

ARBUTUS CENTRE – BLOCK C + D | Mixed Use Development

Rezoning Application

December 22, 2017

SUSTAINABILITY MEASURES

addressing City of Vancouver's
Rezoning Policy for Sustainable Large Developments
& Green Buildings Policy for Rezonings

Completed by



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Dialog

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1. INTRODUCTION

The intent of this section is to describe the sustainability features of the proposed Arbutus Centre Blocks C and D. This includes written responses to Green Buildings Policy for Rezoning as amended January 23, 2017 and Rezoning Policy for Sustainable Large Developments as amended December 16, 2014, which are applicable to the project. The sustainability strategies and responses outlined below, along with a series of sustainability appendices, represent an ongoing conversation with the City of Vancouver to ensure the proposed Blocks C and D satisfy all applicable sustainability requirements, and serve as an example of high performance mixed-use design in Vancouver. The proposed design of Arbutus Centre Blocks C and D aims to satisfy the expectations and intent of these policies. Based on feedback from the City, the sustainability features proposed for the Rezoning Application will be further revised and refined prior to further design development and Development Permit Application.

2. REZONING POLICY FOR SUSTAINABLE LARGE DEVELOPMENTS

In June 2008, Council approved the EcoDensity/EcoCity Revised Charter and Initial Actions. Revised Action A-2 established policies to achieve higher sustainability standards as an essential component in the rezoning of large development sites. The policy was amended in December 16, 2014 to refine the definition of a large site to include large developments and better articulate the requirements associated with this policy and their association with the Greenest City 2020 goals and targets. The policy is now known as the Rezoning Policy for Sustainable Large Developments and is applicable to the Arbutus Centre Development. For large developments, the City requires defined plans or studies related to: Sustainable Site Design; Access to Nature; Sustainable Food Systems; Green Mobility; Rainwater Management; Zero Waste Planning; Affordable Housing; and Low Carbon Energy Supply. As a part of Arbutus Centre Blocks C and D Rezoning Application, the Sustainability Section outlines how the project is addressing the Rezoning Policy for Sustainable Large Developments according to the categories listed. The requirement outlined by City policy has been considered and strategies have been proposed which suit the Arbutus community's overall goals.

Site Metrics and Location

The project consists of the redevelopment of Block C and D, consisting of 9,921 square metres of the Arbutus Shopping Centre site. The redevelopment will include residential featuring 100% rental units and a mix of 1 to 3-bedroom units, commercial spaces to accommodate retail, restaurant and cafes to activate the streetscape and purpose-built community facilities including a Neighbourhood House and an Adult Day Care Centre. The redevelopment of the site will include below grade parking and extensive re-vegetation of the site, both at grade and terrace and roof areas. Once complete, the proposed site will include a gross building area of 32,007 square metres and the community facilities will target LEED Gold Certification to satisfy the City of Vancouver's Green City Facilities mandate.

The project triggers the Rezoning Policy for Sustainable Large Developments policy due to the size of site area. The strategies adopted which contribute the Sustainable Large Development requirements have been noted throughout the Sustainability Section and below preliminary plans articulate how the project will address all applicable sustainable large developments criteria.

2.1 Sustainable Site Design

The City requires a Sustainable Site Design Plan that considers site layout and orientation approaches that reduce energy needs and facilitate passive design solutions and, where appropriate, provide a written strategy and plan to illustrate these approaches. The purpose of these efforts is to ensure the site's contribution to the Greenest City Green Buildings goal of ensuring all new construction is carbon neutral by 2020. The goal of passive site design measures is to reduce energy needs by reducing a building's reliance on mechanical systems for heating, cooling, and lighting, and making increased use of solar power, wind direction, and other climatic effects to fulfill building needs. By leveraging the natural environment, sites and buildings that incorporate passive design strategies and measures often reduce utility bills, improve the comfort of the interior environment, and reduce GHG emissions.

To support the project's goal to reduce total energy use and thermal energy demand, passive design elements have been included in the design of Blocks C and D. The tree canopy coverage of the site will be maximized through installation of trees at grade where possible and in slab or planters with appropriate growing medium of at least 915 mm. Siting and orientation, building shape and massing, landscape planning and solar shading analysis have been considered by the project team and will be incorporated into further building design including the following measures:

Siting, Orientation & Massing

The Arbutus Centre Development has carefully considered the layout and orientation of the buildings being proposed. Building footprints have been located along the streetscape to maximize the size of accessible outdoor spaces. Block C was re-shaped to increase sun access to Plaza areas to improve enjoyment of the outdoor spaces. A terracing and tapering floorplate on upper floors for Blocks C and D minimizes incremental shadowing to surrounding properties and public spaces. The siting and massing of Blocks C and D provides opportunities to harvest sunlight and allow for natural daylighting. The composition of building orientation and façade exposures provides a mix of overall building heating and cooling demand management.

