BOMA BEST
BUILDING CERTIFICATION PROGRAM

Creating better spaces
to live, work and play

BOMA BEST 4.0
QUESTIONNAIRE FOR SUSTAINABLE BUILDINGS

HEALTHCARE
TECHNICAL FIELD GUIDE

June 2023

BOMA BEST
SUSTAINABLE

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ENERGY AND CARBON

INDOOR AIR QUALITY & HAZARDS

ACCESSIBILITY & WELLNESS

BOMA BEST
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TABLE HEADINGS EXPLAINED	
Focus Area	The broad thematic group within the BOMA BEST assessment framework, e.g., Energy and Carbon
Topic	The subject being assessed within the specific Focus Area, e.g., Assessment
#	Unique question number, e.g., E3.1a – Benchmarking Energy Use
Question	Unique question asked about the building's management or operations practices, e.g., Is the whole building's energy use available and benchmarked?
Answer	Different answer options available based on what is in place at the building, e.g., Yes or No, Select all that apply, Select one of the following, or data entry
Points available	The number of points available for each answer option. Also see "**Max. Points Available**"
Max. Points Available	Maximum number of points available if the specific question requirements are met. Baseline means that a question is mandatory and requirements must be met to achieve BOMA BEST certification
Description	Brief background about the topic and question
Requirements	What is required to demonstrate compliance
Documentation	What documentation is needed as proof to demonstrate compliance
Adapted BB3 Question	The corresponding BOMA BEST 3.0 question that was adapted in the new BOMA BEST 4.0 questionnaire. Applicants need to fulfill the new BOMA BEST 4.0 requirements.
Applicability	Clarification about whether the question is applicable to a specific asset class or not, e.g., Not Applicable to Enclosed Shopping Centres, Multi-Unit Residential or Universal Buildings For all applicable asset classes, the requirements apply to the systems managed by the owner or landlord, owner or building manager.
Suggested Lead	In-house unless stated otherwise. "Third-party" means the work may be done by a third-party as the expertise is not typically found in-house. The work can be done in-house if someone from the building management, operations or sustainability team is able to fulfill the requirements
References	Links to resources that may be consulted if further guidance is needed to fulfill requirements

Focus Area	The broad thematic group within the BOMA BEST assessment framework, e.g., Energy and Carbon
Topic	The subject being assessed within the specific Focus Area, e.g., Assessment
#	Unique question number, e.g., E3.1a – Benchmarking Energy Use
Crosswalk	Reference to other certifications that have similar criteria as the specific BOMA BEST question. Applicants can use submittals from other certifications achieved if they can demonstrate that those materials also satisfy the BOMA BEST requirements
Other Notes	Any pertinent information not covered under other headings

ENERGY AND CARBON	E0. BASELINE PRACTICES
Focus Area:	**Energy & Carbon**
Topic:	**Baseline Practices**
Question:	**E1.0a —Energy and Carbon Assessment** **Has a Walkthrough Energy and Carbon Assessment been completed in the past five years?**

Answer
Select one of the following:
- Yes
- Not applicable

Max. Points Available
Minimum requirement, this is a baseline practice

Description
Assessments allow building management to identify opportunities for operational optimization and capital upgrades, focusing on the highest-impact systems and areas. Align methodology with ASHRAE Level I Audit or equivalent.

Buildings with an Energy Star score and obtain GHG information from Energy Star.

To generate recommendations for no- and low-cost energy conservation measures (ECMs) and carbon reduction measures (CRMs) as well as more capital-intensive upgrades, assessments should include estimates of potential savings for proposed measures and consider implementation costs. Measures selected for implementation can then be added to plans and budgets.

Requirements
The Energy and Carbon Assessment Report must cover:
A. Building and system description and review, interviews with building O&M staff
   - If the site visit was completed remotely, describe steps taken to become familiar with the building's construction, equipment, operation and maintenance to demonstrate that the assessment accurately reflects on-site conditions
B. Energy utility history (at least 12 months of continuous data, typically the previous 24-36 months of data) for each energy source
C. Greenhouse Gas inventory or Carbon emission history (at least 12 months of continuous data, typically the previous 24-36 months of data) for each carbon source
D. Baseline energy consumption and carbon emissions, with benchmarking
E. Low- and no-cost energy conservation and/or carbon reduction measures, with high level costing, simple payback and anticipated savings

Also see References and Other Notes

E1.0a —Energy and Carbon Assessment - cont'd

Documentation

- Walkthrough Energy and Carbon Assessment Report

Adapted BB3 Question

Best Practice 2 — Has an ASHRAE Level 1 Energy Assessment been conducted in the past five years?

Applicability

Applicable to Office and Healthcare buildings

Suggested Lead

In-house, with third party support if required

References

ASHRAE Level I Audit: https://www.techstreet.com/ashrae/standards/ashrae-211-2018?product_id=2016437
Energy Star Greenhouse Gas Emissions: https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf
Carbon Risk Real Estate Monitor (CRREM) Global Pathways: https://www.crrem.org/

Crosswalk

N/A

Other Notes

The assessment methodology should at least align with an ASHRAE Level I Audit
Refer to Energy Star for carbon emission calculations and creating a GHG inventory. If other carbon emission factors are used, explain reasoning and factors applied.

ENERGY AND CARBON	E0. BASELINE PRACTICES
Focus Area:	**Energy & Carbon**
Topic:	**Baseline Practices**
Question:	**E2.0 — Energy Management Plan** **Is there an energy management plan with specific energy or carbon reduction targets?**

Answer
Select one of the following:
- Yes
- Not applicable — Net Zero Transition Plan is available (see Question E2.1)

Max. Points Available
Minimum requirement, this is a baseline practice

Description
The development of an energy management plan that includes targets, metrics, approaches and milestones will provide the foundation for building an energy and carbon reduction program. Follow ISO-50001 guidance, or equivalent.

Plans may include carbon emissions from on-site combustion (such as gas-fired boilers), refrigerant leaks (fugitive emissions) and purchased energy (such as electricity or steam), typically referred to as Scope 1 and 2 emissions. As well as working toward developing an approach for assessing emissions from fleet vehicles and emissions from service providers (such as snow removal etc.), typically referred to as Scope 3 emissions.

Requirements
The Energy Management Goal and Plan must cover the following:
A. Outline the vision for energy management going forward, such as goals or targets in relation to the baseline or managing carbon emissions
B. Where Portfolio-wide Energy Management Plans are referenced, provide a narrative that describes how the plan is applied at the building-level
C. For each of the Energy Conservation Measures (ECM) listed in the Assessment, determine the following:
   - Whether it will be implemented (if not, explain why)
   - The associated budget (implementation cost, savings, incentive)
   - Overview of metrics to be used to measure progress
   - A timeline for completion (one year, five years and 10 years)
   - The person responsible for implementation

Documentation
- Building-specific Energy Management Goal and Plan

E2.0 — Energy Management Plan - cont'd

Adapted BB3 Question
Best Practice 4 — Is an Energy Management Plan in place at the building?
Best Practice 5 — Is an energy reduction target in place at the building?

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house

References
ISO 50001 Overview: https://natural-resources.canada.ca/energy-efficiency/energy-efficiency-for-industry/energy-management-industry/iso-50001-energy-management-systems-standard/20405
ISO 50001: https://www.csagroup.org/store/product/CSA%20ISO%2050001%3A19/
NRCan's Energy Management Best Practices Guide – For Commercial and Institutional Buildings: http://publications.gc.ca/collections/collection_2016/rncan-nrcan/M144-256-2014-eng.pdf

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E0. BASELINE PRACTICES
Focus Area:	**Energy & Carbon**
Topic:	**Baseline Practices**
Question:	**E6.0 — Preventative Maintenance** **Is a Preventive Maintenance Plan in place for the building?**

Answer
Select one of the following:
- Yes
- Not applicable

Max. Points Available
Minimum requirement, this is a baseline practice

Description
Day-to-day operations and maintenance (O&M) affect energy consumption and carbon emissions and must be considered in every building. Implementation of best practices for O&M increases the longevity and efficiency of building equipment.

Appropriate plans need to be in place and effectively followed to ensure equipment is maintained. Plans should be revisited periodically to ensure building operations are optimized.

Requirements
The Preventive Maintenance Plan must cover the following:
A. Inventory of the building's systems and equipment components to be reviewed, including gas-fired boilers and other onsite combustion equipment
B. Type of preventative action required, with frequency of inspection vs. maintenance actions
C. Sample logs showing that these actions have been taken and that follow-ups were done when needed
D. Updates recorded when new equipment is added, and when old equipment is removed
E. Plan must be signed by the building manager, dated within the last 12 months.

Also see Other Notes

Documentation
- Preventative Maintenance Plan, with maintenance logs

Adapted BB3 Question
Best Practice 1 — Is a Preventative Maintenance Program in place at the building?

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

E6.0 — Preventative Maintenance - cont'd

Suggested Lead
In-house

References
BOMA BEST Preventive Maintenance Best Practices template: https://bomacanada.ca/wp-content/uploads/2021/07/BP01_PM-Program_Template-1.docx
ASHRAE Standard 180-2018 — Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems: https://www.techstreet.com/ashrae/standards/ashrae-180-2018?product_id=2016639

Crosswalk
N/A

Other Notes
The assessment methodology should at least align with an ASHRAE Standard 180-2018 — Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems

The standard also explains that inspection serves to monitor and document the condition of equipment and components over time regarding appearance, functionality and performance, whereas maintenance serves to preserve equipment condition and performance as required by the facility

ENERGY AND CARBON	E1. ASSESSMENT
Focus Area:	**Energy & Carbon**
Topic:	**Assessment**
Question:	**E1.1 — Mechanical System Assessment** **Has a Condition Assessment of the mechanical systems and components been completed in the past five years?**

Answer

Select one of the following:	Points available:
- Yes	5
- No	0

Max. Points Available

5 - Pick one answer

Description

The condition assessment contains a list of tactical and strategic items that are used to gather a better understanding of how the building is operating in its present state and how funds need to be saved and/or allocated to repair or replace various items. Tactical items are those that will require attention within the first five years of the report's completion. Strategic items are those that are looked at after five years and are typically reviewed in the 10-year capital asset management plan.

Requirements

The Mechanical Systems Condition Assessment must:

A. List the mechanical equipment, installation date and anticipated remaining useful life
B. Indicate required replacement date, highlighting equipment that will require replacement in the next 10 years

Documentation

- Condition Assessment Report of Mechanical Systems (excerpt from Building or Property Condition Report containing relevant information is sufficient)

Adapted BB3 Question

Question 09.02.01 — Has a property condition assessment (PCA) report been completed for this building within the past five years?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

Third-party

E1.1 — Mechanical System Assessment - cont'd

References

Standard Guide for Property Condition Assessments: Baseline Property Condition Assessment Process (ASTM E2018-08): https://webstore.ansi.org/standards/astm/astme201801?gclid=EAIaIQobChMI3oWi6KrF_AIVYsmUCR3YqQjpEAAYAiAAEgKUjvD_BwE

Crosswalk

N/A

Other Notes

None

ENERGY AND CARBON	E1. ASSESSMENT
Focus Area:	**Energy & Carbon**
Topic:	**Energy & Carbon Assessment**
Question:	**E1.2 – Envelope Assessment** **Has a Condition Assessment of the envelope and envelope components been completed in the past five years?**

Answer

Select all that apply:	Points available:
- Yes — Thermal Scan/Air Tightness Test	2
- Yes — Condition Assessment of Envelope	3
- No	0

Max. Points Available

5 - Pick all that apply

Description

The Condition Assessment contains a list of tactical and strategic items that are used to gather a better understanding of how the building is operating in its present state and how funds need to be saved and/or allocated to repair or replace various items. Tactical items are those that will require attention within the first five years of the report's completion. Strategic items are those that are looked at after five years and are typically reviewed in the 10-year capital asset management plan.

Requirements

A. The Thermal Imaging Scan/Air Tightness Test must:
   - Cover all roof and wall components
   - Identify areas where higher-than-normal thermal transfer occurs

B. The Envelope Assessment must:
   - List the envelope (roof, wall, skylight, etc.) components, installation date and anticipated remaining useful life
   - Provide a summary of the performance of the building envelope in terms of water infiltration and condensation, moist air transfer, air flow and heat transfer
   - Indicate required replacement date, highlighting components that will require replacement in the next 10 years

Documentation

- Thermal Imaging Scan/Air Tightness Test
- [For additional points] Condition Assessment Report of Envelope (excerpt from Building or Property Condition Report containing relevant information is sufficient)

E1.2 – Envelope Assessment - cont'd

Adapted BB3 Question
Question 01.02.04 — Has a thermal imaging scan of the roof or walls been performed within the past five years? Question 09.02.01 — Has a property condition assessment (PCA) report been completed for this building within the past five years?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
Third-party

References
ASHRAE Level II Audit: https://www.techstreet.com/ashrae/standards/ashrae-211-2018?product_id=2016437
Energy Star Carbon Emissions: https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf
Carbon Risk Real Estate Monitor (CRREM) Global Pathways: https://www.crrem.org/

Crosswalk

Other Notes
- High-performance building envelope features include:
- Air sealing, interior/exterior shading, automated shading controls
- Double-paned glazing, including high-performance window assembly, double-paned glazing with low-emissivity coating, including high-performance window assembly
- Triple-paned glazing, including high-performance window assembly, triple-paned windows with low-emissivity coating, including high-performance window assembly
- Electrochromic glazing and built-in photovoltaics
- Foundation insulation that is at least 20% better than current code, roof insulation that is at least 20% better than current code, wall insulation that is at least 20% better than current code
- Natural ventilation when outdoor conditions are favourable

ENERGY AND CARBON	E1. ASSESSMENT
Focus Area:	**Energy & Carbon**
Topic:	**Energy & Carbon Assessment**
Question:	**E1.3a — Detailed Energy and Carbon Assessment** **Has a Detailed Energy and Carbon Assessment been performed in the past five years?**

Answer

Select one of the following:	Points available:
- Yes – Detailed Energy and Carbon Assessment	3
- Yes – Detailed Energy and Carbon Assessment includes carbon abatement costs	6
- No	0

Max. Points Available

6 - Pick one answer

Description

It is recommended that assessments be undertaken at least every five years at a level appropriate for meeting building management's objectives. Align methodology with ASHRAE Level II Audit or equivalent.

A detailed assessment can identify more extensive opportunities with metrics to inform a business case.

Requirements

In addition to items covered under Question E1.0a Walkthrough Assessment, the Detailed Energy and Carbon Assessment Report must cover:

A. Detailed site review covering current operations and maintenance procedures and operating parameters
B. End-use breakdown
C. Detailed energy and carbon calculations for energy conservation and carbon reduction measures, with high-level costing and financial analysis
   - (For additional points) Include an estimate of the cost of carbon abatement ($/tCO2e lifetime) of proposed retrofits
D. High-level assessment of available building electrical capacity

Also see References and Other Notes

Documentation

- Detailed Energy and Carbon Assessment Report
- [Additional Points]

Adapted BB3 Question

Question 01.02.05 — Has an ASHRAE Level 2 Energy Assessment been performed on the building in the past five years?

E1.3a — Detailed Energy and Carbon Assessment - cont'd

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
Third-party

References
ASHRAE Level II Audit: https://www.techstreet.com/ashrae/standards/ashrae-211-2018?product_id=2016437
Energy Star Carbon Emissions: https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf

Crosswalk
N/A

Other Notes
The assessment methodology should at least align with an ASHRAE Level II Audit
Refer to Energy Star for carbon emission factors. If other carbon emission factors are used, explain the reasoning and factors applied

ENERGY AND CARBON	E1. ASSESSMENT
Focus Area:	**Energy & Carbon**
Topic:	**Energy & Carbon Assessment**
Question:	**E1.4 — Deep Retrofit Study** **Has a Deep Energy and Carbon Retrofit Study been performed on a targeted building system in the past 10 years?**

Answer

Select one of the following:	Points available:
- Yes – Deep Retrofit Study	3
- Yes – Major heating or cooling system retrofit completed in the last five years	6
- No	0

Max. Points Available

6 - Pick one answer

Description

A Deep Retrofit Study is typically focused on a specific system and provides in-depth analysis of carbon reduction options with schematics and specifications for the recommended solution. Align methodology with ASHRAE Level III Audit or equivalent.

Deep carbon retrofits go a step further than a typical detailed energy assessment, providing more in-depth analysis that focuses on a specific system or measure rather than taking a whole-building approach. In deep carbon retrofit studies, detailed assessments are performed on the available electrical capacity for all electrification measures. The study provides detailed cost estimates and a roadmap for implementation. It is the final step required to inform implementation decisions.

Requirements

In addition to items covered under Question E1.3 Detailed Energy and Carbon Assessment, the Deep Retrofit Study must cover:

A. Assessment of potential capital projects to reduce energy and carbon with multiple options, such as:
   - Like-for-like replacement as a baseline
   - A deep carbon reduction retrofit as the ‘highest savings’ case
   - An optimized approach that meets multiple prioritized criteria
B. Assessment of building electrical capacity and required service upgrades for each option
C. Cost of carbon abatement ($/tCO2e lifetime) of proposed retrofit solution
D. Detailed life-cycle cost analysis (LCCA) and risk assessment
E. Identification of potential incentive opportunities

OR

Provide evidence that the building completed a major heating or cooling system retrofit completed in the last five years.

E1.4 — Deep Retrofit Study - cont'd

Documentation
- Deep Retrofit Study
- OR Evidence of major heating or cooling system retrofit completed in the last five years

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
Third-party

References
ASHRAE Level III Audit: https://www.techstreet.com/ashrae/standards/ashrae-211-2018?product_id=2016437
Energy Star Carbon Emissions: https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf
Carbon Risk Real Estate Monitor (CRREM) Global Pathways: https://www.crrem.org/

Crosswalk
N/A

Other Notes
- A Deep Retrofit Study often includes the development of an energy model, which is a simulation of the retrofit scenarios proposed, to better facilitate effective decision-making
- The assessment methodology should at least align with an ASHRAE Level III Audit
- Refer to Energy Star for carbon emission factors. If other carbon emission factors are used, explain the reasoning and factors applied

ENERGY AND CARBON	E2. PLANNING
Focus Area:	**Energy & Carbon**
Topic:	**Planning**
Question:	**E2.1a — Net Zero Transition Plan** **Is there a net zero transition plan or decarbonization roadmap with specific carbon reduction targets?**

Answer

Select one of the following:	Points available:
- Yes – Net Zero Transition Plan	4
- Yes – Net Zero Transition Plan instead of Energy Management Plan (see Question E2.0a)	4
- No	0

Max. Points Available

4 - Pick one answer

Description

Net Zero Transition Plans include prioritized energy and carbon reduction measures to be implemented in order to reach net zero carbon emissions by a date established by the organization, with periodic milestones included. Update previous energy management practices by including carbon-specific goals and strategies.

Plans may incorporate assessment of indirect emissions from tenant operations and investigate additional sources of carbon emissions, such as employee commuting, business travel, purchased materials and embodied carbon of materials included in retrofit projects.

Requirements

The Net Zero Transition Plan or Decarbonization Roadmap must:

A. Outline the vision for carbon management going forward, such as goals or targets in relation to the baseline
B. For each of the Carbon Reduction Measures (CRM) listed in the assessment, determine the following:
   - If it will be implemented (if not, explain why)
   - The associated budget (implementation cost, savings, cost of carbon abatement ($/tCO2e lifetime), incentives
   - An overview of the metrics to be used to measure progress
   - A timeline for completion (one-year, five-year and 10-year)
   - The person responsible for implementation

Documentation

- Net Zero Transition Plan or Decarbonization Roadmap

E2.1a — Net Zero Transition Plan - cont'd

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house, with third-party support

References
Carbon Risk Real Estate Monitor (CRREM): https://www.crrem.eu/
Task Force on Climate-Related Financial Disclosures (TCFD): https://www.fsb-tcfd.org/

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E2. PLANNING
Focus Area:	**Energy & Carbon**
Topic:	**Planning**
Question:	**E2.2 — Capital Plan** **Are high-cost energy conservation or carbon reduction measures from the assessment included in the capital plan?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available

3 - Pick one answer

Description

Energy conservation and carbon reduction measures require capital investment. The capital plan typically outlines building management and operational spending over a 10-year timeframe. Start planning for ECM or CRM implementation early, spread costs and efforts across multiple years to manage budget expenditures and scale of retrofit projects.

Requirements

The relevant section in the Capital Plan must include:

C. A list of capital projects identified through the energy, carbon and condition assessments
A. Evidence of allocation of budget
B. Implementation timelines
C. Evidence that improvement solutions will achieve energy conservation and carbon reduction

Documentation

- Relevant section of Capital Plan

Adapted BB3 Question

Question 01.01.03 — Does the Capital Plan include measures to ensure continuous improvement of the energy efficiency of the building envelope?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house

E2.2 — Capital Plan - cont'd

References
None

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E3. BENCHMARKING
Focus Area:	**Energy & Carbon**
Topic:	**Benchmarking**
Question:	**E3.1a — Benchmarking Energy Use** **What is the calculated Energy Star score for the building?**

Answer

Indicate which range is representative of your building's most recent Energy Star score:	Points available:
- 90 and higher	5
- 83 to <90	4
- 75 to <83	3
- 65 to <75	2
- Lower than 65	0
- No	0

Max. Points Available

5 - Pick one answer

Description

It is important to establish energy baselines to enable measurement and tracking of progress toward net zero goals.

Portfolio owners may want to benchmark their properties against other buildings within their portfolio to evaluate comparative progress and prioritize asset renewals.

Requirements

To determine the most recent Energy Star score:

A. Enter whole building energy use data under the Benchmarking section of the BOMA BEST portal (bomabesthub.com) or in the Energy Star Portfolio Manager portal
B. If whole building energy use is calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
C. If any spaces were excluded, describe the methodology applied
D. For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation
E. Indicate whether any energy is generated on-site and whether that use has been sub-metered

Documentation

- Data Verification Checklist printed from Energy Star, or screenshot from BOMA BEST Benchmarking section showing the normalised Energy Use Intensity
- Narrative of benchmarking methodology and sub-meter data, if available

E3.1a — Benchmarking Energy Use - cont'd

Adapted BB3 Question
Question 01.02.01 — Do you benchmark energy performance using either BOMA BEST or ENERGY STAR Portfolio Manager portal?

Applicability
Applicable to Office, Healthcare and Multi-Unit Residential buildings

Suggested Lead
In-house or third-party

References
Property characteristics - http://bomacanada.ca/wp-content/uploads/2017/12/Property-Characteristics-Page-Screenshot.pdf
Energy Star guidance - http://bomacanada.ca/wp-content/uploads/2016/09/BOMA-BEST-benchmarking-instructions-with-ESPM-account.pdf
Energy Star FAQ - http://bomacanada.ca/wp-content/uploads/2016/09/ENERGY-STAR-Portfolio-Manager-FAQ.pdf

Crosswalk
N/A

Other Notes
MURBs have the option of completing Question E3.1b if whole building data is not available.

ENERGY AND CARBON	E3. BENCHMARKING
Focus Area:	**Energy & Carbon**
Topic:	**Benchmarking**
Question:	**E3.2a — Benchmarking Carbon Emissions** **Are the whole building's carbon emissions quantified and benchmarked?**

Answer

Select one of the following:	Points available:
- Enter most recent greenhouse gas (GHG) emissions intensity (kgCO2e/ft^2) from Energy Star	2
- No	0

Max. Points Available

2 - Pick one answer

Description

It is important to establish carbon baselines to enable measurement and tracking of progress toward net zero goals.

Portfolio owners may also benchmark their properties against other buildings within their portfolio to evaluate comparative progress and prioritize asset renewals.

Requirements

A. Determine the most recent whole building greenhouse gas (GHG) emissions intensity (kgCO2e/ft^2) as follows:
   - Enter whole building carbon emissions data under the benchmarking section of the BOMA BEST portal (bomabesthub.com), direct and indirect emissions
   - If whole building carbon emissions are calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
   - If any spaces were excluded, provide a brief narrative describing the methodology applied
   - For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation

Documentation

- Data Verification Checklist printed from Energy Star or a screenshot from BOMA BEST Benchmarking section showing the GHG emissions intensity
- Narrative of benchmarking methodology and sub-meter data, if available
- Emission factors per fuel type and reference source

Adapted BB3 Question

New in BOMA BEST 4.0

E3.2a — Benchmarking Carbon Emissions - cont'd

Applicability
Applicable to Office and Healthcare buildings

Suggested Lead
In-house, with third-party support if needed

References
Energy Star - https://www.energystar.gov/buildings/benchmark/understand_metrics/how
Energy Star Portfolio Manager - https://portfoliomanager.energystar.gov/pm/login.html
Energy Star Building Emissions Calculator (US only) - https://portfoliomanager.energystar.gov/buildingEmissionsCalculator/
US EPA - https://www.epa.gov/climateSuggested Leadership/ghg-emission-factors-hub
Canadian Regional Median Greenhouse Gas Emissions Intensity - https://www.nrcan.gc.ca/sites/nrcan/files/energy/pdf/NewGHGI-EnglishClean.pdf
Building Benchmark BC - https://buildingbenchmarkbc.ca/
BC Government PSO - https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf
Montreal's Bylaw – https://montreal.ca/en/articles/law-concerning-ghg-emission-disclosures-and-ratings-large-buildings-20548#:~:text=The%20By%2Dlaw%20concerning%20greenhouse,order%20to%20reduce%20-their%20consumption
Greenhouse Gas Protocol - https://ghgprotocol.org/corporate-standard
Institute for Global Environmental Strategies - https://www.iges.or.jp/en/pub/list-grid-emission-factor/en
European Environmental Agency - https://www.eea.europa.eu/ims/greenhouse-gas-emission-intensity-of-1

Crosswalk
N/A

Other Notes
- Energy Star defines Greenhouse Gas (GHG) Emissions as follows - https://portfoliomanager.energystar.gov/pm/glossary#GHGemissions
- Calculate GHG emissions for the building based on the utility data available, direct and indirect emission factors in the region and systems controlled by the owner or landlord.

ENERGY AND CARBON	E3. BENCHMARKING
Focus Area:	**Energy & Carbon**
Topic:	**Benchmarking**
Question:	**E3.3 – Third-Party Recognition** **Has the building's energy use or carbon emissions been certified by, reported to or recognized by a third party?**

Answer

Select all that apply:	Points available:
- Yes — Energy Star Certification or equivalent achieved	1
- Yes — GHGs reported to third party	1
- Yes — Organization has disclosed net zero targets publicly	1
- Yes — Organization's targets are science-based	1
- No	0

Max. Points Available
4 - Pick all that apply

Description
Select all that apply:
- Yes — Energy Star Certification or equivalent achieved
- Yes — GHGs reported to third party
- Yes — Organization has disclosed net zero targets publicly
- Yes — Organization's targets are science-based

Requirements
Third-party verification of data demonstrates accountability to following best practices for collecting and reporting energy and carbon data. Certifications from well-respected, high-performance building programs demonstrate commitment to operational excellence.

Documentation
Complete any of the following:
- Obtain certification from the Environmental Protection Agency, NRCan (or equivalent) that the building's performance meets the required performance threshold
- Report GHG emissions (at the organization, portfolio or building level) to a third-party verifier
- Disclose commitment to achieving net zero emissions within the next 40 years publicly
- Seek third-party recognition that the net zero targets are science-based

Adapted BB3 Question
Energy Star Certificate
[for additional points] Evidence of third-party GHG Disclosure
[for additional points] Evidence of public disclosure of organization's net-zero targets
[for additional points] Evidence that net-zero targets are science-based

E3.3 – Third-Party Recognition - cont'd

Applicability
New in BOMA BEST 4.0

Suggested Lead
In-house, with third-party support

References
The Climate Registry - https://theclimateregistry.org/registries-resources/carbon-footprint-registry/
Science Based Targets Initiative - https://sciencebasedtargets.org/

Crosswalk
N/A

Other Notes
Reporting to a third party does not satisfy requirements. The applicant needs to provide proof that the data has been validated by a third-party.

ENERGY AND CARBON	E4. TRACKING & MONITORING
Focus Area:	**Energy & Carbon**
Topic:	**Tracking & Monitoring**
Question:	**E4.1a — Energy Use Tracking before Covid** **Was whole-building energy use data tracked before Covid?**

Answer

Enter data for either of the following:	Points available:
- Energy Star score before Covid (2017, 2018 or 2019)	2
- Average Normalised Energy Use Intensity (EUI), before Covid (2017 to 2019)	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Utility data must be tracked and monitored to provide information necessary for assessing a building's energy consumption. This measurement will allow the team to set and track progress toward goals, implement corrective actions and inform larger strategies.

Requirements

To generate the whole building energy use intensity, EUI (ekWh/ft^2):

A. Enter the past years' whole-building energy use data under the Benchmarking section of the online portal (bomabesthub.com)
B. Enter any 12-month average EUI under the Answer section, over the 2017 to 2019 years before Covid
C. If whole building energy use is calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
D. If any spaces were excluded, provide a brief narrative describing the methodology applied
E. For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation
F. Indicate whether any energy is generated on-site and whether that use has been sub-metered

Documentation

- Data Verification Checklist printed from Energy Star or a screenshot from BOMA BEST Benchmarking section showing the past years' energy use (ekWh/ft^2) from any year 2017 to 2019
- Calculation method used to determine the 12-month average
- Narrative of benchmarking methodology and sub-meter data, if available

Adapted BB3 Question

New in BOMA BEST 4.0

E4.1a — Energy Use Tracking before Covid - cont'd

Applicability
Applicable to Office, Healthcare and Multi-Unit Residential buildings

Suggested Lead
In-house

References
Energy Star Portfolio Manager

Crosswalk
N/A

Other Notes
Applicants do not need to provide data for all previous years. Provide at a minimum, data from one year before Covid, i.e. any continuous 12 months between 2017 and 2019.

