

UBC LEED Implementation Guide

for LEED Canada Building Design + Construction 2009

January 2013

campus + community planning



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

UBC is a member of the Canada Green Building Council. We are proud to demonstrate our support of the CaGBC's mission; to lead and accelerate the transformation to high-performing green buildings.



Acknowledgement

UBC aspires to demonstrate leading edge green building design, products, technologies and systems. UBC's Campus and Community Planning, Campus Sustainability Office is committed to this aspiration and commissioned the development of this guidance to provide a platform for achievement of exemplary LEED ratings.

This guide provides specific direction for the UBC Vancouver Campus to implement the LEED Canada Building Design and Construction 2009 Rating Systems. It has been developed to support all UBC policy and in particular, is aligned with the [*UBC Vancouver Campus Plan*](#).

Perkins+Will Canada developed this document in collaboration with UBC's Campus and Community Planning, Campus Sustainability Office.

This guide was developed with thanks to the following UBC departments:

- Campus and Community Planning, Campus Sustainability office;
- Campus and Community Planning, Transportation Planning;
- Campus and Community Planning, Infrastructure and Services Planning;
- Campus and Community Planning, University Architect;
- Building Operations, soft landscape unit;
- UBC Risk Management Services;
- Campus Parking and Access Control Services; and
- UBC Custodial Services.

Summary of Revisions

A summary of revisions is provided to describe the changes from the version published February 2012. Revisions are listed by section as follows:

Section	Revisions
Introduction	'How to Use This Guide' is now included in the introduction along with a list of resource documents.
UBC Requirements	The 'Expected' category has been removed, all credits are now categorised as 'Mandatory' or 'Optional'. Direction has been added to require teams to pursue the Split Review Option for certification. (See Section 2.3)
Requirements and Guidance	
SSc4.1	Sustainable Sites credit, SSc4.1, Option 1 has been revised to reference CIR 831. The UBC Transit site plan has been revised and a second site plan reflecting requirements of CIR 831 has been added. (See Site Plan 4.) Additional guidance for Option 3 has also been included.
EAc1	Energy and Atmosphere credit, EAc1 has been revised to include reference to the LEED Canada 2009 Interpretation Guide for District Energy Systems and provides guidance on incorporating the contribution from the UBC Biomass Research Demonstration Facility.
EAc2	Energy and Atmosphere credit, EAc2 has been revised to include reference to the contribution from the UBC Bioenergy Research Demonstration Facility (BRDF). A BDRF Calculation Summary has been added in Appendix C.
EAc3	Additional guidance on 3rd Party Commissioning contract structure has been included.
IDc1	Innovation in Design credit, IDc1 has been revised to reference the revised UBC Green Cleaning Policy and Program and supporting documents have been included in Appendix D.
RPc2	Regional Priority credit, RPc2, has been revised to reflect new direction from the CaGBC, including the list of available RP credits for British Columbia, Urban.

Summary of Revisions (continued)

Section

Revisions

Appendices

Appendices have been revised as per the Table of Contents; additional Appendices include:

- Appendix C: Bioenergy Research Demonstration Facility Calculation Summary
- Appendix D: Green Cleaning Policy and Program

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1 Introduction

UBC aspires to demonstrate leading edge green building design and technologies, and is committed to accountability in building performance. This guide aims to align the LEED Canada Building Design and Construction 2009 rating systems and UBC campus policy to facilitate a high performance built environment on campus. In addition, it will support the provincial requirement for all publicly funded new construction and major renovation projects to achieve LEED Gold certification.

The objective of this guide is to provide direction and clarification for the implementation of the LEED Canada Reference Guide for Green Building Design and Construction 2009 (LEED Canada BD+C 2009) for the UBC Vancouver Campus. This guide will facilitate a streamlined and coordinated LEED process across the Vancouver campus by identifying UBC sustainability and green building priorities within the LEED Canada BD+C 2009 rating systems, as well as support exemplary project certification ratings. An analysis of all campus compliance paths was undertaken to determine UBC campus-scale eligibility where available. For credits where campus compliance is available, results of the analysis are included and direction on how to comply is provided.

It is the intention of UBC to update the contents of this Implementation Guide in order to maintain consistency with campus policy and priorities as they evolve, and as industry best practice and building performance strategies progress. Version identification will be identified by date; month and year of publication.

1.1 Rationale for the Implementation Guide

This document is a companion document to the UBC Vancouver Campus Plan Design Guidelines and UBC Technical Guidelines, serving to coordinate LEED Canada BD+C 2009 implementation and certification. The Guide is intended to provide project teams with the UBC-specific guidance they require to optimize LEED for the campus.

This guide was informed by an extensive study of past performance of LEED projects at UBC including interviews with design and project management teams, an analysis of UBC policy and programs within the context of LEED requirements, and a review of best practices at other institutions where LEED is used. The study identified the credits within the LEED Canada rating systems that most clearly aligned with UBC policy and sustainable design priorities, in addition to building performance thresholds that were consistently being met or surpassed. Refer to Appendix A for credit achievement rates of LEED Canada 1.0 projects at UBC.

1.2 How to Use This Guide

This Guide interprets and supplements the LEED Canada BD+C 2009 rating systems for projects built on the UBC Vancouver campus. The LEED Canada BD+C 2009 Reference Guide remains the core document providing information and guidance on how to achieve and document each prerequisite and credit. This document identifies mandatory and credits that must be achieved for UBC projects along with specific guidance for both mandatory and optional credits, where applicable. It acts as an application guide where further UBC specific direction is offered and UBC performance priorities are described. **It is imperative to note that direction is only given where applicable to the UBC context; all other cases are to follow the Reference Guide.**

Project teams should also reference the UBC Vancouver Campus Plan including Part 3, Design Guidelines, and the UBC Technical Guidelines. Where a project team feels a mandatory credit cannot be earned due to special circumstances, specific reporting requirements for exemptions are described in Section 2.2.

1.3 Resource List

This section lists the documents referenced within this Guide and should be referred to for additional guidance.

- LEED Canada BD+C 2009 Reference Guide
- LEED Canada EB:O&M 2009 Reference Guide
- LEED Canada 2009 Interpretation Guide for District Energy Systems
- IESNA Recommended Practice Document RP-33-99
- Vancouver Campus Plan
- UBC Water Action Plan
- UBC Waste Action Plan
- UBC Climate Action Plan
- LEED Canada NC and CS 2009 Letter Template Version C
- UBC Building Operations Custodial Green Cleaning Policy September 2012
- UBC Building Operations Custodial Green Cleaning Program September 2012

2 UBC LEED Requirements

2.1 UBC LEED Credits

For the purposes of this Guide, credits were prioritized and classified as Mandatory or Optional for achievement at UBC. UBC expects all credits classified as Mandatory to be achieved, projects may earn an exemption if credit requirements cannot reasonably be met (see 2.2 Exemptions and Requests for Variance below). Achieving all mandatory credits yields a total of 60 points. Refer to the Table 1: Summary of UBC Required LEED Credits following, for the list of mandatory and optional credits.

Table 1: Summary of UBC Required LEED Credits

Credit/Prerequisite	UBC Credit Compliance	Points Required	Points Available
Sustainable Sites			
SSp1 – Construction Activity Pollution Prevention	Prerequisite		
SSc1 – Site Selection	Mandatory	1	1
SSc2 – Development Density and Community Connectivity	Mandatory	5	5
SSc3 – Brownfield Redevelopment	Optional	0	1
SSc4.1 – Alternative Transportation: Public Transportation Access	Mandatory	6	6
SSc4.2 – Alternative Transportation: Bicycles Storage and Change Rooms	Mandatory	1	1
SSc4.3 – Alternative Transportation: Hybrid and Alternative Fuel Vehicles	Optional	0	3
SSc4.4 – Alternative Transportation: Parking Capacity	Optional	0	2
SSc5.1 – Site development: Protect and Restore habitat	Mandatory	1	1
SSc5.2 – Site development: Maximize Open Space	Mandatory	1	1
SSc6.1 – Stormwater design: Quantity Control	Mandatory	1	1
SSc6.2 – Stormwater design: Quality Control	Optional	0	1
SSc7.1 – Heat Island: Non-Roof	Mandatory	1	1
SSc7.2 – Heat Island - Roof	Optional	0	1
SSc8 – Light Pollution Reduction	Optional	0	1
Water Efficiency			
WEp1 – Water use reduction	Prerequisite		
WEc1 – Water Efficient Landscaping	Mandatory	2	4
WEc2 – Innovative Waste Water Technologies	Optional	0	2
WEc3 – Water Use Reduction	Mandatory	2	4
Energy and Atmosphere			
EAp1 – Fundamental Building Commissioning	Prerequisite		
EAp2 – Minimum Energy Performance	Prerequisite		
EAp3 – CFC Reduction in HVAC&R Equipment and Elimination of Halons	Prerequisite		
EAc1 – Optimize Energy Performance	Mandatory	11	19
EAc2 – Renewable Energy	Optional	0	7
EAc3 – Enhanced Commissioning	Mandatory	2	2
EAc4 – Enhanced Refrigerant Management	Mandatory	2	2
EAc5 – Measurement and Verification	Mandatory	3	3
EAc6 – Green Power	Optional	0	2

Credit/Prerequisite	UBC Credit Compliance	Points Required	Points Available
Materials and Resources			
MRp1 – Storage and Collection of Recyclables	Prerequisite		
MRC1.1 – Building Reuse: Maintain Existing Walls, Floors And Roof*	Mandatory	1	3
MRC1.2 - Building Reuse: Maintain Interior Non-Structural Elements*	Optional	0	1
MRc2 – Construction Waste Management	Mandatory	2	2
MRc3 – Materials Reuse	Optional	0	2
MRc4 – Recycled Content	Mandatory	2	2
MRc5 – Regional Materials	Mandatory	1	2
MRc6 – Rapidly Renewable Materials	Optional	0	1
MRc7 – Certified Wood	Optional	0	1
Indoor Environmental Quality			
EQp1 – Minimum IAQ Performance	Prerequisite		
EQp2 – Environmental Tobacco Smoke (ETS) Control	Prerequisite		
EQc1 – Outdoor air delivery monitoring	Optional	0	1
EQc2 – Increased Ventilation	Optional	0	1
EQc3.1 – Construction Iaq Management Plan: During Construction	Mandatory	1	1
EQc3.2 – Construction Iaq Management Plan: Before Occupancy	Mandatory	1	1
EQc4.1 – Low-Emitting Materials: Adhesives And Sealants	Mandatory	1	1
EQc4.2 – Low-Emitting Materials: Paints And Coatings	Mandatory	1	1
EQc4.3 – Low-Emitting Materials: Flooring Systems	Mandatory	1	1
EQc4.4 – Low-Emitting Materials: Composite Wood And Agrifibre Products	Mandatory	1	1
EQc5 – Indoor Chemical & Pollution Source Control	Optional	0	1
EQc6.1 – Controllability of Systems: Lighting	Optional	0	1
EQc6.2 – Controllability of Systems: Thermal comfort	Optional	0	1
EQc7.1 – Thermal comfort: Design	Optional	0	1
EQc7.2 – Thermal comfort: Verification	Optional	0	1
EQc8.1 – Daylight and Views: Daylight	Optional	0	1
EQc8.2 – Daylight and Views: Views	Optional	0	1
Innovation in Design			
IDc1 – Innovation and Design Process	Mandatory	5	5
IDc2 – LEED Accredited Professional	Mandatory	1	1
Regional Priority			
RPc1 – Durable Building	Optional	0	1
RPc2 – Regional Priority Credit	Mandatory	3	3
Total		60	110

Certified: 40-49 points Silver: 50-59 points Gold: 50-79 points Platinum: 80+ points

* Major Renovations Only

2.2 Exemptions and Requests for Variance

UBC expects all credits classified as Mandatory to be achieved. Project teams may earn an exemption if it can be demonstrated that credit requirements cannot reasonably be met. To earn an exemption, a Request for Variance must be made to the Director, C+CP Campus Sustainability. Additional guidance on how to apply for a Variance can be referenced at http://www.technicalguidelines.ubc.ca/technical/design_approvals.html.

2.3 Certification

UBC requires design teams to pursue the Design and Construction Split Review Option for all LEED Canada NC and CS 2009 projects on campus. This split review option, released in July 2012, entails a two-stage review of the design-stage prerequisites and credits immediately following design. Upon completion of the project, a two-stage review of the construction-stage credits and prerequisites is undertaken.

Adopting the split review option allows project teams to document all design related credits during the construction administration process prior to teams dissolving. It also permits clarification of issues while the design team is still actively working with the larger project team, thus greatly simplifying the certification process. A general overview of the certification process can also be found in the updated [Certification Process document](#)¹.