Solar Shading

The overall site design will include architectural shading, vegetation and large tree canopies to provide protection from sun and rain. The inclusion of generous and diverse tree species provides added benefits of climate change adaptation and improved air quality from increased number and size of tree plantings.

Blocks C and D have adopted a unique solar shading treatment for each unique building orientation. To minimize solar heat gains within the buildings, assist in managing the cooling demand within suites and improve overall occupant thermal comfort, the design of each façade will include shading strategies appropriate for the site. The West-facing facades will include external, manually operable metal screen shading to address afternoon solar heat gains. Where appropriate, the South-facing facades will include horizontal clip-on overhang architectural shading elements to address late morning/afternoon solar heat gains. East-facing glazing is not a concern as solar heat gain is lower in the morning. Additionally, the orientation of the site allows for partial shading from Buildings A+B.

The townhomes' orientation presents opportunity to utilize cross ventilation through placement of operable windows. Tree placement considers shading opportunities for these low-rise spaces. The North and West exposure of these units allows for operable internal shading to address solar heat gain, while the orientation of units allows for views access to the North even if shading is in use on the West side of the unit.

Overall, the ratio of glazing has been minimized to the extent possible considering the desired view to Arbutus Village Park. Designing to maintain approximately 50% glazing and selecting higher performance glazing, frames, and wall assemblies and considering thermal breaks will assist with thermal bridging and help minimize heating and cooling demand, improving the overall thermal comfort and energy use within suites.

Vegetative shading will be utilized throughout the development for lower elevations. The passive strategies listed assist in meeting the project's thermal energy demand and total energy use intensity targets.

Landscape Plan & Tree Retention

The Arbutus Centre development is utilizing a Heritage Conservation strategy to retain the Nanton Street trees. Existing and new street trees and private trees throughout the site will be large coniferous and deciduous trees that will provide occupants and visitors with a more enjoyable site experience, natural shading from sun and a connection with nature. Larger shade trees also provide a means of solar shading on lower levels of the building. Wherever possible, fruit-bearing tree species will be included to enhance the edible landscape. Indigenous species will be favored in order to provide local habitat, as well as a rich planting palette.

Extensive vegetation is proposed across the ground, terrace and roof levels. Planting will be selected to be native, adaptive and drought tolerant to minimize water consumption. For further definition of the projects proposed landscaping refer to provided Landscape plans.

These commitments are aligned with the Sustainable Site Design (1) requirement of the Sustainable Large Developments Policy, the Performance Limits (B.2) and the Integrated Rainwater Management Plan and Green Infrastructure (B.10) requirements of the Green Buildings Policy for Rezonings.

2.2 Access to Nature

The City requires an Access to Nature Plan to demonstrate how the project will contribute to improving overall access to nature in Vancouver. This contributes to two Greenest City Access to Nature targets – to ensure that every person lives within a five-minute walk to a natural space by 2020, and to plant 150,000 additional trees between 2010 and 2020. The intent of improving access to nature in the city is to improve the health and wellbeing of the community, to provide habitat, to enhance ecosystem function and services, to create public open spaces for people to gather and socialize, and to create opportunities for people to directly experience nature in the city.

Existing Conditions & Site Interventions

The project is well-situated for compliance with the City's Access to Nature requirements. The project is located next to the Arbutus Village Park and Trails, within a 5 minute walk to Prince of Wales Park, and within a 10 minute walk to Quilchena Park and Trafalgar Park. Building occupants will benefit from the adjacency to these green space amenities. In addition to these existing amenities, the development proposes to provide high quality outdoor amenity spaces for the use of the general public and building commercial and residential occupants.

Proposed Landscape Design

The redevelopment of the site will provide a significant improvement to the existing conditions, offering a welcoming pedestrian environment. The Public Square is a pedestrian-oriented space which can accommodate a farmer's market or a tented vendor's booth arrangement for special events in conjunction with the Lahb Avenue provided in Arbutus Centre Blocks A and B. The Public Square provides a strong connection to the surrounding neighbourhood and Arbutus Village Park and Trails and offers public gathering spaces. A private courtyard within Block D encourages social interaction between building residents, including spaces for children's play. Private patios offer outdoor spaces for as many units as possible. The terraced massing of the buildings allows for accessible roofs at various elevations, which provide outdoor amenity space for entertaining and extend indoor living space to the outdoors with shade and wind protection.

Walkways will be provided along the full periphery of the site and along all roads within the site, including connections through the Public Plaza to Arbutus Village Park and through Lahb Avenue to the Block A and B Buildings. A new traffic signal and pedestrian crossing will be provided on Arbutus Street at Lahb Avenue Street. Way-finding signage will be provided to direct those with limited accessibility to the best route and away from the north lane with steeper grades. Pedestrian links to Arbutus Village Park will be made through pedestrian walkways, Lahb Avenue and the Public Square. Retail, restaurants/cafés and the Neighbourhood House and Adult Day Care Centre spill out into the public realm with open spaces and patio areas. This purposeful street design encourages pedestrian and cycling use throughout the site and surrounding areas, while maintaining safe traffic movement.