MURBs have the option of completing Question E4.1b if whole building data is not available.

ENERGY AND CARBON	E4. TRACKING & MONITORING
Focus Area:	**Energy & Carbon**
Topic:	**Tracking & Monitoring**
Question:	**E4.1a — Energy Use Tracking during Covid** **Was whole-building energy use data tracked during Covid?**

Answer

Enter data for either of the following:	Points available:
- Energy Star score during Covid (2020, 2021 or 2022)	2
- Average Normalised Energy Use Intensity (EUI), during Covid (2020 to 2022)	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Utility data must be tracked and monitored to provide information necessary for assessing a building's energy consumption. This measurement will allow the team to set and track progress toward goals, implement corrective actions and inform larger strategies.

Requirements

To generate the whole building energy use intensity, EUI (ekWh/ft^2):

A. Enter the past years' whole-building energy use data under the Benchmarking section of the online portal (bomabesthub.com)
B. Enter any 12-month average EUI under the Answer section, over the 2020 to 2022 years during Covid
C. If whole building energy use is calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
D. If any spaces were excluded, provide a brief narrative describing the methodology applied
E. For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation
F. Indicate whether any energy is generated on-site and whether that use has been sub-metered

Documentation

- Data Verification Checklist printed from Energy Star or a screenshot from BOMA BEST Benchmarking section showing the past years' energy use (ekWh/ft^2) from any year 2020 to 2022
- Calculation method used to determine the 12-month average
- Narrative of benchmarking methodology and sub-meter data, if available

Adapted BB3 Question

New in BOMA BEST 4.0

E4.1a — Energy Use Tracking during Covid - cont'd

Applicability
Applicable to Office, Healthcare and Multi-Unit Residential buildings

Suggested Lead
In-house

References
Energy Star Portfolio Manager

Crosswalk
N/A

Other Notes
Applicants do not need to provide data for all previous years. Provide at a minimum, data from one year during Covid, i.e. any continuous 12 months between 2020 and 2022.

MURBs have the option of completing Question E4.1b if whole building data is not available.

ENERGY AND CARBON	E4. TRACKING & MONITORING
Focus Area:	**Energy & Carbon**
Topic:	**Tracking & Monitoring**
Question:	**E4.2a — Carbon Emissions Tracking** **Were the carbon emissions associated with whole-building energy use tracked before Covid?**

Answer

Enter:	Points available:
- 12-month kgCO2e/ft^2 average before Covid (2017, 2018 or 2019)	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Carbon emissions due to energy consumption at the building must be calculated to inform progress toward goals and identify priorities for upgrades and optimization.

Emissions vary by fuel source and electricity is regionally dependent. Emission factors should be obtained from local utility, a government source or other credible source.

Requirements

To generate the most recent whole-building greenhouse gas (GHG) emissions intensity (kgCO2e/ft^2):

A. Enter the past years' carbon emissions data under the benchmarking section of the online portal (bomabesthub.com), direct and indirect emissions
B. Enter the annual averages (kgCO2e/ft^2) under the answer section
C. If carbon emissions are calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
D. If any spaces were excluded, provide a brief narrative describing the methodology applied
E. For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation

Documentation

- Data Verification Checklist printed from Energy Star or a screenshot from BOMA BEST Benchmarking section showing the past years' carbon emissions (kgCO2e/ft^2), before Covid
- Calculation method used to determine the 12-month average
- Narrative of benchmarking methodology and sub-meter data, if available
- Emission factors per fuel type and reference source

Adapted BB3 Question

New in BOMA BEST 4.0

E4.2a — Carbon Emissions Tracking - cont'd

Applicability
Applicable to Office and Healthcare buildings

Suggested Lead
In-house, with third-party support

References
Energy Star
https://www.energystar.gov/buildings/benchmark/understand_metrics/how
Energy Star Portfolio Manager - https://portfoliomanager.energystar.gov/pm/login.html
Energy Star Building Emissions Calculator (US only) - https://portfoliomanager.energystar.gov/buildingEmissionsCalculator/
US EPA - https://www.epa.gov/climateSuggested Leadership/ghg-emission-factors-hub
Canadian Regional Median Greenhouse Gas Emissions Intensity - https://www.nrcan.gc.ca/sites/nrcan/files/energy/pdf/NewGHGI-EnglishClean.pdf
Building Benchmark BC - https://buildingbenchmarkbc.ca/
BC Government PSO - https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf
Greenhouse Gas Protocol - https://ghgprotocol.org/corporate-standard
Institute for Global Environmental Strategies - https://www.iges.or.jp/en/pub/list-grid-emission-factor/en
European Environmental Agency - https://www.eea.europa.eu/ims/greenhouse-gas-emission-intensity-of-1

Crosswalk
N/A

Other Notes
- Energy Star defines greenhouse gas (GHG) emissions as follows https://portfoliomanager.energystar.gov/pm/glossary#GHGemissions
- Calculate GHG emissions for the building based on the utility data available, direct and indirect emission factors in the region and systems controlled by the owner or landlord

ENERGY AND CARBON	E4. TRACKING & MONITORING
Focus Area:	**Energy & Carbon**
Topic:	**Tracking & Monitoring**
Question:	**E4.2a — Carbon Emissions Tracking** **Were the carbon emissions associated with whole-building energy use tracked during Covid?**

Answer

Enter:	Points available:
- 12-month kgCO2e/ft^2 average during Covid (2020, 2021 or 2022)	2
- No	0

Max. Points Available
2 - Pick one answer

Description
Carbon emissions due to energy consumption at the building must be calculated to inform progress toward goals and identify priorities for upgrades and optimization.

Emissions vary by fuel source and electricity is regionally dependent. Emission factors should be obtained from local utility, a government source or other credible source.

Requirements
To generate the most recent whole-building greenhouse gas (GHG) emissions intensity (kgCO2e/ft^2):

A. Enter the past years' carbon emissions data under the benchmarking section of the online portal (bomabesthub.com), direct and indirect emissions
B. Enter the annual averages (kgCO2e/ft^2) under the answer section
C. If carbon emissions are calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
D. If any spaces were excluded, provide a brief narrative describing the methodology applied
E. For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation

Documentation

- Data Verification Checklist printed from Energy Star or a screenshot from BOMA BEST Benchmarking section showing the past years' carbon emissions (kgCO2e/ft^2), during Covid
- Calculation method used to determine the 12-month average
- Narrative of benchmarking methodology and sub-meter data, if available
- Emission factors per fuel type and reference source

Adapted BB3 Question
New in BOMA BEST 4.0

E4.2a — Carbon Emissions Tracking - cont'd

Applicability
Applicable to Office and Healthcare buildings

Suggested Lead
In-house, with third-party support

References
Energy Star
https://www.energystar.gov/buildings/benchmark/understand_metrics/how
Energy Star Portfolio Manager - https://portfoliomanager.energystar.gov/pm/login.html
Energy Star Building Emissions Calculator (US only) - https://portfoliomanager.energystar.gov/buildingEmissionsCalculator/
US EPA - https://www.epa.gov/climateSuggested Leadership/ghg-emission-factors-hub
Canadian Regional Median Greenhouse Gas Emissions Intensity - https://www.nrcan.gc.ca/sites/nrcan/files/energy/pdf/NewGHGI-EnglishClean.pdf
Building Benchmark BC - https://buildingbenchmarkbc.ca/
BC Government PSO - https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf
Greenhouse Gas Protocol - https://ghgprotocol.org/corporate-standard
Institute for Global Environmental Strategies - https://www.iges.or.jp/en/pub/list-grid-emission-factor/en
European Environmental Agency - https://www.eea.europa.eu/ims/greenhouse-gas-emission-intensity-of-1

Crosswalk
N/A

Other Notes
- Energy Star defines greenhouse gas (GHG) emissions as follows https://portfoliomanager.energystar.gov/pm/glossary#GHGemissions
- Calculate GHG emissions for the building based on the utility data available, direct and indirect emission factors in the region and systems controlled by the owner or landlord

ENERGY AND CARBON	E4. TRACKING & MONITORING
Focus Area:	**Energy & Carbon**
Topic:	**Tracking & Monitoring**
Question:	**E4.3 — Data Monitoring** **How frequently are energy use and carbon emissions trended and monitored?**

Answer

Select the most finite:	Points available:
- Annually — carbon	1
- Quarterly —carbon	1
- Monthly — energy and carbon	2
- Monthly — energy	2
- Daily — electricity only	3
- Daily – other fuel source	3
- In Real-time — electricity only	4
- In Real-time – other fuel source	4
- None of the above	0

Max. Points Available

4 - Pick one answer

Description

Annual energy consumption and carbon emissions can be normalized by floor area for assessment of trends and benchmarking against other properties, using energy use intensity (EUI) and greenhouse gas intensity (GHGI).

Real-time monitoring of energy consumption and demand provides data necessary for assessment and correction of operational issues. Real-time energy management allows for adjustments and identification of potential measures that will optimize building performance.

Requirements

A. Demonstrate that energy use data is regularly tracked and reviewed by the building operations and management team
B. Graph or table comparing current energy use or carbon emission patterns with the patterns of prior periods, showing samples of the most finite trends available
C. Brief narrative outlining building management's approach to data monitoring. This should explain why trends occurred, including weather, occupancy fluctuations, unexpected leaks, meter faults, conservation projects or corrective actions implemented

Documentation

- Sample set of trend reports or screenshots of data monitoring dashboard demonstrating frequency of tracking
- Narrative outlining building management's approach to data monitoring

E4.3 — Data Monitoring - cont'd

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to Office and Healthcare buildings

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E5. CONSERVATION MEASURES
Focus Area:	**Energy & Carbon**
Topic:	**Energy & Carbon Conservation Measures**
Question:	**E5.1 — Energy and Carbon Conservation** **Which energy conservation or carbon reduction measures were implemented in the past five years?**

Answer

Select all that apply:	Points available:
- >50% of low-and no cost measures (scheduling, sensors, fans etc.) identified in the last energy assessment	1
- >50% of all the ECMs identified in the last or before-last energy assessments	1
- LED retrofit in common or back-of-house areas	1
- LED retrofit in tenant spaces / resident suites	1
- HVAC retrofit	1
- HVAC retrofit as part of tenant change-over	1
- None	0

Max. Points Available

5 - Max points cap

Description

Energy conservation and carbon reduction recommendations identified in assessments are typically identified as no-/low-cost, medium-cost or capital projects. They can also be prioritized by urgency, financial metrics, complexity, environmental impact or other relevant criteria.

Low hanging fruit are generally considered operational efficiency improvements or small upgrades that are simple to implement and easily budgeted but often have lower energy reduction potential than capital measures.

Larger, more complex projects require planning and budgeting, are generally medium- or long-term projects and will significantly reduce energy consumption and carbon emissions. Major capital projects are likely required in order to achieve net-zero carbon.

No-/low-cost measures to improve operational efficiency are important to implement short-term to reduce as much energy and carbon as possible before larger projects are budgeted and scheduled.

Requirements

A. Review and list energy conservation or carbon reduction measures identified in the past five years
B. Document what was implemented

E5.1 — Energy and Carbon Conservation - cont'd

Documentation

- Evidence of energy conservation or carbon reduction measures implemented

Adapted BB3 Question

Question 01.03.04 — Has a low-cost energy conservation measure been implemented in the past three years?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house

References

Case Studies: https://www.saveonenergy.ca/For-Business-and-Industry/Business-Case-Studies
EPA Checklists of Energy-Saving Measures: https://www.energystar.gov/buildings/save_energy_commercial_buildings/ways_save/checklists

Crosswalk

N/A

Other Notes

None

ENERGY AND CARBON	E5. CONSERVATION MEASURES
Focus Area:	**Energy & Carbon**
Topic:	**Energy & Carbon Conservation Measures**
Question:	**E5.2 — Conservation Achieved** **Is there evidence that energy efficiency improved or carbon emissions reduced due to measures implemented in the past ten years?**

Answer

Select all that apply:	Points available:
- Yes – energy efficiency improved	1
- Yes – carbon emissions reduced	2
- No – energy improvements or carbon reductions were not achieved	0

Max. Points Available

3 - Pick all that apply

Description

The real impact of specific energy improvement or carbon reduction measures is often clouded by the impact of ancillary operational activities and equipment performance, as well as pre-and post retrofit measurement and verification (M&V) methods. Consider to what extent the weather and occupancy contribute to the before and after consumption or emission results, and normalise the data accordingly. Operations and maintenance (O&M) activities changed substantially during Covid, and O&M activities post-Covid may also differ from pre-Covid activities. There may be other factors that impact performance before and after implementation, whether it is the consultants providing support, the measurement devices used, the timing of measurement intervals etc. Establish measuring parameters before the implementation of the ECMs or CRMs to develop more reliable results.

Requirements

A. Identify the energy and or carbon reduction measures implemented in the past ten years that are known to have caused energy efficiency or carbon reductions
B. Reference measured data and prepare high-level M&V analysis to demonstrate efficiencies or reductions achieved
C. Describe performance before the measure(s) were implemented and how performance changed after the measure(s) were implemented
D. Describe how operational changes due to Covid etc. were considered and excluded from the high-level M&V analysis

Documentation

- High-level calculations and brief narrative describing reductions achieved

Adapted BB3 Question

New in BOMA BEST 4.0

E5.2 — Conservation Achieved - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
Measurement and Verification (M&V) Principles: https://evo-world.org/en/m-v/principles-of-m-v

Crosswalk
N/A

Other Notes
Savings achieved can be specific to a particular ECM or CRM, or may apply to the whole building, whatever data is available.

ENERGY AND CARBON	E6. OPERATIONS & MAINTENANCE OPTIMIZATION
Focus Area:	**Energy & Carbon**
Topic:	**O&M Optimization**
Question:	**E6.1 — Retro-commissioning Investigation** **Has an Existing Building Commissioning, Recommissioning or Retro-Commissioning Investigation or Operational Optimization Study been completed in the last five years?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available

3

Description

Existing building commissioning (EBCx) is an intensive process that tests, verifies and adjusts the operation of systems and equipment to optimize performance. This can be accomplished through periodic commissioning or operational optimization assessment and implementation by qualified professionals or on a continuous basis through automated fault detection and diagnostics (FDD). Commissioning will result in cost savings, energy reduction and carbon reduction.

Requirements

The Retro-commissioning Investigation or Optimization Study must include:

A. Documentation, detailed site review and interviews with building O&M staff
B. A review of the building automation system
C. Preparing for and conducting system functional testing
D. Sources of performance problems
E. Energy conservation and/or carbon reduction measures with costing, simple payback and anticipated savings
F. A demonstration that the investigation methodology applied is similar to the BCA's commissioning best practices (see Other Notes)

Documentation

- Existing Building Commissioning Investigation or Operational Optimization Study

Adapted BB3 Question

Question 01.03.06 — Are the equipment and energy systems regularly re- or retro-commissioned?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

E6.1 — Retro-commissioning Investigation - cont'd

Suggested Lead
Third-Party

References
BCA Existing Building Commissioning Best Practices - https://www.bcxa.org/uploads/resources/Existing%20Building%20Commissioning%20Best%20Practices.pdf
ASHRAE Guideline 0.2-2015 - Commissioning Process For Existing Systems And Assemblies: https://webstore.ansi.org/standards/ashrae/ashraeguideline2015
Building Operation Optimization: Recommissioning Guide for Building Owners and Managers: http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/canmetenergy/pdf/fichier.php/codectec/En/2008-167/NRCan_RCx_Guide.pdf
ENERGY STAR Building Upgrade Manual Chapter 5: Retro-commissioning: https://www.energystar.gov/sites/default/files/buildings/tools/EPA_BUM_CH5_RetroComm.pdf
Medical Gas Piping Systems: https://www.techstreet.com/standards/csa-z7396-1-22?product_id=2501417

Crosswalk
N/A

Other Notes
The commissioning methodology should at least align with the Building Commissioning Association (BCA)'s Existing Building Commissioning Best Practices in Chapter 3 — Investigation Phase

ENERGY AND CARBON	E6. OPERATIONS & MAINTENANCE OPTIMIZATION
Focus Area:	**Energy & Carbon**
Topic:	**O&M Optimization**
Question:	**E6.2 — Fault Detection** **Is Fault Detection and Diagnosis (FDD) in place?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available

3 - Pick one answer

Description

Pre-empt building system faults based on machine learned behavior. Recognize patterns that resulted in faults and send alerts when the same pattern recurs. Optimize maintenance processes. Reduce building system fault occurrences and increase building up time.

Requirements

Demonstrate the ability of the technology to provide:

A. Root cause analysis and functional testing
B. Fault detection autonomous system adjustment. System has the ability to auto-adjust operation to alleviate potential issues
C. Prevent recurrences of false or non-critical alarms

Documentation

Any of the following:

- Digital Enablement Specifications (BMS, Lighting, EV Charging, Electrical, Fire, Vertical Transportation).
- Vendor documentation (specifications, commissioning report, technical reports, functionality design reports).
- Compliance Registers.
- Use Case - Benefits realisation report.
- Integrations Report.

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

E6.2 — Fault Detection - cont'd

Suggested Lead
In-house

References
None

Crosswalk
BOMA BEST Smart Buildings Question S5.3

Other Notes
None

ENERGY AND CARBON	E7. CONTROLS
Focus Area:	**Energy & Carbon**
Topic:	**Controls**
Question:	**E7.1 — Building Automation** **Does the building have an operational building automation system (BAS)?**

Answer

Select one of the following:	Points available:
- Yes — Direct digital control	3
- Yes — Hybrid	2
- Yes — Pneumatic	0
- No	0

Max. Points Available

3 - Pick one answer

Description

Building automation systems (BAS) control equipment and systems, including HVAC and lighting. Building automation systems can take on different forms, including standalone onboard controllers for specific pieces of equipment, legacy pneumatic controls or direct digital control (DDC) systems.

Through automation, building systems can be monitored and adjusted to ensure that they are performing optimally and can facilitate the implementation energy and carbon reduction measures.

DDC systems are often preferred for controllability, accuracy, reliability, responsiveness, accessibility, connectivity and reduced maintenance.

For some types of buildings and systems, a fully integrated BAS is not practical. Other solutions for responsive controls may be more appropriate.

Requirements

A. Identify the type of building automation system (BAS) in use in the building
B. List types of equipment connected to the BAS
C. Describe the most recent upgrade

Documentation

- Narrative and photos of BAS installed

Adapted BB3 Question

Question 01.04.01 — What type of BAS is in place at the building?

E7.1 — Building Automation - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
None

Crosswalk
N/A

Other Notes
- If any major systems or equipment are not connected, provide a brief narrative outlining the rationale and briefly describe how the systems and equipment are controlled
- Direct digital control (DDC): Uses electrical signals or wireless technologies to operate and communicate with parts of a system. Operators use an interface device, typically a computer, to monitor and communicate with devices. If the building operates on small-scale HVAC equipment (e.g., furnaces, rooftop units under 20 tonnes, etc.), then they typically utilize smart controllers, which fall under DDC
- Pneumatic: Uses a compressor to keep systems at a constant pressure. Pressure increases or decreases as a valve or actuator moves. Desired operation on a device is based on the pressure set point of the valve or actuator connected to it.
- Hybrid: A combination of both DDC and Pneumatic

ENERGY AND CARBON	E7. CONTROLS
Focus Area:	**Energy & Carbon**
Topic:	**Controls**
Question:	**E7.2 — Control Strategies** **What control strategies are in place?**

Answer

Select all that apply:	Points available:
- Night or unoccupied setback	1
- Optimal start-up	1
- Occupancy and equipment scheduling	1
- Standby mode (occupied vs. unoccupied)	1
- Heating water temperature setpoints/reset	1
- Chilled water temperature setpoints/reset	1
- Supply air temperature setpoints/reset	1
- Outdoor air temperature setpoints/reset	1
- Demand controlled ventilation	1
- Programmable thermostats in tenant or residential suites	1
- None of the above	0

Max. Points Available

4 - Max points cap

Description

Through automation, building systems can be monitored and adjusted to ensure that they are performing optimally and can facilitate the implementation energy and carbon reduction measures.

Requirements

Identify appropriate control strategies for the building, and demonstrate implementation

Also see References

Documentation

- Screenshots of BAS

Adapted BB3 Question

Question 01.03.05 – Are control strategies used on the mechanical equipment to reduce energy consumption and demand?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

E7.2 — Control Strategies - cont'd

Suggested Lead
In-house, with third-party support

References
ASHRAE Guideline 13-2014 - Specifying Building Automation Systems: https://webstore.ansi.org/standards/ashrae/ashraeguideline132014

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E7. CONTROLS
Focus Area:	**Energy & Carbon**
Topic:	**Controls**
Question:	**E7.3 — Controls Optimization** **Are mechanisms in place to proactively assess system and/or equipment performance for optimization opportunities?**

Answer

Select all that apply:	Points available:
- Review of operational trends in past three to five years	1
- In-house BAS technician / operator	1
- Third-party BAS technician provides at least monthly in-person support	1
- None of the above	0

Max. Points Available
3 - Pick all that apply

Description
BAS systems require optimization to ensure they are tailored to the systems they serve. Systems need to be assessed periodically as changing requirements (activity types, occupancy rates, operating hours, etc.) often Suggested Lead to new opportunities.

Requirements
A. Provide a brief description of the system or process for assessing equipment performance
B. Include examples of optimization or corrections that were implemented as a result of the monitoring and diagnostic system or process

Also see References

Documentation
- Describe the impact of the mechanism and any corrections implemented

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house, with third-party support

E7.3 — Controls Optimization - cont'd

References
ASHRAE Guideline 36-2021 - High-Performance Sequences of Operation For HVAC Systems: https://webstore.ansi.org/standards/ashrae/ashraeguideline362021

Crosswalk
N/A

Other Notes
In-house BAS technician refers to someone on the building operations team who received required training to competently manage the building's BAS.

ENERGY AND CARBON	E8. LIGHTING
Focus Area:	**Energy & Carbon**
Topic:	**Lighting**
Question:	**E8.1a — LEDs** **Are LED lighting installed in spaces controlled by the owner or landlord?**

Answer

Select all that apply:	Points available:
- Yes — More than 50% of exterior spaces have LEDs	1
- Yes — More than 50% of owner / landlord-managed interior spaces have LEDs	1
- Yes — More than 50% of tenant-managed interior spaces have LEDs	1
- No — less than 50% of building lighting is LEDs	0

Max. Points Available

3 - Pick all that apply

Description

Lighting represents a significant percentage of electricity end use and contributes to electrical demand (kW) in addition to consumption (kWh).

Reduction of lighting energy consumption can reduce electricity consumption and costs, lower impact on the electrical grid, assist with ensuring there is sufficient capacity for building electrification or EV charging and reduce carbon emissions associated with electricity, particularly where the electrical grid has a high emission factor.

Optimization can be achieved through efficient fixtures and enhanced controls while also maintaining occupant safety.

Requirements

A. Mark up a floor plan or take photos to indicate extent of interior and exterior LED installation
B. Keep a record of LED product specifications

Documentation

- Sample of floor plans, photos and product specifications of LED installation
- Plan to increase LED installation if less than 50% of building lighting is LED

Adapted BB3 Question

Question 01.04.04 — What percent of the building exterior and parking lot fixtures have LED lamps or automated controls?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

E8.1a — LEDs - cont'd

Suggested Lead
In-house

References
None

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E8. LIGHTING
Focus Area:	**Energy & Carbon**
Topic:	**Lighting**
Question:	**E8.2a — Light Sensors** **Are occupancy or daylight sensors installed in owner or landlord-controlled spaces, where appropriate?**

Answer

Select all that apply:	Points available:
- Yes — More than 50% owner / landlord-managed interior lights have occupancy sensors	1
- Yes — More than 50% tenant-managed interior lights have occupancy sensors	1
- Yes — More than 50% tenant-managed interior lights have daylight/photocell sensors	1
- Yes – More that 50% of exterior lights have daylight/photocells	1
- No – less than 50% of building lights have sensors / controls	0

Max. Points Available

4 - Pick all that apply

Description

Reduction of lighting energy consumption can reduce electricity consumption and costs, lower impact on the electrical grid, assist with ensuring that there is sufficient capacity for building electrification or EV charging, and reduce carbon emissions associated with electricity, particularly where the electrical grid has a high emission factor.

Optimization can be achieved through efficient fixtures and enhanced controls while also maintaining occupant safety.

Requirements

Mark up a floor plan or take photos to indicate extent of occupancy and/or daylight sensors installed

Documentation

- Sample of floor plans or photos of light sensor or controls installation

Adapted BB3 Question

Question 01.04.05 — What percentage of lighting fixtures are controlled by sensors?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

E8.2a — Light Sensors - cont'd

Suggested Lead
In-house

References
None

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E8. LIGHTING
Focus Area:	**Energy & Carbon**
Topic:	**Lighting**
Question:	**E8.3 — Lighting Zones** **Are lighting controls installed in the building, where appropriate?**

Answer

Select all that apply:	Points available:
- Yes — lighting is on timers, scheduled or individually controlled	1
- Yes — spaces are zone controlled	2
- None of the above	0

Max. Points Available
3 - Pick all that apply

Description
Reduction of lighting energy consumption can reduce electricity consumption and costs, lower impact on the electrical grid, assist with ensuring that there is sufficient capacity for building electrification or EV charging, and reduce carbon emissions associated with electricity, particularly where the electrical grid has a high emission factor.

Optimization can be achieved through efficient fixtures and enhanced controls while also maintaining occupant safety.

Requirements
Mark up a floor plan or take photos to indicate extent of lighting controls installed throughout the building

Documentation
- Sample of floor plans, photos or BAS screenshots of zoned controls installation

Adapted BB3 Question
Question 01.04.07 — What percentage of the building's lighting is connected to an addressable lighting control system?

Applicability
Applicable to Office and Healthcare buildings

Suggested Lead
In-house

References
None

E8.3 — Lighting Zones - cont'd

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E9. DEMAND MANAGEMENT
Focus Area:	**Energy & Carbon**
Topic:	**Demand Management**
Question:	**E9.1 — Peak Demand** **Is the building's peak electrical demand known?**

Answer

Select one of the following:

	Points available:
- Yes	1
- No	0

Max. Points Available

1 - Pick one answer

Description

As more buildings "fuel switch" to electricity and as extreme temperatures become more frequent, additional burdens are placed on the electrical grid, particularly in peak seasons. This results in higher utility costs, less resilient infrastructure and the potential for a dirtier grid if gas-fired power plants are required to satisfy demand during times of peak usage.

Understanding peak demand patterns and schedules in buildings will allow building operators to identify opportunities to minimize the load and cost for electricity in heating and cooling seasons and other thermal heating fuel types.

Requirements

A. Indicate the seasonal peak electrical demand values for the past year, highlighted on utility bills, monthly utility data summary or sub-metered data
B. If electrical demand is not separately measured by the utility or the BAS, provide a monthly load profile based on electrical consumption for the past year with associated data

Documentation

- Utility data analysis identifying the seasonal peak electrical demand values over the past year

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead

In-house

E9.1 — Peak Demand - cont'd

References
None

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E9. DEMAND MANAGEMENT
Focus Area:	**Energy & Carbon**
Topic:	**Demand Management**
Question:	**E9.2 — Peak Demand Patterns** **Is the month with the highest heating fuel consumption known?**

Answer

Select one of the following:	Points available:
- Yes	1
- No	0

Max. Points Available
1 - Pick one answer

Description
In colder climates buildings rely on fuel heating for space heating in many situations. However, as more buildings “fuel switch” to electricity and as extreme temperatures become more frequent, additional burdens are placed on the electrical grid, particularly in peak seasons. This results in higher utility costs, less resilient infrastructure, and the potential for a dirtier grid if gas-fired power plants are required to satisfy demand during times of peak usage.

Understanding peak demand patterns and schedules in buildings will allow building operators to identify opportunities to minimize the load and cost for electricity and gas in heating and cooling seasons and other thermal heating fuel types.

Requirements
Indicate highest consumption month based on the amount and type of heating fuel consumed for the past year, highlighted on utility bills or monthly utility data summary

Documentation
- Analysis of monthly utility data, identifying the highest heating consumption month and type of fuel consumed over the past year

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house

E9.2 — Peak Demand Patterns - cont'd

References
None

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E9. DEMAND MANAGEMENT
Focus Area:	**Energy & Carbon**
Topic:	**Demand Management**
Question:	**E9.3 — Reducing Seasonal Peaks** **Have low-carbon opportunities been identified or implemented to reduce seasonal peak heating loads and heating/cooling electrical demand?**

Answer

Select all that apply:	Points available:
- Yes — opportunities identified	1
- Yes — opportunities implemented	2
- No	0

Max. Points Available

3 - Pick all that apply

Description

Consider low carbon peak shaving strategies to ensure that the effect of reducing demand is not to switch to a potentially less expensive but more carbon intensive alternative.

For example: reducing fan speeds during peak times is considered a low carbon peak shaving strategy; however, increasing gas boiler capacity to reduce air-source heat pump (ASHP) peak consumption is not.