1 <http://www.cagbc.org/Content/NavigationMenu/Programs/LEED/Certificationprocess/default.htm#CertPro>

3 Definitions

Table 2: Definitions

Term	Definition
Campus Scale Compliance:	Compliance to credit or prerequisite requirements as it relates to the scale of the entire UBC Vancouver Campus.
C+CP:	UBC Campus and Community Planning. The Campus and Community Planning office comprises several specialized departments including Campus Sustainability, Transportation Planning, University Architect and Infrastructure and Services Planning.
CIR:	Credit Interpretation Request – an official request made to the Canada Green Building Council to interpret the requirements of a credit or prerequisite as it applies to a specific project issue. CIR rulings are intended to provide assistance to project teams by clarifying credit requirements and/or providing acceptable alternate compliance paths that meet the credit's intent. Project teams may implement CIR rulings at their discretion.
LEED Canada BD+C 2009:	Refers to the LEED Canada Reference Guide for Green Building Design and Construction 2009, published by the Canada Green Building Council, and all subsequent Errata and Addenda. The Reference Guide contains the LEED Canada rating systems for both New Construction and Major Renovations (NC) and Core and Shell (CS).
Mandatory:	Describes credits that are directly aligned with UBC policy, priority and building performance requirements, or with the Vancouver Campus Plan. All credits identified as MANDATORY, must be earned by all UBC projects, unless clear evidence can be shown that credit requirements cannot be reasonably met.
Optional:	Describes credits that may be pursued at the discretion of each project team.
Project Scale Compliance:	Compliance to credit or prerequisite requirements as it relates to the scale of the project/building.
Reference Guide:	Refers to the requirements of the LEED Canada Program by building type. The requirements of the rating system are contained with the Reference Guide. The LEED Canada Reference Guide for Green Building Design and Construction 2009 contains the rating system requirements for LEED Canada for New Construction and Major Renovations (NC) and LEED Canada Core & Shell (CS).

4 Requirements & Guidance

Sustainable Sites

Mandatory	
Points Required	Points Available
1	1
100% of UBC LEED NC1.0 projects achieved this credit.	

SSc1 – Site Selection

Requirements

All projects must comply as per LEED Canada BD+C 2009. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Campus Compliance Eligibility

Although campus-wide compliance is available for this credit, UBC requires projects to demonstrate compliance at the project scale to reflect the most current status of the site.

Guidance

Projects must comply at the building scale to account for changing ecological status. It is imperative that an assessment of any species and ecosystems at risk, is conducted for each new project site.

Resources

BC Conservation Data Centre: <http://www.env.gov.bc.ca/cdc/>

Mandatory	
Points Required	Points Available
5	5
90% of UBC LEED NC1.0 projects achieved this credit.	

SSc2 – Development Density and Community Connectivity

Requirements

All projects must comply as per Option 1 or 3 of LEED Canada BD+C 2009. Projects that cannot comply under Option 1 or 3, must attempt to comply under Option 2. Projects that cannot comply under any option, must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

A density analysis has been completed for the UBC Vancouver Campus. The analysis confirms that only projects located in the academic core of the campus can meet the requirement of at least 13,800 m²/ha. A campus Development Density (Site Plan 1) has been generated to identify the various development densities across campus. Areas shown in blue indicate locations with a density of at least 13,800m²/ha. Areas shown in orange identify residential densities of at least 25 units/hectare.

Sustainable Sites

Campus Compliance Eligibility

The density analysis confirms that UBC cannot meet the requirements of the campus compliance path at this time; however UBC is pursuing increased density to facilitate future compliance. Projects must satisfy the requirements using the project scale compliance path.

Guidance

Option 1: Development Density (5 points)

To demonstrate compliance using Option 1, projects must calculate their unique project density radius using the calculation methodology as detailed in LEED Canada BD+C 2009. Floor areas for each building can be obtained by contacting C+CP Campus Sustainability.

Option 2: Community Connectivity (3 points)

Projects may only pursue SSc2 through this compliance path if Option 1 or 3 cannot be met. An analysis of local amenities should be performed at the time the site is selected. C+CP Campus Sustainability can provide assistance identifying surrounding services and amenities that are not clearly identified on existing campus planning resources. If analysis indicates a lack of amenities/services within the required 800m radius, the project must notify C+CP Campus Sustainability office to determine if additional services may be added within the project timeframe.

Residential areas of campus with average densities of 25 units per hectare have been identified in orange on the campus Density Site Plan. Projects must determine if their site location lies within 800m of at least one of these residential developments.

Option 3: Community Connectivity with Density (5 points)

Projects located in areas of the campus that cannot meet the surrounding community density requirement of 13,800m²/ha, must attempt to comply by demonstrating the project meets the density requirement combined with adequate services and amenities located within 800m of the project site. Refer to Option 2 for guidance on locating amenities, services and residential zones.

Resources

UBC Development Density (see Site Plan 1)

Vancouver Campus Plan: <http://www.campusplan.ubc.ca/> Refer to Part 2 Campus Plan; refer to Maps for locations of some relevant amenities and services.

Optional	
Points Required	Points Available
0	1
20% of UBC LEED NC1.0 projects achieved this credit.	

SSc3 – Brownfield Redevelopment

Requirements

All projects must determine if their site can be considered a brownfield as per the requirements of LEED Canada BD+C 2009.

UBC Context

Few UBC project sites will be officially classified as brownfields or contaminated sites.

Campus Compliance Eligibility

UBC does not meet the requirements of the campus scale compliance path due to the limited presence of brownfields or contaminated sites.

Guidance

Project teams are advised to investigate whether the site is eligible to achieve the credit. If the site is eligible, the project team should consult with UBC Risk Management Services to obtain appropriate documentation and guidance.

Resources

Contacts: UBC Risk Management Services

Mandatory	
Points Required	Points Available
6	6
100% of UBC LEED NC1.0 projects achieved this credit.	

SSc4.1 – Alternative Transportation: Public Transportation Access

Requirements

All projects must comply as per Option 1, applying CIR 831, Option 2 or Option 3, for 6 points of LEED Canada BD+C 2009. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Public transportation access is a campus priority. A transit analysis has been completed for the UBC Vancouver Campus and confirms that most institutional project sites are within either 800 m walking distance of the UBC bus loop (CIR 831) or 400m walking distance of a bus stop. Bus stops routes and walking distance measurements have been identified on the UBC Transit Site Plans attached (See Section Site Plans). No additional transit infrastructure has been planned or funded.

Guidance

Option 1: Rail Station Proximity (6 points)

No rail station serves the UBC Vancouver Campus, however CIR 831 provides an alternate compliance path for sites within 800m

Sustainable Sites

of a major Transit Hub with at least 620 weekday trips and at least 400 weekend trips, from any combination of bus, rail or ferry, where a 'trip' is defined as a departure from a transit stop. (refer to CaGBC CIR Database <http://www.cagbc.org/LEED/CIRS.EN.aspx>.)

A transit analysis has been completed confirming a total of 1184 weekday trips and 491 weekend trips from the UBC Bus Loop (North Bus Loop and Trolley Loop combined²). Refer to Site Plan 2: SSc4.1 Option 1 - UBC Bus Loop and Trip Summary.

To confirm compliance, refer to the Site Plan 3: SSc4.1 option 1 - UBC Transit within 800m, to locate the project site within 800m of the UBC Bus Loop. Please note that the Site Plan uses a straight line distance for the purposes of estimation, however SSc4.1 Option 1 is evaluated based on the accessible walking route from the building to the Transit Hub. Projects must confirm the accessible walking route is 800m or less between the building main entry and the UBC Bus Loop.

Option 2: Bus Stop Proximity (6 points)

Use the Site Plan 4: SSc4.1 Option 2 - UBC Transit within 400m, to determine if the project location meets the required criteria. Areas that do not fall within 400m of one or more stops for two or more public bus lines are indicated with shading on the site plan. Please note that the site plan uses a straight line distance for the purposes of estimation, however SSc4.1 Option 2 is evaluated based on the accessible walking route from the building to the transit stop. Projects must confirm the accessible walking route is 400m or less between the building main entry and the transit stop(s).

Option 3: Transportation Demand Management (3 or 6 points)

UBC may be able to demonstrate a significant reduction in SOV use through the current Transportation Demand Management (TDM) Plan. The LEED Canada 2009 Reference Guide does not provide a clear calculation methodology for establishing a baseline for comparing reduction nor trip reduction assumptions from TDM strategies. Teams wishing to pursue this option should identify the baseline trip rates for the project using the Institute for Transportation Engineers' (ITE) standard rates (<http://www.ite.org/>³).

To determine SOV reductions from TDM strategies, refer to the latest screenline data from the annually published UBC Transportation Status Report available at <http://transportation.ubc.ca/research-and-reports/transportation-status-reports/>. Data contained in the report is for the total campus commuting population, but can be assumed to be consistent at the building scale.

² According to Translink Timetables for September 2012. Refer to UBC Bus Loop Site Plan and Trip Calculation Summary: SSc4.1 Option 1, for a summary of service and trip calculations.

³ Use of ITE Standard trip reduction data to determine the baseline trips is consistent with the USGBC LEED for Neighbourhood Development (ND) 2009 Rating System, NPdC8 – Transportation Demand Management Plan.

Resources

UBC Bus Loop & Transit Site Plans (see Site Plans)

USGBC LEED for Neighbourhood Development 2009 Rating System, NPDc8

Contacts: C+CP Transportation Planning

Mandatory	
Points Required	Points Available
1	1
<p>90% of UBC LEED NC1.0 projects achieved this credit.</p>	

SSc4.2 – Alternative Transportation: Bicycles Storage & Change Rooms

Requirements

All projects must comply as per Case 1 or Case 2 of LEED Canada BD+C 2009. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Cycling infrastructure is a campus priority. UBC bicycle parking requirements in the Campus Plan Design Guidelines exceed LEED requirements. While LEED allows neighbouring buildings to share shower facilities, this is not desirable at UBC.

Guidance

Projects must comply by providing cycling infrastructure within their project boundary, ensuring that the Campus Plan Design Guidelines have been met. Where LEED and UBC requirements conflict, UBC requirements take precedence. All infrastructure must be provided on the project site, unless C+CP Transportation Planning gives permission in advance to share facilities amongst neighbouring buildings.

Resources

Contacts: C+CP Transportation Planning

Optional	
Points Required	Points Available
0	3
<p>20% of UBC LEED NC1.0 projects achieved this credit.</p>	

SSc4.3 – Alternative Transportation: Hybrid and Alternative Fuel Vehicles

Requirements

Projects may choose to pursue this credit as per Option 1, 2 or 3 of LEED Canada BD+C 2009.

UBC Context

Some electric vehicle charging stations have been installed on campus, however expanding alternative and electric vehicle charging infrastructure is not a campus priority. No coordinated

Sustainable Sites

approach for future charging stations, fleet vehicles or car-sharing programs has been established.

Campus Compliance Eligibility

UBC does not meet the requirements of the campus scale compliance path. UBC is not actively pursuing campus-wide infrastructure initiatives.

Guidance

Projects wishing to pursue this credit may do so at the project scale. Any existing alternative fuel charging stations or car-sharing vehicles on site are not available for application to new LEED projects. To achieve this credit, projects must bear the cost of installing infrastructure or arranging the car-sharing program.

Note that Campus Parking and Access Control Services and C+CP Transportation Planning should be consulted to arrange dedicated parking spaces and program facilitation/coordination.

Resources

Local car-sharing programs include:

Modo: <http://www.modo.coop/>

ZipCar: <http://www.zipcar.com/>

Car2Go: <http://car2govancouver.com/>

Contacts: C+CP Transportation Planning

Campus Parking and Access Control Services

SSc4.4 – Alternative Transportation: Parking Capacity

Requirements

Projects may choose to pursue this credit as per Case 1, 2 or 3 under any Option as per LEED Canada BD+C 2009.

UBC Context

An analysis of carpool facilities has been conducted for the UBC Vancouver Campus. Some dedicated carpool parking spaces exist, however no coordinated approach for expansion has been established.

Campus Compliance Eligibility

UBC does not meet the Campus or Shared Infrastructure compliance path as detailed in LEED Canada BD+C 2009 and no additional carpool parking facilities are planned. If projects wish to comply with the credit requirements, they must do so at the project scale.

Sustainable Sites

Optional	
Points Required	Points Available
0	2
50% of UBC LEED NC1.0 projects achieved this credit.	

Guidance

If dedicated parking infrastructure is being added to the site as part of the project, projects may choose to add carpool spaces if desired. Existing carpool spaces may be available to a project to claim as part of their certification; contact C+CP Transportation Planning to confirm.

Resources

UBC Parking: <http://www.maps.ubc.ca/PROD/index.php>

Contacts: C+CP Transportation Planning

Campus Parking and Access Control Services

Mandatory	
Points Required	Points Available
1	1
<p>50% of UBC LEED NC1.0 projects achieved this credit.</p>	

**SSc5.1 – Site Development:
Protect or Restore Habitat**

Requirements

All projects must comply as per Case 1 or Case 2 as applicable. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Analysis indicates that the UBC landscape is comprised of a large proportion of turf grass area in comparison to native/adaptive plants.

Campus Compliance Eligibility

Analysis confirms that campus open space areas cannot meet the requirements of the campus compliance path at this time, however, decreasing turf and increasing native and adaptive planting material in all landscaped areas aligns with the UBC Vancouver Campus Plan. Projects must comply at the project scale.

Guidance

All projects within the institutional core of the UBC Vancouver campus will be considered Previously Developed sites.

Project teams are advised to discuss and establish the landscape plan early to ensure minimum restoration can be met. Projects with limited site boundary also meeting SSc2 Development Density are urged to consider a living roof and/or living wall to contribute to minimum restoration requirement.

Resources

Vancouver Campus Plan: <http://www.campusplan.ubc.ca/> Refer to Part 2 Campus Plan, Map 2-3 Open Space Network.

