solutions that would be considered favourable for the project to consider.			Name / Position: Signature:

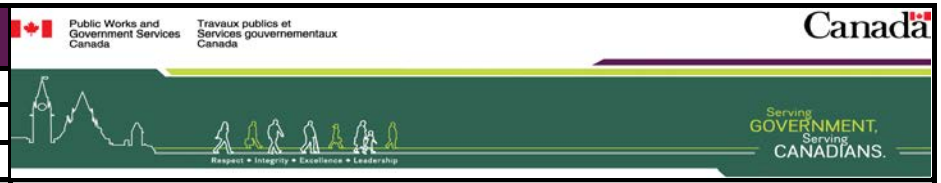
Project Delivery Stage									Project Delivery Stage			
Roofs: Measures Applicable to Roof Projects									**PWGSC Reporting**			
Measure	**Performance Impact & Intent**	**Performance Target Options Available**	**Project Target Selection**	**Category**	**Score**	**Deliverables**	**Responsible Party**	**Reference Standard**	**Comments (PWGSC)**	**Follow-up Action**		**Closeout**
Category: Sites												
Measure # 33: Sustainable Roofing	**Performance Impact:** Reduced Heat Island Effect / Material efficiency Intent: to minimize the use of dark, non-reflective surfaces that can contribute to heat island effect (localized warming of air temperature). **Note: include pedestrian bridges, garage roof areas, outbuildings, etc.., not just main roof areas.** The use of dark, non-reflective surfaces for parking, walkways and other hardscapes contribute to the heat island effect by absorbing the sun's warmth, which then radiates into the surroundings. The result is increased cooling loads in the summer and modification of existing ecosystem. Roofing choices can maximize energy savings and minimize the heat island effect. **Reflective roofing:** Reducing dark coloured roofing surfaces with higher solar reflectance index (SRI) values can reduce heat build-up. Increasing the slope of the roof can improve rainwater management, roofing cladding lifespan, choice of material, and durability. **Vegetated roofing**: Use vegetated roofing systems can reduce heat build-up and also (via evapotranspiration) cool roofing surface. Green roofs can also extend roofing membrane lifespan, retain stormwater, provide insulating benefits, acoustic benefits and provide areas for occupant enjoyment (visual or with accessible roof areas). Coordinate with Architectural/Landscape Design and Life cycle analysis measures.	**1. Recommended Minimum** Cover 75% of the roofing surface with high SRI materials. For a low slope roof, the SRI should be at least 78. For a steep slope roof, the SRI should be at least 29. **2. Best Practice** Provide a green roof for 50% of the total roof area affected by construction + meet SRI (78 or 29) **3. Innovative** Best Practice + make a portion of the roof accessible to pedestrians, or 100% green roof **4. Not Applicable**	**3. Innovative**	Sites	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference. Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement	Consulting Team Contractor	I) LEED v2009 (Sustainable Sites, Credit 7.2) ii) Green Globes v2.0 2015, 3.2 Sites	Change this measure to include SRI targets for best practise and innovative levels (allow 100% coverage and achieve higher SRI values). Include commercial core rooftop patios in measure options.			Name / Position: Signature:

Category: Energy												
Measure # 34: **Thermal Performance**	**Performance Impact:** Energy Efficiency Intent: To optimize Energy Use and minimize the impacts associated with energy production, distribution and use. Following from the Energy Modelling (General Section), the design team must evaluate the thermal performance of the existing and new wall assembly and improve, where feasible the thermal performance of the wall assembly (e.g., considering LCA, LCC, etc..). Continuous insulation is required, where possible, with minimal thermal bridging. Passive energy efficiency is encouraged on all projects. Consider impact of orientation on thermal performance requirements. Coordinate with Energy modelling measure.	**1. Recommended Minimum** New assemblies exceed existing thermal performance (e.g. Between existing and NECB 2015) **2. Best Practice** New assemblies meet NECB 2015 prescriptive values **3. Innovative** New assemblies exceed NECB 2015 prescriptive values by at least 10% **4. Innovative, Level II** Any of above + Monitoring of thermal performance with in-situ sensors **5. Not Appplicable**	**2. Best Practice**	Energy	3	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference.	Consulting Team	I) PSPC Real Property Sustainability Framework & National Performance Standard (NPS) for Office Buildings (DRAFT) ii) LEED v2009 & V4 iii) Green Globes iv) BOMA				Name / Position: Signature:
						Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Contractor					
Category: Innovation												
Measure # 35: **Roof Innovation** **Measure # 1**	**Performance Impact:** Any Impact area Teams are encouge to explore opportunities for innovative ideas. The strategies in this section are not exhaustive, hence two strategy cells have been included to award teams for implementing innovative sustainable strategies. The team may submit strategies related to roofs, which are not listed elsewhere in this toolkit. The additional proposed measure is to be submitted to PWGSC for review and confirmation that the strategy is worthy of the innovative points available here. Strategies may include: -Design for disassembly and deconstruction -Enhance wildlife habitat. For example, green roof designed for animal (birds/bees) habitation and movement through city - green bridges. -significantly increase storm water storage to assist with storm water control. -design for occupant and/or public access and use. -installed permanent moisture detection system (e.g., Electric field vector mapping (EFVM)).	**3. Innovative** To be determined by the team and reviewed by PWGSC. **4. Not Applicable**	**3. Innovative**	Innovative	5	Submit applicable supporting documentation as per the selected performance target in form of a project brief/narrative, specification section and/or drawing reference.	Consulting Team	I) PSPC Real Property Sustainability Framework & National Performance Standard (NPS) for Office Buildings (DRAFT) ii) LEED v2009 & V4 iii) Green Globes iv) BOMA	Include measure option to consider higher parapets that double as safety rail barrier (certain height alleviating need for safety equipment for operations team). Add sustainability approach for rooftop penthouses.			Name / Position: Signature:
						Submit applicable supporting documentation as per the selected performance target in form of a project specification submittal requirement or monthly update report.	Contractor					