Requirements

A. List energy/carbon reduction measures proposed or implemented that specifically address peak demand and high thermal loads
B. Indicate anticipated or measured reduction in electrical demand (kW)

Also see Other Notes

Documentation

- Energy/carbon reduction measures proposed or implemented
- Anticipated or measured reduction in electrical demand

Adapted BB3 Question

Question 01.05.09 — Are strategies or systems in place to allow peak shedding?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead

In-house, with third-party support

E9.3 — Reducing Seasonal Peaks - cont'd

References
None

Crosswalk
N/A

Other Notes
Proposed or implemented measures could include strategies, such as operational optimization and scheduling, system switchover, demand response programs, peak shedding programs, time-of-day usage or similar

ENERGY AND CARBON	E10. HVAC EFFICIENCY
Focus Area:	**Energy & Carbon**
Topic:	**HVAC Efficiency**
Question:	**E10.1 — HVAC Efficiency** **Is high efficiency, low carbon mechanical equipment installed in the building?**

Answer

Select all that apply:	Points available:
- Yes — Condensing boilers	3
- Yes — Electric Boilers	3
- Yes — Heat Recovery implemented	2
- Yes — Heat Pumps	2
- Yes — AHUs and FCUs with low temperature hydronic heating coils	1
- Yes — Hybrid AHUs and RTUs with air source heat pumps (ASHPs) and gas backup/peak heating	1
- Yes – Dual Fuel units	1
- Yes – Other (Describe)	1
- None of the above	0

Max. Points Available

6 - Max points cap

Description

Mechanical equipment and HVAC system efficiency offer the most impactful opportunity for active energy and carbon reduction across all fuel types. To achieve decarbonization goals, building management should plan to replace end-of-life, inefficient or high carbon equipment with high efficiency, low carbon options as part of asset renewals.

Heat recovery should be considered for all systems as a strategy for reducing consumption.

Electrification works toward elimination of carbon emissions related to onsite combustion and improves opportunities for reduced electricity-related emissions through energy supply from clean grids (either now or in the future) and the use of renewable energy.

Cooling systems that use high global warming potential (GWP) refrigerants can have a significant contribution to a building's carbon emissions, through fugitive emissions that occur during leaks or recharging. Low GWP systems are recommended.

Requirements

A. List building systems where heat recovery has been implemented, such as exhaust/ventilation, chilled water or domestic hot water. Describe the type and relative scale of heat recovery for each application
B. For owner or landlord-controlled primary equipment, provide an equipment list outlining attributes including size, systems served, type of fuel, efficiency and why it can be considered low carbon

E10.1 — HVAC Efficiency - cont'd

Documentation

- Equipment list with product details

Adapted BB3 Question

Question 01.05.02 – Is 75% or more of the central heating equipment efficient?
Question 01.05.03 – Are 75% of the rooftop package units efficient?
Question 01.05.05 – Is 75% of the domestic water heating equipment efficient?
Question 01.05.06 – Does 75% of the building's exhaust air pass through a Ventilation Heat/Energy Recovery system?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house

References

City of Toronto – Low Carbon Thermal Energy Ready Buildings: https://www.toronto.ca/wp-content/uploads/2022/02/9441-2021-11-29Low-Carbon-Thermal-Energy-Ready-Buildings-AODA.pdf

Crosswalk

N/A

Other Notes

Heat pumps may include air-to-water, water-to-water, geothermal or CO2 domestic hot water (DHW) heat pumps

ENERGY AND CARBON	E10. HVAC EFFICIENCY
Focus Area:	**Energy & Carbon**
Topic:	**HVAC Efficiency**
Question:	**E10.2 — On-site Combustion** **Has the building transitioned off all forms of on-site combustion?**

Answer

Select applicable:	Points available:
- Yes — equipment has transitioned of on-site combustion	3
- Yes — equipment never used on-site combustion	0
- No	0

Max. Points Available
3 - Pick one answer

Description
Mechanical equipment and HVAC system efficiency offer the most impactful opportunity for active energy and carbon reduction across all fuel types. To achieve decarbonization goals, building management should plan to replace end-of-life, inefficient or high carbon equipment with high efficiency, low carbon options as part of asset renewals.

Heat recovery should be considered for all systems as a strategy for reducing consumption.

Electrification works toward elimination of carbon emissions related to onsite combustion, and improves opportunities for reduced electricity-related emissions through energy supply from clean grids (either now or in the future) and the use of renewable energy.

Requirements
Provide a brief summary attesting that there is no onsite combustion equipment used at the property as part of regular building operations

Also see Other Notes

Documentation
- Evidence that there is no equipment in use as part of regular building operations that relies on-site combustible energy sources

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

E10.2 — On-site Combustion - cont'd

Suggested Lead
In-house

References
None

Crosswalk
N/A

Other Notes
Typical on-site combustion equipment deliver space and domestic water heating and includes gas-fired boilers, gas-fired rooftop units, makeup air units.

The following combustion equipment is excluded from this question:
- Tenant-specific equipment used in restaurants (cooking etc.)
- Emergency generators or back-up power equipment using diesel or other fuels
- District heating systems serving the building

Points will be awarded regardless of when the transition occurred. The building team only need to demonstrate that on-site combustion was part of the original building and has since transitioned.

ENERGY AND CARBON	E11. ENVELOPE
Focus Area:	**Energy & Carbon**
Topic:	**Envelope Performance**
Question:	**E11.1 — Envelope Improvement** **Have any of the low-cost envelope improvement measures identified in assessment, condition or deep retrofit studies been implemented?**

Answer

Select all that apply:	Points available:
- Air leakage	1
- Resealing	1
- Window replacement	2
- Adding shading to sunny areas	2
- None of the above	0

Max. Points Available

4 - Pick all that apply

Description

A building envelope includes exterior components, such as the roof, walls, foundation and windows. A high-performance envelope is the most effective opportunity for achieving decarbonization of a building through passive strategies.

Optimization of the envelope can significantly reduce heating and cooling requirements in the building, thus reducing energy consumption and electrical demand as well as decreasing the size and costs of mechanical equipment.

Lower cost measures might include resealing, replacing broken windows, adding shading to sunny areas or similar strategies. At a minimum, air leakage should be addressed.

If budgeting and renewal cycles permit, it is ideal to undertake a deep green envelope upgrade before HVAC systems are retrofitted to optimize mechanical system design.

Requirements

A. Identify the low-cost envelope improvement items from the assessment, condition or deep retrofit studies that have been implemented
B. Document extent of implementation

Documentation

- Describe measure(s) implemented, the benefit and potential savings impact
- Evidence of implementation through photos, as-built drawings or other proof

E11.1 — Envelope Improvement - cont'd

Adapted BB3 Question
New in BOMA BEST 4. 0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
N/A

Other Notes
None

ENERGY AND CARBON	E11. ENVELOPE
Focus Area:	**Energy & Carbon**
Topic:	**Envelope Performance**
Question:	**E11.2 — Envelope Upgrade** **Have major envelope upgrades been completed or initiated in the past ten years?**

Answer

Select all that apply:	Points available:
- Yes — More than 50% completed (by envelope area covered or project cost)	1
- Yes — some work is underway	2
- No	0
- Not applicable – high-performance features were installed during construction	-

Max. Points Available

3 - Pick all that apply

Description

A high-performance building envelope aims to enhance occupant comfort, improve controllability and minimize the transfer of thermal energy between the outdoors and indoors.

Strategies, such as air tightness, shading, triple-paned glazing and increased insulation can be implemented to reduce energy consumption and GHG emissions while improving thermal comfort and reducing the mechanical system requirements.

Requirements

A. Identify the major envelope upgrades from the assessment, condition or deep retrofit studies that have been implemented
B. Document extent of implementation

Also see Other Notes

Documentation

- Describe measure(s) implemented, the benefit and potential savings impact
- Evidence of implementation through photos, as-built drawings or other proof

Adapted BB3 Question

Question 01.01.03 – Does the capital plan include measures to ensure continuous improvement of the energy efficiency of the building envelope?
Question 01.05.07 – Are 75% of the building's exterior windows considered efficient?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

E11.2 — Envelope Upgrade - cont'd

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
N/A

Other Notes
High-performance envelope characteristics may include:
- Exterior shading
- Automated shading controls
- Double-paned glazing including high-performance window assembly
- Double-paned glazing with low-emissivity coating including high-performance window assembly
- Triple-paned glazing including high-performance window assembly
- Triple-paned windows with low-emissivity coating including high-performance window assembly
- Electrochromic glazing
- Built-in photovoltaics
- Foundation insulation that is 20% better than current code
- Roof insulation that is 20% better than current code
- Wall insulation that is 20% better than current code
- Natural ventilation when outdoor conditions are favourable

ENERGY AND CARBON	E12. TRAINING & INNOVATION
Focus Area:	**Energy & Carbon**
Topic:	**Training**
Question:	**E12.1 – Training in Energy and Carbon** **Did the building operations and management team receive Energy and Carbon training in the previous three years?**

Answer

Indicate which topics are covered in the training:		Points available:
- Assessment, Planning, ECMs and CRMs, Operations & Maintenance Optimization	Yes or No	1
- Benchmarking, Tracking & Monitoring	Yes or No	1
- Controls, Lighting, Demand Management, HVAC Efficiency, Envelope	Yes or No	1
- No		0

Max. Points Available

3 - Pick all that apply

Description

In order for building maintenance staff to effectively manage the building's energy and carbon, training should be provided which addresses the topics of energy and carbon assessment, planning, benchmarking, O&M optimization, controls, lighting etc.

Over time, technologies and preferred practices in building operations and maintenance change. Providing regular professional development opportunities is a good way to help retain staff. Offering training and educational opportunities related to environmental/sustainable building performance not only benefit staff but improve the performance of the building when staff training is applied at the building level.

Requirements

A. List the names of staff members to whom the competencies covered under these topics would apply
B. Provide the applicable course outline or syllabus
C. Provide evidence of competency or training received such as credentials, completion certificate, record of attendance

Documentation

- Name of building O&M team member who received the training
- The course outline or syllabus
- Proof of training received

Adapted BB3 Question

Question 01.01.01 — Does building staff participate in a formalized training program focused on energy efficiency?

E12.1 – Training in Energy and Carbon - cont'd

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house

References
SaveOnEnergy Training and Support (Ontario): https://www.saveonenergy.ca/en/For-Business-and-Industry/Training-and-support

Crosswalk
None

Other Notes
Training can be delivered in-house or by a third party

ENERGY AND CARBON	E12. TRAINING & INNOVATION
Focus Area:	**Energy & Carbon**
Topic:	**Innovation**
Question:	**E12.2 – Innovation in Energy & Carbon** **Is an innovative process or technology in place at the building that goes beyond the requirements outlined in this section?**

Answer

Select all that apply: Points available:

- Renewable energy sources are installed on-site generating >1% of building energy 1
- Green or high-albedo roof covering is in place 1
- Funding / incentive received to advance net zero projects 1
- Building is connected to district or community energy system 1
- [ESC, Univ, LI, OAR, MURB] Energy Star scores available representing whole building consumption for each of the past five years 1
- [ESC, Univ, LI, OAR, MURB] Some tenants share their utility data with owner or landlord 1
- [ESC, Univ, LI, OAR, MURB] Updated tenant lease includes cost recovery of energy-efficient equipment 1
- [ESC, Univ, LI, OAR, MURB] Site staff received training in energy and carbon assessment, tips for operations and maintenance optimisation, lighting and HVAC efficiency or the value of sub-metering 1
- [ESC, Univ, LI, OAR, MURB] >50% (by building area or tenant count) of tenant energy data is sub-metered 1
- [ESC, Univ, LI, OAR, MURB] Joint landlord/tenant energy or carbon initiatives implemented 1 1
- [ESC, Univ, LI, OAR, MURB] Landlord conduct visual inspections of tenant-managed energy systems each year 1
- Other 1
- Not applicable -

Max. Points Available

4 - Max points cap

Description

Many processes and technologies exist that go beyond the standards and requirements set out in the BOMA BEST Assessment. If building managers/owners have invested in innovative processes or technologies that go beyond these standards, innovation points can be earned under this question.

Requirements

A. Provide details of the technology or process applied at the building
B. Indicate when the technology or process was implemented and the steps that are in place to ensure the technology or process' ongoing success

E12.2 – Innovation in Energy & Carbon - cont'd

C. [If "Other" is selected] Explain how the technology or process has improved the building's energy or carbon efficiency for it to be considered innovative

Documentation

- Narrative of innovative technology or process and its impact

Adapted BB3 Question

Question 01.05.14 — Is an innovative process or technology (approved by BOMA Canada) in place at the building that goes beyond the requirements outlined in this section?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

None

Crosswalk

N/A

Other Notes

Innovative processes or technologies apply to what was installed post-construction.

Funding or incentives may include strategic energy management, retrofit, Canada Infrastructure Bank etc. or other equivalent.

Applicants are required to submit the innovative process or technology as part of the BOMA BEST application. It will be evaluated as part of the BOMA BEST verification process, in consultation with our technical experts, as required.

WATER	W0. BASELINE PRACTICES
Focus Area:	**Water**
Topic:	**Baseline Practices**
Question:	**W1.0b — Water Assessment** **Have the water efficiency of systems managed by the owner or landlord been assessed in the last five years?**

Answer
Select one of the following:
- Yes
- Not applicable

Max. Points Available
Minimum requirement, this is a baseline practice

Description
A water assessment refers to a simple audit of the building's configuration and water systems. It focuses on the identification of potential water conserving measures.

Requirements
The water assessment report must contain the following elements:
A. Analysis of water consumption through monthly utility bill analysis and benchmarking. For benchmarking purposes, utility bills must cover a minimum of 12 months of continuous data
B. Assessment and list of current performance of water-consuming equipment.
C. Prioritized list of proposed water conserving measures (WCM's) to enable greater water efficiency
D. Provision of estimates of financial savings the building owner will realize as a result of investing in WCMs and the simple payback period

Documentation
- Water Assessment Report

Adapted BB3 Question
Best Practice 5 — Has a water assessment been conducted in the past five years?

Applicability
Applicable to Office and Healthcare buildings

Suggested Lead
In-house, with third-party support

W1.0b — Water Assessment - cont'd

References

Water Audit Guidance for Commercial Buildings: https://www.allianceforwaterefficiency.org/sites/www.allianceforwaterefficiency.org/files/assets/City_Energy_Project_Water_Audit_Guidance_For_Commercial_Buildings.pdf

Example Commercial and Institutional Water Efficiency Assessment Report: https://www.toronto.ca/wp-content/uploads/2018/07/9857-917c-sample-water-efficiency_report-revised-july-23-2018.pdf

Crosswalk

N/A

Other Notes

Also applicable in Quebec. More frequently now annual water use is published with annual city-tax bill in several Quebec cities. It is also becoming the norm for building managers to install sub-metering and/or whole-building metering, as investors require water-use oversight.

WATER	W0. BASELINE PRACTICES
Focus Area:	**Water**
Topic:	**Baseline Practices**
Question:	**W5.0 — Mould and Water Damage Management** **Is a Mould and Water Damage Management Program in place at the building?**

Answer
Select one of the following:
- Yes – Program in place
- Yes – Program has been shared with Tenant Representative(s)
- No

Max. Points Available
Minimum requirement, this is a baseline practice

Description
Water-impacted building materials can begin to exhibit mould growth in as little as 48 hours. A water damage monitoring and management program will assist in rapidly addressing bulk water damage, including detailed procedures for drying, cleaning and remediating where necessary.

Health Canada's Fungal contamination in public buildings: A guide to recognition and management, 1995 recommends "the development of programs to avoid the development of fungal amplification-sites." Further, the American Industrial Hygiene Association's 2013 "Position Statement on Mould and Dampness in the Built Environment," recommends that a "formal mould/water prevention program with clear actions and responsibilities is required for an effective response to signs of moisture".

Requirements
A. Develop a building-specific Mould and Water Damage Management Program that covers the following:
   - Responsible parties, including the building team's training requirements
   - Requirements and frequency for building and HVAC inspections
   - Actions required to reduce the risk of indoor mould growth
   - Procedures for mould and water damage investigations
   - Procedures for management of mould cleanup activities

B. Demonstrate that the program was developed by a person competent in mould and water damage management practices

C. Program must be signed by the building manager, dated within the last 12 months

OR

D. The owner or landlord must provide information to the Tenant Representative(s) that manage(s) water use within the tenant space on how to implement a Mould and Water Damage Management Program

W5.0 — Mould and Water Damage Management - cont'd

Documentation

- Building-specific Mould and Water Damage Management Program OR evidence that Program was shared with Tenant Representative(s)

Adapted BB3 Question

Question 02.01.01 — Is a Water Damage Monitoring and Management Program in place in the building?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

Health Canada's Fungal contamination in public buildings: A guide to recognition and management, 1995 https://publications.gc.ca/collections/Collection/H46-2-04-358E.pdf
The American Industrial Hygiene Association "Position Statement on Mould and Dampness in the Built Environment" 2013 (reviewed 2018) https://www.med.navy.mil/Portals/62/Documents/NMFA/NMCPHC/root/Documents/industrial-hygiene/P-Mold-03-26-13_2018.pdf?ver=FoUGYT28BpdB52oR1rQTnQ%3D%3D
Institute for Inspection Cleaning and Restoration Certification, Standard S-520, Standard and Reference Guide for Professional Mould Remediation, 2015: https://iicrc.org/s520/
Canadian Construction Association Guide 82, Mould Guidelines for the Canadian Construction Industry, 2018 https://www.cca-acc.com/wp-content/uploads/2019/02/Mould-guidelines2018.pdf
Environmental Abatement Council of Canada (EACC), Mould Abatement Guidelines, Edition 3 (2015) https://www.eaccanada.ca/wp-content/uploads/2021/06/EACC-Mould-Guideline-April-2015.pdf

Crosswalk

N/A

Other Notes
Water treatment in HVAC equipment must, at all times, meet local provincial and/or federal guidelines and regulations.

WATER	W1. ASSESSMENT
Focus Area:	**Water**
Topic:	**Water Assessment**
Question:	**W1.1 – Water Efficient Features** **Does the building incorporate any high-efficiency water fixtures?**

Answer

Select all that apply:	Points available:
- >50% of toilets are 4.8L/6L dual-flush or less	4
- >50% of urinals are 1.9L per flush or less	3
- >50% of lavatory faucets are 5.7L per min or less	1
- None	0

Max. Points Available
7 - Pick all that apply

Description
A high-efficiency fixture uses less water while still performing its function.

Requirements
A. For each fixture type, survey how many are installed in the building and calculate the percentage that meet the specified performance criteria
B. Provide evidence such as fixture cut sheets, flow-test results or photos showing flow-rates

Documentation
- List of total fixture counts, and number that meet or exceed flowrate thresholds
- Evidence that fixtures deliver specified flowrates

Adapted BB3 Question
02.04.03 – What percentage of water fixtures are efficient, based on inventory amount?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
WaterSense Products: https://www.epa.gov/watersense/watersense-products

Crosswalk
N/A

Other Notes
None.

WATER	W2. BENCHMARKING
Focus Area:	**Water**
Topic:	**Benchmarking**
Question:	**W2.1c — Benchmark whole-building** **What is the calculated Water Use Intensity (WUI) for the building?**

Answer

Indicate which range is representative of your building's most recent WUI (L/ft2): Points available:

HOSPITALS:

- 250 L/ft2 and higher 2
- 200 to <250 L/ft2 3
- 150 to <200 L/ft2 4
- 100 to <150 L/ft2 5
- Lower than 100 L/ft2 6
- No 0

MEDICAL OFFICES:

- 125 L/ft2 and higher 2
- 100 to <125 L/ft2 3
- 75 to <100 L/ft2 4
- 50 to <75 L/ft2 5
- Lower than 50 L/ft2 6
- No 0

LONG TERM CARE:

- 150 L/ft2 and higher 2
- 115 to <140 L/ft2 3
- 80 to <115 L/ft2 4
- 50 to <80 L/ft2 5
- Lower than 50 L/ft2 6
- No 0

Max. Points Available

6 - Pick one answer

Description

Benchmarking informs organizations about how much water they use and where they use it. It allows organizations to identify opportunities to optimize water use and reduce operating costs.

A building's annual water consumption can be normalized to a water use intensity (WUI) on the basis of floor area or occupancy to facilitate performance comparison against similar properties, similar to energy performance benchmarking using EUI.

W2.1c — Benchmark whole-building - cont'd

Requirements

To determine the whole building water use intensity, WUI (L/ft^2):

A. Enter whole building water-use data under the Benchmarking section of the BOMA BEST portal (bomabesthub.com) or in the Energy Star Portfolio Manager portal
B. Alternatively, calculate the WUI by entering the data in RealPac's NWUI Tool
C. If whole-building water use is calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
D. If any spaces were excluded, provide a brief narrative describing the methodology applied
E. For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation
F. Indicate whether any water is collected and used on-site and whether that use has been sub-metered

Documentation

- Table showing most recent 12-months of whole building water use
- Calculation method used to determine the WUI

Adapted BB3 Question

Question 02.02.01 — Do you benchmark water performance using either the BOMA BEST or ENERGY STAR Portfolio Manager portal?

Applicability

Applicable to Healthcare buildings

Suggested Lead

In-house

References

ENERGY STAR Portfolio Manager: https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/energy-star-for-buildings/3691
RealPac's NWUI Methodology: https://realpac.ca/product/neuinwui/

Crosswalk

N/A

Other Notes

Water consumption data derived from landlord-installed meters, read manually each month is acceptable.

WUI is often measured on the basis of floor area but water consumption per occupant may be more appropriate if occupancy data is available.

WATER	W3. TRACKING & MONITORING
Focus Area:	**Water**
Topic:	**Tracking**
Question:	**W3.1a — Tracking Whole-Building Use before Covid** **Was whole-building water-use data tracked during Covid?**

Answer

Enter what is available:	Points available:
- Average Water Use Intensity (WUI), before Covid (any continuous 12 months between 2017 and 2019): _____ L/ft^2	3
- None	0

Max. Points Available

3 - Pick one answer

Description

Tracking building performance ensures that the building operations and management team can identify issues and opportunities for improvement, track progress toward goals, implement corrective actions and inform larger water management strategies.

Requirements

To generate the whole building water use intensity, WUI (L/ft^2):

A. Enter whole building water-use data under the Benchmarking section of the BOMA BEST portal (bomabesthub.com) or in the Energy Star Portfolio Manager portal
B. Enter any 12-month average WUI under the Answer section, over the 2017 to 2019 years before Covid
C. If whole-building water use is calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
D. For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation

Documentation

- Table showing past years' water data of whole building water use
- Calculation method used to determine the 12-month average and WUI

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to Office and Healthcare buildings

Suggested Lead

In-house

W3.1a — Tracking Whole-Building Use before Covid - cont'd

References
See Question W2.1

Crosswalk
N/A

Other Notes
Applicants do not need to provide data for all previous years. Provide at a minimum, data from one year before Covid, i.e. any continuous 12 months between 2017 and 2019.

Water consumption data derived from landlord-installed meters, read manually each month is acceptable.

WATER	W3. TRACKING & MONITORING
Focus Area:	**Water**
Topic:	**Tracking**
Question:	**W3.1a — Tracking Whole-Building Use during Covid** **Was whole-building water-use data tracked during Covid?**

Answer

Enter what is available:	Points available:
- Average Water Use Intensity (WUI), during Covid (any continuous 12 months between 2020 and 2022): _____ L/ft^2	3
- None	0

Max. Points Available

3 - Pick one answer

Description

Tracking building performance ensures that the building operations and management team can identify issues and opportunities for improvement, track progress toward goals, implement corrective actions and inform larger water management strategies.

Requirements

To generate the whole building water use intensity, WUI (L/ft^2):

A. Enter whole building water-use data under the Benchmarking section of the BOMA BEST portal (bomabesthub.com) or in the Energy Star Portfolio Manager portal
B. Enter any 12-month average WUI under the Answer section, over the 2020 to 2022 years during Covid
C. If whole-building water use is calculated by adding data from different bills or sub-meters, provide a brief narrative describing the methodology applied. Show how the 12-month total use was calculated
D. For any sub-meters referenced, provide details, such as make, model, location, photo and year of installation

Documentation

- Table showing past years' water data of whole building water use
- Calculation method used to determine the 12-month average and WUI

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to Office and Healthcare buildings

Suggested Lead

In-house

W3.1a — Tracking Whole-Building Use during Covid - cont'd

References
See Question W2.1

Crosswalk
N/A

Other Notes
Applicants do not need to provide data for all previous years. Provide at a minimum, data from one year during Covid, i.e. any continuous 12 months between 2020 and 2022.

Water consumption data derived from landlord-installed meters, read manually each month is acceptable.

WATER	W3. TRACKING & MONITORING
Focus Area:	**Water**
Topic:	**Monitoring**
Question:	**W3.2 — Data Monitoring** **How frequently are any of the water uses trended and monitored?**

Answer

Select the most finite:	Points available:
- Annually	2
- Quarterly	3
- Monthly	4
- Daily	5
- In Real-time	6
- None of the above	0

Max. Points Available

6 - Pick one answer

Description

Monitoring and tracking building water usage can highlight irregularities which, when corrected, can improve building performance. This includes a review of the water use over specific time periods, costs and consumption patterns with events highlighted. An “event” refers to a noticeable spike or dip in trend data.

This practice can help the building operations and management team identify issues and opportunities for improvement, track progress toward goals, implement corrective actions and inform larger strategies.

Requirements

A. Demonstrate that water use data is regularly tracked and reviewed by the building operations and management team
B. Graph or table comparing the most recent year’s water use patterns with the patterns of prior years, showing daily, weekly, monthly or seasonal trends as available
C. Brief narrative outlining building management’s approach to data monitoring. Also explaining why trends occurred, such as weather, occupancy fluctuations, unexpected leaks, meter faults, conservation projects or corrective actions implemented

Documentation

- Sample set of trend reports
- Narrative outlining building management’s approach to data monitoring

Adapted BB3 Question

Question 02.05.02 — Have three years of water consumption been analyzed in order to establish trends?

W3.2 — Data Monitoring - cont'd

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house

References
None

Crosswalk
N/A

Other Notes
None

WATER	W4. CONSERVATION MEASURES
Focus Area:	**Water**
Topic:	**Water Conservation**
Question:	**W4.1 — Water Conservation** **Which water conservation measures were implemented in the past five years?**

Answer

Select all that apply: Points available:

- >50% of low-and no cost measures identified in the most recent water assessment 3
- >50% of all the WCMs identified in the last or before-last water assessments 5
- None 0

Max. Points Available

8 - Pick all that apply

Description

Water conservation measures (WCMs) are often categorized as no-/low-cost, medium-cost or capital projects. They can also be prioritized by urgency, complexity, environmental or financial benefits or other relevant criteria.

Requirements

A. Review water reduction measures identified in past assessments or optimization studies
B. Calculate the percentage implemented, either by count of measures, or by water reduction impact, whichever is greater
C. Document the implementation of these measures

Documentation

- Evidence of water conservation measures implemented

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house

References

None

W4.1 — Water Conservation - cont'd

Crosswalk
None

Other Notes
Recognition is given for reduction in municipal water use. Water collected and used on-site can be excluded from the total water use calculations

WATER	W5. WATER HAZARDS
Focus Area:	**Water**
Topic:	**Water Hazards**
Question:	**W5.1 – Water Damage Response** **Is a process in place to respond to leaks or water infiltration issues?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available

3 - Pick one answer

Description

Reduce the response time for water damage events in a building. There is a short 48-to-72-hour window following a water loss where building finishes can be dried without significant risk of indoor mould growth. Having a service contract in place with a trusted provider helps ensure cleanup work can start as quickly as possible, minimizing the risk of mould growth.

Requirements

A. Provide the contact details of at least 3 pre-qualified service providers, with active accounts set up, who can be contacted in case of water damage emergency
B. Description of their proficiency in dealing with water damage events, credentials, response time and approach to address water losses

Documentation

- Contact details of 3 pre-qualified service providers, their proficiency, approach and response times

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

Institute for Inspection Cleaning and Restoration Certification, Standard S-500, Standard and Reference Guide for Professional Water Damage Restoration, 2021: https://iicrc.org/s500/

W5.1 – Water Damage Response - cont'd

Crosswalk
N/A

Other Notes
If this service is delivered by an in-house party, describe their expertise and approach.

Water treatment in HVAC equipment must, at all times, meet local provincial and/or federal guidelines and regulations.

WATER	W5. WATER HAZARDS
Focus Area:	**Water**
Topic:	**Water Hazards**
Question:	**W5.2 — Legionella Bacteria Control Management** **Is a Legionella Bacteria Control Management Program in place at the building?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available

3 - Pick one answer

Description

Legionella risk management is important to provide a safe environment for employees and visitors to your facility and in preventing the bacteria that causes Legionnaires' disease.