SSc5.2 – Site Development: Maximize Open Space

Requirements

All projects must comply as per Case 2 of LEED Canada BD+C 2009. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

The UBC Vancouver Campus plan details several priorities and requirements with respect to preserving and enhancing the open space network.

Campus Compliance Eligibility

Preliminary analysis indicates that documenting campus wide compliance would be onerous and costly. UBC intends to pursue campus compliance over time. All projects must comply at the project level.

Guidance

All projects within the institutional core of the UBC Vancouver campus will be considered Previously Developed sites. Campus Plan Design Guidelines must be met in addition the credit requirements. Where LEED and UBC requirements conflict, UBC requirements take precedence.

Project teams are advised to discuss and establish the landscape plan early to ensure the open space requirement can be met. Projects with limited site area, also meeting SSc2 Development Density, are urged to consider a living roof and/or naturally designed ponds to contribute to minimum open space requirement.

Resources

Vancouver Campus Plan: <http://www.campusplan.ubc.ca/>
Refer to Part 2 Campus Plan, Map 2-3 Open Space Network.

Mandatory

Points Required	Points Available
1	1

50%

of UBC LEED NC1.0 projects achieved this credit.

Mandatory	
Points Required	Points Available
1	1
30% of UBC LEED NC1.0 projects achieved this credit.	

SSc6.1 – Stormwater Design: Quantity Control

Requirements

All projects must comply as per Case 1 or Case 2 outlined in LEED Canada BD+C 2009, as applicable. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Stormwater management is mandatory as part of the Campus Plan Design Guidelines. Managing stormwater is essential to limit cliff erosion and protect sensitive riparian environments on campus. The UBC stormwater system overall does not include any provision for campus-wide quantity or quality control, and therefore credit requirements must be met on a project scale.

Campus Compliance Eligibility

The UBC Vancouver Campus does not have a campus scale approach for stormwater management that currently meets the requirements of the credit. UBC intends to pursue campus compliance over time. All projects must address stormwater management at the project scale.

Guidance

The Campus Plan Design Guidelines require that the stormwater rate is slowed by at least 50%, consistent with the LEED requirement. Project teams are advised to refer to the Campus Plan Design Guidelines for restrictions on passive infiltration strategies.

Resources

UBC Water Action Plan

<http://www.sustain.ubc.ca/campus-water>

Contacts: C+CP Campus Sustainability

C+CP Infrastructure & Services Planning

Optional	
Points Required	Points Available
0	1
20% of UBC LEED NC1.0 projects achieved this credit.	

SSc6.2 – Stormwater Design: Quality Control

Requirements

Projects may comply with requirements as per LEED Canada BD+C 2009.

UBC Context

The UBC stormwater system overall does not include any provision for campus-wide quantity or quality control, and therefore credit requirements must be met on a project scale.

Campus Compliance Eligibility

The UBC Vancouver Campus does not have a campus scale approach for stormwater management that currently meets the requirements of the credit. UBC may pursue campus compliance over time. If projects wish to comply with the credit requirements, they must do so at the project scale.

Guidance

The Campus Plan Design Guidelines require that the stormwater rate is slowed by at least 50%; quality is not addressed. Project teams are advised to refer to the Campus Plan Design Guidelines for restrictions on passive infiltration strategies.

Resources

UBC Water Action Plan

<http://www.sustain.ubc.ca/campus-water>

Contacts: C+CP Campus Sustainability

C+CP Infrastructure & Services Planning

SSc7.1 – Heat Island Effect: Non-roof

Requirements

All projects must comply as per Option 1 or Option 2 outlined in LEED Canada BD+C 2009. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Reducing the effects of heat island and increasing permeable and landscaped surfaces is a priority for UBC.

Campus Compliance Eligibility

Preliminary analysis demonstrates that campus wide compliance via Option 1 would be onerous and costly. UBC may pursue campus compliance over time. Projects must comply at the project scale. In addition, project teams are advised that less than 50% of total parking spaces on campus are covered.

Guidance

Project teams are advised to discuss the landscape plan early to establish appropriate strategies.

Mandatory

Points Required	Points Available
1	1

90%

of UBC LEED NC1.0 projects achieved this credit.

Optional	
Points Required	Points Available
0	1

60%
of UBC LEED NC1.0 projects
achieved this credit.

SSc7.2 – Heat Island Effect: Roof

Requirements

Projects may choose to pursue this credit as per LEED Canada BD+C 2009.

UBC Context

Concerns related to controlling access to green roofs, providing infrastructure for ongoing maintenance and safety issues have been identified by the University Architect and Building Operations.

Guidance

Project teams are advised to include a detailed discussion of related design strategies early in the design process in order to address safety and maintenance concerns. Project teams are asked to engage with Building Operations to gain insight from past project experience.

Projects pursuing this credit by installing highly reflective roofing materials are asked to consider reflectivity/optical comfort of occupants in adjacent, higher rise buildings, with views over the project roof area.

Resources

Contacts: C+CP University Architect
UBC Building Operations

SSc8 – Light Pollution Reduction

Requirements

Projects may choose to comply with the credit as per Option 1 or 2 for Interior Lighting, as outlined in LEED Canada BD+C 2009. For Exterior Lighting, site specific lighting that does not meet the Campus Plan Design Guidelines must be approved in advance by submitting a Variance Request to the Director, C+CP Campus Sustainability.

UBC Context

The Vancouver Campus Plan Lighting Guidelines are currently consistent with Outdoor Lighting Zone LZ3 – Medium.

Guidance

Although the Campus Plan Lighting Zone Guidelines are consistent with LZ3, project teams are encouraged to refer to the Lighting Zone definitions in the LEED Canada BD+C 2009 Reference Guide and IESNA-RP-33-99 to evaluate their specific site accordingly. Lighting Zones across campus may vary from LZ1 to LZ3 depending on adjacent land use, and project scale analysis is required to determine appropriate site classification.

Resources

Vancouver Campus Plan: <http://www.campusplan.ubc.ca/>

Refer to Part 3 Campus Plan, Map 3-13 Lighting – Building Exterior Areas.

IESNA-RP-33-99 Lighting for Exterior Environments ⁴

Contacts: C+CP Campus Sustainability

⁴ Illuminating Engineering Society of North America Recommended Practice document RP-33-99.

Optional

Points Required	Points Available
0	1

100%

of UBC LEED NC1.0 projects achieved this credit.

Water Efficiency

Prerequisite

WEp1: Water Use Reduction

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009.

UBC Context

Potable water use reduction is a major priority for UBC. A water fixture study was conducted for the UBC Campus to determine maximum water use reduction possible (UBC Water Fixture Analysis, January 2012), with fixtures that meet the durability and maintenance requirements of UBC Campus Operations.

The flush and flow rates for the water consuming fixtures listed below are the lowest allowable rates for fixtures installed at UBC. Although not preferred, waterless urinals will be considered in lower occupancy program areas.

Table 3: Minimum Fixture Flush/Flow rates for UBC

Commercial Building Types		Residential Building Types	
Fixture Type	Flow Rate	Fixture Type	Flow Rate
Low-flow toilets	4.8 LPF	Dual flush toilets	High flush = 6 LPF Low flush = 3.4 LPF
Low-flow urinals	1.9 LPF	Low-flow urinals	1.9 LPF
Conventional lavatory faucets	1.9 LPM	Low-flow lavatory faucet	1.9 LPM
Ultra-low-flow kitchen faucets	5.7 LPM	Ultra-low-flow kitchen faucets	5.7 LPM
Low-flow showers	5.7 LPM	Low-flow showers	5.7 LPM

Based on the fixture performance of Table 3, the maximum water savings were determined to be:

- Approximately 28% for commercial building types. (Further water saving strategies would be required to achieve the minimum 30% target for WEc3, such as waterless urinals, or greywater usage.)
- Approximately 46% for residential building types.

The water fixture study indicates that if waterless urinals are used in place of low-flow urinals, approximately 36% reduction is possible.

Guidance

Project teams are advised to select low-flow toilets with a Maximum Performance (MaP) rating of at least 1000g of waste per flush for the best performance results.

Resources

Water Use Reduction Fixture Calculations. (*Appendix B*)

Maximum Performance (MaP) website:

<http://www.map-testing.com/>

UBC Water Action Plan

<http://www.sustain.ubc.ca/campus-water>

Contacts: UBC Building Operations

WEc1 – Water Efficient Landscaping

Requirements

All UBC projects must reduce potable water use for landscaping by at least 50% for two points by demonstrating compliance with Option 1 of the LEED Canada BD+C 2009. Projects are also encouraged to pursue additional points by complying with Option 2, Path 1. Projects that cannot comply for 2 points, must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Potable water use reduction is major priority for UBC. Projects must provide infrastructure for automatic irrigation systems. UBC does not allow projects to comply by eliminating irrigation.

Campus Compliance Eligibility

The UBC Vancouver Campus does not have a campus-wide approach for irrigation that currently meets the requirements of the credit. UBC may pursue campus compliance over time. Projects must comply with the credit requirement at the project scale.

Guidance

Option 1 Reduce by 50% (2 points)

Projects may only comply by providing an automatic irrigation system. Drip irrigation systems have been identified by Building Operations as problematic and weak. Project teams are directed to identify alternative high efficiency, non-drip systems that can meet the efficiency requirements. In addition, teams are encouraged to consider non-potable irrigation.

Mandatory

Points Required	Points Available
2	4

90%

of UBC LEED NC1.0 projects achieved **50%** reduction in potable water use.

40%

of UBC LEED NC1.0 projects achieved **100%** reduction in potable water use.

Option 2 No Potable Water Use or Irrigation (4 points)

Projects that wish to pursue additional points by applying Option 2 may do so only through Path 1. UBC requires landscaped areas to be irrigated. Projects must consider captured rainwater, recycled wastewater/greywater or other non-potable sources to meet the requirements of Option 2.

Resources

UBC Water Action Plan

<http://www.sustain.ubc.ca/campus-water>

Contacts: UBC Building Operations, Soft Landscape Unit

Optional	
Points Required	Points Available
0	2

10%
 of UBC LEED NC1.0 projects achieved this credit.

WEc2 – Innovative Wastewater Treatment

Requirements

Projects may choose to comply as per the requirements of LEED Canada BD+C 2009.

UBC Context

Potable water use reduction is a priority for UBC. Demand reduction is currently the preferred method for reducing water usage at UBC.

Campus Compliance Eligibility

Infrastructure does not exist to support campus wide compliance.

Guidance

Projects may only comply at the project scale.

Resources

UBC Water Action Plan

<http://www.sustain.ubc.ca/campus-water>

Contacts: C+CP Campus Sustainability
 UBC Building Operations

WEc3 – Water Use Reduction

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009 for a water use reduction of at least 30% for 2 points. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval. Projects wishing to install waterless urinals must obtain prior permission from C+CP Campus Sustainability and UBC Building Operations.

UBC Context

Potable water reduction is a major priority for UBC. A water fixture study was conducted for the UBC Campus to determine maximum water use reduction possible (UBC Water Fixture Analysis, January 2012), with fixtures that meet the durability and maintenance requirements of UBC Campus Operations.

The flush and flow rates for the water consuming fixtures listed below are the lowest allowable rates for fixtures installed at UBC. Although not preferred, waterless urinals will be considered in lower occupancy program areas.

Table 4: Minimum Fixture Flush/Flow rates for UBC

Commercial Building Types		Residential Building Types	
Fixture Type	Flow Rate	Fixture Type	Flow Rate
Low-flow toilets	4.8 LPF	Dual flush toilets	High flush = 6 LPF Low flush = 3.4 LPF
Low-flow urinals	1.9 LPF	Low-flow urinals	1.9 LPF
Conventional lavatory faucets	1.9 LPM	Low-flow lavatory faucet	1.9 LPM
Ultra-low-flow kitchen faucets	5.7 LPM	Ultra-low-flow kitchen faucets	5.7 LPM
Low-flow showers	5.7 LPM	Low-flow showers	5.7 LPM

The water fixture study indicates that if waterless urinals are used in place of low-flow urinals, approximately 36% reduction is possible.

Based on the fixture recommendations below, the maximum water savings were determined to be:

- Approximately 28% for commercial building types.
Approximately 46% for residential building types.

Mandatory

Points Required	Points Available
2	4

100%

of UBC LEED NC1.0 projects achieved **20%** reduction in potable water use.

80%

of UBC LEED NC1.0 projects achieved **30%** reduction in potable water use.

Guidance

Project teams are advised to select low-flow toilets with a Maximum Performance (MaP) rating of at least 1000g of waste per flush for the best performance results.

Projects are urged to consider captured rainwater, recycled wastewater/greywater or other non-potable sources and strategies to meet the requirements.

Resources

Water Use Reduction Fixture Calculations. (*Appendix B*)

Maximum Performance website:

<http://www.map-testing.com/>

UBC Water Action Plan

<http://www.sustain.ubc.ca/campus-water>

Contacts: C+CP Campus Sustainability

UBC Building Operations

Energy and Atmosphere

EAc1 – Optimize Energy Performance

Requirements

All projects must comply as per Option 1, Path 1 or Path 2 of the requirements of LEED Canada BD+C 2009. All projects must demonstrate an energy cost savings equivalent to 11 EAc1 points. Projects that cannot meet the minimum of 11 points and/or not intending to connect to the campus DES must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

As per the UBC Climate Action Plan, energy conservation and the associated cost savings are a high priority for UBC. UBC requires a minimum energy cost savings of 42% better than MNECB, or 11 EAc1 points. Projects may choose to reference ASHRAE 90.1 – 2007, demonstrating a cost savings of at least 32%.