The proposed landscape design effectively widens the Arbutus Village Park and improves access to green space featuring native, adaptive and resilient plant species. Habitats for birds and urban wildlife will be created through the planting selection to increase the biodiversity of plant species. Plantings will be selected based on their ability to facilitate resting, nesting and foraging birds. This will include consideration for birds common to shrub habitats such as song birds and western purple martin. The Bird Advice for False Creek guidelines provided by the City of Vancouver will be referenced during further detailed design development. Drier planted areas such as sloped planting beds, versus wet areas such as vegetated swales and raingardens, provide a diversity of habitat opportunities through plant selection and conditions. Canopy coverage will be significantly increased. Diversity of local tree plantings will provide shading, aesthetic, air quality and habitat benefits. Trees will be included at grade locations where possible but also on slab with appropriate growing mediums of at least 915 mm. The project will plant new street trees in accordance with City requirements and in-line with the Arbutus streetscape design. There will be an overall net increase in the amount of trees on site and in the density of plantings in general.

These commitments are aligned with the Access to Nature (2) requirement of the Sustainable Large Developments Policy, the Integrated Rainwater Management Plan and Green Infrastructure (B.10) requirements of the Green Buildings Policy for Rezoning, and the Vancouver Bird Strategies.

See the *Landscape Section* for more information on how the development will include more green space.

2.3 Sustainable Food Systems

The City of Vancouver requires applicants to demonstrate the overall increase of food system assets. Food assets are defined as resources, facilities, services, or spaces that are available to residents of the city (either at the citywide or neighbourhood scale) and which are used to support the city's food system. This will contribute to the Greenest City target of supporting Local Food: by 2020, to increase city and neighbourhood food assets by a minimum of 50% over 2010 levels. The intent of creating a sustainable food system is to improve the resilience of Vancouver's food system in accordance with the vision, principles, and goals defined in the Vancouver Food Strategy (2013).

To contribute to the City's goal to be global leaders in urban food systems, Blocks C and D will incorporate local and sustainable food assets to boost social sustainability and improve resiliency within the community.

Edible Landscapes

Edible plant species throughout the landscape design, specifically along the site perimeter walkway bordering the Arbutus Village Park, will provide a local source of harvestable food for building occupants. Where such species are planted, signage will be included to provide education and alert passersby to the opportunity for food harvesting. Edible plants may include species such as Oregon grape, coastal strawberry, evergreen huckleberry, hazelnut, thimbleberry, salmon berry, and apple tree. The intention of the landscape design is to have a minimum of 25% of the proposed planting be edible and harvestable in line with the policy objective.

Plants that provide food to local fauna may also be planted on site – examples of native plants that provide food to local fauna could include:

- Flowering Currant Nectar – provides food for Rufous Hummingbirds
- Pacific Dogwood – berries provide food for Pileated Woodpeckers
- Western Red Cedar – seeds eaten by Pine Siskins
- Pacific Crab Apple – fruit eaten by Purple Finches
- Stinging Nettle – feeds caterpillars of Milbert's Tortoiseshell, Red Admiral, and West Coast Lady butterflies
- Mountain Ash – berries eaten by Cedar Waxwings

Community Food Market

The Public Square has been designed to accommodate a local market, to promote the consumption of sustainable, locally harvested goods and increase socialization of the site. To support a sheltered and secure space for market space, further design development will accommodate at least 10 market stands up to 3 square metres in area. Electrical conduit and outlets will be provided to the Public Square to ensure events will have access to a supply of power and will not need to rely on generators.

Urban Agriculture & Organics Composting

Garden plots and urban agriculture are proposed for roof areas of Blocks C and D to maximize sunlight access. The plots will be designed to accommodate a minimum soil depth of 18 inches while also considering accessibility, ongoing management and maintenance. Composters will be provided to manage yard trimmings and garden waste on-site, reducing overall waste generation from Blocks C and D. In such a densely populated urban environment, these personal outdoor spaces for food growth are premium amenities for building occupants. These spaces are important for food security and increasing human connections to natural systems. By placing urban agriculture in communal areas, community interaction and participation is also encouraged.

These commitments are aligned with the Sustainable Food Systems (3) and the Zero Waste Planning (6) requirement of the Sustainable Large Developments Policy, Green Infrastructure (B.10) requirements of the Green Buildings Policy for Rezoning, and the Vancouver Bird Strategies.

See the *Landscape Section and Drawings* for more details about the sustainable food systems.