Requirements

A. Develop a building-specific Legionella Bacteria Control Management compliant with ASHRAE 188 "Legionellosis: Risk Management for Building Water Systems" and Public Works and Government Services Canada's "Control of Legionella in Mechanical Systems"

B. The program must cover the following:
   - Responsible parties, including the building team's training requirements
   - Analysis of building water systems and water system flow diagrams. The following systems must be considered for Legionella susceptibility, at a minimum:
     - Cooling towers and evaporative condensers
     - Aerosol-generating misters, atomizers, humidifiers
     - Hot and cold water systems
     - Domestic hot water storage tanks
     - Open-air systems (such as decorative fountains)
     - Whirlpool Spas
     - Building-specific water sampling protocol
     - Control measures, monitoring and corrective actions

C. Demonstrate that the program was developed by a person competent in Legionella mitigation measures

D. Program must be signed by building manager, dated within the past 12 months.

OR

E. The owner or landlord must provide information to the Tenant Representative(s) that manage(s) water use within the tenant space on how to implement a Legionella Bacteria Control Management Program

W5.2 — Legionella Bacteria Control Management - cont'd

Documentation

- Building-Specific Legionella Bacteria Control Management Program OR evidence that Program was shared with Tenant Representative(s)

Adapted BB3 Question

Question 05.01.01 — Is a Legionella Bacteria Control Management Program in place at the building?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

ANSI ASHRAE Standard 188 (2018): Legionellosis Risk Management for Building Water Systems: https://www.ashrae.org/technical-resources/bookstore/ansi-ashrae-standard-188-2018-legionellosis-risk-management-for-building-water-systems

ASHRAE Guidance on Reducing the Risk of Legionella: https://www.ashrae.org/technical-resources/standards-and-guidelines/guidance-on-reducing-the-risk-of-legionella

Public Works and Government Services Canada's "Control of Legionella in Mechanical Systems", MD 15161 – 2013: Control of Legionella in Mechanical Systems: https://www.tpsgc-pwgsc.gc.ca/biens-property/documents/legionella-eng.pdf

Crosswalk

N/A

Other Notes

Only having a legionella management plan for a specific system (e.g. cooling towers) is not sufficient to meet requirements. The plan should cover all applicable water-using systems in the building.

The building's water systems should be described in the form of a flow diagram to assist in analyzing the areas of risk and determining sampling locations. Where necessary, control measures, such as preventative maintenance, inspections and water treatment should be implemented. These control measures must be monitored to ensure they are effective (for example, through routine sampling activities and checking temperatures of hot water once a month)

Risk analysis and monitoring of control measures must be documented and kept current. At a minimum, the program must be reviewed every 12 months to ensure risks associated with legionella susceptible systems are mitigated

Water treatment in HVAC equipment must, at all times, meet local provincial and/or federal guidelines and regulations.

WATER	W5. WATER HAZARDS
Focus Area:	**Water**
Topic:	**Water Hazards**
Question:	**W5.3 – Water Features in Healthcare** **Are the following strategies implemented to manage water and waste water quality in laboratories**

Answer

Select all that apply:	Points available:
- Water-saving sterilization processes or equipment are used (such as mechanical vacuum systems and/or water tempering devices)	1
- Chemicals, chemical waste and liquid pharmaceutical waste stored in way that minimizes and contains spills	1
- There a policy in place that specifically discourages the discharge of chemicals into the sanitary sewer while also explicitly prohibiting all discharges exceeding legal limits	1
- There are documented procedures to ensure that glycol discharges from the flushing of cooling coils are minimized or eliminated	1
- Measures are implemented to reduce contaminated storm water run-off from outdoor hazardous or biomedical waste storage areas	1
- None	0

Max. Points Available

3 - Max points cap

Description

N/A

Requirements

Demonstrate that the following is in place at the building:

A. Water-saving sterilization processes or equipment are used (such as mechanical vacuum systems and/or water tempering devices)
B. Chemicals, chemical waste and liquid pharmaceutical waste stored in way that minimizes and contains spills
C. There a policy in place that specifically discourages the discharge of chemicals into the sanitary sewer while also explicitly prohibiting all discharges exceeding legal limits
D. There are documented procedures to ensure that glycol discharges from the flushing of cooling coils are minimized or eliminated
E. Measures are implemented to reduce contaminated storm water run-off from outdoor hazardous or biomedical waste storage areas

W5.3 – Water Features in Healthcare - cont'd

Documentation

- Emails, memo, service agreements, photos or any other evidence which demonstrate requirements are met

Adapted BB3 Question

Questions 2.M.8, 4.3.1, 4.3.M.1, 4.3.3.1

Applicability

Applicable to Healthcare buildings

Suggested Lead

In-house with third-party support as needed

References

None

Crosswalk

N/A

Other Notes

Mechanical vacuum systems are applicable where the volume of equipment needing to be sterilized is high or where equipment needs to be sterilized quickly. A vacuum drawing on the chamber allows better contact with the steam. Water tempering reduces the amount of water needed to cool the hot condensate created during sterilization before it can be sent down the drain. A condensate tempering system monitors the temperature of the draining water and applies cold water only when needed - e.g. when the water from the sterilizer is hotter than 60°C (140°F).

At a minimum, there must be containment of chemicals and pharmaceutical used in building operations, for example, oils, solvents, rust inhibitors, biocides, pesticides and liquid pharmaceutical waste (such as the disinfectant (HDL) glutaraldehyde). This can consist of secondary containment with plastic trays to store the materials. Where there are no chemicals or pharmaceuticals in the building, mark "not applicable".

This policy must explicitly identify all departments that are expected to comply (for example, pathology, research, printing, housekeeping, dentistry, etc.). Departments are expected to report their discharge activity to the staff member responsible for regulatory compliance.

Used glycol and water from cooling towers should be tested to ensure that they meet local sewer-use by-laws before being discharged into the drain system. Ethylene glycol, used as an anti-corrosion agent and in freezing point depressants in air conditioning systems, is toxic to humans and animals.

Storm water may contain effluent from outdoor hazardous and biomedical waste storage areas unless appropriate measures are taken to properly contain and protect these storage areas from dripping, spilling, and overflowing in rainstorms. Best management practices can be structural or operational. Structural measures include: installing a water-tight lid on the storage bin or placing a catchment

W5.3 – Water Features in Healthcare - cont'd

container under the bin. Operational practices include: regular monitoring of these storage areas to ensure they are in good condition (no holes) and placing hazardous/biomedical waste storage bins outdoors only on collection days.

ASHRAE Standard (SPC188) Prevention of Legionellosis Associated with Building Water Systems establishes absolute requirements for the prevention of legionellosis associated with building water systems. The standard requires Hazard Analysis and Critical Control Point (HACCP) risk management to be used to reduce the potential of legionellosis associated with buildings. Having point-of-use water heaters OR by maintaining water temperatures between 50 and 55°C and avoiding stratification and dead legs in water circulation systems may a simplest way of meeting the standard.

WATER	W6. TRAINING & INNOVATION
Focus Area:	**Water**
Topic:	**Training**
Question:	**W6.1 – Training in Water Management** **Did the building operations and management team receive water efficiency training in the previous three years?**

Answer

Indicate which topics are covered in the training:		Points available:
- Assessment, WCMs	Yes or No	1
- Benchmarking, tracking & monitoring	Yes or No	1
- Water hazards	Yes or No	1
- No		0

Max. Points Available

3 - Pick all that apply

Description

In order for building maintenance staff to effectively manage the building's water use, training should be provided which addresses the topics of water assessment, benchmarking, tracking and monitoring, WCMs and hazards, such as mould, leaks and Legionella.

Over time, technologies and preferred practices in building operations and maintenance change. Providing regular professional development opportunities is a good way to help retain staff. Offering training and educational opportunities related to environmental/sustainable building performance not only benefit staff but improve the performance of the building when staff training is applied at the building level.

Requirements

A. List the names of staff members to whom the competencies covered under these topics would apply
B. Provide the applicable course outline or syllabus
C. Provide evidence of competency or training received such as credentials, completion certificate, record of attendance

Documentation

- Name of building O&M team member who received the training
- Course outline or syllabus
- Training Certificate or Record of Attendance

Adapted BB3 Question

New in BOMA BEST 4.0

W6.1 – Training in Water Management - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
N/A

Crosswalk
None

Other Notes
Though owner or landlord management scope is limited in Light Industrial or Open-Air Retail buildings, the operations staff's competencies need to be maintained nonetheless. In these instances applicants are expected to provide

WATER	W6. TRAINING & INNOVATION
Focus Area:	**Water**
Topic:	**Innovation**
Question:	**W6.2 – Innovation in Water Management** **Is an innovative process or technology in place at the building that goes beyond the requirements outlined in this section?**

Answer

Select all that apply:	Points available:
- Whole-building water use is benchmarked in RealPac's NWUI Tool	1
- >50% of toilets installed in tenant-managed spaces are 4.8L/6L dual-flush or less	1
- Sub-metering installed on 2 or more of the largest water end-uses	1
- Strict "no water bottle" policy applies to entire building management team	1
- Potable water testing program is in place	1
- Alternatively sourced water makes up at least 5% of the building's total water consumption	1
- [ESC, Univ, LI, OAR, MURB] Sub-metered water use data is available, anytime between 2017 - 2021	1
- [ESC, Univ, LI, OAR, MURB] Joint landlord/tenant water initiatives implemented	1
- Other	1
- Not applicable	-

Max. Points Available

4 - Max points cap

Description

Many processes and technologies exist that go beyond the standards and requirements set out in the BOMA BEST Assessment. If building managers/owners have invested in innovative processes or technologies that go beyond these standards, innovation points can be earned under this question.

Requirements

A. Provide details of the technology or process applied at the building
B. Indicate when the technology or process was implemented and the steps that are in place to ensure the technology or process' ongoing success
C. [If "Other" is selected] Explain how the technology or process has improved the building's water efficiency for it to be considered innovative

Documentation

- Narrative of innovative technology or process and its impact

W6.2 – Innovation in Water Management - cont'd

Adapted BB3 Question
Question 02.05.04 — Is an innovative process or technology (approved by BOMA Canada) in place at the building that goes beyond the requirements outlined in this section?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
N/A

Other Notes
None

INDOOR AIR QUALITY & HAZARDS	I0. BASELINE PRACTICES
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Baseline Practices**
Question:	**I1.0a — Owner or landlord manages whole building IAQ** **Has an Indoor Air Quality (IAQ) Management Plan and Assessment been prepared for the in owner or landlord-controlled areas in the past three years?**

Answer
Select one of the following:
- Yes
- Not applicable

Max. Points Available
Minimum requirement, this is a baseline practice

Description
Indoor Air Quality (IAQ) is achieved through the selection of appropriate and achievable air quality goals, regular surveillance and testing to verify HVAC performance and hygiene, efficient and effective procedures for addressing occupant IAQ concerns and adequate training for the building management team.

Requirements
A. The IAQ Management Plan must include the following:
   - Responsible parties, including the building team's training requirements
   - Determine IAQ parameters for the building around carbon dioxide, carbon monoxide, temperature, relative humidity, dust, volatile organic compounds and other known contaminants of concern
   - Identify HVAC systems impacted by IAQ parameters and set a schedule for regular HVAC inspection and maintenance tasks

B. The IAQ assessment must cover spaces within owner or landlord control and include the following:
   - Visual inspection of a representative number of HVAC systems for general cleanliness and maintenance
   - Visual inspection of occupied areas of the building for general cleanliness
   - At least one round of spot readings with direct reading instrumentation of the temperature, relative humidity, carbon dioxide, carbon monoxide, TVOCs and particulate
   - Summary of corrective actions that may be needed

Documentation
- IAQ Management Plan with strategies during normal operations as well as flu season, and/or pandemic response
- IAQ Assessment Report

Adapted BB3 Question
Best Practice 7 – Is an Indoor Air Quality Monitoring Plan in place at the building? And Question 03.02.01 – Does the air quality meet the goals set out in the IAQ Monitoring Plan?

I1.0a — Owner or landlord manages whole building IAQ - cont'd

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house, with third-party support

References
Health Canada – Draft guidance on improving indoor air quality in office buildings: https://www.canada.ca/en/health-canada/programs/consultation-draft-guidance-improving-indoor-air-quality-office-buildings.html
Indoor Air Quality Guideline for Non-Industrial Workplaces, EACC, 2020: https://www.eaccanada.ca/guidelines/guideline-eacc-indoor-air-quality-form/
IAQ Checklist (US EPA): https://www.epa.gov/sites/production/files/2014-08/documents/mgmtlist.pdf
Example of IAQ Housekeeping Activities (US EPA): https://www.epa.gov/sites/production/files/2014-08/documents/housekeeping_tasks.pdf
IAQ Maintenance Inspection Form (US EPA): https://www.epa.gov/sites/production/files/2014-08/documents/om_periodic_inspections.pdf
Indoor Air Quality Guide (US EPA): https://www.ashrae.org/technical-resources/bookstore/indoor-air-quality-guide
ASHRAE HVAC operation recommendations during flu season and/or pandemic response: https://www.ashrae.org/file%20library/technical%20resources/covid-19/Baseline-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf

Crosswalk
N/A

Other Notes
The assessment must be detailed enough for management to gain a comprehensive understanding of all of the factors that could influence the building's indoor air quality. It must consist of a walkthrough inspection of the building and must report on a review of the following: a list of responsible staff and/or contractors, evidence of training, and job descriptions, HVAC design data, manuals and operating instructions including control settings and operating schedules, HVAC maintenance and calibration records, testing and balancing reports, inventory of locations where occupancy, equipment, or building use has changed, identification of areas where positive or negative pressures should be maintained, a record of locations that need monitoring or correction, and an inventory of HVAC system components needing repair, adjustment, or replacement.

Suggested performance goals for IAQ include the following for frequently occupied indoor spaces:
- Carbon dioxide not exceeding 700 ppm above ambient (ASHRAE 62.1);
- Carbon monoxide not exceeding 9 ppm (ASHRAE 62.1);
- Total volatile organic compound concentrations do not exceed 1000 µg/m3 (440 ppb) (Health Canada);
- PM10 does not exceed 50 µg/m3 (ASHRAE 62.1);
- Temperature in the range of 21 – 27 C°, taking into account seasonal variances, relative humidity (ASHRAE 55);
- Relative humidity in the range of 30-60% (USEPA I-BEAM) or more than 20% (CSA);

I1.0a — Owner or landlord manages whole building IAQ - cont'd

- HVAC system interiors are in good general condition, clean, free of standing water and debris, and have no visible suspect mould growth.
- If other local regulations exist for the above performance criteria, the most stringent will apply.

Regarding the preventative maintenance schedule for HVAC systems and equipment that will impact IAQ, include language regarding how environmental quality performance will be verified. At a minimum, testing should be conducted over a typical workday, taking into account fluctuations in contaminant levels that may occur. Testing should be conducted, at a minimum, in the morning and afternoon.

During flu season and/or pandemic response consider the following ASHRAE HVAC operation recommendations:

- Maintain temperature and humidity design set points;
- Maintain equivalent clean air supply required for design occupancy whenever anyone is present in the space served by a system
- When necessary to flush spaces between occupied periods, operate systems for a time required to achieve three air changes of equivalent clean air supply
- Limit re-entry of contaminated air from energy recovery devices, outdoor air and other sources to acceptable levels

INDOOR AIR QUALITY & HAZARDS	I0. BASELINE PRACTICES
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Baseline Practices**
Question:	**I4.0 – IAQ Management in Construction** **Is a plan in place to minimize indoor air quality impacts during renovation and construction?**

Answer
Select one of the following:
- Yes
- Not applicable

Max. Points Available
Minimum requirement, this is a baseline practice

Description
During renovation or construction activities, elevated airborne particulate can be generated through the disturbance of various building materials (e.g., concrete, plaster, drywall, ductwork, flooring and insulation), dusts originating from products used in the construction and by equipment that may emit combustion products. Additionally, building furnishings and finishes typically emit volatile organic compounds. Strategies to mitigate the impact of construction-generated contaminants in adjacent spaces should be developed and implemented.

Specific guidelines must be in place for base-building or tenant renovations and construction projects to ensure that contaminants are not released into the surrounding interior environment and building indoor air quality (IAQ) is maintained.

Requirements
C. Reference SMACNA IAQ Guidelines
A. Develop the building-specific Construction IAQ Control Plan, covering the following:
- Hazardous materials management
- Dust control
- Isolation of HVAC zones and/or enhanced ventilation
- HVAC filter replacement
- VOC emission/absorption and odour management
- Noise, vibration control monitoring
- De-pressurization of construction zones as needed (e.g., in medical Offices, hospitals and long-term care facilities)

Documentation
- Building-Specific Construction IAQ Control Plan

I4.0 – IAQ Management in Construction - cont'd

Adapted BB3 Question
Question 03.01.03 — Is a plan in place to control construction-generated contaminants prior to base-building or tenant renovations?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 2nd edition ANSI/SMACNA 008, 2008: https://store.smacna.org/iaq-guidelines-for-occupied-buildings-under-construction

Crosswalk
N/A

Other Notes
SMACNA guidelines cover the following:
- HVAC Protection: Protect HVAC equipment from construction debris that may enter ductwork or spaces, such as isolating the return air side of the system and installing temporary filters
- Source Control: Use low-emission alternatives when selecting paints, sealants, adhesives, carpeting, cleaning products etc.
- Pathway Interruption: Prevent airborne contaminants from construction to circulate through the rest of the building. Strategies include the installation of physical barriers between construction and occupied spaces and ventilating with 100% outside air
- Housekeeping: Keep the construction-sites clean and promptly clean spills to prevent the potential for growth of microbial contaminants
- Scheduling: Consider the sequence in which materials are installed. Some materials absorb volatile organic compounds (VOCs) emitted by other materials, so those should ideally be installed after

INDOOR AIR QUALITY & HAZARDS	I1. ASSESSMENT
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Assessment**
Question:	**I1.1a – Owner or landlord IAQ Corrective Actions** **Has base building Indoor Air Quality (IAQ) corrective actions been addressed by the owner or landlord?**

Answer

Select one of the following:	Points available:
- Yes	5
- No	0

Max. Points Available

5 - Pick one answer

Description

Indoor Air Quality (IAQ) is achieved through the selection of appropriate and achievable air quality goals, regular surveillance and testing to verify HVAC performance and hygiene, efficient and effective procedures for addressing occupant IAQ concerns, and adequate training for the building management team.

Requirements

Demonstrate corrective action taken in relation to the following:

A. Reference the IAQ Assessment Report (from Question I1.0a)
B. [If applicable] Reference Occupant Service Request (from Question A4.1)
C. [If applicable] Reference Occupant Satisfaction Survey (from Question A4.2)

Documentation

- Narrative with photos showing corrective actions taken
- Explain why recommended actions were not addressed, with implementation plan / schedule if actions were deferred due to cost constraints

Adapted BB3 Question

Question 03.03.02 – Has the building manager acted on recommended corrective actions identified in the IAQ audit?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead

In-house, with third-party support

I1.1a – Owner or landlord IAQ Corrective Actions - cont'd

References
None

Crosswalk
N/A

Other Notes
Applicant may answer "yes" if no corrective actions were found in the most recent assessment.

INDOOR AIR QUALITY & HAZARDS	I1. ASSESSMENT
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Assessment**
Question:	**I1.2 – Owner or landlord frequently assesses IAQ** **How frequently are IAQ assessments conducted at the building?**

Answer

Select one of the following:	Points available:
- Annually	3
- Alternating seasons	5
- None	0

Max. Points Available
5 - Pick one answer

Description
Annual IAQ testing can assist in confirming if HVAC systems are operating properly and if occupants are comfortable in the working environment.

Most IAQ complaints are received during either the heating or cooling seasons so it is best to conduct the testing during these seasons. Provide the dates of the last IAQ assessments and that they have alternated between heating and cooling seasons to achieve additional points.

Requirements
Provide copies of each IAQ Assessment Report completed within the past three years.

Documentation
- At least 3 past IAQ Assessment Reports

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house, with third-party support

References
Indoor Air Quality Guideline for Non-Industrial Workplaces, EACC, 2020: https://www.eaccanada.ca/guidelines/guideline-eacc-indoor-air-quality-form/
IAQ Checklist (US EPA): https://www.epa.gov/sites/production/files/2014-08/documents/mgmtlist.pdf

I1.2 – Owner or landlord frequently assesses IAQ - cont'd

Example of IAQ Housekeeping Activities (US EPA): https://www.epa.gov/sites/production/files/2014-08/documents/housekeeping_tasks.pdf
IAQ Maintenance Inspection Form (US EPA): https://www.epa.gov/sites/production/files/2014-08/documents/om_periodic_inspections.pdf
Indoor Air Quality Guide (US EPA): https://www.ashrae.org/technical-resources/bookstore/indoor-air-quality-guide

Crosswalk
N/A

Other Notes
Testing in alternating seasons means an applicant may test in the Fall in one year and in the Spring in the next year, and again in the Fall the following year. Meaning the time that went by between audits may vary, it could be six months or 18 months. The value of conducting audits in alternating seasons means the building operations and maintenance team may gain insights on differences in IAQ in different seasons.

INDOOR AIR QUALITY & HAZARDS	I2. VENTILATION & EXHAUST
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Ventilation & Exhaust**
Question:	**I2.1a – Owner or landlord maintains Outdoor Air** **Do measured Outdoor Air (OA) ventilation rates in owner or landlord-controlled areas meet minimum carbon dioxide (CO2) or ASHRAE 62.1 thresholds?**

Answer

Select all that apply:	Points available:
- Yes – CO2 concentrations below 800ppm	2
- Yes – OA rates meet current ASHRAE 62.1 Table 6.2.2.1 minimum requirements	5
- No	0

Max. Points Available

7 - Pick all that apply

Description

Maintaining adequate ventilation and thermal comfort within the built environment is important for occupant health and safety, comfort, and productivity.

Inadequate ventilation is one of the major sources of IAQ complaints and also an indicator that the HVAC system may not be functioning optimally.

Requirements

A. Demonstrate CO2 concentrations below 800ppm:
   - Refer to most recent IAQ Assessment Report and highlight section showing CO2 concentrations measured below 800ppm in owner or landlord-controlled spaces
   - The assessment must have been completed within the last year

B. Demonstrate ASHRAE 62.1 Table 6.2.2.1 minimum requirements are met:
   - Determine the average ventilation rate for frequently occupied indoor spaces through on-site measurement of actual outdoor and supply air through the use of a certified air balancing contractor or equivalent
   - The assessment must have been completed within the last five years, or as major renovations of the HVAC systems occur

Documentation

- Table showing CO2 concentrations measured below 800ppm
- Table comparing calculated and measured based on ASHRAE 62.1 Table 6.2.2.1 ventilation rates

Adapted BB3 Question

Question 03.04.04 – Do measured outdoor air ventilation rates meet the minimum requirements of Table 6.2.2.1 of the current ASHRAE 62.1 Standard?

I2.1a – Owner or landlord maintains Outdoor Air - cont'd

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house, with third-party support

References
ASHRAE 62.1 Standard: https://bomacanada.sharepoint.com/sites/BOMA_Mainshare/Mainshare_data/BOMA%20BEST/BOMA%20BEST%204.0/Ph2%20Development/Working/!BB4%20Sustainable%20Questionnaires/!FINAL/,%20https:/www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2

Crosswalk
N/A

Other Notes
None

INDOOR AIR QUALITY & HAZARDS	I2. VENTILATION & EXHAUST
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Ventilation & Exhaust**
Question:	**I2.3 – Air Quality Sensors** **Are air quality sensors (CO2, Temp, RH) present within the HVAC system and monitored on the Building Automation System (BAS)?**

Answer

Select all that apply:	Points available:
Yes, sensors provide real-time monitoring of IAQ metrics, with a data output interval of at least once every 10 minutes ...	
... AND measure at least 3 of the following:	
- PM2.5	1
- PM10	1
- CO2	1
- CO	1
- ozone	1
- NO2 (nitrogen dioxide)	1
- total VOCs	1
- formaldehyde	1
- No	0

Max. Points Available

3 - Max points cap

Description

Maintaining adequate ventilation and thermal comfort within the built environment is important for occupant health and safety, comfort, and productivity.

Having sensors measure CO2 concentrations, temperature and relative humidity within the building HVAC system can provide useful information to help manage indoor air quality.

Requirements

A. At least one sensor must be installed within a regularly occupied space in the building
B. Demonstrate air quality sensors are present within the HVAC system, as follows:
   - The BAS system must be equipped with sensors to measure CO2 concentrations, temperature, and relative humidity in the air supply serving at least 75% of the occupied spaces in the building
   - Sensors must be non-dispersive infrared and provided by a reputable manufacturer
   - Sensors should be either self-calibrating or regularly calibrated as per manufacturer's direction
C. Provide BAS readouts that demonstrate how IAQ is monitored on the BAS
D. Provide brief narrative explaining how BAS readings are used to inform building operations & maintenance procedures

I2.3 – Air Quality Sensors - cont'd

Documentation

- Purchase orders, installation records, maintenance work orders or photos of sensors installed
- Screenshots of BAS readings
- Narrative of IAQ monitoring activities

Adapted BB3 Question

Question 11.04.01 – Have real-time air quality sensors been installed since the start of the COVID-19 pandemic?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead

In-house, with third-party support

References

None

Crosswalk

N/A

Other Notes

None

INDOOR AIR QUALITY & HAZARDS	I2. VENTILATION & EXHAUST
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Ventilation & Exhaust**
Question:	**I2.4 – CO Monitoring in Parking Areas** **Do carbon monoxide (CO) concentrations in enclosed parking garages and loading docks meet minimum thresholds?**

Answer

Select one of the following:	Points available:
- Yes – CO is tested	1
- Yes – CO sensors installed	2
- No	0
- Not Applicable – there are no enclosed parking garages of loading docks at the building	-

Max. Points Available

2 - Pick one answer

Description

Carbon monoxide emissions from internal combustion vehicles can present a serious health and safety risk. Monitoring carbon monoxide within enclosed parking areas and loading docks can help identify exposures before they exceed current occupational exposure limits.

The current ACGIH Threshold Limit Values for carbon monoxide exposure is 25 ppm.

Requirements

A. If IAQ testing data is available, provide representative sampling that:
   - Demonstrates that CO levels are below 25 ppm
   - Is conducted at least annually and captures high traffic periods

B. If sensors are installed:
   - Demonstrate that concentrations of carbon monoxide are monitored continuously
   - Provide sensor details (electrochemical or metal oxide semi-conductor with a resolution of 0.1 ppm)
   - Show that sensors are calibrated in accordance with manufacturer's specifications
   - Confirm that CO levels are below 25 ppm. Provide sensor logs and/or IAQ testing data for these locations

Documentation

- IAQ testing results or
- IAQ sensor data

Adapted BB3 Question

Question 03.04.06 – Is the enclosed parking garage and/or gas/fuel-fired equipment room ventilated?

I2.4 – CO Monitoring in Parking Areas - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
ACGIH Threshold Limit Values (TLV) – Chemical Substances: https://www.acgih.org/science/tlv-bei-guidelines/tlv-chemical-substances-introduction/

Crosswalk
N/A

Other Notes
None

INDOOR AIR QUALITY & HAZARDS	I2. VENTILATION & EXHAUST
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Ventilation & Exhaust**
Question:	**I2.5 – CO Monitoring in Occupied Spaces** **Do carbon monoxide (CO) concentrations in occupied spaces adjacent to parking garages, loading docks, and mechanical rooms meet minimum thresholds?**

Answer

Select one of the following:	Points available:
- Yes – CO is tested	1
- Yes – CO sensors installed	3
- No	0
- Not Applicable – there are no enclosed parking garages of loading docks at the building	-

Max. Points Available

3 - Pick one answer

Description

Carbon monoxide emissions from vehicles and improperly vented combustion equipment like boilers and hot water tanks can present a serious health and safety risk. Monitoring carbon monoxide concentrations in occupied spaces adjacent to indoor parking areas and mechanical rooms can help identify exposures before they become a health hazard.

Health Canada has indicated that carbon monoxide concentrations above 5 ppm are indication pf possible emissions and warrant further investigation.

Requirements

A. Identify occupied spaces that are located adjacent to parking garages, loading docks and mechanical rooms
B. If IAQ testing data is available, provide representative sampling that:
   - Demonstrates that CO levels are below 5 ppm
   - Is conducted at least annually and captures high traffic periods
C. If sensors are installed:
   - Demonstrate that concentrations of carbon monoxide is monitored continuously
   - Provide sensor details (electrochemical or metal oxide semi-conductor with a resolution of 0.1 ppm)
   - Show that sensors are calibrated in accordance with manufacturer's specifications
   - Confirm that CO levels are below 5 ppm

Documentation

- Identify occupied spaces potentially exposed to CO
- IAQ testing results OR
- IAQ sensor data

I2.5 – CO Monitoring in Occupied Spaces - cont'd

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
Health Canada: Indoor Air Quality in Office Buildings, A Technical Guide, 1995: https://publications.gc.ca/collections/Collection/H46-2-93-166Erev.pdf

Crosswalk
N/A

Other Notes
None

INDOOR AIR QUALITY & HAZARDS	I2. VENTILATION & EXHAUST
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Ventilation & Exhaust**
Question:	**I2.6 – IAQ Management in Laboratories** **Are the following strategies implemented to manage Indoor Air Quality (IAQ) in laboratories and specialised rooms?**

Answer

Select all that apply:	Points available:
- Yes – failsafe, self-identifying alarm systems are in place	1
- Yes – biological safety cabinets are labeled with an annual dated certification and instructions	1
- Yes – in-line filters for biological safety cabinet vacuum lines are inspected monthly and changed as necessary	1
- Yes – where corrosive substances are used, easy to access emergency eyewash stations are installed nearby, and/or showers are free from obstruction	1
- Yes – laboratories are kept under positive or negative pressure (as required) to prevent entry of pollutant	1
- Yes – there is differential pressure monitoring in adjacent areas	1
- Yes – fluorinated anesthetic waste captured instead of being discharged to the exterior	1
- None	0

Max. Points Available

3 - Max points cap

Description

N/A

Requirements

Demonstrate the following is in place:

A. Failsafe, self-identifying alarm systems
B. Biological safety cabinets are labeled with an annual dated certification and instructions
C. In-line filters for biological safety cabinet vacuum lines are inspected monthly and changed as necessary
D. Where corrosive substances are used, easy to access emergency eyewash stations are installed nearby, and/or showers are free from obstruction
E. Laboratories are kept under positive or negative pressure (as required) to prevent entry of pollutant
F. Differential pressure monitoring in adjacent areas
G. Fluorinated anesthetic waste captured instead of being discharged to the exterior

I2.6 – IAQ Management in Laboratories - cont'd

Documentation

- Emails, memo, service agreements, photos or any other evidence which demonstrate requirements are met

Adapted BB3 Question

BOMA BEST 3.0 Questions 5.1.M.3 – 5.1.M.9

Applicability

Applicable to Healthcare buildings

Suggested Lead

In-house, with third-party support

References

Health Canada: Indoor Air Quality in Office Buildings, A Technical Guide, 1995: https://publications.gc.ca/collections/Collection/H46-2-93-166Erev.pdf

Crosswalk

N/A

Other Notes

Fluorinated anesthetic waste (such as desflurane, sevoflurane, and isoflurane) is typically vented to the outdoors through a dedicated scavenging system. This practice poses significant environmental and public health risks. Anesthetic gas should instead be filtered, and harmful gases captured before the remaining gas is vented to the atmosphere. Once captured, gases can be processed into raw material to manufacture new anesthetics. The capture process must be monitored regularly, with monthly reporting.