As per LEED Canada BD+C 2009, all projects must account for the UBC District Energy System (DES) whether it positively or negatively affects energy cost savings. While not all projects can connect to the DES immediately, all projects must be designed to be 'connection ready', and must account for the impact of the DES. In addition, the UBC Bioenergy Research and Demonstration Centre plant contributes renewable electricity to the campus grid, and as such must also be considered in the Whole Building Simulation.

Guidance

Project teams should refer to the LEED Canada 2009 Interpretation Guide for District Energy Systems, published April 1, 2012, and the Guidance for Non-traditional Fuels in Canada. (See Resources.) Biomass can be considered either a Non-traditional Fuel or Renewable Energy. Teams should assess the most advantageous scenario for their specific project.

Calculations from the Bioenergy Research and Demonstration Facility have been conducted by UBC Utilities to confirm thermal and electrical energy contributions.

Suggested contribution for the UBC Academic core:

- Thermal Energy: 12%
- Electrical Energy: 4.5%

Refer to Appendix C for the calculation sheet; project teams are advised to contact UBC Utilities to confirm this calculation is valid at the time of energy simulation.

Mandatory

Points Required	Points Available
11	19

54%

of UBC LEED NC1.0 projects achieved this credit.

Project teams are urged to consider synergies and relationships with EAc5 – Measurement & Verification.

Resources

UBC Climate Action Plan:

<http://climateaction.ubc.ca/climate-action-plan>

Contacts: C+CP Campus Sustainability

UBC Building Operations

CaGBC LEED Canada Supplement: Guidance for Non-Traditional Fuels

CaGBC LEED Canada Supplement: LEED Canada 2009 Interpretation Guide for District Energy Systems

CaGBC Members may login and download the documents here:

<http://www.cagbc.org/Content/NavigationMenu/Programs/LEED/RatingSystems/NewConstruction/default.htm>

Optional	
Points Required	Points Available
0	7

EAc2 – On-Site Renewable Energy

Requirements

Projects may choose to comply with the requirements of LEED Canada BD+C 2009. All projects must plan to connect to the campus DES and account for the renewable energy contribution of the Bioenergy Plant. On-site renewables are optional. Project teams must provide schematics for all on-site renewables which will be reviewed by the UBC Energy Manager, C+CP Campus Sustainability.

UBC Context

On-site renewables are not currently a priority for UBC. The UBC Bioenergy Research and Demonstration plant will supply thermal energy and electricity to the UBC grid. Projects must consider the contribution of UBC's Bioenergy plant in addition to any project-site renewable energy generation strategies.

Guidance

Biomass can be considered either a Non-traditional Fuel or Renewable Energy. Teams should assess the most advantageous scenario for their specific project.

Calculations from the Bioenergy Research and Demonstration Facility have been conducted by UBC Utilities to confirm thermal and electrical energy contributions

Suggested contribution for the UBC Academic core:

- Thermal Energy: 12%
- Electrical Energy: 4.5%

Refer to Appendix C for the calculation sheet; project teams are advised to contact UBC Utilities to confirm this calculation is valid at the time of energy simulation.

Resources

Contacts: C+CP Campus Sustainability
 UBC Building Operations
 UBC Utilities

EAc3 – Enhanced Commissioning

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Enhanced Commissioning is a high priority for UBC, and requirements are clearly aligned with other campus programs such as Continuous Optimization, operational effectiveness and user education and building performance reporting.

Guidance

Project teams are urged to consider synergies and relationships with EAc5 – Measurement & Verification.

Project teams should ensure that the company engaged as the 3rd Party Commissioning Authority is not engaged to provide other services (such as Testing and Balancing) unless the contractual agreement for all scopes of work is arranged directly through the owner.

Resources

Contacts: C+CP Campus Sustainability
 UBC Building Operations

Mandatory

Points Required	Points Available
2	2

60%

of UBC LEED NC1.0 projects achieved this credit.

Mandatory

Points Required	Points Available
2	2

100%
of UBC LEED NC1.0 projects achieved this credit.

EAc4 – Enhanced Refrigerant Management

Requirements

All projects must comply as per the requirements LEED Canada 2009 BD+C Reference Guide. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Enhanced Refrigerant Management is a priority for UBC.

Guidance

NA

Resources

NA

Mandatory

Points Required	Points Available
3	3

40%
of UBC LEED NC1.0 projects achieved this credit.

EAc5 – Measurement and Verification

Requirements

All projects must comply as per the requirements LEED Canada 2009 BD+C Reference Guide, Option 1 or Option 2. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Measurement and Verification is a high priority for UBC, and requirements are clearly aligned with other campus programs such as continuous optimization, operational effectiveness, user education and building performance reporting.

Guidance

Project teams are asked to engage with UBC Utilities to discuss the monitoring strategy and operational data reporting protocol so as to maximize opportunities for operator feedback and gain insight from operator experience.

Resources

Contacts: C+CP Campus Sustainability
UBC Utilities

EAc6 – Green Power

Requirements

Projects may only comply as per the requirements of LEED Canada BD+C 2009 with prior approval from the C+CP Campus Sustainability Energy Manager.

UBC Context

UBC does not support engaging in renewable energy contracts. If projects obtain prior permission to purchase green power, all funding and coordination must be provided by the project team and project budget.

Campus Compliance Eligibility

UBC is currently not eligible and is unlikely to pursue campus compliance over time. This credit may only be achieved at the project scale with prior permission from the C+CP Campus Sustainability Energy Manager.

Guidance

If permission is obtained, acceptable sources of Green Power include those that meet EcoLogo or Green-e program requirements, and are generated in Canada.

Resources

Contacts: C+CP Campus Sustainability

Optional

Points Required	Points Available
0	2

40%

of UBC LEED NC1.0 projects achieved this credit.

Materials and Resources

Mandatory

Points Required	Points Available
1	3

100%
of UBC LEED NC1.0 projects
achieved this credit.

MRc1.1 – Building Reuse: Maintain Existing Walls, Floors and Roof

Requirements

All major renovations/UBC Renew projects must comply as per the requirements of LEED Canada BD+C 2009. Eligible renovation projects that cannot comply must prepare a Variance Request and submit it to the Director, C+P Campus Sustainability for approval.

UBC Context

This credit is supported through the existing UBC Renew Program.

Guidance

N/A

Resources

N/A

Mandatory

Points Required	Points Available
2	4

100%
of UBC LEED NC1.0 projects
achieved **50%** construction
waste diversion.

90%
of UBC LEED NC1.0 projects
achieved **75%** construction
waste diversion.

MRc2 – Construction Waste Management

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009, earning at least two points with a construction waste diversion rate of 85% or higher. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Eliminating construction waste is a high priority for UBC. This credit is mandatory and the required waste diversion rate of 85% is supported by the Campus Waste Action Plan.

Campus Compliance Eligibility

The campus compliance path as detailed in the LEED Canada BD+C 2009 is not an acceptable strategy by which to demonstrate the project diversion rate. Each project must divert at least 85% construction waste.

Guidance

Analysis indicates that the local market for diverting construction waste materials is highly developed and therefore this credit is easily achieved. Project teams are advised to employ a clear

and detailed waste tracking strategy and require monthly waste reporting by the General Contractor to the LEED Consultant, to ensure the best diversion rate. Project teams must also submit monthly reports to Campus Sustainability for waste diversion reporting.

Resources

UBC Waste Action Plan:

<http://www.sustain.ubc.ca/campus-waste>

Contacts: C+CP Campus Sustainability

MRc4 – Recycled Content 20%

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009 demonstrating project recycled content of at least 20%. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Past LEED projects at UBC have consistently demonstrated high rates of recycled content.

Guidance

Analysis indicates this credit is easily achieved as the market for recycled content materials is evolving rapidly. Project teams are advised to consider recycled content for all materials, with specific focus on high cost items and post-consumer recycled content.

Project teams are advised to consider recycled content for all materials, with specific focus on high cost items and post-consumer recycled content for materials, and to include considerations for recycled content within the contract specifications. Project teams are also advised to employ a clear and detailed materials tracking strategy and to require monthly reporting by the General Contractor to the LEED Consultant to ensure the best rate.

Existing Building Renovation project teams may be challenged to achieve a 20%, and are advised to carefully consider recycled content in all material choices.

Resources

N/A

Mandatory	
Points Required	Points Available
0	2
<p>100% of UBC LEED NC1.0 projects achieved a 7.5% recycled content.</p> <p>75% of UBC LEED NC1.0 projects achieved a 15% recycled content.</p>	

Mandatory	
Points Required	Points Available
1	2

90%
of UBC LEED NC1.0 projects achieved **50%** regional materials.

50%
of UBC LEED NC1.0 projects achieved **20%** regional materials.

MRc5 – Regional Materials

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009 demonstrating project regional materials of at least 20%. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Past LEED projects at UBC have consistently demonstrated high achievement rates for regional material credits.

Guidance

Project teams are advised to consider recycled content for all materials, with specific focus on high cost items, and to include considerations for regional sourcing within the contract specifications. Project teams are also advised to employ a clear and detailed materials tracking strategy and to require monthly reporting by the General Contractor to the LEED Consultant to ensure the best rate.

Existing Building Renovation project teams may be challenged to achieve 30%, and are advised to carefully consider sourcing in all material choices.

Resources

N/A

Optional	
Points Required	Points Available
0	1

30%
of UBC LEED NC1.0 projects achieved this credit.

MRc7 – Certified Wood

Requirements

Projects may choose to comply as per the requirements of LEED Canada BD+C 2009.

UBC Context

UBC considers sourcing wood in British Columbia a priority over using FSC certified wood. Although the value of FSC certified wood products is acknowledged, UBC recognizes that sourcing local, cost effective FSC wood is challenging. As such projects pursuing this credit must ensure any FSC wood used in the project also meets the requirements of MRc5.

Guidance

Projects choosing to target this credit should consider the most appropriate wood based materials for FSC certification and research availability as early as possible.

Resources

FSC Canada: www.fsccanada.org, <http://findfsc.com/>

Materials and Resources

Indoor Environmental Quality

EQp2 – Environmental Tobacco Smoke Control

Prerequisite

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009.

UBC Context

UBC and Provincial Smoking Policy states that no smoking is allowed within 6 metres of building entries, operable windows or air intakes. EQp2 requires that no smoking be allowed within 7.5 metres of building entries, operable windows or air intakes. As such, project teams must work with C+CP Campus Sustainability to create a project specific smoking policy.

Guidance

Project teams must work with UBC to draft a project specific letter that clearly states smoking is not allowed within 7.5m of entries, windows or air intakes. Permanent signage should also be installed and photographed, clearly identifying the 7.5m distance.

Resources

<http://riskmanagement.ubc.ca/health-safety/smoking>

Contacts: C+CP Campus Sustainability
UBC Building Operations

EQc3.1 – Construction IAQ Management Plan: During Construction

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Analysis indicates that this credit is easily achieved and industry understanding of requirements is well developed. Protection of Indoor Air Quality (IAQ) is a priority for UBC.

Guidance

Project teams are advised to prepare a construction IAQ plan early, identifying the IAQ strategies to be photographed and the time period at which they will be taken. Project teams are advised to employ a clear and detailed reporting protocol by the

Mandatory

Points Required	Points Available
1	1

100%

of UBC LEED NC1.0 projects achieved this credit.

general contractor to the LEED Consultant, including submittal of photographs showing IAQ measures implemented on a monthly basis.

Resources

Sheet Metal and Air Conditioning Contractor's National Association:
www.smacna.org

Mandatory	
Points Required	Points Available
1	1

90%
of UBC LEED NC1.0 projects
achieved this credit.

EQc3.2 – Construction IAQ Management Plan: Before Occupancy

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009 as per Option 1 or 2. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Analysis indicates this credit is easily achieved and industry understanding of requirements is well developed. Protection of Indoor Air Quality (IAQ) is a priority for UBC.

Guidance

Option 1 Flush out (1 point)

Project teams pursuing Path 1 or Path 2, are advised to consider the construction schedule carefully. Teams must provide time contingency to ensure an adequate period is available to flush the building post construction and in advance of occupancy.

Project teams are advised to liaise with the mechanical engineer early to determine the required flush-out period based on equipment and average outdoor temperature at the time of flushing.

Option 2 Air testing (1 point)

Project teams pursuing Option 2 are advised to create the best conditions under which to conduct IAQ testing. The building should be cleaned and allowed to air before the IAQ testing takes place. Any cleaning products used before testing should be low in VOCs such as EcoLogo or Green Seal certified products. Project teams are urged to contact their IAQ testing professional for additional advice on building condition in advance of testing, as well as to discuss scheduling and timing.

Scheduling should allow time for lab results to confirm the air quality has met the requirements, in case re-testing is necessary. Re-testing must be done in advance of occupancy.

Resources

Sheet Metal and Air Conditioning Contractor's National Association:
www.smacna.org

EQc4 – Low Emitting Materials

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009 for EQc4.1, EQc4.2, EQc4.3 and EQc4.4. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Analysis indicates that industry understanding of requirements is well developed and therefore this credit is easily achieved. Protection of Indoor Air Quality (IAQ), and reducing the impact of harmful materials is a priority for UBC. Credit achievement is not considered difficult, onerous or costly.