Building Envelope Project Sustainability Index

1.00 - 2.00 = Mandated Sustainability Approach **2.00 - 3.00 =** Best Practice Sustainability Approach **3.00 - 4.00 =** Innovative Sustainability Approach	3.24	This score represents an overall innovative sustainability approach for the LTDLC Building Envelope Replacement Project

Sustainability Summary Index



Project Name:	**LTDLC**
Date:	**June 9, 2016**
Project Score:	**3.24**

Measure I.D. & Measure Name	Project Target Selection	Comments (PWGSC)
Measure # 1: Integrative Project Planning and Design	2. Best Practice	
Measure # 2: Urban Design	4. Not Applicable	This measures is not within the scope of the LTDLC Envelope Replacement Project. However, the project must be compatible with principles considered.
Measure # 3: Architectural Design	2. Best Practice	
Measure # 4: Landscape Design	1. Recommended Minimum	Courtyards should be for active use such as yoga. While roof decks are nice, there will be security concerns. Consider commercial area to incorporate roof terraces. Innovative item should include improved habitat for bees and butterflies. *This measure falls outside the scope of the LTDLC Envelope Replacement Program. However, any design/work completed should not inhibit future site planning work, as detailed here.
Measure # 5: Wind and Solar Study & Implementation	3. Innovative	
Measure # 6: Stormwater Management Study & Implementation	1. Recommended Minimum	
Measure # 7: Site Analysis Study	2. Best Practice	Links at 2nd floor level (glazed) are to be removed as part of the project. However, there is high use by occupants. This will eliminate the winter connectivity between the buildings.
Measure # 8: Energy Modelling	3. Innovative	
Measure # 9: Mechanical System Impact Study & Retro Mechanical Co	2. Best Practice	
Measure # 10: Acoustic Study & Implementation	1. Recommended Minimum	Not a high priority. Ground floor is more transparent and acoustics are not an issue. Group felt that properly designed and installed envelope would eliminated the need for this measure.
Measure # 11: Air, Vapour and Moisture Control Study & Implementati	2. Best Practice	
Measure # 12: Existing Materials Reuse Study	4. Not Applicable	This measure was determined as not applicable, due to the condition of the precast panels.
Project Delivery Stage		
General: Measures Applicable to All Envelope Projects		
Measure I.D. & Measure Name	**Project Target Selection**	**Comments (PWGSC)**
Measure # 13: Light Pollution	2. Best Practice	
Measure # 14: Renewable Energy	3. Innovative	This project is to set a high precedent for future projects. Design options should include, but are not limited to, the assesment for building integrated photovoltaics. Penthouses will be targeted to be covered with 25% photovoltaics where suitable.
Measure # 15: Building Durability Plan	1. Recommended Minimum	
Measure # 16: Building Envelope Commissioning	3. Innovative	