INDOOR AIR QUALITY & HAZARDS	I3. FILTRATION
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Filtration**
Question:	**I3.1 – Filter Inspection** **Are filters in air handling systems inspected/replaced at regular intervals and corrective actions taken when required?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available

3- Pick one answer

Description

Use of ASHRAE Minimum Efficiency Reporting Value MERV 8/8-A or greater filtration shall be utilized in intermittently occupied areas and used primarily in the protection of HVAC equipment and components only. In regularly occupied areas, a minimum MERV 13/13-A filter shall be utilized. Pressure gauges shall be used wherever possible to determine the correct change-out interval of the filters. Filtration of return-air (from systems, such as compartment units, fan-coil units, heat pumps) prevents recirculation of occupant-generated contaminants.

Filtration systems need to be properly maintained in accordance with manufacturers recommendations. Filters should be inspected at least quarterly.

Requirements

A. All filters to be rated as per ASHRAE 52.2 (latest version)
B. Confirmation of MERV-A ratings or equivalent must be in writing
C. Filters in Constant Velocity systems can be replaced at the manufacturers maximum rated pressure drop providing there is no detrimental effect on air flow. Air filters in VFD systems to be replaced at approximately twice the initial pressure drop to achieve maximum energy savings
D. Provide filter inspection records and maintenance log showing frequency of inspection and replacements
E. Outline corrective actions taken or plan to address issues identified

Documentation

- Filter rating (ASHRAE test reports including Appendix “J” testing or written confirmation from supplier that filters do not decrease in efficiency through their life)
- Filter replacement schedule
- Filter inspection records and maintenance log
- Corrective actions

I3.1 – Filter Inspection - cont'd

Adapted BB3 Question
Question 03.04.01 – What MERV filters are in use for all outdoor air and return air (i.e. circulating air) systems? And Question 03.04.03 – Are measures in place to alert building operators that HVAC filtration systems need replacement?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
ASHRAE 52.2-2017 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size: https://www.ashrae.org/File%20Library/Technical%20Resources/COVID-19/52_2_2017_COVID-19_20200401.pdf

Crosswalk
N/A

Other Notes
None

Verification
Where owner or landlord is in charge of HVAC maintenance, look for filter requirements : types and preventative maintenance / replacement cycle. Discuss the use of pressure differential sensor where available. Upon visit, it is often possible to see boxes of replacement filters, sometimes indicating the rating. When unclear, request spec sheets or ordering details clearly showing rating.

For tenant-managed ventilation, the demonstration can be achieved by accessing relevant excerpts of the HVAC maintenance contract signed by tenants, or discussing with the personal in charge if present during verification. Unless specific lease clauses request disclosure to the owner or landlord, this might however be a challenge.

INDOOR AIR QUALITY & HAZARDS	I3. FILTRATION
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Filtration**
Question:	**I3.2 – MERV Filter Rating** **Are filters with MERV rating 13 or higher installed on AHUs?**

Answer

Select one of the following:	Points available:
- Yes	4
- No	0

Max. Points Available

4 - Pick one answer

Description

Installation of filtration systems that meet ASHRAE Minimum Efficiency Reporting Value (MERV) 13 or higher helps prevent smaller outdoor and recirculated air contaminants, such as mould spores, pollen and dusts from entering the HVAC system (the removal of aerosols and VOC's can only be accomplished with molecular filtration such as carbon or potassium permanganate). Installation of filtration systems that meet ASHRAE MERV 13 to 16 prevent up to 90% of fine outdoor air contaminants from entering the HVAC system.

Requirements

A. Provide evidence of the MERV filter rating. All filters must be rated as per ASHRAE 52.2. Concerns of filters loosing efficiency throughout their life in the system shall also include Appendix "J" test reports.
B. Filters must be replaced
   - In constant speed fan units: at or before the pre-determined pressure drop or timeframe, not exceeding the manufacturer's specifications and ASHRAE Standard 180 (Maintenance Standard)
   - In VFD applications for optimum energy savings: at approximately twice the initial installation/fan speed pressure drop
   - Waste reduction: In order to decrease waste (and decrease energy consumption), multi-stage filtration shall be reduced to a minimum while avoiding detriment to overall efficiency and function of the air handling unit. Filter longevity based on final change-out pressure drop will be a deciding factor for waste reduction.

Documentation

- Filter rating (MERV 13 to 16), such as via inventory list, product box, photos, test results
- Filter replacement schedule, along with competitive comparisons (if done) proving optimum environmentally friendly design has been implemented

Adapted BB3 Question

Question 03.04.01 – What MERV filters are in use for all outdoor air and return air (i.e. circulating air) systems?

I3.2 – MERV Filter Rating - cont'd

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house

References
ASHRAE 52.2-2017 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size: https://www.ashrae.org/File%20Library/Technical%20Resources/COVID-19/52_2_2017_COVID-19_20200401.pdf

Crosswalk
N/A

Other Notes
None

INDOOR AIR QUALITY & HAZARDS	I4. RENOVATION & CONSTRUCTION
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Renovations & Maintenance**
Question:	**I4.1 – IAQ Control in Construction Specifications** **Are the construction IAQ controls included in specifications for owner or landlord renovation or construction projects?**

Answer

Select one of the following:	Points available:
- Yes – included in specifications	1
- Yes – evidence of implementation exists	3
- No	0

Max. Points Available

3 - Pick one answer

Description

Specific guidelines must be in place for base-building or tenant renovations and construction projects to ensure that contaminants are not released into the surrounding interior environment and building indoor air quality (IAQ) is maintained.

Contractors or sub-contractors performing renovation or construction work in a building may be required to follow SMACNA IAQ guidelines as directed by the owner or landlord.

Requirements

Before construction:

A. Incorporate the Construction IAQ Control Plan into design and construction specifications for all owner or landlord-led renovation or construction projects being planned in the building
B. Identify construction projects where the implementation of the Construction IAQ Control Plan would apply
C. Prepare the specifications for those projects and highlight the sections detailing the construction IAQ control measures to follow

During and after construction:

D. Conduct regular inspections and document where and how the construction IAQ control measures are followed
E. Keep a record of the inspections and track implementation of controls for the duration of the construction project

Documentation

- Section of construction specifications detailing IAQ control measures
- Photos, air monitoring or inspection reports demonstrating implementation of the Construction IAQ Plan

I4.1 – IAQ Control in Construction Specifications - cont'd

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 2nd edition ANSI/SMACNA 008, 2008
https://store.smacna.org/iaq-guidelines-for-occupied-buildings-under-construction

Crosswalk
N/A

Other Notes
None

INDOOR AIR QUALITY & HAZARDS	I4. RENOVATION & CONSTRUCTION
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Renovations & Construction**
Question:	**I4.2 – IAQ Management in Tenant Construction** **Are the construction IAQ controls included in specifications for tenant renovation or construction projects?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Specific guidelines must be in place for base-building or tenant renovations and construction projects to ensure that contaminants are not released into the surrounding interior environment and building indoor air quality (IAQ) is maintained.

Tenants, their contractors or sub-contractors performing renovation or construction work in a building may be required to follow SMACNA IAQ guidelines as directed by the owner or landlord.

Requirements

A. Develop tenant construction manuals for all tenant-led renovation or construction projects being planned in the building
B. Share the building-specific Construction IAQ Control Plan with tenants to include in their design and construction specifications

Documentation

- Section of tenant construction manual detailing IAQ control measures

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house

I4.2 – IAQ Management in Tenant Construction - cont'd

References
SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 2nd edition ANSI/SMACNA 008, 2008: https://store.smacna.org/iaq-guidelines-for-occupied-buildings-under-construction

Crosswalk
N/A

Other Notes
None

INDOOR AIR QUALITY & HAZARDS	I5. REFRIGERANTS
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Refrigerants**
Question:	**I5.1 – Refrigerant Safety Program** **Is a Refrigerant Safety Program in place?**

Answer

Select one of the following: Points available:

- Yes 2
- No 0

If yes, select all that apply, whether owner or landlord- or tenant-managed:

- R12
- R22
- R410a
- R407c
- R134a
- R32
- R513a
- R1234ze
- R1234yf
- R514a
- R1233zd
- Ammonia (R717)
- Propane (R290)
- CO2 (R744)
- Water (R718)
- Halon or Halocarbon Fire Suppressants greater than 10 kg
- Other (include refrigerant name and GWP)
- None

Max. Points Available

2 - Pick one answer

Description

Refrigerants are fluids used by heating and cooling equipment (e.g., air conditioners, heat pumps, commercial chillers, and variable-refrigerant-flow (VRF) systems, vending machines, cooled water-fountains, kitchen/catering/freezers etc.) to transfer heat. Some refrigerants present both a health and environmental hazard. Safety measures should be employed to reduce the potential for releases.

Halon is an ozone depleting substance as well as an indoor atmospheric hazard (oxygen displacing). Use of halon in fire-suppression systems has been banned in many jurisdictions.

A Refrigerant Safety Program can help prevent leaks or occupant exposure to refrigerants and halocarbons.

I5.1 – Refrigerant Safety Program - cont'd

Requirements

A. Develop a building-specific Refrigerant Safety Program, compliant with ASHRAE Standard 15 "Safety Standard for Refrigeration Systems," CSA Mechanical Refrigeration Code B52-13 and the Federal Halocarbon Regulation
B. The program must:
   - Cover responsible parties, including the building team's training requirements
   - List refrigerants in use at the building
   - List actions required to reduce and managed refrigerant leaks
   - Describe procedures for refrigerant investigations and corrective action
C. Demonstrate that the program was developed by a person competent in refrigerant safety practices
D. Be signed by the building manager, dated within the past 12 months.

OR

E. Where refrigeration systems are owned and managed by the tenants, the owner or landlord must provide information to tenants on how to implement a Refrigerant Safety Program. Tenants must be encouraged to disclose any halocarbon fire suppressant systems within their space

Documentation

- Building-specific Refrigerant Safety Program
- Proof that program was shared with tenants

Adapted BB3 Question

Question 05.01.02 – Is a Refrigerant Safety Program in place at the building?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

ASHRAE Standard 15, 2022 – "Safety Standard for Refrigeration Systems":
https://www.techstreet.com/ashrae/standards/ashrae-15-2022-packaged-w-standard-34-2022?product_id=2504061
CSA Mechanical Refrigeration Code B52-13
http://www.csagroup.org/documents/codes-and-standards/CSA-SafetyBulletin-B52-Dec12-2013-en.pdf
Federal Halocarbon Regulation
https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-110/index.html

Crosswalk

N/A

Other Notes

None

INDOOR AIR QUALITY & HAZARDS	I5. REFRIGERANTS
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Refrigerants**
Question:	**I5.2 – Refrigerant Inspections** **Have leak checks and inspections been conducted on refrigerant systems?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0
- Not applicable – there are no refrigerants managed by the owner or landlord	-

Max. Points Available

2 - Pick one answer

Description

Refrigerants are fluids used by heating and cooling equipment (e.g., air conditioners, heat pumps, commercial chillers, and variable-refrigerant-flow (VRF) systems) to transfer heat. Some refrigerants present both a health and environmental hazard. Safety measures should be employed to reduce the potential for releases.

A Refrigerant Safety Program can help prevent leaks or occupant exposure to refrigerants and halocarbons. Regular leak check and inspections safeguard occupants from potential risks.

Requirements

A. Identify the third-party consultant or service contractor responsible for conducting the required refrigeration leak tests. The service contractor should have an ozone depleting substance (ODS) certification card or equivalent
B. Conduct inspections and tests at regular intervals as outlined in the respective refrigeration standards and detail:
   - The date of service and time since previous service
   - The nature of the service
   - Whether a leak was discovered
   - Corrective action taken, such as the amount of refrigerant lost or added to the system

Documentation

- Credentials of third-party delivering the refrigerant management service
- Record of most recent refrigeration inspections and leak tests conducted

Adapted BB3 Question

New in BOMA BEST 4.0

I5.2 – Refrigerant Inspections - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
Third-party

References
ASHRAE Standard 15, 2022 – "Safety Standard for Refrigeration Systems":
https://www.techstreet.com/ashrae/standards/ashrae-15-2022-packaged-w-standard-34-2022?product_id=2504061
CSA Mechanical Refrigeration Code B52-13
http://www.csagroup.org/documents/codes-and-standards/CSA-SafetyBulletin-B52-Dec12-2013-en.pdf
Federal Halocarbon Regulation
https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-110/index.html

Crosswalk
N/A

Other Notes
Inspections are required annually in Federal sites in Canada. For provincially regulated sites the leak check inspection is required when equipment needs to be charged or topped up

INDOOR AIR QUALITY & HAZARDS	I5. REFRIGERANTS
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Refrigerants**
Question:	**I5.3 – Phase-out High GWP Refrigerants** **Is there a plan to phase out any of the high global warming potential (GWP) refrigerants in use at the building or have any already been phased out?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

If yes, select which of the following high GWP refrigerants are planned for phase-out:

- R12
- R22
- R410a
- R407c
- R134a
- Halon or Halocarbon Fire Suppressants greater than 10 kg
- Other (include refrigerant name and GWP)
- None

Max. Points Available

3 - Pick one answer

Description

Refrigerants contribute to climate change by trapping heat in the atmosphere similar to CO2. The global warming impact of a refrigerant is referred to as Global Warming Potential (GWP), a metric that measures a substances impact relative to CO2. When a refrigerant is released to the atmosphere it contributes to a building emissions. This often occurs when leaks develop, equipment is damaged, and during decommissioning. As refrigerants are phased out equipment will require decommissioning and replacement with new equipment.

For comparison, the common refrigerant R410A has a GWP 2,088, meaning the warming effect it has when released to the atmosphere is 2,088x more than that of CO2.

Requirements

A. Indicate which type of refrigerants have already been phased out
B. Indicate which type of refrigerants are currently being used in the building
C. Where high GWP refrigerants are being used please describe the transition plan

I5.3 – Phase-out High GWP Refrigerants - cont'd

Documentation
- Evidence of refrigerants already phased out
- Refrigerant Phase-out Plan

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
Regulations Amending the Ozone-depleting Substances and Halocarbon Alternatives: SOR/2020-177
https://gazette.gc.ca/rp-pr/p2/2020/2020-09-02/html/sor-dors177-eng.html
Greenhouse Gas Protocol – Global Warming Potential Values:
https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

Crosswalk
N/A

Other Notes
The following refrigerants are considered to have medium to low GWP compared to those with high GWP listed above:
- R32 (medium GWP)
- R513a (medium GWP)
- R1234ze (low GWP)
- R1234yf (low GWP)
- R514a (low GWP)
- R1233zd (low GWP)
- Ammonia (R717) (low GWP)
- Propane (R290) (low GWP)
- CO2 (R744) (low GWP)
- Water (R718) (low GWP)

Low emissions refrigerants have a GWP under 600 kgCO2e/m2

INDOOR AIR QUALITY & HAZARDS	I6. IAQ HAZARDS
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**IAQ Hazards**
Question:	**I6.1 – Hazardous Materials Management** **Is a Hazardous Materials Management Program implemented at the building?**

Answer

Select one of the following: Points available:

- Yes 3
- No 0

If yes, select all hazardous materials known or suspected to be present, handled or stored at the building, managed by the owner or landlord and tenants:

- Asbestos
- PCBs
- Silica
- Suggested Lead
- Mercury
- Urea Formaldehyde Foam Insulation
- Chrysotile
- Other
- If none - provide letter of attestation that no hazardous materials are in the building

Max. Points Available

3 - Pick one answer

Description

To mitigate the risk of exposure to hazardous materials associated with building materials, equipment and finishes, the building owner/manager must develop a program to periodically inspect the condition of these materials, conduct safe repair, assess disturbance or complete removal of these materials, and to adequately train personnel in contact with hazardous materials.

The presence and condition of hazardous materials must be identified and managed for the safety of building occupants.

Requirements

A. Develop and implement a Hazardous Materials Management Program
   - Responsible parties, including the building team's training requirements
   - Inventory of all building materials known or presumed to contain asbestos, Suggested Lead, PCBs, silica, and mercury etc.
   - Outline requirements and frequency for hazardous materials surveys and/or inspections
   - Describe how to safely store chemical products in accordance with product Safety Data Sheets and remove asbestos or PCB-containing materials from the building

B. Engage a third-party expert to survey and inspect hazardous materials present, handled and stored at the building

C. Conduct a hazardous materials survey, that covers the following:

I6.1 – Hazardous Materials Management

- Type, location, approximate quantity in each area and overall extent of hazardous materials present or stored in the building
- Description of sampling methodology applied and locations where samples were taken
- Findings and recommendations that provide site specific handling, abatement and disposal guidelines
- Appendices that include relevant laboratory testing results of samples taken

D. Inspect hazardous materials to ensure these are managed in accordance with the building's Hazardous Materials Management Program

Documentation

- Hazardous Materials Management Program
- Credentials of third-party delivering the hazardous materials assessment service
- Outline of construction, renovation or operations activities that may have come in contact with these hazardous materials in the last three years
- Inspection records demonstrating that materials are safely handled
- Corrective actions identified and completed

Adapted BB3 Question

Best Practice 9: Is a Hazardous Building Materials Management Program in place at the building?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house with Third- Party support

References

ASTM E2356 – 14 "Standard Practice for Comprehensive Building Asbestos Surveys": https://www.astm.org/e2356-18.html

The laboratory performing the sample testing should be accredited by one of the following organizations:

- National Voluntary Laboratory Accreditation Program (NVLAP)
- American Industrial Hygiene Association (AIHA)
- The Canadian Association for Laboratory Accreditation (CALA)
- The Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST), or equivalent

Crosswalk

None

Other Notes

Consult with the building's third-party hazardous materials expert to determine how frequently surveys need to be conducted. If operations or renovation and construction activities are not affecting the location of these materials then consider whether survey frequency can be adjusted

Inspections of known or presumed asbestos-containing materials, where present, are required every year. The condition or state of the asbestos-containing materials (e.g., poor, fair, good) must be reviewed. Inspection of materials known or presumed to contain Suggested Lead, mercury, PCBs or other hazardous building materials or equipment, where present, are required every three years.

INDOOR AIR QUALITY & HAZARDS	I6. IAQ HAZARDS
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**IAQ Hazards**
Question:	**I6.2 – Hazardous Chemicals Management** **Is a Hazardous Chemical Product Management Program implemented at the building?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Identification and management of chemical products in use or storage at the building is essential to manage health hazards and safety risks, as well as potential environmental impacts.

Internationally, a Globally Harmonized System (GHS) for safety related to the use of hazardous chemical products has been developed by the United Nations. Similar systems such as the Workplace Hazardous Materials Information System (WHMIS) in Canada and HAZCOM in the US are regulated approaches to the management of hazardous chemical or use-related products.

A use-related product is defined as anything that is brought into the building and can include a hazardous chemical. A hazardous chemical is defined as a dangerous good which could be a solid, liquid, or gas that can harm people, other living organisms, property, or the environment.

Requirements

The Hazardous Chemical Products Management Program must include all following components:

A. Periodic inventory of in-use, base-building hazardous chemical products (at least annually, or as procurement is revised)
B. Storage of chemical products in accordance with product Safety Data Sheets
C. Continuous and proactive review process to ensure up-to-date Safety Data Sheets for all hazardous chemical products are always available to employees, performed within the last three (3) years
D. Chemical products labeled in accordance with WHMIS/GHS/HAZCOM.
E. Training of building maintenance staff (including safe handling and use of chemicals pertaining to their work, symbol recognition, safety data sheets, first aid and spill response, storage, and disposal)
F. Review and updating of the Program as products are changed and at least annually

Documentation

- Hazardous Chemical Management Program

I6.2 – Hazardous Chemicals Management - cont'd

Adapted BB3 Question
Best Practice 10 – Is a Hazardous Chemical Products Management Program in place at the building?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
None

Crosswalk
N/A

Other Notes
None

INDOOR AIR QUALITY & HAZARDS	I6. IAQ HAZARDS
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**IAQ Hazards**
Question:	**I6.3 – Radon Risk Assessment** **Has a Radon Risk Assessment been performed?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0
- No – properties located in Canada, complete the follow-up question:	1
Go to link (https://health-infobase.canada.ca/datalab/radon-blog.html), find the region where this building is located in Canada and enter the % of homes in that region with high radon levels:	___ %

Max. Points Available

3 - Pick one answer

Description

Radon is a colourless, odourless, naturally occurring radioactive gas present in soil, rock and water.

In outdoor environments the concentration of radon is low, and the associated health risk is negligible. However, radon can enter buildings through any openings that are in contact with the sub-surface soil and rock, and can accumulate to higher concentrations which results in a higher health risk for the occupants within.

Health Canada has identified elevated radon concentrations in every public health unit across Canada and as such, it is recommended that every building be tested in order to confirm if radon levels within are acceptable. The only way to know the radon concentrations that are present within a building is to test for it.

Requirements

A. Conduct testing in the following locations:
   - Radon testing must occur in all occupied areas where the floors or walls are in direct contact with the ground or is over crawlspaces, utility tunnels or parking garages. Health Canada defines an occupied area as one that is occupied by an individual for four hours per day
   - Unoccupied rooms should also be tested at the same time as occupied rooms if there are plans for them to become occupied in the near future
   - If none of the ground contact floors are occupied, test all occupied rooms on the first occupied floor level above

B. Measurement of occupied areas within a building is required for a minimum duration of 91 days. The testing period will occur entirely during the heating season.

C. Use only measurement devices approved by C-NRPP

I6.3 – Radon Risk Assessment - cont'd

D. Final analysis must be completed by a laboratory certified by the C-NRPP or similar. Not all measurement protocols require laboratory analyses (e.g., E-PERM Electrets) so long as the analyst is accredited to conduct that analysis through C-NRPP
E. The radon risk assessment report must be signed by an individual certified by the C-NRPP or similar certification body

Documentation

- Radon Risk Assessment Report

Adapted BB3 Question

Question 05.02.01 – Has a radon risk assessment been completed for the building?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

What is radon and where can I find it? https://health-infobase.canada.ca/datalab/radon-blog.html
Canadian National Radon Proficiency Program: www.C-NRPP.ca
Guide for Radon Measurements in Public Buildings: https://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/radiation/radon_building-edifices/27-15-1468-RadonMeasurements_PublicBuildings-EN13.pdf
General Information about Radon in Canada: https://www150.statcan.gc.ca/n1/pub/16-508-x/16-508-x2016002-eng.htm
About Radon Testing: https://takeactiononradon.ca
Find a certified radon measurement professional: https://c-nrpp.ca

Crosswalk

Third-party

Other Notes

High radon levels can potentially exist on upper floors due to the upward movement of air from stack effect or if radon is suspected to be emanating from building materials. However, Health Canada has conducted large-scale testing of federal buildings and these factors are not considered to be significant. If elevated radon levels are identified on the lower floors, the C-NRPP mitigation professional could potentially conduct diagnostic testing on the upper floors while the mitigation strategy is being developed, to confirm the full scope of mitigation required

INDOOR AIR QUALITY & HAZARDS	I7. TRAINING & INNOVATION
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Training**
Question:	**I7.1 – Training in IAQ & Hazards** **Did the building operations and management team receive Indoor Air Quality & Hazards training in the previous three years?**

Answer

Indicate which topics are covered in the training:		Points available:
- IAQ Assessment, Ventilation, Exhaust & Filtration	Yes or No	1
- Renovation & Maintenance	Yes or No	1
- Refrigeration & IAQ Hazards	Yes or No	1
- None		0

Max. Points Available

3 - Pick all that apply

Description

In order for building maintenance staff to effectively manage the building's Indoor Air Quality & Hazards, training should be provided which addresses the topics of IAQ assessment, ventilation and exhaust, filtration, renovation & maintenance, refrigeration or IAQ hazards.

Over time, technologies and preferred practices in building operations and maintenance change. Providing regular professional development opportunities is a good way to help retain staff. Offering training and educational opportunities related to environmental/sustainable building performance not only benefit staff but improve the performance of the building when staff training is applied at the building level.

Requirements

A. List the names of staff members to whom the competencies covered under these topics would apply
   - Training must be provided on the equipment and systems for which the owner or landlord is responsible, covering content such as:
   - A review of maintenance practices, such as filter changes, coil cleaning, drain pans, humidifiers, fan operation, cooling tower maintenance, etc.
   - A review of applicable IAQ standards and guidelines as well as building performance goals
   - Typical causes of IAQ complaints and suggested remedies
   - What is radon, health effects of radon exposure, how does radon enter buildings? Applicable guidance and legislation, testing for radon, mitigation of radon, radon and new construction

B. Provide the applicable course outline or syllabus

C. Provide evidence of competency or training received such as credentials, completion certificate, record of attendance

I7.1 – Training in IAQ & Hazards - cont'd

Documentation

- Name of building O&M team member who received the training
- Course outline or syllabus
- Training Certificate or Record of Attendance

Adapted BB3 Question

Question 03.01.01 – Is a training program on indoor air quality (IAQ) in place for Property Managers and Building Maintenance staff?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

ASHRAE 180 "Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems": https://www.ashrae.org/File%20Library/Technical%20Resources/Bookstore/previews_2016639_pre.pdf
ASHRAE Indoor Air Quality Guide: https://www.ashrae.org/technical-resources/bookstore/indoor-air-quality-guide.pdf

Crosswalk

None

Other Notes

None

INDOOR AIR QUALITY & HAZARDS	I7. TRAINING & INNOVATION
Focus Area:	**Indoor Air Quality & Hazards**
Topic:	**Innovation**
Question:	**I7.2 – Innovation in IAQ & Hazards** **Is an innovative process or technology in place at the building that goes beyond the requirements outlined in this section?**

Answer

Select all that apply:	Points available:
- Permanent IAQ sensors installed	1
- Corrective actions taken to address any of the hazardous materials risks identified (including, but not limited to radon)	1
- [ESC, Univ, LI, OAR, MURB] Joint landlord/tenant IAQ initiatives implemented	1
- [ESC, Univ] Measured Outdoor Air (OA) ventilation rates in tenant-controlled areas meet minimum carbon dioxide (CO_2) thresholds	1
- Other	1
- No	0

Max. Points Available

3 - Max points cap

Description

Many processes and technologies exist that go beyond the standards and requirements set out in the BOMA BEST Assessment. If building managers/owners have invested in innovative processes or technologies that go beyond these standards, innovation points can be earned under this question.

Requirements

A. Provide details of the technology or process applied at the building
B. Indicate when the technology or process was implemented and the steps that are in place to ensure the technology or process' ongoing success
C. [If "Other" is selected] Explain how the technology or process has improved the building's IAQ or hazards management practices for it to be considered innovative

Documentation

- Narrative of innovative technology or process and its impact

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

I7.2 – Innovation in IAQ & Hazards - cont'd

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
N/A

Other Notes
None

ACCESSIBILITY & WELLNESS	A0. BASELINE PRACTICES
Focus Area:	**Accessibility & Wellness**
Topic:	**Baseline Practices**
Question:	**A1.0 – Accessibility Awareness** **Has the property management team considered the following accessibility questions in relation to this building?**

Answer
Select one of the following:
- Yes – Complete BOMA BEST Form A1.0
- No

Max. Points Available
Minimum requirement, this is a baseline practice

Description
The intent behind this question is to raise awareness about the different building elements that impact accessibility.

The BOMA Accessibility Guide is a resource to help building owners and managers understand how to be more inclusive of people with varying temporary and permanent disabilities. It was developed in partnership with the Rick Hansen Foundation.

The Rick Hansen Foundation Accessibility Certification™ (RHFAC) provides a holistic and consistent approach to measuring access through a rating survey.

Requirements
A. Review the BOMA Accessibility Guide and Rick Hansen Foundation materials linked under references
B. Review the features on-site and check off which accessibility features are installed on-site

Documentation
- Photos of each question marked “Yes”

Adapted BB3 Question
Question 04.02.02 – Is the building designed such that potential accessibility barriers are addressed?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord’s control)

Suggested Lead
In-house

A1.0 – Accessibility Awareness - cont'd

References

BOMA Accessibility Guide: https://bomacanada.ca/2022-accessibility-guide/
RHFAC Program: http://www.rickhansen.com/RHFAC
RHFAC Rating Survey: https://www.rickhansen.com/sites/default/files/2020-05/acp-845-finalrhfac-rating-survey-BOMA BEST 3.00-pre-release-may-2020.pdf

Crosswalk

RHFAC

Other Notes

Applicants will not be penalised if the building lacks accessibility features. By completing the form to the best of the building management team's abilities will achieve this baseline requirement.