Guidance

Project teams are advised to include considerations for low-emitting materials within the contract specifications. Project teams are also advised to employ a clear and detailed materials tracking strategy and to require monthly reporting by the General Contractor to the LEED Consultant to ensure compliance.

Resources

N/A

Mandatory	
Points Required	Points Available
1	1
100% of UBC LEED NC1.0 projects achieved this credit.	

Optional	
Points Required	Points Available
0	1

60%
of UBC LEED NC1.0 projects achieved projects have achieved **EQc8.1**.

50%
of UBC LEED NC1.0 projects achieved projects have achieved **EQc8.2**.

EQc8 – Daylight and Views

Requirements

Projects may choose to comply as per the requirements of LEED Canada BD+C 2009.

UBC Context

The UBC Design Guidelines state that energy efficiency requirements must not be compromised for daylighting. Glazing should not be the predominant feature of the building.

Guidance

Project teams are advised that daylight spaces remain a priority alongside energy efficiency. UBC recognizes the challenges associated with achieving the minimum performance requirement in 75% of regularly occupied space given diverse programming requirements and desire to limit glazing in support of better energy performance. Project teams are still expected to maximize daylighting opportunities in all building types.

Resources

N/A

Innovation in Design

IDC1 – Innovation in Design

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009 to earn the maximum of five available Innovation in Design (ID) points. Projects are asked to submit their Green Education materials to C+CP Campus Sustainability.

UBC Context

An analysis of past UBC LEED projects indicates that it is not difficult, onerous or costly to earn the maximum number of available points under Innovation in Design. Although the rating system allows up to three ID points to be earned through Exemplary Performance for base credits, it is a priority for UBC to quantify and demonstrate innovative green building strategies not already recognized within the LEED BD+C rating systems.

In addition, **ALL** projects **MUST** implement a Green Education Program in accordance with LEED Canada requirements regardless of whether these strategies are submitted for ID credit. Projects with several viable ID strategies may wish to earn credit for other performance achievements, however confirmation of Green Education implementation is still required.

Guidance

Green Education Program

Projects are asked to comply with the Green Education Program by building on UBC Sustainability's current inventory of Green Building and Sustainability Education resources. At a minimum, projects must comply by creating a Case Study (passive strategy) and a tour script and floor plan to be added to the existing UBC Sustainability office Green Building Tour (active strategy). Other strategies may also be included as desired and appropriate.

Project teams should reference the existing UBC Campus Sustainability website for related Green Building education resources: <http://www.sustain.ubc.ca/>

Green Cleaning

Project teams wishing to pursue Green Cleaning must demonstrate compliance with three out of the six LEED Canada 2009 EB:O&M Green Cleaning credits (EQc3) as described in the LEED Canada 2009 BD+C Reference Guide. UBC Custodial Services has implemented a campus-wide Green Cleaning Policy and Program to comply with the requirements of a Green Cleaning Innovation in Design credit under LEED Canada BD+C 2009 rating system. Copies of the Green Cleaning Policy and Program can be found in Appendix D and project teams are asked to liaise with Custodial Services to

Mandatory

Points Required	Points Available
5	5

60%

of UBC LEED NC1.0 projects achieved this credit.

obtain the documentation for LEED submissions, where applicable. If project teams wish revise the Green Cleaning documentation, they should work with directly with Custodial Services. A sample narrative has also been included in Appendix D for reference.

Other Strategies

Strategies that have earned ID credits under the LEED Canada-NC 1.0 rating system at UBC include:

- Exemplary performance: WEc3, EAc6, MRc2, MRc4, MRc5
- Educational Outreach Program: list passive and active strategies
- Green Cleaning
- Composting program
- Operational Water Use Reduction
- Composite Wood Structure
- Life Cycle Analysis
- Natural Gas Carbon Offset
- LEED Canada-CI EQc4.5 – Low Emitting Furniture
- Alternative Energy Strategies

Resources

Contacts: UBC Custodial Services (for assistance and information on Green Housekeeping).

C+CP, Campus Sustainability (for assistance and information on Green Education).

Regional Priority

RPc2 – Regional Priority

Requirements

All projects must comply as per the requirements of LEED Canada BD+C 2009 to earn the maximum of 3 available RPc2 points. Projects that cannot comply must prepare a Variance Request and submit it to the Director, C+CP Campus Sustainability for approval.

UBC Context

Regional Priority Credits are not considered difficult, onerous or costly and projects must earn the maximum number of 3 available points under Regional Priority credit 2.

Guidance

As described by LEED Canada BD+C 2009, regional priority credits are intended to allow project teams to add point emphasis to recognize one or more issues that have regional environmental importance.

To earn a point under Regional Priority credit 2, projects must first earn the base credit and then propose that credit as Regional Priority.

Project teams are required to select the most suitable compliance path from the following two options:

1) Standard compliance path (recommended)

LEED Canada BD+C 2009 has a predetermined a list of Regional Priority credits for Urban areas in British Columbia (see Table 5 below). Projects registered after August 31, 2012 are required to follow the methodology of using pre-selected RPCs from this list, and must therefore use version C (or later) of the LEED Canada 2009 NC and CS Letter Templates. Previously registered projects have the option of applying this new methodology for all regional priorities, or using the older methodology described in Option 2 below. All project teams at UBC are encouraged to adopt the new methodology for greater simplicity.

Table 5: LEED Canada BD+C Regional Priority credits for Urban areas in British Columbia

Credit/Prerequisite	
SSc2	Development Density and Community Connectivity
SSc6.1	Stormwater Design: Quantity Control
WEc3	Water Use Reduction ($\geq 35\%$)
EAc1	Optimize Energy Performance - Option 1 ($\geq 40\%$)
MRc2	Construction Waste Management ($\geq 75\%$)
RPc1	Durable Building

Mandatory

Points Required	Points Available
3	3

2) Optional compliance path (for projects registered before September 1, 2012)

Project teams may choose any allowable credit from which to earn credits for Regional Priority. UBC considers the following to align with campus policy and priorities.

Sustainable Sites

SSc6.1 – Stormwater Design: Quality Control

Water Efficiency

WEc1 – Water Efficient Landscaping: 50% reduction and 100% reduction

WEc3 – Water Reduction: 30% reduction

Energy Efficiency

EAc1 – Optimize Energy Performance: Option 1

EAc3 – Enhanced Commissioning

EAc5 – Measurement and Verification: Option 1, 2 or 3

Materials and Resources

MRc2 – Construction Waste Management

Project teams should also refer to [Version C of the LEED Canada 2009 NC and CS Letter Templates for submittal requirements](#).⁵

A narrative is required that summarizes why the environmental impacts underlying the proposed credit are a higher priority for the region in which the project is located than for adjacent regions or most others in Canada. Project teams must also provide clear supporting documentation/research and data to justify the claim, for example, maps research and technical data.

Resources

CaGBC Regional Priority Credit webpage:

http://www.cagbc.org/AM/Template.cfm?Section=Regional_Priority_Credits

⁵ http://www.cagbc.org/AM/Template.cfm?Section=New_Construction

Site Plans

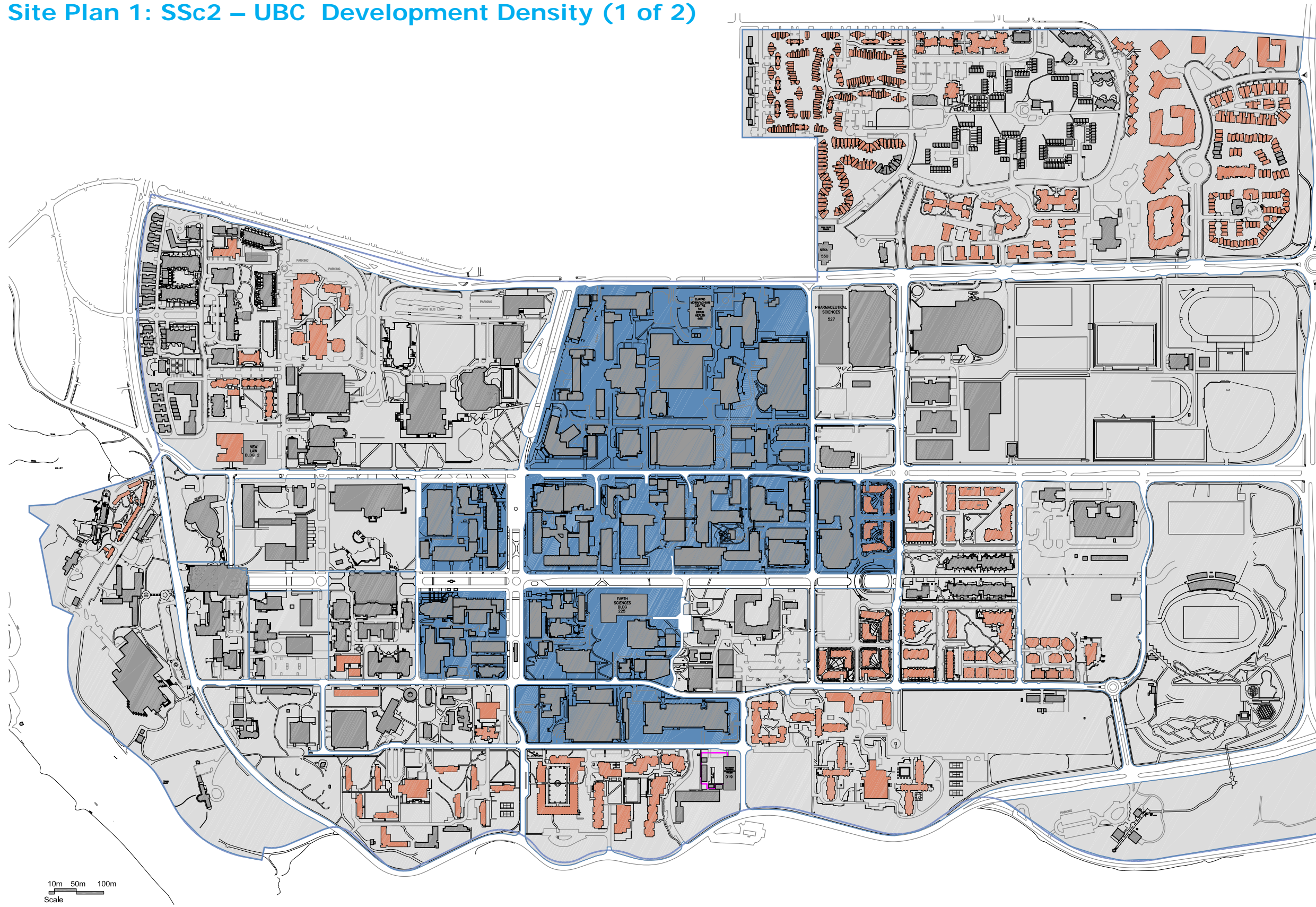
Site Plan 1: SSc2 – UBC Development Density

Site Plan 2: SSc4.1 Option 1 – UBC Bus Loop and Trip Summary




Site Plan 3: SSc4.1 Option 1 – UBC Transit within 800m

Site Plan 4: SSc4.1 Option 2 – UBC Transit within 400m

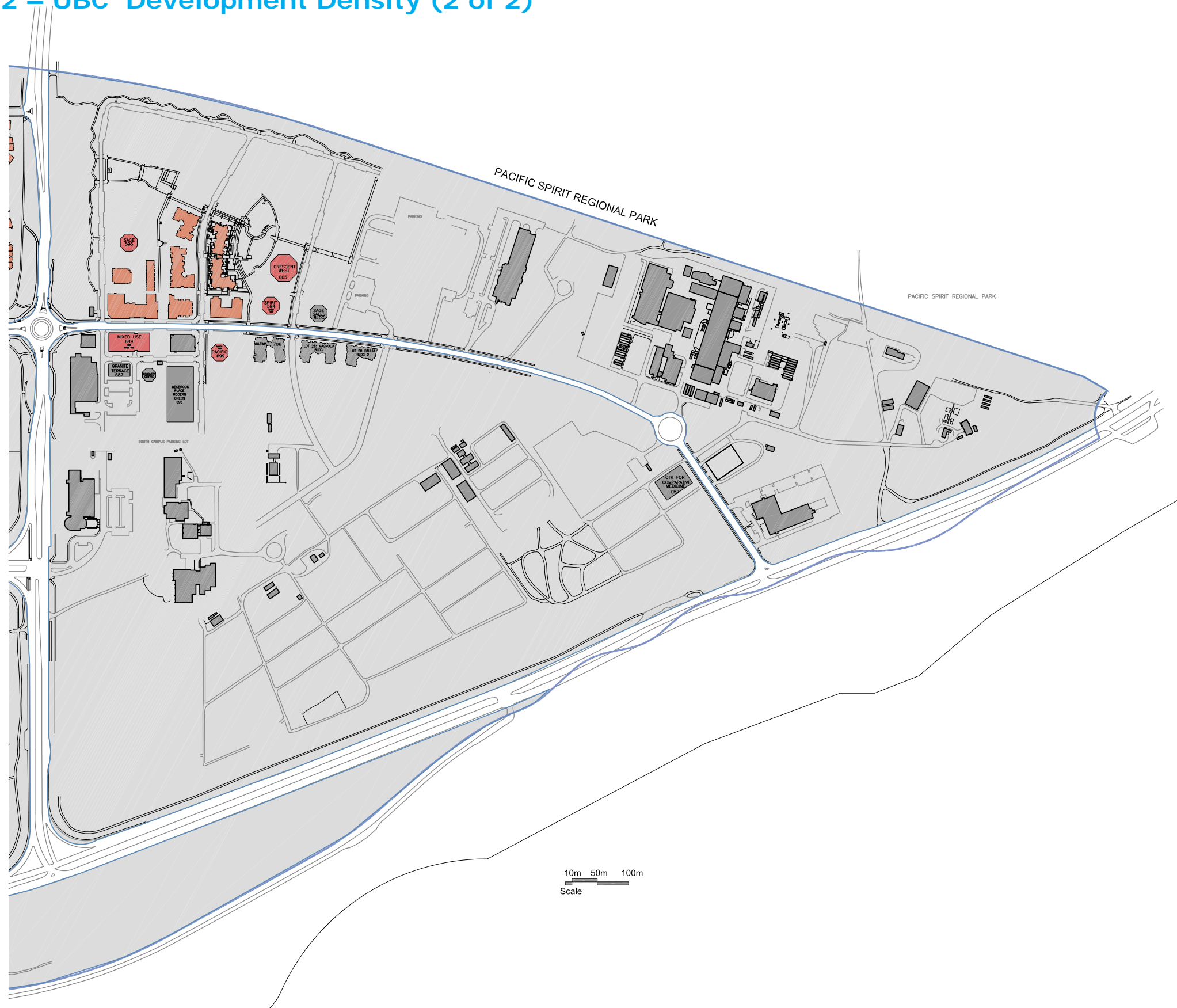
Site Plan 1: SSc2 – UBC Development Density (1 of 2)



