Collaborative Design of an Eco-District on South Campus, UBC

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Collaborative Design of an Eco-District on South Campus, UBC

FINAL REPORT

Design Charrette Conducted July 12-13 & 19-20, 2017

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STAKEHOLDERS

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OTHER PARTICIPANTS:

Brendan Buchanan Dee, Sahar Badiei, Teena Aujla, Students, SALA

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Collaborative Design of an Eco-District on South Campus, UBC

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Collaborative Design of an Eco-District on South Campus, UBC

THE CHARRETTE PROCESS

Team : Chaitrali Salvi, Jessica MacDaniel, Hema Ramnani

The UBC South Campus Charrette was a visioning exercise, where students imagined UBC South Campus as an eco-district. Concepts of neighborhood and district scale sustainability characterize this charrette as an eco-district. The sustainability targets that were developed by the class for each charrette team to meet were based on UBC's sustainability priorities and targets. The charrette allowed students work with the public and stakeholders to conceptualize ideas about an area of campus that has potential to grow and become more integrated with UBC North Campus.

The existing land use plans by Campus Planning committee of South Campus were referred to during the charrette. The future plans for an eco-district include TRIUMF expansion, a district energy plant, new research facilities and additional services, all forming a new type of hub on South Campus. We considered the site to have potential for a new defining gateway to the campus from south-west Marine drive, and a new waste reuse, recycling and re-purposing center. Since Campus and Community Planning is working on a strategy for the development of UBC South Campus, it allowed students to design an area that has the opportunity to be re-visioned. The designs produced during this charrette may be referenced by Campus and Community Planning in the future.

Why a Design Charrette?

This class, and the overall process of the charrette gave students the opportunity to experience an intensive and collaborative-based design process, which took place over a period of four days. Students learned about the theory of design charrettes and took part in preparing for this charrette in many capacities; through research, preparing metric goals and formulas to be used by teams during the charrette, and coordination and development of the charrette itself.

It was a collaborative, intensive design workshop that lasted for four days. The goal of the charrette was to produce flexible plans and conceptual ideas as a visioning design exercise. The charrette had four design teams who produced alternative solutions and goals for UBC South Campus. Students stayed in four groups throughout the duration of the charrette in order to produce a total of four well-developed visions for UBC South Campus.

The public invitation poster

Charrette Agenda

Working in a design charrette allows for many people to work through design problems quickly. It is also an economical way to execute designs. It is a platform where people can collaborate with others from various backgrounds. Stakeholders and the public can are also invited and have an opportunity to be heard and have their needs considered while designs are being developed. It gives people a platform where discussion is welcome and all ideas are discussed and considered.

One team from the class coordinated and developed the charrette. During the charrette they participated by working with facilitators, coordinating the schedule, set-up, outreach, and as a primary communication contact for other logistical needs.
(see the appendix for the breakdown of design teams)

Scale 1: 2500

Scales

Design teams studied the future of UBC South Campus at a scale that includes south of 16th avenue, including Westbrook place, the UBC Farm, other green academic areas and the research triangle at the southern tip.

The other scale that was focused on during the charrette is the southern tip of UBC South Campus, which includes TRIUMF, the National Research Council of Canada, Centre for Comparative Medicine, the UBC Library PARC (preservation and archives facility), and campus operations facilities such as; composting, material recovery, and the campus nursery.

Scale 1: 1500

The Schedule

The length of the charrette was determined at the start of the course and developed by the charrette team. The National Charrette Institute, Design Charrette for Sustainable Communities, 2008 by Patrick Condon and Riddick's, Charrette Processes helped us determine what aspects of their schedule suited our charrette. The discussion, brainstorming, and designing portions of the charrette are roughly in the same place as other charrettes schedules that we referred to. Some specific changes in our charrette reflect the best times that students would be looking for certain types of feedback depending on what stages they were at in their charrette.