2.4 Green Mobility

The City requires a Green Mobility Plan outlining measures and strategies to prioritize more sustainable travel to and from the site. This will include the prioritization of walking, cycling, and public transit over automobile use, and support for low-carbon vehicles, such as electric vehicles. These strategies contribute to the Transportation 2040 and Greenest City targets of: increasing walking, cycling and public transit to form a minimum of 50% of all trips by 2020 and 66% of all trips by 2040; reducing motor-vehicle kilometers traveled per resident by 20% from 2007 levels. It will also contribute to the Greenest City target on Climate Leadership to reduce community-based greenhouse gas emissions by 33% from 2007 levels. The intent of encouraging sustainable transportation is:

- To reduce reliance on travel that consumes excessive energy and contributes to GHG emissions and poor air quality;
- To support a thriving economy, to improve the health of residents and the vibrancy of the city, and to enhance the natural environment; and
- To meet mobility needs while minimizing environmental impacts and providing long-term health benefits.

A Green Mobility Plan has been developed for the Arbutus Centre Site and has been previously reviewed with Block A Development Permit Application. To specifically address the needs of Blocks C and D, this site-wide Green Mobility Plan has been referenced, along with the HUB report “Not Just Bike Racks”, to identify appropriate measures to prioritize green mobility to and from the site, including the prioritization of walking, cycling, and public transit over automobile use, and support for low-carbon vehicles, such as electric vehicles. These measures have been integrated into the Blocks C and D to encourage sustainable transportation, improve local air quality and enhance human health and mobility and will be further investigated and developed through detailed project design.

Pedestrian Support

Arbutus Centre Blocks C and D proposes significant improvement to the existing site conditions for pedestrians, offering a welcoming pedestrian-oriented environment. The Public Square is a dedicated pedestrian area and Lahb Avenue to the East can function as pedestrian area. The proposed site plan improves connectivity across site through pedestrian-oriented pathways and other interventions to navigate the sloping site. A new traffic signal and pedestrian crossing along with way-finding signage improves safety and overall accessibility of the site. The site plan design includes improved pedestrian scale lighting addressing security and visibility concerns.

Cycling Support

As a part of the Arbutus Centre development, the existing shared bicycle and driving lanes will be upgraded around the site. To further encourage cycling to access the various community amenities within Blocks C and D, the site plan design proposes to exceed the minimum bylaw requirements for Class B bicycle parking spaces, including surface bicycle stalls at the southern extent of Block C. Class A secured spaces for building residents and employees will be located on the P1 parking level of Block C, along with an end of trip facilities including washrooms, showers, change rooms and lockers for both male and females, fully compliant with Parking Bylaw requirements. A Bicycle Repair Room, located close to the bicycle parking access elevator on the P2 parking level of Block A, will be accessible for use by all residents and employees of the Arbutus Centre development. Additionally, a bicycle fix it station will be provided at grade toward the northern extent of Block D.

Reference	Alternative Transportation Infrastructure
City of Vancouver Minimum	306 - Class A Bicycle Spaces 18 - Class B Bicycle Spaces
Proposed Building Design	Meet Bylaw Requirements Additional Class B Bicycle Spaces Bicycle Fix-it Station Bicycle Repair Room (Blocks A and B)

Car Sharing Support & Electric Vehicle Charging

To exceed the bylaw requirements of the City of Vancouver, the project proposes to include electrical conduit infrastructure for at least 50% of parking stalls, capable of accommodating additional electric vehicles as future demand requires. Additionally, Arbutus Centre Block C and D proposes on equipping 4 publically accessible commercial parking stalls with Level 2 Electric Vehicle Charging Stations, to be integrated to the most accessible and preferred parking spaces. The parkade will also include 5 car share stalls to support car-free households and also improve access to and from the site.

Reference	Alternative Transportation Infrastructure
City of Vancouver Minimum	47 Residential – EV Charging Stalls (20% of residential parking stalls) 10 Commercial – EV Charging Stalls (10% of non-residential parking stalls)
Proposed Building Design	Exceed Bylaw requirements – 50% of parking stalls to include electrical conduit for future accommodation of EV charging. 5 Car Share stalls. 4 Level 2 EV Charging Station stalls in commercial parkade area.

These commitments are aligned with the Green Mobility (4) requirement of the Sustainable Large Developments Policy. For the Arbutus Centre Site Green Mobility Plan, please see *Sustainability Appendix A*.

2.5 Rainwater Management

The City of Vancouver requires a Rainwater Management Plan that recognizes rainwater as a resource to enhance the community and environment. This will contribute to the Clean Water Greenest City target: to reduce per-capita residential water consumption by 20% by 2020. It also supports several other Greenest City goals. The intent is to reduce stormwater discharge, reduce the generation of runoff, treat surface runoff to reduce contaminants, and where possible, conserve potable water use.

To satisfy the requirements of the Rezoning Policy for Sustainable Large Developments the project will focus on a combined effort to increase the amount of vegetation on site and treat rainwater before it is discharged to the municipal sewer system. These solutions aim to meet both the requirements for reducing the volume of stormwater run-off while providing opportunities for settling rainwater to remove sediments and further treating the water through filtration prior to exiting the site.