ACCESSIBILITY & WELLNESS	A1. ACCESSIBILITY
Focus Area:	**Accessibility & Wellness**
Topic:	**Accessibility**
Question:	**A1.1 – RHFAC Survey or equivalent** **Has a Rick Hansen Foundation Accessibility Certification™ (RHFAC) Professional or equivalent conducted an on-site visit of the building to identify barriers faced by people with disabilities?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available
2 - Pick one answer

Description
RHFAC Professionals are designated individuals who can conduct RHFAC ratings. They are trained with specific knowledge and skills to conduct a systematic review of the building's elements and features using the RHFAC methodology, based on the holistic user experience of people with varying disabilities affecting their mobility, vision, and hearing.

Requirements
Engage a RHRAC Professional to conduct an on-site visit as part of the systematic review of the building's elements and features using the RHFAC methodology

Documentation
- Proof that on-site visit was conducted by RHFAC Professional

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house or third-party

References
RHFAC Rating Survey: https://www.rickhansen.com/sites/default/files/2020-05/acp-845-finalrhfac-rating-survey-BOMA BEST 3.00-pre-release-may-2020.pdf

Crosswalk
RHFAC

Other Notes
None

ACCESSIBILITY & WELLNESS	A1. ACCESSIBILITY
Focus Area:	**Accessibility & Wellness**
Topic:	**Accessibility**
Question:	**A1.2 – RHFAC Plan or Action** **Have steps been taken to address any shortcomings identified in the Rick Hansen Foundation Accessibility Certification™ (RHFAC) Professional's on-site visit?**

Answer

Select one of the following:	Points available:
- Plan	1
- Action	2
- No	0

Max. Points Available
3 - Pick one answer

Description
The Rick Hansen Foundation Accessibility Certification™ (RHFAC) provides a holistic and consistent approach to measuring access through a rating survey.

Requirements
Provide proof of steps taken following on-site visit to show how accessibility shortcomings are being addressed. This may be in the form of a plan or actual progress made in addressing shortcomings identified

Documentation
- Plan of actions and timeline
- Photos of corrective actions taken (if any)

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre and Universal buildings

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
RHFAC

Other Notes
None

ACCESSIBILITY & WELLNESS	A1. ACCESSIBILITY
Focus Area:	**Accessibility & Wellness**
Topic:	**Accessibility**
Question:	**A1.3 – RHFAC Certification or equivalent** **What level of Rick Hansen Foundation Accessibility Certification™ (RHFAC) or equivalent has the building achieved?**

Answer

Select one of the following:	Points available:
- RHFAC Certified	2
- RHFAC Gold	3
- Other equivalent accessibility certification achieved	2
- No	0

Max. Points Available

3 - Pick one answer

Description

The Rick Hansen Foundation Accessibility Certification™ (RHFAC) provides a holistic and consistent approach to measuring access through a rating survey.

Requirements

A. Buildings can achieve RHF Accessibility Certified level by meeting certification prerequisites and achieving a score of at least 60% on the RHFAC Rating Survey
B. Buildings can achieve RHF Accessibility Gold level by meeting gold certification prerequisites and achieving a score of at least 80% on the RHFAC Rating Survey
C. Buildings can achieve any level of equivalent accessibility certification achieved

Documentation

- RHFAC Registry issued Letter of Certification and Scorecard
- Certificate and scorecard of equivalent accessibility certification achieved

Adapted BB3 Question

Question 04.05.03 – Is the building currently certified with the Rick Hansen Foundation Accessibility Certification™?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre and Universal buildings

Suggested Lead

In-house or third-party

A1.3 – RHFAC Certification or equivalent - cont'd

References
RHFAC Guide to Certification: http://www.rickhansen.com/RHFAC-Certification-Guide

Crosswalk
RHFAC

Other Notes
None

ACCESSIBILITY & WELLNESS	A2. COMFORT, VIEWS & ACOUSTICS
Focus Area:	**Accessibility & Wellness**
Topic:	**Thermal Comfort**
Question:	**A2.1 – Humidification** **Are humidification systems present and properly maintained?**

Answer

Select one of the following:	Points available:
- Yes – humidification systems are present and properly maintained	2
- Not applicable – humidification systems were considered but deemed not necessary	-
- No	0

Max. Points Available

2 - Pick one answer

Description

Low indoor relative humidity is a common problem in cold climate buildings during winter months and a common source of indoor air quality complaints. The addition of a carefully maintained whole building humidification system, that is focused on human comfort, can help maintain a more comfortable work environment.

Humidification systems should be cleaned and inspected annually. ASHRAE 180-2018 recommends annual inspection and cleaning of strainers, drain pans, distributors and semi-annual cleaning of steam traps, pumps and controls

Requirements

A. Describe the type of humidification system present at the building
B. Maintain the humidification system in accordance with manufacturer's recommendations

OR

C. Describe the steps taken to understand the building's humidification needs (e.g. not needed in humid climate)
D. Explain why humifidication systems are not used at the building

Documentation

- Humidification System Maintenance Program and Maintenance records
- Annual cleaning and inspection logs

Adapted BB3 Question

New in BOMA BEST 4.0

A2.1 – Humidification - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
ASHRAE 180-2018 Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems, Table 5-11, https://www.ashrae.org/File%20Library/Technical%20Resources/Bookstore/previews_2016639_pre.pdf
For more guidance on creating this risk management plan, please review the Hazard Analysis and Critical Control Point (HACCP) risk management plan in ASHRAE Standard 188, Prevention of Legionellosis Associated with Building Water Systems.

Crosswalk
N/A

Other Notes
Requirements apply to humidification delivered to occupied spaces.

FOR HEALTHCARE BUILDINGS
If steam humidification is used, confirm whether clean steam rather than treated boiler water utilized. The steam must not be provided from a source using chemical water treatment, such as the central heating plant, because of potential air contamination from boiler additives used to control scale and corrosion. Independent steam generation, using potable water in equipment such as re-boilers, instantaneous electric, or gas fired steam generators is required. Water treatment in HVAC equipment must, at all times, meet local provincial and/or federal guidelines and regulations.

If spray humidification is used, confirm whether the system is rigorously maintained and free of rust, algae, or loose contaminants of any kind. Poor maintenance of spray humidification systems may increase the likelihood of microbial growth and legionella. A Risk Management Plan must include documented records of inspection with respect to: preventing standing water in drain pans; limiting water droplet carry-over; minimizing stagnant water in humidifier and water spray sumps.

Water treatment in HVAC equipment must, at all times, meet local provincial and/or federal guidelines and regulations.

ACCESSIBILITY & WELLNESS	A2. COMFORT, VIEWS & ACOUSTICS
Focus Area:	**Accessibility & Wellness**
Topic:	**Thermal Comfort**
Question:	**A2.2 – Relative Humidity** **Is Relative Humidity (RH) maintained according to ASHRAE 55?**

Answer

Select one of the following:	Points available:
- Yes	2
- Not Applicable – Question A2.1 answered Not Applicable or No	-
- No	0

Max. Points Available
2 - Pick one answer

Description
Maintaining relative humidity in the proper range can prevent occupant complaints and condensation issues on building finishes. High relative humidity can cause discomfort and can also Suggested Lead to condensation and mould growth within buildings. Low relative humidity causes dryness and is a common indoor air quality complaint during winter months.

As per ASHRAE's Epidemic Task Force, Building Readiness Guide, maintaining the space relative humidity between 40% and 60% decreases the bio-burden of infectious particles in the space and decreases the infectivity of many viruses in the air. Some regions recommend humidity levels are maintained between 30% to 50%.

Requirements
Demonstrate ASHRAE 55 is maintained at the building

Documentation
- BAS logs or equivalent documentation showing humidity set point

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

A2.2 – Relative Humidity - cont'd

References

ASHRAE 55-2020 Thermal Environmental Conditions for Human Occupancy, https://www.ashrae.org/technical-resources/bookstore/standard-55-thermal-environmental-conditions-for-human-occupancy

ASHRAE Building Readiness Guide, 2022: https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-building-readiness.pdf

Crosswalk

N/A

Other Notes

None

ACCESSIBILITY & WELLNESS	A2. COMFORT, VIEWS & ACOUSTICS
Focus Area:	**Accessibility & Wellness**
Topic:	**Visual Environment**
Question:	**A2.3 – Visual Elements** **Have the visual elements in the building been reviewed to identify and recognise improvement opportunities?**

Answer

Select all that apply:	Points available:
- Yes – review conducted of access to views and natural light	1
- Yes – review conducted of quality of electric light	1
- Yes – review conducted on glare control devices	1
- Yes – low and no-cost corrective actions addressed	1
- Yes – plan in place to address higher cost corrective actions (such as natural features in building e.g. living wall, plants etc.)	1
- [Healthcare] Yes - >50% of patients have an outside view from their beds	1
- None of the above	0

Max. Points Available

3 - Max points cap

Description

A property's visual environment includes factors, such as the quality of light, daylighting, access to views, natural landscapes, or biophilic interior design elements.

A healthy visual environmental is vital for many physiological processes including performance and alertness, sleep-wake cycles, hormone regulation, and immune system function.

It is suggested that owner or landlords collaborate with tenants to assess opportunities for addressing visual environment.

Building management can implement measures to promote balanced and comfortable access to natural light and views and reduced glare, supplemented by high quality electric light to positively impact occupants' experience. Enhancements may be a co-benefit of other building improvements, such as lighting upgrades.

Requirements

A. List the visual environment elements that have been reviewed within owner or landlord-controlled areas and summarize qualitative observations as applicable:
   - Access to views and natural light, including views, lines of sight to natural landscapes, daylight, interior or exterior natural features (e.g., biophilia)

A2.3 – Visual Elements - cont'd

- Quality of electric light, including visible light transmittance of glazing, intensity and spectrum of electric light, lighting controls, lighting zones, lighting schedule- glare control devices, including manual or automated shading, luminaire shields to prevent glare and any other visual elements not listed
- Provide the date of review, the name and role of the reviewer (may be internal), the reason for the review (tenant request, tenant complaint, owner or landlord initiative, existing feature, or other) and a summary of findings

Documentation

- List with descriptions and observations of visual elements reviewed
- Explanation why any areas were excluded

Adapted BB3 Question

Question 05.05.01 – Are features that attempt to simulate the natural environment installed in commonly occupied base-building areas?

Applicability

Applicable to Office and Healthcare buildings

Suggested Lead

In-house, third-party support

References

None

Crosswalk

LEED BOMA BEST 4.0 and WELL

Other Notes

The scope of this question is limited to the aspects that the owner or landlord can control.

Examples of improvements could include light replacements, providing indoor plants in common areas, or adding interior view blinds.

ACCESSIBILITY & WELLNESS	A2. COMFORT, VIEWS & ACOUSTICS
Focus Area:	**Accessibility & Wellness**
Topic:	**Acoustic Performance**
Question:	**A2.4 – Acoustic Elements** **Have the acoustic elements in the building been reviewed to identify and recognise improvement opportunities?**

Answer

Select all that apply:	Points available:
- Yes – review conducted	1
- Yes – low and no-cost corrective actions addressed	1
- Yes – plan in place to address higher cost corrective actions	1
- No	0

Max. Points Available

3 - Max points cap

Description

Much of the acoustic conditions within an office building are affected by the levels of background noise generated from building equipment and road noise.

Requirements

A. List the acoustic environment elements that have been reviewed within owner or landlord-controlled areas and summarize qualitative observations as applicable:
   - Common area space use by noise level (quiet, medium, loud activities)
   - External noise intrusion (traffic, maintenance, construction)
   - Internal building system and operational noise intrusion (HVAC, elevators, maintenance, food service areas)
   - Internal occupant noise (foot traffic, conversations)
   - Whether space use activities and current conditions match or conflict acoustically
   - Other considerations not listed above

B. Provide the date of review, the name and role of the reviewer (may be internal), the reason for the review (tenant request, tenant complaint, owner or landlord initiative, existing feature, or other) and a summary of findings

Documentation

- List with descriptions and observations of acoustic elements reviewed
- Explanation why any areas were excluded

Adapted BB3 Question

Question 04.02.01 – Has an assessment been performed of background sound levels generated from exterior and base-building sources?

A2.4 – Acoustic Elements - cont'd

Applicability
Applicable to Office and Healthcare buildings

Suggested Lead
In-house, with third-party support

References
ASHRAE "HVAC Applications" handbook
USGSA Centre for Workplace Strategy , Whole Building Design Guide – Sound Matters: How to Achieve Acoustic Comfort in the Contemporary Office: https://www.wbdg.org/FFC/GSA/gsa_soundmatters.pdf

Crosswalk
LEED BOMA BEST 4.0 and WELL

Other Notes
Conduct an assessment of the background sound levels generated from exterior and base-building sources in a representative sample of spaces including open plan workspaces, private offices and meeting rooms. Background Noise Criteria (NC) levels must be compared to those stated in the ASHRAE "HVAC Applications" handbook and USGSA Centre for Workplace Strategy "Sound Matters" guidelines: maximum of 40 NC for open plan workspaces, 35 NC for private offices, and 25 NC for meeting rooms.

The scope of this question is limited to the aspects that the owner or landlord can control.

Examples of improvements could include building policies regarding noise levels, establishment of quiet, medium, and loud zones, or installing acoustic panels.

ACCESSIBILITY & WELLNESS	A3. EQUITY & INCLUSIVITY
Focus Area:	**Accessibility & Wellness**
Topic:	**Equity & Inclusivity**
Question:	**A3.1 – DEI Assessment** **Have the building features been evaluated against diversity, equity and inclusion (DEI) aspects to inform an implementation plan**

Answer

Select one of the following:	Points available:
- Yes – in-house assessment conducted	1
- Yes – third party DEI expert engaged	2
- Yes – implementation plan developed	3
- None of the above	0

Max. Points Available

3 - Pick one answer

Description

Inclusivity addresses equity of building use by different groups of occupants, providing a spectrum of amenities to support varying needs. This can include welcoming other users through building elements, such as Universal washrooms and family washrooms, or providing signage in different languages.

Promoting inclusivity within buildings can ensure that efforts to improve building wellness impact all building users equally. It is an opportunity to consider diversity and equity in planning and programming, to include components that support underrepresented, minority, and less visible user groups.

Requirements

A. Conduct an assessment that considers a variety of DEI strategies, and the feasibility of implementing them
B. Engage a third-party DEI expert to consider in-house assessment and help in the development of a building-specific DEI strategy
C. Develop a long-term DEI implementation plan based on the building-specific DEI strategies identified in the in-house assessment and through consultation with DEI expert

Refer to Other Notes below.

Documentation

- In-house assessment of DEI strategies
- Letter confirming engagement of third-party DEI expert, with their credentials
- Long-term DEI implementation plan

A3.1 – DEI Assessment - cont'd

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
None

Crosswalk
WELL Equity Rating

Other Notes
Strategies to consider include:
Amenities:
- Universal washrooms
- baby feeding room
- infant change tables in washrooms for all genders
- family washrooms
- gender neutral washrooms
- provision of free female hygiene products
- on-site childcare
- prayer/meditation/restorative room
- spaces provided for community events/meetings
- outdoor place of respite
- safety and security measures (e.g., lighting, areas of refuge, safe walk programs, visible entries and exits)
- training for tenants or employees (e.g., anti-racism, LGBTQIA+)
- other

Sense of Place:
- Ancestral land acknowledgement
- Historical community acknowledgement (e.g. slavery, ethno-cultural)
- Hosting events to celebrate location and connection to the community
- Public art or interior/exterior design elements, such as murals to reflect and celebrate ancestral land use and community
- Art by local Indigenous artists
- Conservation of heritage features
- Outdoor publicly-accessible and safe amenities
- Installations or permanent displays recognizing the local geography or environment
- Other structural or social strategies to enhance sense of place

ACCESSIBILITY & WELLNESS	A3. EQUITY & INCLUSIVITY
Focus Area:	**Accessibility & Wellness**
Topic:	**Equity & Inclusivity**
Question:	**A3.2 – Inclusive Amenities** **Have steps been taken to enhance inclusive amenities at the building?**

Answer

Select all that apply:	Points available:
- Universal washrooms	1
- baby feeding room	1
- infant change tables in washrooms for all genders	1
- family washrooms	1
- gender neutral washrooms	1
- provision of free female hygiene products	1
- on-site childcare	1
- prayer/meditation/restorative room	1
- spaces provided for community events/meetings	1
- outdoor place of respite	1
- safety and security measures (e.g., lighting, areas of refuge, safe walk programs, visible entries and exits)	1
- training for tenants or employees (e.g., anti-racism, LGBTQIA+)	1
- other	1
- none of the above	0

Max. Points Available

5 - Max points cap

Description

Inclusivity addresses equity of building use by different groups of occupants, providing a spectrum of amenities to support varying needs. This can include welcoming other users through building elements, such as Universal washrooms and family washrooms, or providing signage in different languages.

Promoting inclusivity within buildings can ensure that efforts to improve building wellness impact all building users equally. It is an opportunity to consider diversity and equity in planning and programming, to include components that support underrepresented, minority, and less visible user groups.

Requirements

For owner or landlord-controlled areas, indicate the inclusive amenity features that are implemented to make building users feel welcome

Documentation

- Description of strategies implemented with accompanying photos

A3.2 – Inclusive Amenities - cont'd

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
None

Crosswalk
WELL Equity Rating

Other Notes
The strategies covered under this question is meant to go above and beyond common tenant / occupant engagement initiatives. Applicants are required to demonstrate the effort taken to understand building-specific DEI challenges and opportunities.

By implementing strategies to create a sense of place that celebrates both relevant historic and contemporary cultures, Owner or landlords can foster community-building opportunities beyond the site boundaries.

Inclusivity efforts will enhance safety, security and comfort while promoting a sense of belonging for all building users and the broader community.

ACCESSIBILITY & WELLNESS	A3. EQUITY & INCLUSIVITY
Focus Area:	**Accessibility & Wellness**
Topic:	**Equity & Inclusivity**
Question:	**A3.3 – Sense of Place** **Have measures been implemented to enhance occupant and visitor inclusivity through creating a sense of place in the broader community?**

Answer

Select all that apply:	Points available:
- Ancestral land acknowledgement	1
- Historical community acknowledgement (e.g. slavery, ethno-cultural)	1
- Hosting events to celebrate location and connection to the community	1
- Public art or interior/exterior design elements, such as murals to reflect and celebrate ancestral land use and community	1
- Art by local Indigenous artists	1
- Conservation of heritage features	1
- Outdoor publicly-accessible and safe amenities	1
- Installations or permanent displays recognizing the local geography or environment	1
- Other structural or social strategies to enhance sense of place	1
- None	0

Max. Points Available

4 - Max points cap

Description

For owner or landlord-controlled areas, indicate the inclusive amenity features that are either planned or already implemented to make building users feel welcome

Requirements

Describe the measures implemented to enhance the property's sense of place

Documentation

- Description of strategies implemented with accompanying photos

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

A3.3 – Sense of Place - cont'd

References
None

Crosswalk
N/A

Other Notes
The strategies covered under this question is meant to go above and beyond common tenant / occupant engagement initiatives. Applicants are required to demonstrate the effort taken to understand building-specific DEI challenges and opportunities.

ACCESSIBILITY & WELLNESS	A4. OCCUPANT EXPERIENCE
Focus Area:	**Accessibility & Wellness**
Topic:	**Occupant Experience**
Question:	**A4.1 – Occupant Service Requests** **Is an Occupant Service Request Program in place?**

Answer

Select all that apply:	Points available:
- Yes – Occupant Service Request Program in place	1
- Yes – Evidence of requests resolved within 1 – 2 weeks	2
- No	0

Max. Points Available

3 - Pick all that apply

Description

Service requests for maintenance are used to identify issues pertaining to the building. Having a formal process in place allows tracking of various Key Performance Indicators (KPIs) such as critical equipment maintenance and critical building maintenance.

Building occupants (tenants and building staff) are important stakeholders in IAQ management. Promoting a better understanding of IAQ in the building will encourage feedback and demonstrate active management of IAQ concerns.

Building management must have in place a documented means for addressing occupant (tenant and building staff) concerns regarding maintenance service requests. Visitors to the building may also log service requests. Such service request logs can provide evidence of occupant dissatisfaction and its causes. Trends in complaint rates over time may indicate occupant reactions to changes in building operation.

Requirements

A. Describe the process used in the building to receive, document and respond to complaints (such as IAQ, temperature, smell, dust, dryness etc.)
B. The Occupant Service Request Program must include the following components:
   - A mechanism to ensure that all service requests are reviewed and acted upon within 1-2 weeks, unless otherwise specified (e.g., critical area or critical equipment) – see Other Notes
   - Information on the origins of the service request
   - Information on the status of the service request (e.g., in progress, resolved, etc.)
   - Information on the corrective action taken.
C. Service requests must be reviewed and acted upon within 1-2 weeks, unless otherwise specified (e.g., critical area or critical equipment).
D. Ensure there are considerations and direction provided for when a complaint can be handled by on-site maintenance staff and where the complaint requires escalation to bring in a third party
E. Describe procedures to follow if issues require more time to resolve

A4.1 – Occupant Service Requests - cont'd

Documentation

- Occupant Service Request Program
- Sample service requests received and resolved, such as closed work orders
- Demonstrate service requests are addressed within 1-2 weeks
- Provide communication with occupant as proof that matters were resolved

Adapted BB3 Question

Best Practice 8 – Is an Occupant Service Request Program in place?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house

References

None

Crosswalk

N/A

Other Notes

The Occupant Service Request Program must have a mechanism in place for recording the following information:

- Incident log number
- Occupant name, company and department, location in building.
- Date complaint was received;
- Description of complaint;
- Suggested cause;
- Summary of problem;
- Actions completed;
- Date of occupant interview (if applicable);
- Remedial action report;
- Date of when occupant was advised about actions taken;
- Additional details (as required)

ACCESSIBILITY & WELLNESS	A4. OCCUPANT EXPERIENCE
Focus Area:	**Accessibility & Wellness**
Topic:	**Occupant Experience**
Question:	**A4.2 – Occupant Satisfaction Survey** **Was an occupant satisfaction survey conducted in the last three years?**

Answer

Select all components covered in the survey:	Points available:
- Quality and effectiveness of building management and services	1
- Air quality	1
- Thermal comfort	1
- Lighting	1
- Acoustics, and/or noise	1
- Frequency and timeliness of communication and response times	1
- Inclusivity	1
- [Healthcare] Ease of interaction	1
- [Healthcare] Privacy	1
- Other	1
- No	0

Max. Points Available

4 - Max points cap

Description

Conducting regular occupant satisfaction surveys can help management better understand the issues/ priorities that matter most to occupants. Surveys can also help improve management-tenant relationships, and inform management priorities.

Requirements

A. Conduct an occupant satisfaction survey every two years, at a minimum
B. The survey must be provided to at least 50% of building occupants
C. Record the date the survey was distributed and survey recipients
D. Advertise the survey in different media channels, as appropriate, to encourage occupant participation
E. Compile survey results, detail corrective actions planned and implemented

Also see Other Notes

Documentation

- Survey questions
- Sample of occupant responses received
- Summary report, corrective actions planned and implemented

A4.2 – Occupant Satisfaction Survey - cont'd

Adapted BB3 Question
Question 10.02.01 - Does building management regularly conduct an occupant satisfaction survey that includes the following components?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
None

Crosswalk
N/A

Other Notes
Although there is no minimum rate of response required, a rate of 30% is encouraged for results to be considered informative

ACCESSIBILITY & WELLNESS	A5. TRAINING & INNOVATION
Focus Area:	**Accessibility & Wellness**
Topic:	**Training**
Question:	**A5.1 – Training in Accessibility & Wellness** **Did the building operations and management team receive Accessibility & Wellness training in the previous three years?**

Answer

Indicate which topics are covered in the training:		Points available:
- Accessibility, Equity	Yes or No	1
- Comfort, Views & Acoustics	Yes or No	1
- Occupant Experience	Yes or No	1

Max. Points Available

3 - Pick all that apply

Description

In order for building maintenance staff to effectively manage the building's Accessibility & Wellness, training should be provided which addresses the topics of accessibility, comfort, views, acoustics, occupant experience and equity.

Over time, technologies and preferred practices in building operations and maintenance change. Providing regular professional development opportunities is a good way to help retain staff. Offering training and educational opportunities related to environmental/sustainable building performance not only benefit staff but improve the performance of the building when staff training is applied at the building level.

Requirements

A. List the names of staff members to whom the competencies covered under these topics would apply
B. Provide the applicable course outline or syllabus
C. Provide evidence of competency or training received such as credentials, completion certificate, record of attendance

Documentation

- Name of building O&M team member who received the training
- Course outline or syllabus
- Training Certificate or Record of Attendance

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

A5.1 – Training in Accessibility & Wellness - cont'd

Suggested Lead
In-house, with third-party support

References
N/A

Crosswalk
None

Other Notes
None

ACCESSIBILITY & WELLNESS	A5. TRAINING & INNOVATION
Focus Area:	**Accessibility & Wellness**
Topic:	**Innovation**
Question:	**A5.2 – Innovation in Accessibility & Wellness** **Is an innovative process or technology in place at the building that goes beyond the requirements outlined in this section?**

Answer

Select all that apply:	Points available:
- [ESC, Univ, LI, OAR, MURB] Visual / Acoustic elements reviewed	1
- [LI/OAR] Evidence of Accessibility & Wellness communication share with tenant	1
- Other	1
- Not applicable	-

Max. Points Available

1 - Max points cap

Description

Many processes and technologies exist that go beyond the standards and requirements set out in the BOMA BEST Assessment. If building managers/owners have invested in innovative processes or technologies that go beyond these standards, innovation points can be earned under this question.

Requirements

A. Provide details of the technology or process applied at the building
B. Indicate when the technology or process was implemented and the steps that are in place to ensure the technology or process' ongoing success
C. [If "Other" is selected] Explain how the technology or process has improved the building's accessibility and wellness practices for it to be considered innovative

Documentation

- Narrative of innovative technology or process and its impact

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

A5.2 – Innovation in Accessibility & Wellness - cont'd

References
None

Crosswalk
N/A

Other Notes
Visual / Acoustic elements reviewed may include: access to views and natural light, quality of electric light, glare control devices, corrective actions addressed, plan to address higher cost corrective actions.

CUSTODIAL & WASTE	P0. BASELINE PRACTICES
Focus Area:	**Custodial & Waste**
Topic:	**Baseline Practices**
Question:	**P2.0 – Green Cleaning Program** **Is a Green Cleaning Program in place at the building?**

Answer
Select one of the following:
- Yes
- Not applicable

Max. Points Available
Minimum Requirement, this is a baseline practice

Description
A Green Cleaning Program emphasizes the use of environmentally preferred products, maintenance of cleaning equipment and effective cleaning practices.

Requirements
A. Develop a building-specific Green Cleaning Program that covers the following:
   - Responsible parties, including the building team and cleaning staff's training requirements
   - Standard operating procedures (SOP) for cleaning activities and waste collection
   - Specify cleaning products and supplies to be used, requiring that at least half (by total volume) meets third-party recognized green cleaning standards (see Other Notes)

B. Specify cleaning equipment to be used, requiring that the majority of vacuums use HEPA filtration or is a chemical-free cleaning system or is a mobile UV cleaning device

C. Program must be signed by the building manager, dated within the past 12 months.

Where custodial services are managed and delivered by the tenants and their service providers, the owner or landlord must provide information to the tenants on how to implement a Green Cleaning Program

Documentation
- Building-specific Green Cleaning Program
- Proof that program was shared with tenants

Adapted BB3 Question
Best Practice 11 and Question 07.04.01 – Is a Green Cleaning Program in place at the building? Is high-efficiency cleaning equipment used in the building?

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

P2.0 – Green Cleaning Program - cont'd

Suggested Lead
In-house

References
EcoLogo
Green Seal: https://greenseal.org/wp-content/uploads/GS-42-CleaningServicesGuidebook_2021_02.pdf
US EPA Safer Choice
GREENGUARD
Forest Stewardship Council (FSC)
Sustainable Forestry Initiative (SFI)
Sustainable Forest Management Standard (SFMI)

Crosswalk
N/A

Other Notes
Green Cleaning Program can be integrated into Janitorial / Custodial service provider's contract.

Where custodial services are contracted, communicate custodial goals and green cleaning initiatives to the contracted company. The contracted company must provide the building manager with documentation showing the same information outlined in the requirements.

Third-party recognized green cleaning standards include: EcoLogo, Green Seal, US EPA Safer Choice, GREENGUARD, Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), Sustainable Forest Management Standard (SFMI) or equivalent.

CUSTODIAL & WASTE	P0. BASELINE PRACTICES
Focus Area:	**Custodial & Waste**
Topic:	**Baseline Practices**
Question:	**P4.0a – Waste Audit** **Has a Waste Audit been completed for the building in the past three years?**

Answer

Select one of the following:

- Yes – audit conducted every three years, and waste sampling took place over one day
- Not applicable

Max. Points Available

Minimum Requirement, this is a baseline practice

Description

Improving waste management practices requires knowledge regarding the nature and mass of waste collected on-site. Often data provided by waste haulers is not always based on weighted data, making a reliable analysis of a building's performance impossible. Regular auditing of the waste generated on a site is therefore recommended to gain a more accurate understanding of the volume of waste generated, size of different waste streams and where waste is taken once it leaves the building site.