Measure # 17: Life-cycle impact Reduction	3. Innovative	
Measure # 18: Construction Waste Management	1. Recommended Minimum	Measure determined to be unlikely to achieve 75% or above due to the previous investigation work into diverting the existing panels. The team was encouraged to communicate the intent of construction waste management to the Prime Consultant in the TOR.
Measure # 19: Environmental Product Declarations	1. Recommended Minimum	
Measure # 20: Recycled Content in Construction Materials	1. Recommended Minimum	
Measure # 21: Regionally Manufactured Materials	2. Best Practice	
Measure # 22: Sustainably Harvested Wood	1. Recommended Minimum	
Measure # 23: Construction IAQ Management Plan	3. Innovative	
Measure # 24: Volatile Organic Compounds (VOC's)	1. Recommended Minimum	
Measure # 25: IAQ Testing Post Construction	1. Recommended Minimum	
Project Delivery Stage		
Walls: Measures Applicable to Wall Projects		
Measure I.D. & Measure Name	**Project Target Selection**	**Comments (PWGSC)**
Measure # 26: Thermal Performance	3. Innovative, Level II	Consider different performance level for each orientation of each building. Consider instrumentation to monitor performance. Various key locations could include in-situ sensors to measure performance. Level of risk is low and not expensive. Get feedback information for the next building, learning feedback enabled. Allows for preventative maintenance of building envelope systems.
Measure # 27: Wall Innovation Measure # 1	3. Innovative	Design for disassembly and deconstruction was indicated as the innovation selection. For example, designing building components to be efficiently dismantled at the end of their life.
Project Delivery Stage		
Fenestration: Measures Applicable to Fenestration Projects		
Measure I.D. & Measure Name	**Project Target Selection**	**Comments (PWGSC)**
Measure # 28: Reduce Bird Collisions	3. Innovative	
Measure # 29: Thermal Performance	3. Innovative	
Measure # 30: Controlled Natural Daylight	2. Best Practice	Many stakeholder feel that floor to ceiling glazing is unnecessary. Thermal performance could be improved with no loss of natural daylight or views impacted.
Measure # 31: Pollutant Source Control	2. Best Practice	
Measure # 32: Fenestration Innovation Measure # 1	3. Innovative	The schematic design report (GRC) highlighted many innovative glazing solutions that would be considered favourable for the project to consider.
Project Delivery Stage		
Roofs: Measures Applicable to Roof Projects		
Measure I.D. & Measure Name	**Project Target Selection**	**Comments (PWGSC)**
Measure # 33: Sustainable Roofing	3. Innovative	Change this measure to include SRI targets for best practise and innovative levels (allow 100% coverage and achieve higher SRI values). Include commercial core rooftop patios in measure options.
Measure # 34: Thermal Performance	2. Best Practice	

Measure # 35: Roof Innovation Measure # 1	3. Innovative	Include measure option to consider higher parapets that double as safety rail barrier (certain height alleviating need for safety equipment for operations team). Add sustainability approach for rooftop penthouses.

#1

Yes
No
Limited amounts

#2 Data Validation List - Category

Innovative
Project Management
Sites
Energy
Water
Materials
Indoor Environment
Operations

#3 Data Validation List

1. Recommended Minimum
2. Best Practice
3. Innovative
4. Not Applicable

#4 Data Validation List - Performance Impact

Optimize Energy Use
Moisture Protection
Fire Safety
Acoustics
Occupant Comfort
Day Lighting
Perimeter Visual Environment
Material Conservation
Material Durability
Resource Efficiency
System Maintainability
Enhanced Indoor Environment
Use Greener Materials
Optimize Site Potential

#5	Data Validation List - Standard
	Green Globes v1.0 NC Retrofit Checklist
	LEED
	Green Globe v2.0 2015
	BBB
	WELL Standard

#6	Data Validation List - Composite Wood
	Non-certified products only used outdoors
	CARB Phase II Compliant
	No Added Urea-Formaldehyde
	Not Applicable

Data > Validation > Input Message

IF Commands

Primary Colour		Forest Green
Primary Colour		Lime Green
Primary Colour		Mint Green
Primary Colour		Egg Plant Purple
Primary Colour		Stone Grey
Alternate Colour		Royal Blue
Alternate Colour		Tangerine Orange
Alternate Colour		Crimson Red
Alternate Colour		Chocolate Brown

Alternates (should only be used where it is necessary to use more colours such as a pie-chart).

Measure #
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35

Title
Integrative Project Planning and Design
Urban Design
Architectural Design
Landscape Design
Wind and Solar Study & Implementation
Stormwater Management Study & Implementation
Site Analysis Study
Energy Modelling
Mechanical System Impact Study & Retro Mechanical Commissioning
Acoustic Study & Implementation
Air, Vapour and Moisture Control Study & Implementation
Existing Materials Reuse Study
Light Pollution
Renewable Energy
Building Durability Plan
Building Envelope Commissioning
Life-cycle impact Reduction
Construction Waste Management
Environmental Product Declarations
Recycled Content in Construction Materials
Regionally Manufactured Materials
Sustainably Harvested Wood
Construction IAQ Management Plan
Volatile Organic Compounds (VOC's)
IAQ Testing Post Construction
Thermal Performance
Wall Innovation Measure # 1
Reduce Bird Collisions
Thermal Performance
Controlled Natural Daylight
Pollutant Source Control
Fenestration Innovation Measure # 1
Sustainable Roofing
Thermal Performance
Roof Innovation Measure # 1

	Row Start	Row End
General: Charrette and Studies Measures	21	52
General: Measures Applicable to All Envelope Projects	52	85
Walls: Measures Applicable to Wall Projects	85	94
Fenestration: Measures Applicable to Fenestration Projects	94	111
Roofs: Measures Applicable to Roof Projects	111	122

Building Envelope Project Sustainability Index

	#	%
1. Recommended Minimum	10	29.4%
2. Best Practice	10	29.4%
3. Innovative	12	35.3%
4. Not Applicable	2	5.9%

# of measures
12
13
2
5
3