Existing Conditions

The Arbutus Village Shopping Centre is bounded by Arbutus Street to the east, Nanton Avenue to the south, existing residential developments to the north and southwest and City of Vancouver property to the northwest. The south terminus of Parkway Drive is located north of the property. Existing conditions are developed with a commercial and recreational facility building at the northwest portion of the site and at-grade paved parking, with various landscaping features for the balance of the site. The existing building is a single level structure with a basement level that daylight toward the west. Various underground utilities are present across the site that include storm, sanitary, water, gas and electrical lines. Topography in the general vicinity of the property slopes gently toward the west and southwest with an elevation difference of about 5-8 metres across the site from east to west.

Proposed Strategy

Blocks C and D has proposed an overall stormwater quantity and quality management strategy for the site through optimizing vegetated areas and inclusion of infiltration fields along the Arbutus Village Park to ensure the post-development runoff rate and volume equals or improves upon the pre-development rate and volume for the 2-year 24-hour duration storm. The proposed infiltration field is designed to manage groundwater collected from the building foundation drainage pipes from the proposed development that would be pumped into the infiltration field. The accumulated groundwater within the infiltration field would be infiltrated into the permeable soil at a relatively shallow depth. The proposed location for the infiltration boxes has been reviewed on site and appears to be practical from both installation and operational points of view.

The overall stormwater quality strategy is to ensure that 90% of the average runoff volume is treated to remove 85% of TSS, primarily achieved through a landscape-based treatment system, with mechanical filtration support. Storm water interceptors (i.e., Stormceptors) will be installed at all storm sewer connections, which will remove sediment, screen large debris and allow oil and grease to separate from storm water runoff for future collection and environmentally sound removal on site. This reduces the contaminants to the municipal storm sewer system, which often drains untreated into water ways, lakes, rivers, and streams, destroying the fish and wildlife habitat, and the fresh drinking water supply.

These commitments are aligned the Rainwater Management (5) requirement of the Sustainable Large Developments Policy and the Integrated Rainwater Management and Green Infrastructure (B.10) requirements of the Green Buildings Policy for Rezoning.

For the Preliminary Integrated Rainwater Management Plan for Arbutus Centre Blocks C and D, Arbutus Village Shopping Centre Stormwater Analysis by AMEC (2008), the Groundwater Management Strategy Summary Report & Addendum by Horizon (2017), please see *Sustainability Appendix B*.

2.6 Zero Waste Planning

The City requires a Zero Waste Design and Operations Plan that considers deconstruction, infrastructure design, and post-construction operations to meet or exceed the City's Greenest City 2020 goals with respect to waste reduction, increased opportunities for material re-use and recycling, and GHG emissions reductions. The intention is for this to contribute to the Greenest City target on Zero Waste – to reduce solid waste going to the landfill or incinerator by 50% from 2008 levels.

The ultimate objective is to facilitate the reorientation of peoples' habits and practices toward the City's zero waste target. Therefore, the key objectives of a project's Zero Waste Design and Operations Plan are to foster ongoing waste reduction and increased diversion of products and materials from the waste stream through re-use, composting and recycling. The Plan should also aim to reduce operations-related environmental emissions, notably GHG emissions, through strategies such as reduced service-vehicle trips.

Zero Waste Plan

A Zero Waste Plan has been developed for Arbutus Centre, with details provided for Block A's final design. This Zero Waste Plan has been evaluated and applied to the needs to Blocks C and D. The project has ensured that there is sufficient space in building and site design to allow for adequate sorting and diverting of materials from landfill or incinerator. The project will support the regional and Greenest City target of achieving a minimum of 70% waste diversion on site. As design development processes for Arbutus Centre Blocks C and D, the Zero Waste Plan will be finalized.

Vision Statement: This project will be a model for waste diversion in mixed-use developments and re-orient attitudes at the outset of the development to be leaders in the City of Vancouver.

Description of Project and Diversion Objectives: As part of this comprehensive strategy, the Arbutus Centre has targeted an ongoing diversion rate of 70%. As per operational approach, the building will seek to incorporate the latest in waste management best practices and innovative ways to dispose of waste generated on site.

Demolition & Construction Waste Management

Construction waste management, beginning with green demolition of existing structures, will be an integral part of the building process, firstly through source minimization, smart product selection, packaging and transport. Recycled content and regionally sourced materials will be preferred through the selection process, focusing on steel, concrete and glass components, reducing the impact of extracting of virgin resources. These materials retain their high value in the recycling chain and so once the service life of the proposed building comes to an end, re-use and integration into new building materials is a viable option. Furthermore, waste generated on site during construction will be addressed through a comprehensive waste management plan, detailing recycling facilities and documenting the diversion of standard debris from landfill. A diversion from landfill target of at least 75% has been adopted by the project through demolition and construction activities.

Space Allocation Expectations for Zero Waste Initiatives & Residual Waste Storage

Garden areas will have composters for yard trimmings to accommodate on-site organics management. Common areas across the Arbutus Centre will adopt the practice of twinning recycling containers with waste receptacles to increase source separation.