Requirements

A. The Waste Audit must address:
   - The time period and duration of waste sampling
   - The sample size representing a minimum of 10% of the building's waste and recycling materials and reasons why the sample is representative
   - Details specific to each stream and if each stream has an available program locally for collection for recycling or reuse
   - How the waste data was categorized, evaluated and analyzed based on its composition (the site must be equipped with a minimum number of worktables, precise scales, and mobile containers for weighing the waste)

B. The Waste Audit Report must include:
   - Summary of the sampling protocol and methodology used
   - Total of each waste stream and overall total waste
   - Audit diversion rate
   - Audit capture rate
   - If data is extrapolated to represent annual waste weights or volumes, describe the calculation methodology used
   - Summary of recommendations for improving waste diversion
   - Suggested implementation plan for recommendations
   - Credentials of third-party who conducted the audit

P4.0a – Waste Audit - cont'd

Documentation

- Waste Audit Report
- Demonstrate that sampling duration constitutes a representative sample of the building's waste distribution behaviour

Adapted BB3 Question

Best Practice 13 – Has a Waste Audit been completed for the building in the past three years?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead

Third-party

References

BOMA BEST Waste Audit Guiding Principles – http://bomacanada.ca/wp-content/uploads/2016/09/BOMA-Canada-Waste-Auditing-Guide.pdf
BOMA BEST Waste Auditing Requirements – https://bomacanada.ca/wp-content/uploads/2016/09/BOMA-BEST-Waste-Auditing-Requirements.pdf

Crosswalk

3R Certified

Other Notes

Waste audits conducted with the exclusive use of cameras in bins are not admissible.

At a minimum, a waste audit should be carried out every three years. Annual audits are recommended. Auditing is a scientific approach aimed at collecting precise data about the characteristics of waste, including its mass, composition, waste stream and methods of disposal. To be credible, auditing should be conducted using a trustworthy methodology. In addition, it should clearly establish the different criteria and methods of evaluation, as outlined in an initial protocol

CUSTODIAL & WASTE	P1. PROCUREMENT
Focus Area:	**Custodial & Waste**
Topic:	**Procurement**
Question:	**P1.1 – Circular Economy Procurement Strategy** **Are circular economy procurement strategies implemented and maintained in building management activities?**

Answer

Select one of the following:	Points available:
- Yes – circular economy strategies are implemented	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Green or sustainable procurement typically concentrates on how to improve sustainable practices within a linear economic model and as a result, focus can be narrowly applied to individual components, such as what materials are used in the product.

On the other hand, circular procurement focuses on the value of a product, considers needs, best use, and end of life management. Within this system, it is possible to leverage the full value of a product or material while minimizing environmental and social impacts.

While waste diversion may be a critical piece of the company's sustainability objectives, its interrelationship with procurement is rarely recognized. When end-of-life considerations are included in procurement decisions less waste is generated, and diversion and capture rates increase.

Requirements

A. How equipment is selected to reduce the environmental impact over its life cycle
B. How resources use is optimized to reduce consumption, or generate energy/collect water on-site
C. Source food products from local suppliers, select durable or refurbished products
D. Inform procurement decisions by considering waste creation and vendor take-back programs

Documentation

- Procurement policy highlighting any of the aspects listed above
- Documentation showing an example of each strategy implemented

Adapted BB3 Question

Question 06.01.01 – Is an environmental procurement program in place at the building that includes the following components?

P1.1 – Circular Economy Procurement Strategy - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house

References
BOMA Canada – Circular Economy in Commercial Real Estate Focus: Circular Procurement: https://bomacanada.ca/wp-content/uploads/2022/09/BOMACANADA_CircularEconomyBrief_2022_EN.pdf
Circular Innovation Council - https://circularinnovation.ca/circular-economy/

Crosswalk
N/A

Other Notes
None

CUSTODIAL & WASTE	P1. PROCUREMENT
Focus Area:	**Custodial & Waste**
Topic:	**Procurement**
Question:	**P1.2 – Social Procurement Strategy** **Are social procurement strategies implemented and maintained in building management activities?**

Answer

Select one of the following:	Points available:
- Yes – social procurement strategies are implemented	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Green or sustainable procurement typically concentrates on how to improve sustainable practices within a linear economic model and as a result, focus can be narrowly applied to individual components, such as what materials are used in the product.

On the other hand, circular procurement focuses on the value of a product, considers needs, best use, and end of life management. Within this system, it is possible to leverage the full value of a product or material while minimizing environmental and social impacts.

While waste diversion may be a critical piece of the company's sustainability objectives, its interrelationship with procurement is rarely recognized. When end-of-life considerations are included in procurement decisions less waste is generated, and diversion and capture rates increase.

Requirements

A. Award contracts to local, independent and/or socially responsible businesses
B. Partner with equity-seeking groups to fill staffing positions and apprentice opportunities

Documentation

- Procurement policy highlighting any of the aspects listed above
- Documentation showing an example of each strategy implemented

Adapted BB3 Question

Question 06.01.01 – Is an environmental procurement program in place at the building that includes the following components?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

P1.2 – Social Procurement Strategy - cont'd

Suggested Lead
In-house

References
City of Toronto's Social Procurement Program: https://www.toronto.ca/business-economy/doing-business-with-the-city/social-procurement-program/

Crosswalk
N/A

Other Notes
None

CUSTODIAL & WASTE	P2. CUSTODIAL MAINTENANCE & OPERATIONS
Focus Area:	**Custodial & Waste**
Topic:	**Custodial Maintenance & Operations**
Question:	**P2.1 – Pest Management** **Is an Integrated Pest Management Program in place?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Unhygienic conditions can result in the presence and proliferation of organisms that produce harmful or irritating by-products.

Requirements

A. Develop a building-specific Integrated Pest Management Program that covers:
   - Responsible parties, including the building team's training requirements
   - Standard operating procedures (SOP) for pest management
   - Interior and exterior pest management products and supplies to be used
   - Guidance about the use of environmentally preferable or low-risk pesticides and circumstances when the use of conventional products are appropriate
   - Strategies about storing food in sealed containers with daily disposal
   - Proactive inspection for evidence of pests, at least monthly
   - How to manage communications with tenants when pesticide applications are needed

B. Program must be signed by the building manager, dated within the past 12 months

C. Where pest management services are managed and delivered by the tenants and their service providers, the owner or landlord must provide information to the tenants on how to implement a Pest Management Program

Documentation

- Building-specific Integrated Pest Management Program
- Proof that Program was shared with Tenants

Adapted BB3 Question

Question 07.03.02 – Are pest reduction strategies in place at the building?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

P2.1 – Pest Management - cont'd

Suggested Lead
In-house

References
Integrated Pest Management – https://ipminstitute.org/what-is-integrated-pest-management/

Crosswalk
N/A

Other Notes
None

CUSTODIAL & WASTE	P2. CUSTODIAL MAINTENANCE & OPERATIONS
Focus Area:	**Custodial & Waste**
Topic:	**Custodial Maintenance & Operations**
Question:	**P2.2 – Enhanced Cleaning Protocols** **Is there an Enhanced Cleaning Protocol in place during flu season or for pandemic response?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available

2 - Pick one answer

Description

During flu season and pandemic response there is elevated risk for frequently touched surfaces to harbour bacteria and viruses.

Frequently touched surfaces, such as door handles and elevator buttons and shared common area, such as kitchens, washrooms can harbour bacteria and viruses for extended periods.

An enhanced sanitation schedule must be developed which identifies frequently touched surfaces (e.g., door handles/knobs, elevator call buttons, handrails, light switches, faucets, drinking water stations, kitchen equipment, countertops, shared Office equipment, etc.) and commonly shared areas (e.g., fitness rooms, boardrooms, break areas, shared kitchens, shared washrooms, shared Office equipment, lobbies, hallways, elevators, stairs, etc.).

Requirements

A. Develop Enhanced Cleaning Protocols as follows:
- Frequently touched surfaces should be easily cleanable and sanitized with a disinfectant at least twice daily during flu season, a pandemic response, or similar circumstances
- Use acceptable disinfection products registered with Health Canada (DIN), products certified by Ecologo or equivalent
- Hand sanitizers should contain at least 60% alcohol content for effective virus control, approved for use by your local health authority and be placed in central locations for easy access
- Signage: raise awareness, reminders of handwashing, safe distancing etc.
- Scheduling: increase cleaning frequency to at least twice daily to disinfect high contact and commonly shared areas
- Maintenance: increase the supply and upkeep of soap, toilet paper, and paper towels
- Training: ensure building and custodial staff are appropriately trained in proper cleaning and safety techniques

P2.2 – Enhanced Cleaning Protocols - cont'd

B. Provide evidence that the enhanced cleaning protocol was implemented (e.g. hi-touch cleaning)
C. Where custodial services are managed and delivered by the tenants and their service providers, the owner or landlord must provide information to the tenants on how to implement enhanced cleaning protocols

Documentation
- Building-specific Enhanced Cleaning Protocol
- Proof that Program was shared with Tenants

Adapted BB3 Question
Question 07.03.01 – Does the building management maintain an inventory and sanitation schedule for frequently touched surfaces?

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
Third-party

References
Health Canada – Hard-surface disinfectants and hand sanitizers (COVID-19): https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19.html
BOMA Canada's Pandemic Guide – https://bomacanada.ca/wp-content/uploads/2021/07/BOMA_PandemicGuide_2021_EN-v2.pdf
Hand Washing, Cleaning, Disinfection and Sterilization in Health Care – https://publications.gc.ca/collections/collection_2016/aspc-phac/HP3-1-24-S8-eng.pdf
Centres for Disease Control and Prevention– https://www.cdc.gov/infectioncontrol/guidelines/disinfection/index.html

Crosswalk
N/A

Other Notes
None

CUSTODIAL & WASTE	P3. CUSTODIAL ASSESSMENT
Focus Area:	**Custodial & Waste**
Topic:	**Custodial Maintenance & Operations**
Question:	**P3.1 – Cleaning Products & Equipment in use** **Do the cleaning products and equipment used in the building meet the Green Cleaning Program requirements**

Answer

Select any of the following as applicable:	Points available:
- More than half of total volume of cleaning products meet third-party green cleaning standards	1
- Majority of vacuums use HEPA filtration	1
- Some of the cleaning equipment is a chemical-free cleaning system	1
- Some of the cleaning equipment is a mobile UV cleaning device	1
- Less than half of the cleaning products are compliant	1
- None of the cleaning equipment is compliant	0

Max. Points Available

3 - Max points cap

Description

Well-maintained, high-performing cleaning equipment reduces the required amount of water, disposable cleaning products and frequency of cleaning as well as reducing the spread of indoor air contaminants.

Requirements

A. Develop an inventory of all cleaning products and equipment used in the building
B. Conduct a survey annually of the products and equipment in use to determine the extent to which green cleaning requirements are being met
C. Identify corrective actions addressed and planned (if it is not possible to remedy immediately)

Documentation

- Inspection records, dated within the last year
- Photos, receipts, etc. of the cleaning products and equipment that meet Green Cleaning requirements

Adapted BB3 Question

Question 07.04.01 – Is high efficiency cleaning equipment used in the building?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead

In-house

P3.1 – Cleaning Products & Equipment in use - cont'd

References
None

Crosswalk
N/A

Other Notes
A chemical-free cleaning system includes devices that use ionized, ozonated, or electrolyzed water as a substitute for cleaning chemicals.

CUSTODIAL & WASTE	P3. CUSTODIAL ASSESSMENT
Focus Area:	**Custodial & Waste**
Topic:	**Custodial Maintenance & Operations**
Question:	**P3.2 – Custodial and Pest Management Assessment** **Has an assessment of the building's custodial practices been conducted in the last two years?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Independent assessment of custodial and pest management practices ensure that the building's cleanliness and pest management goals are being met.

Requirements

A. Engage someone who is not affiliated with the custodial management staff to assess whether the building's green cleaning program requirements are being met to complete the following:
   - Review the custodial and pest management service providers' Standard Operating Procedures and evaluate to what extent these are implemented at the building
   - Check cleaning products and equipment specified and evaluate to what extent these are used at the building
   - Check pesticides applied over the last two years, the extent of low-risk vs. conventional pesticides applied and determine if changes are needed
   - Create an inventory of the different space use types, visit a representative sample of these spaces and determine the level of cleanliness and pest management in each
   - Summarize findings, indicating what areas need improvement

B. Guidelines how the areas can be improved

C. Identify corrective actions addressed and planned (if it is not possible to remedy immediately)

Documentation

- Custodial Effectiveness Assessment Report
- Credentials of person(s) conducting the assessments
- Photos, etc. demonstrating corrective actions addressed

Adapted BB3 Question

Question 07.02.01 – Is a green cleaning audit conducted annually at the building?

P3.2 – Custodial and Pest Management Assessment - cont'd

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house (someone not directly involved with cleaning services)

References
None

Crosswalk
N/A

Other Notes
None

CUSTODIAL & WASTE	P4. WASTE AUDIT & MEASUREMENT
Focus Area:	**Custodial & Waste**
Topic:	**Waste Audit & Measurement**
Question:	**P4.1 – More frequent or detailed Waste Audit** **Has a Waste Audit been completed for the building in the past years or sampling for more than 24 hours?**

Answer

Select all that apply:	Points available:
- Yes – audit conducted every year	3
- Yes – waste sampling took place over two days	1
- Yes – waste sampling took place over three or days	2
- No	0

Max. Points Available

5 - Max points cap

Description

Improving waste management practices requires knowledge regarding the nature and mass of waste collected on-site. Often data provided by waste haulers is not always based on weighted data, making a reliable analysis of a building's performance impossible. Regular auditing of the waste generated on a site is therefore recommended to gain a more accurate understanding of the volume of waste generated, size of different waste streams and where waste is taken once it leaves the building site.

Requirements

A. Waste Audit needs to meet requirements laid out in Question P4.0a
B. Highlight section that provides audit date and sampling duration

Documentation

- Waste Audit Report

Adapted BB3 Question

Best Practice 13 – Has a Waste Audit been completed for the building in the past three years?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead

Third-party

P4.1 – More frequent or detailed Waste Audit - cont'd

References

BOMA BEST Waste Audit Guiding Principles – http://bomacanada.ca/wp-content/uploads/2016/09/BOMA-Canada-Waste-Auditing-Guide.pdf

BOMA BEST Waste Auditing Requirements – https://bomacanada.ca/wp-content/uploads/2016/09/BOMA-BEST-Waste-Auditing-Requirements.pdf

Crosswalk

3R Certified

Other Notes

At a minimum, a waste audit should be carried out every three years. Annual audits are recommended. Auditing is a scientific approach aimed at collecting precise data about the characteristics of waste, including its mass, composition, waste stream and methods of disposal. To be credible, auditing should be conducted using a trustworthy methodology. In addition, it should clearly establish the different criteria and methods of evaluation, as outlined in an initial protocol

CUSTODIAL & WASTE	P4. WASTE AUDIT & MEASUREMENT
Focus Area:	**Custodial & Waste**
Topic:	**Waste Audit & Measurement**
Question:	**P4.2 – Corrective Action** **Is there evidence of Waste Audit corrective actions implemented in the last five years?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available
3 - Pick one answer

Description
Improving waste management practices requires knowledge regarding the nature and mass of waste collected on-site. Regular auditing of the waste generated on a site is therefore recommended to gain a more accurate understanding of the volume of waste generated, size of different waste streams and where waste is taken once it leaves the building site

Requirements
A. Reference the Waste Audit Report and demonstrate any corrective actions taken
B. Explain why recommended actions were not addressed, with implementation plan/schedule if actions were deferred due to cost constraints

Documentation
- Narrative with photos or correspondence showing corrective actions taken

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house

References
None

Crosswalk
3R Certified

Other Notes
None

CUSTODIAL & WASTE	P4. WASTE AUDIT & MEASUREMENT
Focus Area:	**Custodial & Waste**
Topic:	**Waste Audit & Measurement**
Question:	**P4.3 – Diversion Rate**

Answer

Indicate which range is representative of your building's waste diversion rate:	Points available:
- 90% and higher	4
- 75 to <90%	3
- 60 to <75%	2
- 40 to <60%	1
- 20 to <40%	0
- Less than 20%	-

Max. Points Available

4 - Pick one answer

Description

Improving waste management practices requires knowledge regarding the nature and mass of waste collected on-site. Often data provided by waste haulers is not always based on weighted data, making a reliable analysis of a building's performance impossible. Regular auditing of the waste generated on a site is therefore recommended to gain a more accurate understanding of the volume of waste generated, size of different waste streams and where waste is taken once it leaves the building site.

Requirements

A. Provide yearly data on weights of all waste streams collected. Some streams will have weights provided from haulers, while others will need to be approximated using number of pick-ups (schedules), the volume of the bins (cubic yards) and fill-level data if available
B. The diversion rate must be based on 12 months of data. Data cannot be older than the past three (3) years.
C. If available, included weights of tenant-managed bins. Indicate if weights are approximated or actual
D. Calculate waste diversion as follows: [A / (A+B)] x 100
   A = Annual weight of all materials currently diverted from disposal
   B = Annual weight of all materials currently sent for disposal (includes landfill, incineration and EFW)
E. Express the annual weight in metric tonnes or kilograms.

Documentation

- If information is not contained in Waste Audit, then provide:
- Table showing (at least) the last 2 years of whole building waste data
- Calculation method used to determine the 12-month average
- Narrative of approach, waste weight vs volume, conversion factors applied, etc.

P4.3 – Diversion Rate- cont'd

Adapted BB3 Question
Question 08.02.01 and 08.02.02 – What is the building's Reduce, Reuse, Recycle (3Rs) diversion rate? What is the building's capture rate?

Applicability
Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead
In-house

References
GRESB: See Appendix 7 on estimation methodology: https://documents.gresb.com/generated_files/real_estate/2021/real_estate/reference_guide/complete.html#estimation_methodology
Also see recent GRESB update to Appendix 7 that states that sensor fill-levels can be used, or bin can be assumed at 100% if fill-levels are not known (page 21):
https://gresb-prd-public.s3.amazonaws.com/2022/2023+Standards/List+of+2023+Changes+GRESB+Real+Estate

Crosswalk
3R Certified

Other Notes
If waste audits were not conducted during Covid, reference the last Waste Audit that was completed before Covid.

Calculating a yearly diversion number from yearly pick-up data is considered the preferred method over the Waste Audit diversion number. Where weights are provided from haulers, these can be submitted and indicated as real weights. Where the number of hauls and bin sizes per stream are available only, these will be converted to weights using EPA densities and assuming full bins (unless reliable fill-level data can be provided).

For density of material, the EPA provides standard densities for each material type which is the current highest standard in the industry: https://www.epa.gov/smm/volume-weight-conversion-factors-solid-waste-to-convert-volume-to-weight

CUSTODIAL & WASTE	P5. WASTE MANAGEMENT
Focus Area:	**Custodial & Waste**
Topic:	**Waste Management**
Question:	**P5.1a – Workplan** **Is a Waste Reduction Work Plan in place at the building?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Source separation strategy facilitates the separation of waste at the point of generation for recycling and waste destined for disposal.

Requirements

A. Reference the Waste Audit and develop the following:
- A building-specific Waste Reduction Work Plan that covers the following:
- Responsible parties, including the building team's training requirements
- Standard operating procedures (SOP) for waste collection
  - Identify the waste streams generated at the building, covering the following:
  - Recyclables, such as paper (general, mixed and confidential shredded paper), metal cans, glass, plastics (rigid or soft), cardboard etc.
  - Food and organics, such as food waste, coffee pods, grease/cooking oil, containers, cutlery, etc.
  - Electronic waste (e-waste), batteries, printer cartridges etc.
  - Waste (or garbage)
  - Construction and renovation (skids, light bulbs, etc.)
  - Furniture, equipment
  - Miscellaneous
  - Treatment of contaminated waste
  - hazardous
  - Tenant-managed waste
  - Describe each stream's waste removal strategy, such as:
  - Identify the different waste streams collected at the building (at least two streams (garbage, mixed or paper recycling)
  - How waste is collected within the building and site (describe the on-site source separation strategies)
  - Who collects each of the current waste streams from the building and site
  - [Optional] Determine if there any waste streams that represent >15% of the total waste stream (as measured in the waste audit sample) and separate collection is not yet set up at the building

P5.1a – Workplan - cont'd

  - Waste hauling destination
  - Frequency of collection
- Outcomes and recommendations from the most recent waste assessment
- Clear outline of the waste reduction plan for the next 12-24 months

B. Program must be signed by the building manager, dated within the past 12 months

Documentation

- Waste Reduction Workplan
- Proof that program was shared with tenants

Adapted BB3 Question

Best Practice 12 and Best Practice 14 – Is a Source Separation Program in place at the building? Is a Waste Reduction Work Plan in place at the building?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

Suggested Lead

In-house, with third-party support

References

3R Certified: http://3rcertified.ca/

Crosswalk

Other Notes

This work plan incorporates many other areas of the BOMA waste section into a unified plan, and will be used to verify and cross-reference other claims

CUSTODIAL & WASTE	P5. WASTE MANAGEMENT
Focus Area:	**Custodial & Waste**
Topic:	**Waste Management**
Question:	**P5.2a – Waste Management Strategies** **Is a program in place at the building for recycling, waste avoidance, reuse or donation of the following waste streams?**

Answer

Select all that apply:	Points available:
- (If applicable) New waste stream collection set up (i.e. >15% identified in Question P4.1a)	1
- Paperless initiatives	1
- E-waste and batteries	1
- Bulk dispensers	1
- Water refill stations (in owner or landlord-managed spaces)	1
- Food waste donation (in owner or landlord-managed spaces)	1
- Community reuse partnerships with charities for products, such as furniture and computers	1
- None of the above	0

Max. Points Available

4 - Max points cap

Description

"Programs that reduce waste and recycling generation and reuse products instead of putting them into the waste stream is an important piece of a waste reduction strategy. A transition to a circular economy must go beyond recycling, and also promote the reuse of existing materials, or the elimination of their production in the first place. Making a new product emits greenhouse gases that contribute to climate change and requires a lot of materials and energy – raw materials must be extracted from the earth, and the product must be fabricated then transported to wherever it will be sold. As a result, reduction and reuse are the most effective ways you can save natural resources, protect the environment and save money." (Source: https://www.epa.gov/recycle/reducing-and-reusing-basics)

Requirements

A. Indicate all reduction, reuse and donation programs implemented at the building
B. (If applicable) Set up separate collection of waste streams that represent more than 15% of the total waste stream (as measured in the waste audit sample), where separate collection was not previously set up
C. Collect documentation to demonstrate these initiatives are in place, such as
   - Donation program partnerships
   - Confirmed pick-ups from charities or organizations
   - Launch of reduction/avoidance campaigns (e.g., paperless)
   - Sourcing of items that promote bulk use (e.g., soap dispensers)

P5.2a – Waste Management Strategies - cont'd

Documentation

- Emails, memo, service agreements, photos or any other evidence which demonstrate requirements are met

Adapted BB3 Question

Questions 08.03.01, Question 08.03.02 and Question 08.03.03 – Are any of the following waste diversion initiatives in place at the building? Has the recycling program been expanded to include any of the following waste materials? Are reuse initiatives in place at the building that have the potential to result in less waste disposed?

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre and Universal buildings

Suggested Lead

In-house

References

Circular Economy: https://circularinnovation.ca/circular-economy/
The Waste Hierarchy: https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/warr-strategy/the-waste-hierarchy

Crosswalk

3R Certified

Other Notes

- Reduction can be hard to measure. Evaluate if the waste would have been produced at the building had the initiative not put in place
- Check whether the service schedule is appropriate given the proportion of the stream. For example: a building with food service establishments would need an organics program that is picked up more than every other week.
- Ensure that streams are set up in locations that will maximize the success of the program
- Initiatives not covered here can be included under Innovation

CUSTODIAL & WASTE	P5. WASTE MANAGEMENT
Focus Area:	**Custodial & Waste**
Topic:	**Waste Management**
Question:	**P5.3 – Bin-sizing** **Is there evidence of bin right-sizing as recycling and reuse programs are established and efficiencies are required with changing volumes across waste streams?**

Answer

Select all that apply:	Points available:
- Yes – regular visual assessments	1
- Yes – sensors installed	2
- Yes – corrective actions implemented	2
- None of the above	0

Max. Points Available

5 - Pick all that apply

Description

Optimization of service schedules can occur with the assistance of bin sensors (IoT Technology), or by on-site monitoring of fullness levels on the days prior to pick-up and making adjustments based on these visual assessments.

Carbon dioxide (CO_2) reductions result when eliminating unnecessary truck trips to sites, and programs are better utilized when schedules reflect correct projected volumes.. The goals is to reduce waste and reduce the number of waste pick-ups needed.

Requirements

A. Evidence of a monitoring system for fullness levels, either through regular visual inspections or sensor technology
B. Demonstrate corrective action taken to adjust schedules and/or bin sizes

Documentation

- Photos of bin fullness levels from visual assessment or sensors
- Correspondence regarding bin schedule or bin size adjustments

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

P5.3 – Bin-sizing - cont'd

Suggested Lead
In-house, with third-party support

References
Smart waste management solutions deliver reduction in CO2 emissions caused by the waste collection process: https://cordis.europa.eu/project/id/101010676/reporting

Crosswalk
3R Certified

Other Notes
IoT technology is more accurate and offers more benefits (such as the identification of contamination in bins and data trend lines), but could be considered proprietary. On-site visual assessments to ensure bin right sizing will also be awarded points

CUSTODIAL & WASTE	P6. RENOVATIONS & CONSTRUCTION
Focus Area:	**Custodial & Waste**
Topic:	**Renovations & Construction**
Question:	**P6.1 – Waste Management in Construction** **Is a Construction Waste Management Program in place to minimize waste impacts during renovation and construction?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Renovation, construction, and demolition projects create a lot of waste materials (about 30% of Canada's disposal) and need to be effectively managed to minimize the adverse impact on the environment.

These materials are largely inert, very heavy and can pose unique challenges in source separation because most materials are combined and difficult to recycle. This is further complicated because the Project Managers for C&D projects work in a separate department and interdepartmental collaboration is minimal .

Without effective communication and planning from the initial project design stages, waste minimization and diversion is nearly impossible.

Requirements

A. Develop and implement a Construction Waste Management Program that covers:
   - Responsible parties, including the building team's training requirements
   - Plan to sort discarded materials into corresponding waste bins for separation, reuse/recycling and haul off-site by a verified hauler
   - Details on how construction waste materials are handled, how waste is tracked, and diverted/garbage volumes reported

B. Program must be signed by the building manager, dated within the past 12 months

C. Where construction services are managed and delivered by the tenants and their service providers, the owner or landlord must provide information to the tenants on how to implement a Construction Waste Management Program

Documentation

- Building-specific Construction Waste Management Program

P6.1 – Waste Management in Construction - cont'd

Adapted BB3 Question
Question 08.01.02 – Is a program in place at the building to minimize construction, renovation and/or demolition waste being sent to landfill?

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
3R Certified

Other Notes
None

CUSTODIAL & WASTE	P6. RENOVATIONS & CONSTRUCTION
Focus Area:	**Custodial & Waste**
Topic:	**Renovations & Construction**
Question:	**P6.2 – Waste Control in Construction Specifications** **Are the construction waste controls included in specifications for owner or landlord renovation or construction projects?**

Answer

Select all that apply:	Points available:
- Yes – included in specifications	1
- Yes – evidence of implementation exists	1
- No	0

Max. Points Available

2

Description

Renovation, construction, and demolition projects create a lot of waste materials (about 30% of Canada's disposal) and need to be effectively managed to minimize the adverse impact on the environment.

These materials are largely inert, very heavy and can pose unique challenges in source separation because most materials are combined and difficult to recycle. This is further complicated because the Project Managers for C&D projects work in a separate department and interdepartmental collaboration is minimal.

Without effective communication and planning from the initial project design stages, waste minimization and diversion is nearly impossible.

Requirements

Before construction:

A. Develop design and construction specifications for all owner or landlord-led renovation or construction projects being planned in the building
B. Ensure all items covered in the building-specific Construction Waste Management Program are covered in the design and construction specifications
C. Include directive in the specifications that binds the contractor to follow the Construction Waste Management Program during construction

During and after construction:

D. Identify construction projects to implement the Construction Waste Management Program
E. Gather the specifications for those projects and highlight the sections detailing the construction waste control measures to follow
F. Conduct regular inspections and document where and how the construction waste management are followed

P6.2 – Waste Control in Construction Specifications - cont'd

G. Keep a record of the inspections and track implementation of waste sorting activities for the duration of the construction project

Documentation

- Section of construction specifications detailing waste control measures
- Section of construction specifications detailing contractor commitment
- Photos, way bills or inspection reports demonstrating implementation of the program

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

None

Crosswalk

3R Certified

Other Notes

None

CUSTODIAL & WASTE	P6. RENOVATIONS & CONSTRUCTION
Focus Area:	**Custodial & Waste**
Topic:	**Renovations & Construction**
Question:	**P6.3 – Waste Management in Tenant Construction** **Are the construction waste controls included in specifications for tenant renovation or construction projects?**

Answer

Select one of the following:	Points available:
- Yes	1
- No	0

Max. Points Available

1 - Pick one answer

Description

Renovation, construction, and demolition projects create a lot of waste materials (about 30% of Canada's disposal) and need to be effectively managed to minimize the adverse impact on the environment.