UBC LEED Development Density and Community Connectivity Key Plan

Key	Legend
	Housing Density > 25 units/hectare
	> 13,800 m ² /hectare
	< 13,800 m ² /hectare

Site Plan 1: SSc2 – UBC Development Density (2 of 2)



Development Density and Community Connectivity




General Notes and Methodology:

Zones of the campus that meet the minimum density threshold are highlighted. Primary roads for campus traffic have been considered right-of-ways and are excluded from the density calculations. The areas included in the calculations are shaded according to the key plan.

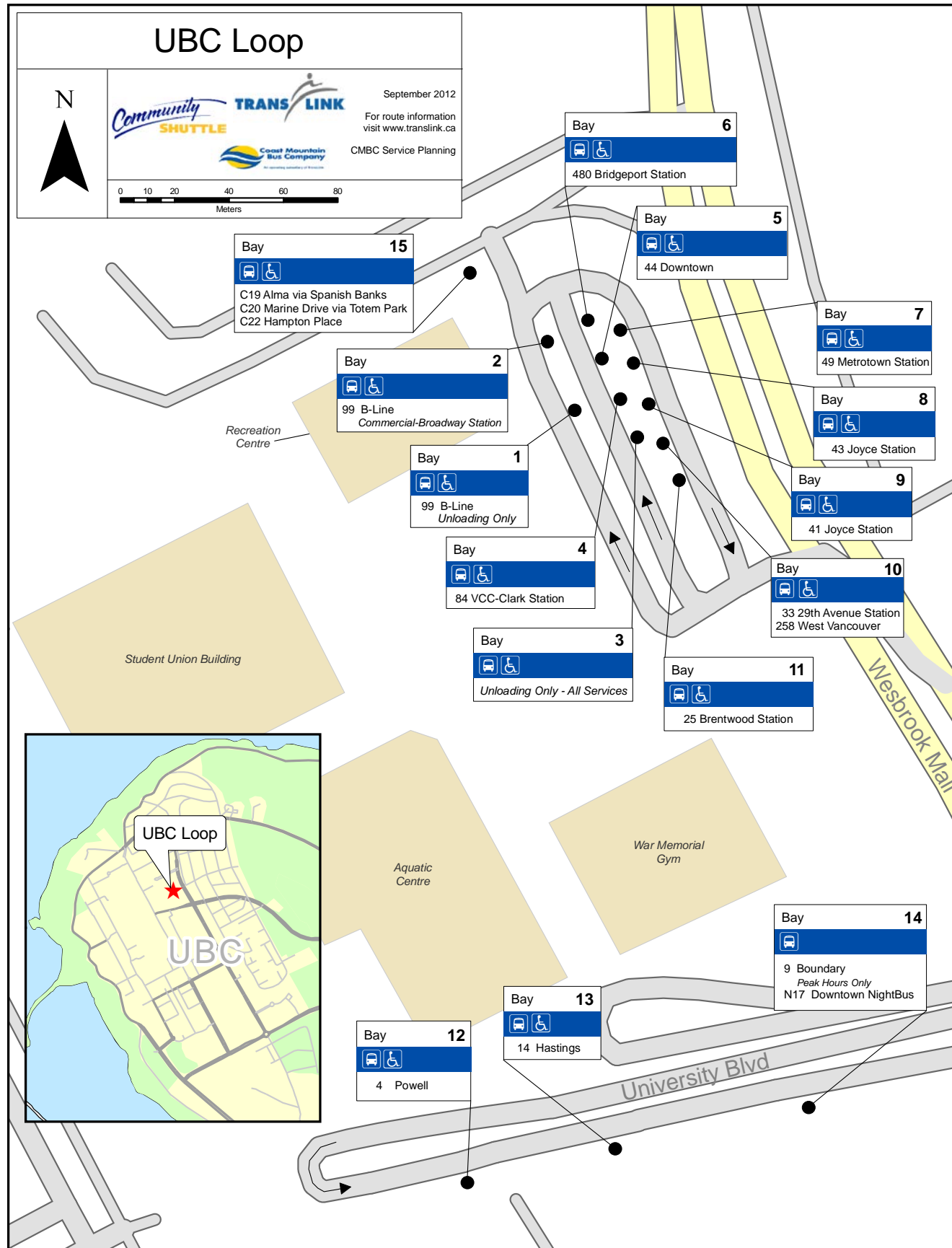
GIS Source: UBC provided a GIS model to calculate gross square footage of the buildings on campus. This file was sent by UBC Infrastructure Development on 11/23/2011. New buildings not included in the GIS file were added to the calculations.

Future buildings included in the density calculations were currently under construction at the beginning of 2012.

Residential areas that meet the 25 units per hectare requirement are indicated in the key plan. Some housing does not meet the requirements and is not highlighted.

UBC LEED Development Density and Community Connectivity Key Plan	
Key	Legend
	Housing Density > 25 units/hectare
	> 13,800 m ² /hectare
	< 13,800 m ² /hectare

Site Plan 2: SSc4.1 Option 1 – UBC Bus Loop and Trip Summary



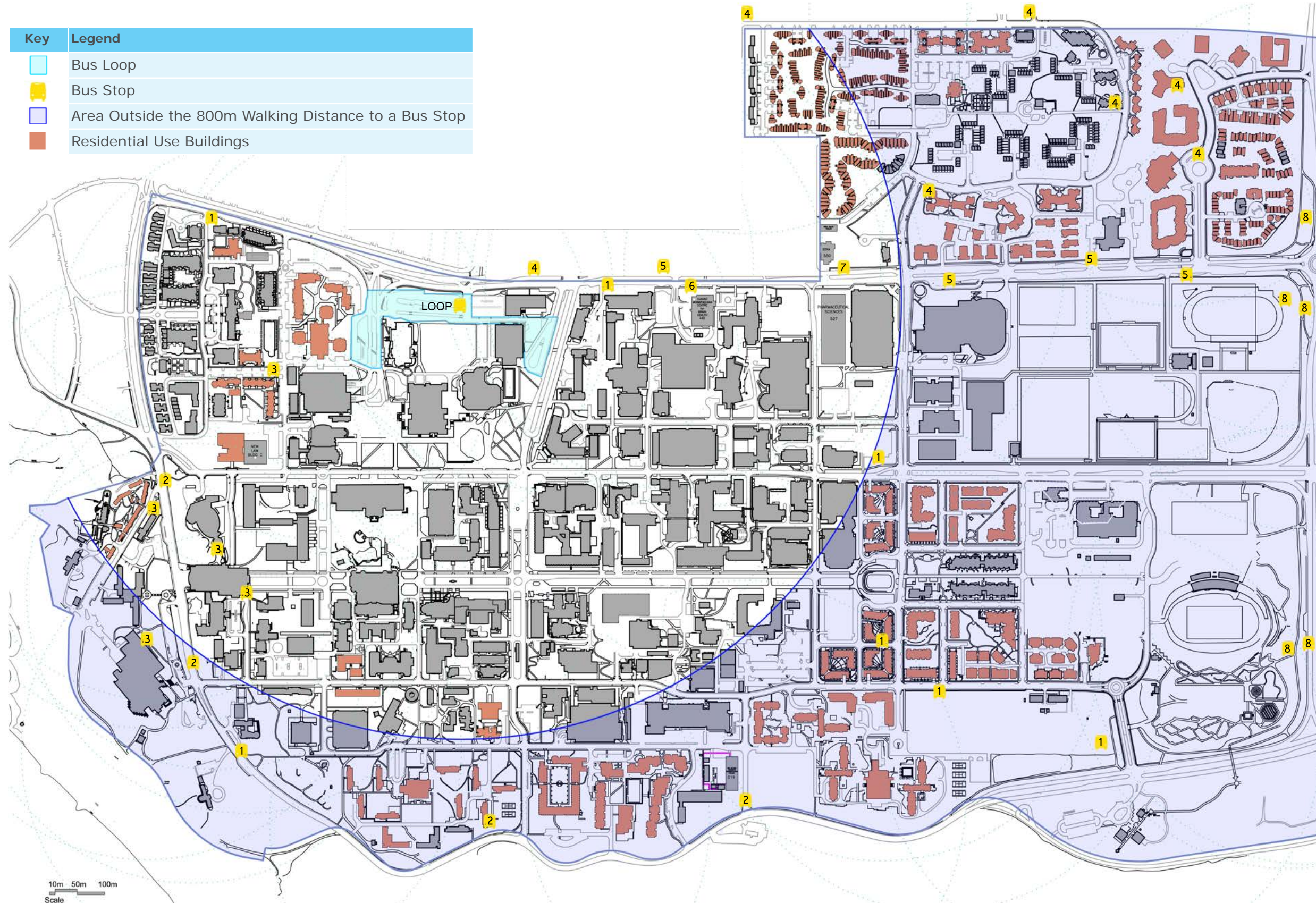
UBC Bus Loop Trip Summary			
Bay Number	Bus Number	Weekday Trips	Weekend Trips
1	N/A	N/A	N/A
2	99 B-Line	276	126
3	N/A	N/A	N/A
4	84	107	34
5	44	47	0
6	480	65	0
7	49	68	0
8	43	49	0
9	41	124	38
10	33, 258	75	71
11	25	108	61
12	4	67	50
13	14	82	91
14	9, N17	47	3
15	C19, C20, C22	75	70
Total Trips		1184	491

Notes:

*Trip Summary based on TransLink schedules for September – December 2012 available at: <http://www.translink.ca/en/Schedules-and-Maps/Bus/Schedules-by-Region.aspx>

Exchange Map reference:
http://www.translink.ca/~media/documents/schedules_and_maps/stn_exch/ubcloop.ashx

Site Plan 3: SSc4.1 Option 1 – UBC Transit within 800m



Key	Legend
	Bus Loop
	Bus Stop
	Area Outside the 800m Walking Distance to a Bus Stop
	Residential Use Buildings

Public Transportation Access

General Notes and Methodology

The UBC bus loop was identified according to the UBC Way Finding map published by UBC Campus Planning in September 2012 (http://www.maps.ubc.ca/PROD/index_detail.php?locat1=N042), and the Translink UBC Bus Loop Exchange Map published September 2012: http://www.translink.ca/~media/documents/schedules_and_maps/stn_exch/ubcloop.ashx.

Areas outside the required 800m distance were identified by drawing a 800m radius around the centre of the Bus Loop; areas outside the 800m radius are denoted by the purple shading. Please note that SSc4.1 Option 1 is evaluated based on the accessible walking route from the building to the Bus Loop, as such projects must confirm the accessible walking route for each project is 800m or less.

UBC Bus Stop Table	
Bus Stop Number	Route Number
Loop: North	25, 33, 41, 43, 44, 49, 84, 99, 258, 480, C19, C20, C22
Trolley	4, 9, 14, N17
1	C20
2	C20, C19
3	C19
4	C22
5	25, 33, 41, 43, 49, 480, C22
6	25, 33, 41, 43, 480, C20, C22
7	25, 33, 41, 43, 49, 480
8	43, 49, 480

Site Plan 4: SSc4.1 Option 2 – UBC Transit within 400m (1 of 2)



Public Transportation Access

General Notes and Methodology

Transit stops were identified according to the UBC Way Finding map published by UBC Campus Planning in September 2012 (http://www.maps.ubc.ca/PROD/index_detail.php?locat1=N042)

Areas outside the required 400m distance were identified by drawing a 400m radius around each stop; areas outside the 400m radius are denoted by the purple shading. Please note that SSc4.1 Option 2 is evaluated based on the accessible walking route from the building to the transit stop, as such projects must confirm the accessible walking route for each project is 400m or less from at least two bus lines (one or more stops).