All buildings will include space for receptacles and separation of organics, bottles & cans, plastic containers, paper, cardboard, batteries, e-waste. To aid in the ongoing diversion of recyclables and organics, collection areas will utilize signage and color coding to visually distinguish each waste stream from the others. Signage will include visual cues of the appropriate items for each waste stream to aide in the identification and separation of materials by staff, occupants and site visitors. Zero waste planning throughout operations extends from the residential, to commercial, to community and publically accessible areas. Each residential unit will include space for organics and recycling bins in kitchen designs. There will be a waste/recycling room located in the parkade to allow building occupants to deposit organics, recycling and waste with appropriate signage and convenient access from elevators. Commercial tenants will have access to a separate waste/recycling room, where recyclables including organics services will be provided by a private vendor. Commercial and residential services will be staggered to not overload the staging area.

Occupant Education and Outreach

Facilities operators will be trained to ensure that waste management procedures are followed once building programming and management has been confirmed. The Zero Waste Management Plan will be refined once final programming of buildings has been determined.

These commitments are aligned with the Sustainable Food Systems (3) and Zero Waste Planning (6) requirements of the Sustainable Large Developments Policy, and the Refrigerant Emissions & Embodied Emissions requirement (B.6) of the Green Buildings Policy for Rezonings.

For the Zero Waste Plan for Arbutus Centre Block A, please see *Sustainability Appendix B*.

2.7 Affordable Housing

The City will require – for large developments accommodating housing – an Affordable Housing Plan that considers a range of unit types and tenures, and demonstrates how the project will meet or exceed the requirements of the City's Affordable Housing in New Neighbourhoods policy. Applicants are required to meet with City staff and the pre-application stage to discuss the appropriate mix of incomes, household types and tenures. The intent is to create options for more housing affordability, types and choices, including housing for individuals and families that fall under the Housing Income Limits published by BC Housing, and purpose-built rental housing for moderate income households. Applicants should refer to the City's Affordable Housing in New Neighbourhoods policy for Council's priorities on achieving affordable housing through large developments.

The proposed Blocks C and D residential gross building area totals 28,349 square metres and will include 1, 2, and 3-bedroom units. Blocks C and D have adopted the Rental 100: Secured Market Rental Housing Policy. The CD-1 Zoning By-law approved in 2011 for the Arbutus Centre site includes 100 units of affordable housing to meet the City's 20% Affordable Housing requirement – these units are located in Block A. The proposed Arbutus Centre Blocks C and D include an increase in residential floor area as compared to the approved 2011 CD-1 Zoning By-law. Per the Arbutus Centre Policy Statement's affordable housing direction, 20% of this additional residential floor area will be added to the existing social housing in Block A, and transferred to the City of Vancouver.

The additional social housing in Block A will be contingent on amending Development Permit DE418990 for the added floor space. The added floor space can be accommodated within the allowable height on Block A of 65 metres geodetic elevation.

These commitments are aligned with the Arbutus Centre Policy Statement, the Affordable Housing (7) requirement of the Sustainable Large Developments Policy, the Mayor's Task Force on Housing Affordability – Priority Action Plan, the Vancouver Housing and Homelessness Strategy 2012-2021 and the Rate of Change Policies and Regulations 2007. These policies will be reviewed with City Staff during detailed building design and planning.

2.8 Low Carbon Energy Supply

A low carbon feasibility study was conducted by Compass Resource Management in 2009 for the Arbutus Centre Development and has been included in Arbutus Centre Blocks C and D Rezoning Application. This study includes consideration of building efficiency strategies and alternative energy supplies, including the potential for district energy within the site. Options suggested from this study included geexchange, sewer heat recovery, biomass, biogasification with cogeneration and natural gas cogeneration. The study also proposed a central system with centralized boilers, natural gas cogeneration, or geexchange for heating and cooling.

Low Carbon Strategy

70% of total annual space heating and domestic hot water energy will be delivered as part of the renewable energy system to buildings within the development. Mechanical heating and domestic hot water systems for all buildings will be designed to be easily serviced by Blocks C and D renewable energy system. This will be achieved through the proper selection of air source heat pumps.

These commitments are aligned with the Low Carbon Energy Supply (8) requirement of the Sustainable Large Developments Policy, and the Performance Limits (B.2) of the Green Buildings Policy for Rezoning. For the Preliminary GeoExchange Resource Evaluation by Hemmera (2009), the Arbutus Centre Green Energy Strategy by Compass (2009), please see *Sustainability Appendix D*.

3. GREEN BUILDING POLICY FOR REZONINGS

As a part of the Rezoning Application, the following Sustainable Design Strategy has been developed to provide confirmation the project design submitted is on target to meet the requirements as dictated by the Green Buildings Policy for Rezonings as amended January 23, 2017, Option B. Low Emissions Green Building. The preliminary strategies proposed for Blocks C and D aim to achieve the various requirements of the Low Emissions Green Building pathway, along with all supporting evidence required at this stage of design.