These materials are largely inert, very heavy and can pose unique challenges in source separation because most materials are combined and difficult to recycle. This is further complicated because the Project Managers for C&D projects work in a separate department and interdepartmental collaboration is minimal.

Without effective communication and planning from the initial project design stages, waste minimization and diversion is nearly impossible.

Requirements

A. Develop tenant construction manuals for all tenant-led renovation or construction projects being planned in the building
B. Share the building-specific Construction Waste Management Program with tenants to include in their design and construction specifications

Documentation

- Section of tenant construction manual detailing construction waste management measures

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

P6.3 – Waste Management in Tenant Construction - cont'd

Suggested Lead
In-house

References
None

Crosswalk
3R Certified

Other Notes
None

CUSTODIAL & WASTE	P7. TRAINING & INNOVATION
Focus Area:	**Custodial & Waste**
Topic:	**Training**
Question:	**P7.1 – Training in Custodial & Waste** **Did the building operations and management team receive Custodial & Waste training in the previous three years?**

Answer

Indicate which topics are covered in the training:		Points available:
- Procurement	Yes or No	1
- Custodial O&M and Assessment	Yes or No	1
- Waste Management, Audit and Measurement	Yes or No	1
- Waste in Renovations & Construction	Yes or No	1
- No		0

Max. Points Available

4 - Pick all that apply

Description

In order for building maintenance staff to effectively manage the building's Custodial & Waste, training should be provided which addresses the topics of custodial maintenance & operations, custodial assessment, waste management, waste audit and measurement and renovations and construction.

Over time, technologies and preferred practices in building operations and maintenance change. Providing regular professional development opportunities is a good way to help retain staff. Offering training and educational opportunities related to environmental/sustainable building performance not only benefit staff but improve the performance of the building when staff training is applied at the building level.

Requirements

A. List the names of staff members to whom the competencies covered under these topics would apply
B. Provide the applicable course outline or syllabus
C. Provide evidence of competency or training received such as credentials, completion certificate, record of attendance

Documentation

- Name of building O&M team member who received the training
- Course outline or syllabus
- Training Certificate or Record of Attendance

Adapted BB3 Question

New in BOMA BEST 4.0

P7.1 – Training in Custodial & Waste - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
N/A

Crosswalk
None

Other Notes
None

CUSTODIAL & WASTE	P7. TRAINING & INNOVATION
Focus Area:	**Custodial & Waste**
Topic:	**Innovation**
Question:	**P7.2 – Innovation in Custodial & Waste** **Is an innovative process or technology in place at the building that goes beyond the requirements outlined in this section?**

Answer

Select all that apply:	Points available:
- Evidence of procurement practices implemented (e.g. fair-trade, social or circular economy principles applied)	1
- Evidence of waste reduction (not due to Covid-related reduced occupancy)	1
- Evidence of waste avoidance (e.g. single-use plastics, zero-waste event hosted, embodied energy considerations applied)	1
- Food procurement initiative in place that specifies the purchase of sustainable foods for food prepared on-site (e.g. cafeteria, patient meal catering etc.)	1
- [ESC, Univ, LI, OAR, MURB] Joint landlord/tenant custodial or waste initiatives implemented	1
- Other (e.g. TRUE or equivalent certification achieved)	1
- Not applicable	-

Max. Points Available

5 - Max points cap

Description

Many processes and technologies exist that go beyond the standards and requirements set out in the BOMA BEST Assessment. If building managers/owners have invested in innovative processes or technologies that go beyond these standards, innovation points can be earned under this question.

Requirements

A. Provide details of the technology or process applied at the building
B. Indicate when the technology or process was implemented and the steps that are in place to ensure the technology or process' ongoing success
C. [If "Other" is selected] Explain how the technology or process has improved the building's procurement, custodial and waste management practices for it to be considered innovative

Documentation

- Narrative of innovative technology or process and its impact

Adapted BB3 Question

New in BOMA BEST 4.0

P7.2 – Innovation in Custodial & Waste - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
N/A

Other Notes
None

RESILIENCE & SITE	R0. BASELINE PRACTICES
Focus Area:	**Resilience & Site**
Topic:	**Baseline Practices**
Question:	**R2.0 – Past Climate Hazards** **What climate hazards and extreme weather events has the site experienced in the past ten years?**

Answer
Select one of the following:
- Complete BOMA BEST Form R2.0
- Building-specific Climate Change Risk or Resilience Assessment (CCRA) or equivalent
- No

Max. Points Available
Minimum Requirement, this is a baseline practice

Description
To enable preparation and planning, relevant climate-related hazards specific to a property's location should be identified. This requires consideration of past events that have caused damage and/or disruption and projected future events including their likelihood of occurring and potential consequences at the property level if they do.

Consider both climate hazards that are experienced as trends, such as rising annual temperatures, and climate hazards that are experienced as events, such as severe storms.

Climate risk analysis is complex, and this question is intended to be an initial step rather than a comprehensive assessment.

Requirements
Complete the BOMA BEST Question R2.0 Form that covers:
A. High-impact climate hazards and events that have been experienced or considered as posing a risk at the property and/or within the region in the past ten years by completing the provided template
B. Provide detail on how relevant hazards affected occupants, key building systems and components
C. If information is not available for ten (10) years or for the hazard, explain why
D. [Alternative] Conduct a building-specific Climate Change Risk or Resilience Report

Documentation
- Completed Form R2.0
- [Optional] Building-specific Climate Change Risk or Resilience Report

Adapted BB3 Question
New in BOMA BEST 4.0

R2.0 – Past Climate Hazards - cont'd

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
In-house, with third-party support

References
Resilience in the CRE Industry: https://bomacanada.ca/wp-content/uploads/2022/07/ResilienceInTheCommercialRealEstateIndustry_EN_220713_small.pdf
Ahead of the Storm: https://bomacanada.ca/wp-content/uploads/2020/07/Ahead-of-the-Storm-1.pdf and https://bomacanada.ca/wp-content/uploads/2020/07/BOMA-Resillience-Single-Pager-v2.pdf
BOMA Canada – Resilience Brief: https://bomacanada.ca/wp-content/uploads/2019/11/BOMA_Resilience_Brief_Eng_v5.pdf
Intergovernmental Panel on Climate Change (IPCC): https://www.ipcc.ch/

Crosswalk
N/A

Other Notes
According to the Intergovernmental Panel on Climate Change (IPCC), climate risk results from the interaction of hazard, exposure and vulnerability. Hazard refers to the potential occurrence of climate-related physical events or trends that may cause damage and loss. Exposure indicates the presence of assets, services, resources and infrastructure that could be adversely affected. Vulnerability is the propensity or predisposition to be adversely affected

RESILIENCE & SITE	R1. SITE
Focus Area:	**Resilience & Site**
Topic:	**Site**
Question:	**R1.1 – Site Irrigation** **Which type of water efficient controls are used to irrigate the site's landscaped areas?**

Answer

Select all that apply:	Points available:
- Drip or root-fed irrigation	1
- Rain and/or soil moisture sensors	1
- Weather-based controllers	1
- Pressure regulated head	1
- Smart scheduling	1
- Stormwater capture	1
- Landscaping does not require irrigation	1
- None of the above	0

Max. Points Available

5 - Max points cap

Description

Water-efficient irrigation controls reduce water consumption.

Requirements

Indicate which type of irrigation control is in place at the building and used to irrigate 80% or more of the landscape

Documentation

- Photos, specifications, excerpts from landscaping contract etc. showing example of specific strategy implemented

Adapted BB3 Question

Question 02.04.01: Which type of water efficient controls are used for irrigation?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house

R1.1 – Site Irrigation - cont'd

References
None

Crosswalk
N/A

Other Notes
- Drip irrigation: Water lines with low flow, dripping applicators spread throughout the irrigated area to more conservatively distribute water.
- Root-fed irrigation: Applicators are below ground and close to the roots zone of plants.
- Soil moisture sensors: Moisture sensors are placed in the soil of the irrigated area and communicate with an automatic scheduling system to adjust scheduling based on the real-time moisture levels of the irrigated area.
- Rain sensors: Precipitation sensors placed in the irrigated area communicate with an automatic scheduling system to adjust scheduling based on previous rainfall on the irrigated area.
- Weather-based controllers: Can be either a Smart or Central Controller. Must be WaterSense approved
- Smart scheduling: Manual scheduling based on an interaction of factors to maximize the efficiency of water use in irrigating plants. Considers the following: timing (to reduce evapotranspiration, best at night or away from peak sun and heat loads); flow rate and distribution of irrigation system; slope; soil type and infiltration rate of area being irrigated; plant type (watering needs and root depth); seasonal changes in watering needs; and predicted and actual rainfall.

RESILIENCE & SITE	R1. SITE
Focus Area:	**Resilience & Site**
Topic:	**Site**
Question:	**R1.2 – Sensitive Site Management** **Are environmentally sensitive site management strategies implemented and maintained on the site?**

Answer

Select all that apply:	Points available:
- Native plant species	1
- Native pollinator-friendly flowering plants	1
- Edible garden	1
- Bee hives or hotels	1
- Bird-safe	1
- None of the above	0

Max. Points Available

5 - Pick all that apply

Description

How a building manages its landscaped areas through mowing and fertilization practices can have an impact on the surrounding environment (e.g., the persistence of invasive species; the release of harmful chemicals and toxins into the environment such as pesticides, fertilizers and herbicides; and on resource use like water).

Broad-spectrum application of pesticides, fertilizers, and herbicides has significant impacts on the health of the landscape and the runoff of harmful chemicals into the environment. Building managers can reduce non-point source pollution by focusing on using non-chemical control methods. When chemical options are used, these should be low in toxicity and persistence. Their use should be part of an overall landscape management plan.

Requirements

Strategies include:

A. >80% of landscaping contains native and drought resistant plant species
B. >80% of landscaping contains native and drought resistant flowering plants that encourage pollinators
C. Removal of invasive/non-native plant species
D. Environmentally preferable pesticides, fertilizers and herbicides
E. Bee hives or bee hotels
F. Bird-safe strategies include grey or black deterrent markers installed on reflective or clear glass surfaces

R1.2 – Sensitive Site Management - cont'd

Documentation

- Photos, specifications, excerpts from landscaping contract etc. showing example of specific strategy implemented

Adapted BB3 Question

Question 09.01.01 – Is a landscape management program in place for the building that includes the following considerations?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

CSA Bird-safe Design Guide: https://www.featherfriendly.com/csa-building-standards
Bird-friendly Certification: https://naturecanada.ca/defend-nature/how-you-help-us-take-action/bfc/
Pollinator Partnership Canada: https://pollinatorpartnership.ca/en/bee-city-canada

Crosswalk

N/A

Other Notes

If there is no landscaping on site then there is still the possibility of implementing the proposed strategies in other areas of the building, such as bee hives on the roof, bird-friendly films on glazing etc.

Measures should be in place for at least a year, or one prior summer season.

RESILIENCE & SITE	R2. CLIMATE HAZARDS & RISKS
Focus Area:	**Resilience & Site**
Topic:	**Climate Hazards & Risks**
Question:	**R2.1 – Future Climate Hazards** **Have the site-specific risks associated with potential future climate hazards and related events been identified**

Answer

Select one of the following:	Points available:
- Yes	5
- No	0

Max. Points Available

5 - Pick one answer

Description

To enable preparation and planning, relevant climate-related hazards specific to a property's location should be identified. This requires consideration of past events that have caused damage and/or disruption and projected future events including their likelihood of occurring and potential consequences at the property level if they do.

Consider both climate hazards that are experienced as trends, such as rising annual temperatures, and climate hazards that are experienced as events, such as severe storms.

The time horizon under consideration should extend into the future, through at least 2050 or further, using climate projections from national and international climate data sources. From climate data projections and the team's input, the most relevant hazards for the property based on potential level of impact can be identified for assessment of climate risk.

Climate risk analysis is complex, and this question is intended to be an initial step rather than a comprehensive assessment.

Requirements

A. Determine the relevant climate hazards on the site, using climate projection data. Outline methodology and data sources.
B. Identify exposure of the site to high-impact climate-related hazards in the future, as it is relevant to the site and considering that every situation is different.
C. Establish the timeframe based on the organization's planning horizons, but extend to at least 2040.

For example: A property that is located far from any forests or grassland would likely have a low exposure to wildfires impacting the site now and through 2050. However, a property that is located near a forest in a region that regularly experiences wildfires now and is projected to experience more frequent droughts by 2050 could be considered to have a high exposure to wildfires now and through 2050.

R2.1 – Future Climate Hazards - cont'd

Documentation

- Narrative or in-house climate risk and adaptation survey or exposure assessment
- [Alternative] Building-Specific Climate Change Risk or Resilience Report

Adapted BB3 Question

Question 09.01.13 and 09.01.14 – Has a resilience or business continuity plan been prepared for the building that includes the following components? A long-term climate change risk assessment

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

References

Climate projection data is often available through regional or federal governments or related organizations, such as https://www.climatedata.ca , https://www.climateriskinstitute.ca/climate-data/ , or https://www.floodsmartcanada.ca/floodplain-maps/ .
https://www.climateatlas.cacanada.ca/climate-servicesPCIC
BC: https://www.pacificclimate.org/data or https://www2.gov.bc.ca/gov/content/environment/climate-change/adaptation/risk-assessment
California: https://climateassessment.ca.gov/
https://www.cityresilienceindex.org/#/
https://climateriskinstitute.ca/climate-data/municipal and regional floodplain maps http://floodsmartcanada.ca/floodplain-maps/)
Municipal zoning/DPAs (e.g., hazard lands, steep slopes, floodplains)
Regional/provincial climate risk assessments
Regional wildland urban interface fire risk class maps and landslide susceptibility maps
Scientific papers
Portfolio wide risk assessments

Crosswalk

N/A

Other Notes

If the hazards were identified through high-level portfolio-wide review, outline the methodology or framework (e.g. GRESB), tools used, level of accuracy and other pertinent information.

For individual building assessments, review regional climate projections where available to determine potential future climate hazards through 2040, 2050 or beyond. Indicate the future emissions/temperature scenario considered and the rationale for the chosen scenario

RESILIENCE & SITE	R2. CLIMATE HAZARDS & RISKS
Focus Area:	**Resilience & Site**
Topic:	**Climate Hazards & Risks**
Question:	**R2.2 – Rank Climate Risks** **Have the climate risks been ranked and assessed for the building and site?**

Answer

Select one of the following:	Points available:
- Yes	4
- No	0

Max. Points Available
4 - Pick one answer

Description
Commercial real estate Suggested Leaders are increasingly recognizing the risks posed by extreme weather events that will continue to occur more frequently than in the past. Design and operations need to focus on business continuity, safety, and wellbeing to reduce risks to assets, occupant health and safety, and services.

Climate risks can be assessed on the basis of the likelihood of a high impact climate hazard occurring and the severity of the consequences to property components, people and systems that may occur. Consequences can include health and safety, displacement, asset damage, inaccessible and unusable space, legal liability, increased insurance premiums, supply chain and service interruptions, reputational impact, increased operations and maintenance costs, environmental effects, and other considerations.

The inclusion of climate resilience in planning, preparation, and implementation projects will reduce risks to ensure that people and property are protected, costs are minimized, reputation is maintained, environmental effects are reduced, and asset value is enhanced.

Requirements

A. Conduct a Climate Risk Assessment. Include information on the relative likelihood of occurrence for each hazard identified and the potential impacts.
B. For each high-risk hazard identified, determine the likelihood of occurrence through 2040. Rate and describe potential consequences on the building components identified as vulnerable to that hazard.

For example: major floods occur annually and are projected to increase in frequency by 2050, so the likelihood could be rated as ‘high.’ If the mechanical systems are vulnerable to flooding and located in the basement, the consequences of a flood event impacting the mechanical equipment could be total loss of HVAC systems and requirement for replacement, so the consequence could be rated as ‘high.’ However, if the mechanical room is on an upper floor, the consequence of a flood to that system could be ‘low.’

C. From this review, identify the highest risks based on the most significant consequences for the most likely, high-impact relevant hazards, where Risk = Likelihood x Consequences).

R2.2 – Rank Climate Risks - cont'd

For example: provision of equipment and supplies, infrastructure upgrades, or retrofits to improve resiliency.

D. Provide an explanation/description of the data sources, methodologies and Representative Concentration Pathway (RCP) scenario(s) used to determine the highest or most important risks facing the building and site

Documentation
- Building-Specific Climate Change Risk or Resilience Report

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
Third-party

References
IPCC: https://www.ipcc.ch/climateatlas.cacanada.ca/climate-servicesPCICClimate Change Risk Assessment Guidance: https://ccme.ca/en/res/riskassessmentguidancesecured.pdf
https://icleicanada.org/barc-program/
Also refer to the BOMA website under 'climate resilience.': https://bomacanada.ca/wp-content/uploads/2022/07/ResilienceInTheCommercialRealEstateIndustry_EN_220713_small.pdf
ISO 31000:2018
Ontario Climate Change and Health Toolkit
PIEVC Engineering Protocol
BARC Milestone 2
Acceptable asset-level risk assessment frameworks include:- CRREM https://www.crrem.eu/wp-content/uploads/2020/09/CRREM-Risk-Assessment-Reference-Guide-2020-09-21.pdf
- PIEVC https://pievc.ca/
- ISO 31000 https://www.iso.org/obp/ui/#iso:std:iso:31000:ed-2:v1:en-
- GRESB https://www.gresb.com/nl-en/products/climate-risk-platform/
- BOMA Canada will accept other frameworks if equivalency is proven

Crosswalk
N/A

Other Notes
Climate projection data referenced as part of hazard identification will typically include likelihood or increases in occurrence.

Identification of level of risk will vary for each organization, and criteria for determining high, medium, and low consequence and risk should be established internally.

A recommended scenario is Representative Concentration Pathway 8.5 (RCP8.5) from the Intergovernmental Panel on Climate Change (IPCC).

RESILIENCE & SITE	R2. CLIMATE HAZARDS & RISKS
Focus Area:	**Resilience & Site**
Topic:	**Climate Hazards & Risks**
Question:	**R2.3 – Resilience Strategies** **Have resilience strategies been identified to address the most significant climate risks at the building and site level?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available

3 - Pick one answer

Description

Commercial real estate Suggested Leaders are increasingly recognizing the risks posed by extreme weather events that will continue to occur more frequently than in the past. Design and operations need to focus on business continuity, safety, and wellbeing to reduce risks to assets, occupant health and safety, and services.

The inclusion of climate resilience in planning, preparation, and implementation projects will reduce risks to ensure that people and property are protected, costs are minimized, reputation is maintained, environmental effects are reduced, and asset value is enhanced.

While the previous question provides guidance on conducting a high-level assessment of risks to your facility, having a comprehensive assessment done that follows one of the acceptable climate risk assessment frameworks will provide greater depth and detail, and can provide a stronger foundation for planning and decision-making, particularly if completed by a climate risk expert.

Requirements

A. Conduct a Climate Risk Assessment and highlight the framework used to undertake the assessment, as well as the Representative Concentration Pathway (RCP) scenario(s) evaluated
B. Acceptable asset-level risk assessment frameworks include CRREM, PIEVC, ISO 31000, GRESB or similar, but must focus on the individual property.
C. If not identified in the report, for each of the highest risks, indicate any measures that have been implemented to address identified risks. Examples include equipment and supplies, infrastructure upgrades, retrofits or other tangible actions

Documentation

- Climate Risk Assessment, referencing industry-accepted framework used

R2.3 – Resilience Strategies - cont'd

Adapted BB3 Question
New in BOMA BEST 4.0

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
Third-party

References
Acceptable asset-level risk assessment frameworks include:- CRREM https://www.crrem.eu/wp-content/uploads/2020/09/CRREM-Risk-Assessment-Reference-Guide-2020-09-21.pdf
- PIEVC https://pievc.ca/
- ISO 31000 https://www.iso.org/obp/ui/#iso:std:iso:31000:ed-2:v1:en-
- GRESB https://www.gresb.com/nl-en/products/climate-risk-platform/
- BOMA Canada will accept other frameworks if equivalency is proven

Crosswalk
N/A

Other Notes
IPCC's recommended Representative Concentration Pathway (RCP) scenario(s) is RCP8.5 – see https://www.ipcc.ch/ and https://climate-scenarios.canada.ca/?page=scen-rcp

RESILIENCE & SITE	R3. CLIMATE PLANNING & VULNERABILITIES
Focus Area:	**Resilience & Site**
Topic:	**Climate Planning & Vulnerabilities**
Question:	**R3.1 – Emergency Preparedness** **Do emergency preparedness and response plans include climate hazards and related extreme events?**

Answer

Select one of the following:	Points available:
- Yes	5
- No	0

Max. Points Available

5 - Pick one answer

Description

Commercial real estate leaders are increasingly recognizing the risks posed by extreme weather events that will continue to occur more frequently than in the past. Design and operations need to focus on emergency preparedness, safety, and wellbeing to reduce risks to assets, occupant health and safety, and services.

The inclusion of climate resilience in planning, preparation, and implementation projects will reduce risks to ensure that people and property are protected, costs are minimized, reputation is maintained, environmental effects are reduced, and asset value is enhanced.

Planning activities to respond to high priority climate risks will increase resilience. Risks must be addressed in operations, including emergency response plans and business continuity plan.

Requirements

Demonstrate the extent to which climate change and related hazards have been incorporated into the building-specific emergency preparedness and response plans

Documentation

- Highlight relevant sections in Emergency Preparedness and Response Plans

Adapted BB3 Question

Question 09.01.13 and 09.01.14 – Has a resilience or business continuity plan been prepared for the building that includes the following components?

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord’s control)

R3.1 – Emergency Preparedness - cont'd

Suggested Lead
In-house, with third-party support

References
Resilience in the CRE Industry: https://bomacanada.ca/wp-content/uploads/2022/07/ResilienceInTheCommercialRealEstateIndustry_EN_220713_small.pdf
Ahead of the Storm: https://bomacanada.ca/wp-content/uploads/2020/07/Ahead-of-the-Storm-1.pdf and https://bomacanada.ca/wp-content/uploads/2020/07/BOMA-Resillience-Single-Pager-v2.pdf
BOMA Canada – Resilience Brief: https://bomacanada.ca/wp-content/uploads/2019/11/BOMA_Resilience_Brief_Eng_v5.pdf
Intergovernmental Panel on Climate Change (IPCC): https://www.ipcc.ch/

Crosswalk
N/A

Other Notes
None

RESILIENCE & SITE	R3. CLIMATE PLANNING & VULNERABILITIES
Focus Area:	**Resilience & Site**
Topic:	**Planning & Vulnerabilities**
Question:	**R3.2 – Maintain Critical Systems** **Have the building's critical systems been identified that must be maintained in an extreme climate-related hazard event?**

Answer

Select one of the following:	Points available:
- Yes	4
- No	0

Max. Points Available

4 - Pick one answer

Description

The focus of this question is to guide owners and landlords to think about how future climate events may impact critical building systems, and to plan accordingly. It is meant to go beyond day-to-day emergency preparedness practices.

Resilient buildings reduce vulnerability to climate-related hazards; maintain and enhance healthy, liveable spaces for occupants; and mitigate carbon emissions. Investments in building infrastructure protect against damage and losses and reduce insurance premiums. The owner or landlord should determine which elements are important to review, since every building and situation is different.

Components and systems could include elements related to buildings, site, infrastructure, programs and services, operations, health and safety, or other categories that the owner or landlord deems important for the property. Each element may be reviewed to determine its relative level of exposure and sensitivity to relevant hazards, as well as current ability to adapt to them. In combination, these criteria can be used to assess a building element's vulnerability to climate hazards.

Requirements

A. List or describe the critical systems that must be maintained in an emergency situation and the building function that requires these systems
B. For each of the relevant hazards identified, indicate which of the systems could be affected
C. Provide an explanation of the measures necessary to maintain the critical systems, including critical spare equipment components

Also see Other Notes

Documentation

- Highlight relevant sections in Emergency Preparedness and Response Plans and associated Policies
- Documentation must be building-specific

R3.2 – Maintain Critical Systems - cont'd

Adapted BB3 Question
Question 09.01.13 and 09.01.14 – Has a resilience or business continuity plan been prepared for the building that includes the following components? A long-term climate change risk assessment

Applicability
Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead
Third-party

References
BOMA Canada: https://bomacanada.ca/climate-resilience/
GRESB: https://www.gresb.com/nl-en/scaling-building-resilience-in-the-face-of-climate-change/
RDH's report "Climate Change Resilience for Buildings Primer": https://www.rdh.com/wp-content/uploads/2021/07/Climate-Change-Resilience-for-Buildings-Primer.pdf
Resilience in Hospitals: https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/symposium/2016/14_lessons_in_hospital_resilience_-_robin_guenther.pdf

Crosswalk
N/A

Other Notes
Example for a power outage due to an extreme storm:
- Electricity: Is adequate backup/emergency power in place? Note, backup power should be provided with 72 hours of fuel for critical systems/spaces at a minimum
- Heating, cooling and ventilation: What provisions are in place for maintaining safe conditions in case of a power outage?
- Security and communications: What provisions are in place for maintaining security and communications in case of a power outage?
- Accessibility: How will individuals with disabilities fare during power outages and what supports might they need?
- Other: e.g. water, sanitary plumbing, natural gas, stormwater drainage

RESILIENCE & SITE	R3. CLIMATE PLANNING & VULNERABILITIES
Focus Area:	**Resilience & Site**
Topic:	**Planning & Vulnerabilities**
Question:	**R3.3 – Capital Planning** **Are capital upgrade and renewal planning processes informed by climate-related risks?**

Answer

Select one of the following:	Points available:
- Yes	3
- No	0

Max. Points Available

3 - Pick one answer

Description

Planning activities to respond to high priority climate risks will increase resilience. Risks must be addressed in operations, including emergency response plans and business continuity plan.

Capital project investments will be required to ensure that assets can respond to and recover from extreme weather events. Projects addressing climate risks should be incorporated into capital projects.

Requirements

D. Provide an explanation of how climate risks are incorporated into planning and budgeting
A. Show the inclusion of climate risk mitigation projects that have been incorporated into the 10 year plan
B. List completed, initiated or budgeted climate risk mitigation capital projects, identifying the risks addressed
C. Indicate the extent of the improvements and the implementation stage

Documentation

- Explanation of how climate risks have been incorporated into planning and budgeting.
- List of climate mitigation capital projects and identify the risks addressed

Adapted BB3 Question

Question 09.01.13 and Question 09.01.15 – Has a resilience or business continuity plan been prepared for the building that includes the following components? An adaptation plan based on assessed long-term climate risks

Applicability

Applicable to Office, Healthcare, Enclosed Shopping Centre, Universal and Multi-Unit Residential buildings

R3.3 – Capital Planning - cont'd

Suggested Lead
Third-party

References
None

Crosswalk
N/A

Other Notes
None

RESILIENCE & SITE	R4. TRAINING & INNOVATION
Focus Area:	**Resilience & Site**
Topic:	**Training**
Question:	**R4.1 – Training in Resilience** **Did the building operations and management team receive resilience training in the previous three years?**

Answer

Select one of the following:	Points available:
- Yes	2
- No	0

Max. Points Available

2 - Pick one answer

Description

Over time, technologies and preferred practices in building operations and maintenance change. Providing regular professional development opportunities is a good way to help retain staff. Offering training and educational opportunities related to environmental/sustainable building performance not only benefit staff but improve the performance of the building when staff training is applied at the building level.

Requirements

A. List the names of staff members to whom the competencies covered under these topics would apply
B. Provide the applicable course outline or syllabus
C. Provide evidence of competency or training received such as credentials, completion certificate, record of attendance

Documentation

- Name of building O&M team member who received the training
- Course outline or syllabus
- Training Certificate or Record of Attendance

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

Suggested Lead

In-house, with third-party support

R4.1 – Training in Resilience - cont'd

References
N/A

Crosswalk
None

Other Notes
None

RESILIENCE & SITE	R4. TRAINING & INNOVATION
Focus Area:	**Resilience & Site**
Topic:	**Innovation**
Question:	**R4.2 – Innovation in Resilience & Site** **Is an innovative process or technology in place at the building that goes beyond the requirements outlined in this section?**

Answer

Select all that apply:	Points available:
- Non-potable sources of water is used for irrigation	1
- Actions are being taken to address climate risk hazards identified	1
- Other Asset Classes] Electric Vehicle (EV) charging stations installed for >2% of parking stalls	1
- [MURBs] Electric Vehicle (EV) charging stations installed for >2% of resident suites	1
- Other	1
- Not Applicable	-

Max. Points Available

4 - Max points cap

Description

Many processes and technologies exist that go beyond the standards and requirements set out in the BOMA BEST Assessment. If building managers/owners have invested in innovative processes or technologies that go beyond these standards, innovation points can be earned under this question

Requirements

A. Provide details of the technology or process applied at the building
B. Indicate when the technology or process was implemented and the steps that are in place to ensure the technology or process' ongoing success
C. [If "Other" is selected] Explain how the technology or process has improved the building's resilience and site management practices for it to be considered innovative

Documentation

- Narrative of innovative technology or process and its impact

Adapted BB3 Question

New in BOMA BEST 4.0

Applicability

Applicable to all buildings (systems or equipment in the owner or landlord's control)

R4.2 – Innovation in Resilience & Site - cont'd

Suggested Lead
In-house, with third-party support

References
None

Crosswalk
N/A

Other Notes
None