UBC Bus Stop Table	
Bus Stop Number	Route Number
Loop: North	25, 33, 41, 43, 44, 49, 84, 99, 258, 480, C19, C20, C22
Trolley	4, 9, 14, N17
1	C20
2	C20, C19
3	C19
4	C22
5	25, 33, 41, 43, 49, 480, C22
6	25, 33, 41, 43, 480, C20, C22
7	25, 33, 41, 43, 49, 480
8	43, 49, 480

Site Plan 4: SSc4.1 Option 2 – UBC Transit within 400m (2 of 2)



UBC Bus Stop Table	
Bus Stop Number	Route Number
8	43, 49, 480
9	41, 43, 49, 480
10	41

Appendices

Appendix A: Credit Achievement Rates for UBC LEED Canada 1.0 Projects

Appendix B: Water Use Reduction Fixture Calculations

Appendix C: Bioenergy Research Demonstration Facility Calculation Summary

Appendix D: Green Cleaning Policy and Program

Appendix A: Credit Achievement Rates for UBC LEED Canada 1.0 Projects

Chart 1: Sustainable Sites

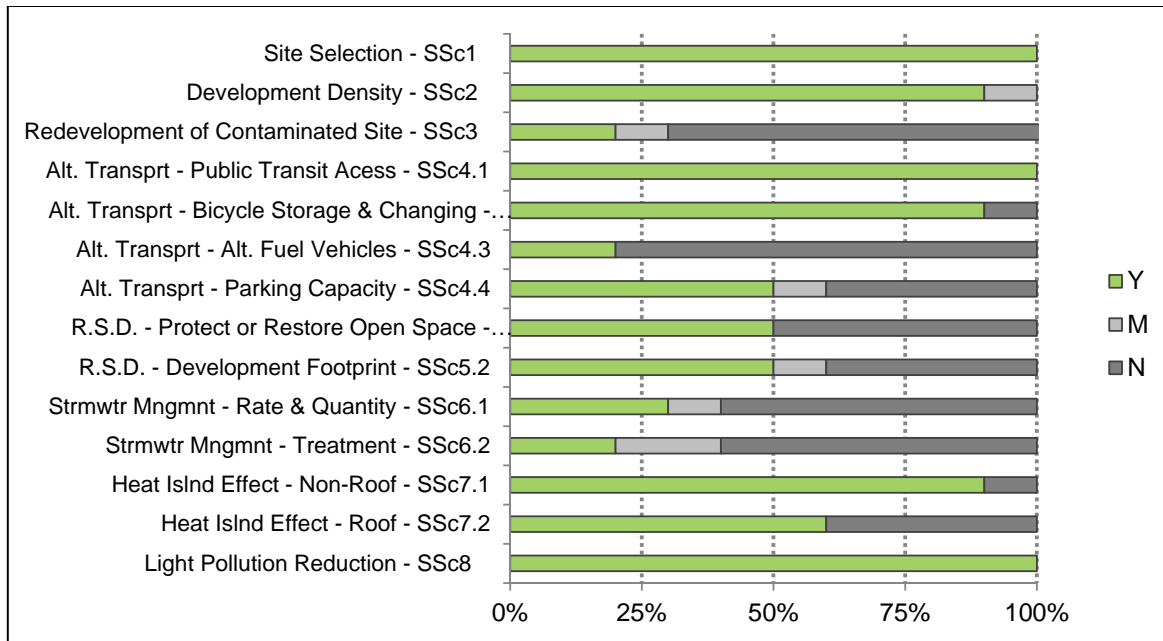


Chart 2: Water Efficiency

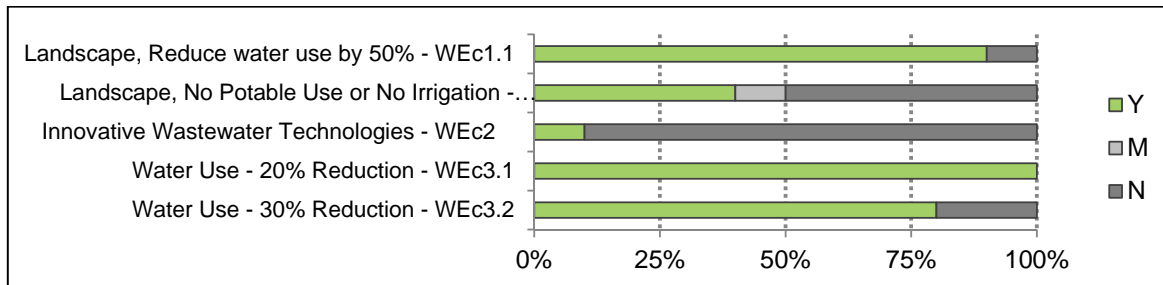


Chart 3: Energy & Atmosphere

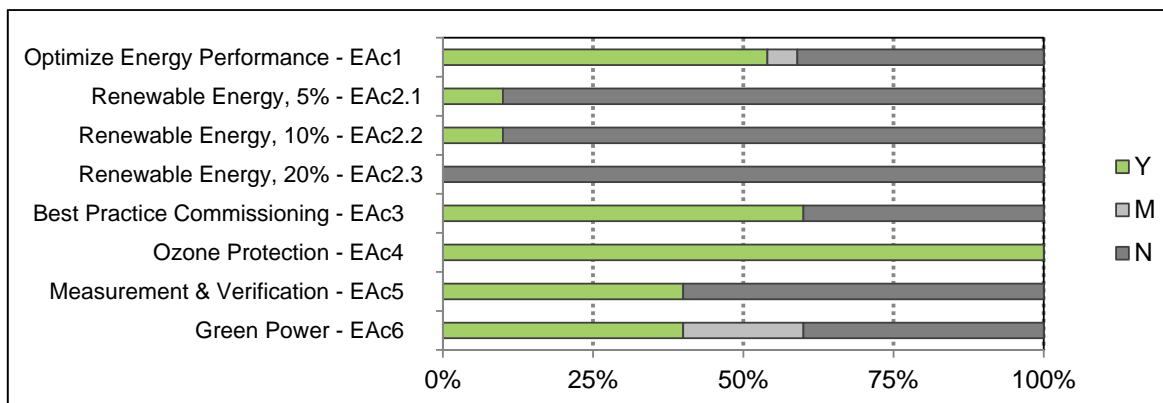


Chart 4: Materials and Resources

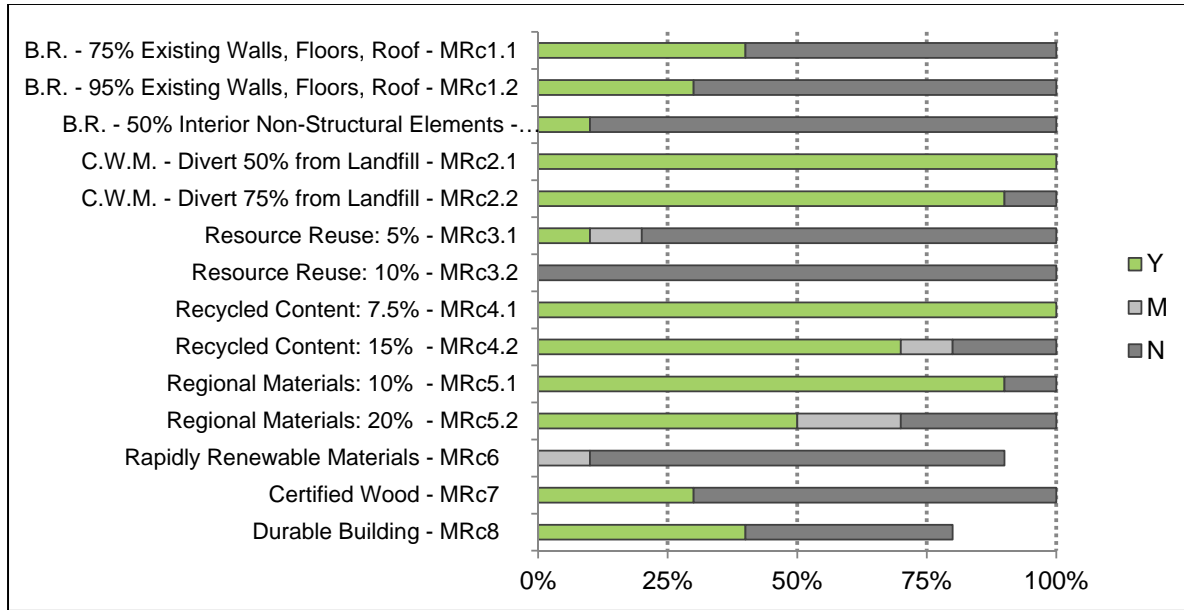
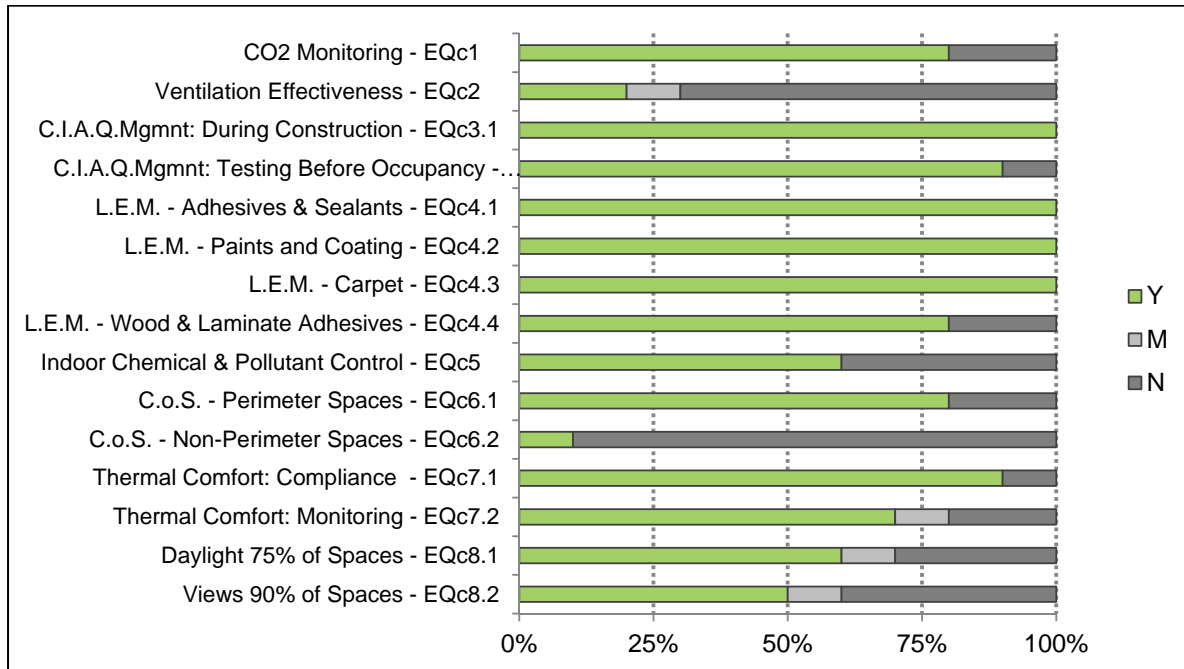


Chart 5: Indoor Environmental Quality



Appendix B: Water Use Reduction Fixture Calculation and Estimates

Commercial Building Type

LEED Canada for New Construction and Major Renovations 2009

Project Number:0
UBC Water Testing

WE Prerequisite 1 & WE Credit 3: WATER USE REDUCTION

Please select only **ONE** of the following options:

Standard Compliance Path: WE Prerequisite: Water Use Reduction 20%

WE Prerequisite: Water Use Reduction 20%
WE Credit: Water Use Reduction 30% - 2 Points
WE Credit: Water Use Reduction 35% - 3 Points
WE Credit: Water Use Reduction 40% - 4 Points

Special Circumstances or Alternative Compliance Path

Standard Compliance Path: WE Prerequisite: Water Use Reduction 20%

WE Prerequisite

Provide the following to support the WE Prerequisite 1:

- A narrative briefly describing the content in the tables.
(Narrative should specifically address any usage pattern assumptions or cistern calculations.)
- Approved shop drawings of all water consuming fixtures and water meter(s).
- Cistern performance calculations (if applicable)

Table: Flow Fixture Chart

Flow Fixture Type	Water Use [LPM]	Duration [sec]
Commercial Lavatory (Private)	8.3	15
Commercial Lavatory (Public)	1.9	15
Commercial Lavatory (metering)	0.95	60
Kitchen Sink (Non-residential)	8.3	15
Commercial Shower	9.5	300
Residential Lavatory	8.3	60
Residential Kitchen Sink	8.3	60
Residential Shower	9.5	480
Low-flow Commercial Shower	5.7	300
Low-flow Residential Shower	5.7	480
Low-flow Residential Lavatory	1.9	60
Ultra-low flow kitchen sink	5.7	15
Other (user defined)		
Other (user defined)		
Other (user defined)		
Other (user defined)		
Other (user defined)		
Other (user defined)		
Other (user defined)		

Table: Flush Fixture Chart

Flush Fixture Type	Water Use [LPF]
Commercial / Residential Toilet	6
Blow-out Water Closet	13.2
Low-Flow Water Closet	4.2
Ultra Low-Flow Water Closet	3
Composting Toilet	0
Commercial Urinal	3.8
Low-Flow Urinal	1.9
Waterless Urinal	0
Dual flush high	6
Dual flush low	3.4
Other low-flow water closet	4.8
Other (user defined)	
Other (user defined)	
Other (user defined)	
Other (user defined)	
Other (user defined)	