3.1 LEED Gold Certification

As Blocks C and D are predominantly residential buildings (greater than 50% residential building floor area for each building), the LEED Gold certification requirement does not apply to this project.

The City of Vancouver amenity spaces within Block C, the Neighbourhood House and Adult Day Care Centre, will be built to meet LEED Gold certification through the interior design and construction rating system. This is to satisfy the Green City Facilities mandate to ensure all City facilities are as sustainable as possible. A preliminary LEED Scorecard has been included, please see *Sustainability Appendix E*.

3.2 Energy Performance Limits

The Arbutus Centre includes an on-site low carbon energy system featuring air source heat pumps, which when paired with high performance building systems and resilient design practices, will ensure lower energy demand and cost associated with building operations. The design of Arbutus Centre Blocks C and D will meet the performance limits related to total energy use intensity (TEUI), thermal energy demand intensity (TEDI) and greenhouse gas intensity (GHGI) for buildings not connected to a low carbon energy system, as identified in the Green Building Policy for Rezoning.

Through further design, should Arbutus Blocks C and D on-site low carbon energy system meet the City of Vancouver requirements of a low carbon energy system, the performance limits associated with buildings connected to a low carbon energy source may be referenced. Robust energy investigations are to be conducted through further design development which will drive the parameters targeted related to envelope, electrical and mechanical system, building orientation, façade shading and fuel source selections, to ensure the performance limits for either typical buildings or those connected to a low carbon district energy system can be met. To meet the stipulated performance limits, a preliminary energy model has been conducted for the Rezoning Application.

These commitments are aligned with the Low Carbon Energy Supply (8) requirement of the Sustainable Large Developments Policy, and the Performance Limits (B.2) of the Green Buildings Policy for Rezonings.

For Detailed Energy Modeling Inputs and Preliminary Zero Emissions Building Plan Checklist, please see *Sustainability Appendix F*.

3.3 Enhanced and Ongoing Building Performance

The ongoing building performance and access to performance feedback regarding potential areas of future improvement are paramount to ensure the Arbutus Centre Development maintains its goal of lower cost operations and continued sustainable performance. The following design, construction and operational strategies will improve the quality of construction of Blocks C and D and will improve access to building performance information:

Airtightness Testing

The airtightness of entire buildings, paired with residential suite-to-suite compartmentalization verification will be addressed in design and construction to guarantee envelope performance and limit the possibility of indoor air contamination and trespass. An Envelope Consultant and potential Airtightness Contractor will be included in design development to review various air barrier strategies and ensure a continuous air barrier and associated materials and techniques are included on architectural plans, sections and details for Building Permit Application. Later during construction they will review the air barrier installation and conduct airtightness testing so a report can be included in Occupancy Permit Application. This will improve the quality of indoor air and also thermal comfort of indoor spaces.

Enhanced Commissioning

In addition to high performance system design, the project's mechanical, electrical, and envelope systems will be commissioned, ensuring the ongoing performance of the entire development through to building operations. Through integrated activities intended to ensure project targets are met and building systems perform as intended, enhanced commissioning will verify performance expectations are met and future recommissioning will identify areas for further improvement. A Commissioning Authority will be included from early stages of design to review Owner Project Requirements, ensure an appropriate Basis of Design is established, and a Commissioning Plan is included with Building Permit

Application. A draft Commissioning Report detailing commissioning activities will be included with Occupancy Permit Application and within 12 months of occupancy, a Final Commissioning Report will be provided to the City.

Energy System Sub-Metering & Reporting

Separate master metering for each energy utility and each building, along with sub-metering for all major energy end-uses and/or space uses within each building will be provided. The Blocks C and D Strata will enter into an agreement with the City of Vancouver to share data collected via Energy Star Portfolio Manager. This level of energy monitoring allows access to a continual stream of information which can help identify operational issues as they occur and ultimately result in continued energy savings and environmental benefit beyond the initial design of the project. For Building Permit Application, mechanical and electrical drawings will indicate master and sub energy meters. Within 12 months of occupancy, a qualified service provider retained to assist with and review annual energy benchmarking with Ownership and the City for at least three years, will provide confirmation that an Energy Star Portfolio Management account has been set up.

These commitments are aligned with Airtightness Testing (B.3), Enhanced Commissioning (B.4) and Energy System Sub-Metering and Reporting (B.5) requirements of the Green Buildings Policy for Rezoning.

For Commitment Letter regarding Green Building requirements from Project Ownership, please see *Sustainability Appendix G*.

3.4 Refrigerant Emissions & Embodied Emissions

The Arbutus Centre Blocks C and D will utilize multiple life cycle assessments focusing on building materials and refrigerants to minimize wherever feasible the impact of embodied emissions in relation to global warming potential, along with other deleterious environmental impacts such as acidification of land and water sources and eutrophication.

Preliminary embodied emissions calculations for all major building materials have been conducted based on the building's rezoning concept design. Various floor, wall and roof areas have been confirmed through the preliminary energy model. As current designs do not include detailed structural information, various comparable mixed-use developments in Vancouver were referenced. From these reference buildings, applicable details related to column quantity, span, load and typical wall assemblies have been applied to the various floor, wall, and roof lengths and areas for this building. Upon detailed design of each individual building, preliminary life cycle assessments will be conducted to demonstrate a baseline and embodied emissions calculations will be included with Building Permit Applications along with a description of what measures, if any, were taken to reduce embodied emissions. Final embodied refrigerant and embodied emissions will be calculated to reflect major changes during construction and included with Occupancy Permit Application.

This commitment is aligned with the Zero Waste Planning (6) requirement of the Sustainable Large Developments Policy, and the Refrigerant Emissions & Embodied Emissions requirement (B.6) of the Green Buildings Policy for Rezoning.

For Commitment Letter regarding Green Building requirements from Project Ownership, please see *Sustainability Appendix G*.

For Details associated with the Life Cycle Assessment, please see *Sustainability Appendix H*.

3.5 Enhanced Indoor Environmental Quality

Blocks C and D will provide an enhanced indoor environment to support the health of building occupants by controlling pollutant sources, reducing the source of contaminants, while also diluting pollutants through direct and continuous ventilation.

Verified Direct Ventilation

Outdoor air ventilation will be provided to all occupiable indoor spaces and design will adhere to ASHRAE 62.1-2010 to reduce occupant exposure to indoor pollutants by ventilating with appropriate flows of outdoor air. Preliminary mechanical system selection indicates this will be provided via in-suite heat or energy recovery ventilators and fan coil units which will provide continuous ventilation according to each space type's requirements. For Building Permit Application, mechanical drawings will indicate the direct ventilation systems and volumes provided directly to all occupiable space including bedrooms, living rooms and dens.

Low-Emitting Materials

To further improve the indoor air quality within all buildings, healthier material ingredient options for interior finishes and coatings will be selected to limit the quantities of harmful volatile organic compounds (VOCs) which would be off-gassed after installation. The selection of low emitting materials including interior paints, coatings, adhesives sealants, flooring and urea formaldehyde free woods will be specified prior to tender issue and Building Permit Application. For Occupancy Permit Application, the design team and general contractor will confirm the installation of low emitting finishes.

Indoor Air Quality Testing

To ensure the quality of the indoor environment prior to occupancy, testing will be conducted for formaldehyde, particulates, ozone, total volatile organic compounds and carbon monoxide. Results will be shared with the City of Vancouver upon Occupancy Permit Application. Testing airborne pollutant levels will confirm that source control strategies have been effectively implemented, and demonstrate spaces are suitable for occupancy.

These commitments are aligned with the Verified Direct Ventilation (B.7), the Low-Emitting Materials (B.8) and the Indoor Air Quality Testing (B.9) requirements of the Green Buildings Policy for Rezoning.

For Commitment Letter regarding Green Building requirements from Project Ownership, please see *Sustainability Appendix G*.

3.6 Integrated Rainwater Management

The City of Vancouver requires the site's rainfall be managed through integrated rainwater management and green infrastructure as described in the City-Wide Integrated Rainwater Management Plan. Referencing the total site area of 9,921 square metres, the project commits to the following rainwater management requirements:

- Quantity Management: to infiltrate 238.1 cubic metres (the first 24 mm in 24 hours)
- Quality Management: to treat 238.1 cubic metres (the second 24 mm in 24 hours)
- To convey safety from site rainwater in excess of 476.2 cubic metres away from site (rainwater surpassing 48 mm in 24 hours)

These commitments are aligned the Rainwater Management (5) requirement of the Sustainable Large Developments Policy and the Integrated Rainwater Management and Green Infrastructure (B.10) requirements of the Green Buildings Policy for Rezoning.

For Preliminary Integrated Rainwater Management Plan, please see *Sustainability Appendix B*.

3.7 Resilient Drinking Water Access

Accessible potable water sources will be made available throughout the site with the aim of increasing the resiliency of the community. Along publically accessible grade and lower floors within buildings, potable water access points will be provided where residual City water pressure is a minimum of 10 psi to ensure safe drinking water access in any condition. Providing unencumbered access to safe drinking water is one example of how Blocks C and D contribute to the City's goal of ensuring vibrant, liveable and resilient communities in the face of climate change.

Points of water access will be provided for every 75 occupants; according to preliminary project data, Blocks C and D would have around 569 residential and 52 commercial building occupants - this would equate to nine points of resilient water access.

This commitment is aligned with the Resilient Drinking Water Access (B.11) requirement of the Green Buildings Policy for Rezoning.

For Commitment Letter regarding Green Building requirements from Project Ownership, please see *Sustainability Appendix G*.