* User defined fixture to be addressed in Narrative

Table: Design Case

Flush Fixture	Daily Uses	Flow Rate [LPF]	Duration [flush]	Occupant users	Sewage Generation [L/day]
Other low-flow water closet					
Male	1	4.8	1	400	1920
Female	3	4.8	1	400	5760
Low-Flow Urinal					
Male	2	1.9	1	400	1520
Female	0	1.9	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0
Flow Fixture	Daily Uses	Flow Rate [LPM]	Duration [sec]	Occupant users	Sewage Generation [L/day]

Commercial Lavatory (Public)	3	1.9	15	800	1140
Ultra-low flow kitchen sink	1	5.7	15	800	1140
Low-flow Commercial Shower	0.1	5.7	300	800	2280
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
Total uses by all occupants					5,680
Total Daily Volume [L]					13,760
Annual Work Days					260
Annual Volume [L]					3,577,600
Greywater or Stormwater Reuse Volume [L]					0
Total Annual Volume [L]					3,577,600

Table: Baseline Case

Flush Fixture	Daily Uses	Flow Rate [LPF]	Duration [flush]	Occupant users	Sewage Generation [L/day]
Commercial / Residential Toilet					
Male	1	6	1	400	2,400
Female	3	6	1	400	7,200
Commercial Urinal					
Male	2	3.8	1	400	3,040
Female	0	3.8	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0

Flow Fixture	Daily Uses	Flow Rate [LPM]	Duration [sec]	Occupant users	Sewage Generation [L/day]
Commercial Lavatory (Public)	3	1.9	15	800	1,140
Kitchen Sink (Non-residential)	1	8.3	15	800	1,660
Commercial Shower	0.1	9.5	300	800	3,800
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
Total uses by all occupants					5,680
Total Daily Volume [L]					19,240
Annual Work Days					260
Total Annual Volume [L]					5,002,400
Water Use Reduction					28.48%

Special Circumstances or Alternative Compliance Path

(3 Points)

Special circumstances preclude documentation of credit compliance with the submittal requirements outlined in this form or the project team is using an alternative compliance path in lieu of standard submittal paths.

Provide the following to support the selected option:

- A narrative describing the special circumstances or alternative compliance path and any supporting alternate documentation. (The narrative must include justification that the credit intent and requirements are met and reference the alternate documentation provided. Non-standard documentation will be considered upon its merits.)

Credit Interpretation Request (CIR) applied to credit:

WE Prerequisite 1: Water Use Reduction

Prerequisite Documented

Standard Compliance Path: Water Use Reduction 20%
Special Circumstances or Alternative Compliance Path

YES
NO

WE Credit 3: Water Use Reduction

Points Documented

Standard Compliance Path: Water Use Reduction
Special Circumstances or Alternative Compliance Path (3 points)

0
0

The signature below constitutes a declaration that the project meets the credit intent and the requirements of the option selected above and that

the submitted documents accurately represent the project.

Name: _____ Your Name _____
Organization: _____ Your Company _____
Role in project: _____ Mechanical Engineer _____
Signature: _____
Date: _____

Residential Building Type

LEED Canada for New Construction and Major Renovations 2009

Project Number:0
 UBC Water Testing

WE Prerequisite 1 & WE Credit 3: WATER USE REDUCTION

Please select only **ONE** of the following options:

- Standard Compliance Path: Water Use Reduction 40%**
 WE Prerequisite: Water Use Reduction 20%
 WE Credit: Water Use Reduction 30% - 2 Points
 WE Credit: Water Use Reduction 35% - 3 Points
 WE Credit: Water Use Reduction 40% - 4 Points
- Special Circumstances or Alternative Compliance Path**

Standard Compliance Path: Water Use Reduction 40%

(4 Points)

Provide the following to support the WE Prerequisite 1:

- A narrative briefly describing the content in the tables.
 (Narrative should specifically address any usage pattern assumptions or cistern calculations.)
- Approved shop drawings of all water consuming fixtures and water meter(s).
- Cistern performance calculations (if applicable)

Table: Flow Fixture Chart

Flow Fixture Type	Water Use [LPM]	Duration [sec]
Commercial Lavatory (Private)	8.3	15
Commercial Lavatory (Public)	1.9	15
Commercial Lavatory (metering)	0.95	60
Kitchen Sink (Non-residential)	8.3	15
Commercial Shower	9.5	300
Residential Lavatory	8.3	60
Residential Kitchen Sink	8.3	60
Residential Shower	9.5	480
Low-flow Commercial Shower	5.7	300
Low-flow Residential Shower	5.7	480
Low-flow Residential Lavatory	1.9	60
Ultra-low flow kitchen sink	5.7	60
Other (user defined)		
Other (user defined)		
Other (user defined)		
Other (user defined)		
Other (user defined)		
Other (user defined)		
Other (user defined)		

Table: Flush Fixture Chart

Flush Fixture Type	Water Use [LPF]
Commercial / Residential Toilet	6
Blow-out Water Closet	13.2
Low-Flow Water Closet	4.2
Ultra Low-Flow Water Closet	3
Composting Toilet	0
Commercial Urinal	3.8
Low-Flow Urinal	1.9
Waterless Urinal	0
Dual flush high	6
Dual flush low	3.4
Other low-flow water closet	4.8
Other (user defined)	
Other (user defined)	
Other (user defined)	
Other (user defined)	
Other (user defined)	

* User defined fixture to be addressed in Narrative

Table: Design Case

Flush Fixture	Daily Uses	Flow Rate [LPF]	Duration [flush]	Occupant users	Sewage Generation [L/day]
Dual flush high					
Male	1	6	1	400	2400
Female	1	6	1	400	2400
Dual flush low					
Male	0	3.4	1	0	0
Female	4	3.4	1	400	5440
Low-Flow Urinal					
Male	4	1.9	1	400	3040
Female	0	1.9	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0
Flow Fixture	Daily Uses	Flow Rate [LPM]	Duration [sec]	Occupant users	Sewage Generation [L/day]

Low-flow Residential Lavatory	5	1.9	60	800	7600
Ultra-low flow kitchen sink	4	5.7	60	800	18240
Low-flow Residential Shower	1	5.7	480	800	36480
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
Total uses by all occupants					12,000
Total Daily Volume [L]					75,600
Annual Work Days					260
Annual Volume [L]					19,656,000
Greywater or Stormwater Reuse Volume [L]					0
Total Annual Volume [L]					19,656,000

Table: Baseline Case

Flush Fixture	Daily Uses	Flow Rate [L/PF]	Duration [flush]	Occupant users	Sewage Generation [L/day]
Commercial / Residential Toilet					
Male	1	6	1	400	2,400
Female	5	6	1	400	12,000
Commercial Urinal					
Male	4	3.8	1	400	6,080
Female	0	3.8	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0

Male	0	0	1	0	0
Female	0	0	1	0	0
Flow Fixture	Daily Uses	Flow Rate [LPM]	Duration [sec]	Occupant users	Sewage Generation [L/day]
Residential Lavatory	5	8.3	60	800	33,200
Residential Kitchen Sink	4	8.3	60	800	26,560
Residential Shower	1	9.5	480	800	60,800
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
---	0	0	0	0	0
Total uses by all occupants					12,000
Total Daily Volume [L]					141,040
Annual Work Days					260
Total Annual Volume [L]					36,670,400
Water Use Reduction					46.40%

Special Circumstances or Alternative Compliance Path

(3 Points)

Special circumstances preclude documentation of credit compliance with the submittal requirements outlined in this form or the project team is using an alternative compliance path in lieu of standard submittal paths.

Provide the following to support the selected option:

- A narrative describing the special circumstances or alternative compliance path and any supporting alternate documentation. (The narrative must include justification that the credit intent and requirements are met and reference the alternate documentation provided. Non-standard documentation will be considered upon its merits.)

Credit Interpretation Request (CIR) applied to credit:

WE Prerequisite 1: Water Use Reduction

Prerequisite Documented

Standard Compliance Path: Water Use Reduction 20%
Special Circumstances or Alternative Compliance Path

YES
NO

WE Credit 3: Water Use Reduction

Points Documented

Standard Compliance Path: Water Use Reduction 40% (4 Points)
Special Circumstances or Alternative Compliance Path (3 points)

4
0

The signature below constitutes a declaration that the project meets the credit intent and the requirements of the option selected above and that

the submitted documents accurately represent the project.

Name: _____ Your Name _____

Organization: _____ Your Company _____

Role in project: _____ Mechanical Engineer _____

Signature: _____

Date: _____

Appendix C: Bioenergy Research Demonstration Facility Calculation Summary

Calculation Sheet: BRDF Annual Contribution to UBC Academic Thermal and Electrical Consumption

PREPARED FOR: **UBC LEED Implementation Guide: Clarification on Point EAc2**
 PREPARED BY: Joshua Wauthy, Energy Conservation Analyst
 REVIEWED BY: Paul Holt, Director of Utilities
 APPROVED BY: Paul Holt, Director of Utilities
 REVISION No. 1
 REVISION DATE: 11/8/2012
 PRINTED DATE: 11/8/2012

BRDF Facility Operation

		Thermal Mode	Cogen Mode	Total	Reference
Operating Days	days	100	200	300	
Operating Hours	hours	2400	4800	7200	
Operating Load % of Design		95%	100%		

Biomass

Design Biomass (45% w)	lb/hr	6770	6531		
Actual Biomass (45% w)	lb/hr	6432			
Actual Biomass (45% w)	tonnes	7001	14219.6		
Annual Biomass	BDMT/yr	3900	7800	11700	BRDF PFD - Dwg No: B-100-0-0011 & B-100-0-0011

Thermal

Steam

Design Boiler 1 Output	lb/hr	21071	5004		
Design Boiler 2 Output	lb/hr	0	4663		
Boiler 1 Operating Output	lb/hr	20017	5000		
Boiler 2 Operating Output	lb/hr	0	4660		
Annual Output	klbs/yr	48000	46400	94400	BRDF PFD - Dwg No: B-100-0-0011 & B-100-0-0011 BRDF PFD - Dwg No: B-100-0-0011 & B-100-0-0011

Hot Water

Hot Water Recovery	MW _t		0.9		
Annual HW Delivered	MWh_t		4320	4320	

Annual total Thermal	GJ	50640	64504	115144	
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Electrical

Installed Power	kW		1942		
Average Power Output	kW		1500		Operation at 75% Load

Annual Electrical	MWh_e		7200	7200	
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UBC Academic Core Consumption Only

		3-year Average	2012/2013 Est.	2011/2012	2010/2011
Steam Consumption	klbs	593674	574657	603542	602824
Steam Consumption	GJ	626324	606261	636735	635977

Finance Supervisor: UBC Commodity & Consumption Data

BRDF %Thermal Contribution	18.4%
% Suggested for UBC LEED Implementat	12.0%

		3-year Average	2012/2013 Est.	2011/2012	2010/2011
Electrical Consumption	MWh	146314	152108	147769	139066

Finance Supervisor: UBC Commodity & Consumption Data

BRDF % Electrical Contribution	4.9%
% Suggested for UBC LEED Implementat	4.5%

Appendix D:
Green Cleaning Policy and Program

UBC Building Operations Custodial Green Cleaning Policy September 2012

UBC Building Operations Custodial Green Cleaning Program September 2012

Innovation in Design credit IDc1.X – Green Cleaning Template Form

Appendix D: Green Cleaning Policy and Program

Innovation in Design credit IDc1.X – Green Cleaning Template Form

Innovation in Design credit IDc1.X – Green Cleaning

Building Name: Building Address, University of British Columbia
LEED Project ID: 12345

Intent:

To reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems, and the environment.

Requirements:

- Have in place a Green Cleaning policy and program that address at least half of the LEED Canada EB:O&M credits for green cleaning, one of which must include EB:O&M IEQc3.1 (Green Cleaning: High Performance Cleaning Program)
- Demonstrate that the cleaning program applies to the entire project being certified.

Submittals:

- Provide a signed IDc1 LEED letter template
- Provide a copy of the Green Cleaning Policy
- Provide a copy of the Green Cleaning Program
- Provide an Excel copy of any calculation tables (EQc3.3)

Approach:

UBC Building Operations Custodial Services is responsible for cleaning at all campus buildings operated by the University. A green cleaning policy and program have been developed and implemented to reflect the requirements of the Indoor Environmental Quality credits for Green Cleaning within the LEED Canada EB:O&M 2009 Rating System.

The UBC Custodial Services Green Cleaning program includes all LEED Canada EB:O&M IEQc3 credits, however, for the purposes of compliance with IDc1 under LEED Canada 2009 BD+C, we wish to demonstrate that the following Green Cleaning credits have been met:

- EQp3 – Green Cleaning Policy
- EQc3.1 – Green Cleaning: High Performance Cleaning Program
- EQc3.2 – Green Cleaning: Custodial Effectiveness Assessment
- EQc3.3 – Green Cleaning: Purchase of Sustainable Cleaning Products and Materials.

The attached Policy and Program and associated appendices along with separate Excel calculation tables, include all required documentation. We trust this satisfies the requirements of Innovation in Design for Green Cleaning.

Sincerely,

Name
Title
Contact