Design Charrette Schedule

	DAY 1 - July 12	DAY 2 - July 13	DAY 3 - July 19	DAY 4 - July 20
9:00	**Overview**	Facilitator Meet + display work	Team Meeting	Discussion
10:00	**Presentations**	**Design**	**Refine Designs** and metric scenarios	**Refine Design**
	Introduction to Methods			
11:00	Design teams **discussion**			
12:00	*Lunch*	*Lunch*	*Lunch*	*Lunch*
1:00	**Brainstorm and draw**	**Design** with advising	Overview for Stakeholders	**Finalize Design**
2:00			Consult with stakeholders and refine **Design**	
3:00		**Consolodate work**		**Prepare Presentation**
4:00	**Debrief**	**mid-point presentation**	**Debrief discussion**	**Public Presentations**
5:00				

The decision making took place when consultation was provided at end of day discussions and also during/after guests such as stakeholders and other experts were invited to give input on the designs.

Charrette Agenda

The ideas were refined by incorporating feedback from set stakeholders, expert groups and public meetings. The feedback provided charrette teams with the information necessary to create a feasible designs. The teams were provided with set deliverables for the day in order to produce desired quality outputs.

Participants of the charrette include 24 students who took part in the class and did theme background research and pre-charrette preparation. Those students helped guide invitees and the team design process as facilitators (with a new student facilitating in groups each day). There were a handful of students who attended and participated in the charrette as guest designers. The guests designers were SALA students who were invited through social media, and weekly communication newsletters.

At specific times during the charrette stakeholders and experts in various, related fields on campus and throughout the city were invited to attend the charrette to give feedback on designs as they were developing. The experts provided guidance and input, while stakeholders shared feedback about the designs. Public were invited at the start of the course to hear about what the charrette was about, they were also invited to the final presentations on the last day to see the concluding design proposals. People were contacted and invited to the charrette through posters, newsletters, and e-mail outreach.

Final Deliverables

Scheme name
Full names of team members

1. Executive Summary of the proposal, including the principles, and other important descriptions or rationalization of the scheme. Short-term action items- what are projects that UBC could undertake in the near future? Secondly, future list of research, which other SEEDS affiliated courses or students could undertake.

2. Diagrams, which explain the main systems of the scheme aligned with principles.

3. A very brief report of how the scheme meets any targets that the team has been able to estimate/evaluate.

4. The 1:1500 site plan. This can be a scanned hand drawing or a digital plan.

5. At least two “zoom” studies. These are more detailed examinations of important areas of the design. The originals might be designed at 1:500 or 1:250.

6. Two to three perspective images of important areas of the design. Hand drawn sketches are fine.

7. At least three cross sections of important proposed spaces on the scheme, such as across Westbrook Mall, along a green way, in a pedestrian space.

Team Formations

Inspired by UBC Okanagan's Whole Systems Infrastructure Plan, we wanted designs to be planned considering valuable systems, and assets that are currently functioning, or that could be explored further. When dividing students into charrette teams we took members of initial research groups and mixed them into charrette teams in order for each charrette team to have students of various site-research backgrounds. Since students were also from various disciplines such as; Landscape Architecture, Architecture, Urban Design, Environmental Design, Engineering, and Geography we also distributed students so that there would be a range of backgrounds on each team in order for a cross-pollination of ideas.

There were also a few additional design guests attendees that stayed for a portion of the charrette to work with the design teams.

Team Formation				
	Team 1	**Team 2**	**Team 3**	**Team 4**
Energy and carbon		--		--
Water				
Land and biodiversity				
Materials and waste				
Transportation and infrastructure				
Place: buildings and public realm				
No. of members	5	5	6	5
Facilitators	1	1	1	1

The team formation guide.

During the charrette students took turns as facilitators. We would have morning facilitator meetings to guide students on how to direct their teams throughout the day and how to meet the deliverables. They were given information about attendee's, how to manage the personalities and ensure that everyone has an equal chance to contribute. Students were directed on how to include guests and manage tasks such as; note taking, drawing, producing metrics etc. Facilitators were also given information on interpersonal skills that can help when leading a large group of people, this was referenced from the Facilitator Guide in the Enterprise Green Communities Charrette Tools manual.

Tools

During the charrette teams were provided with;
- rolls of trace paper
- two base maps (at the scale of 1:500 and 1:2500)
- two A4 maps for the presentations
- large sheet-paper
- a toolbox with; markers, scissors, dots, sticky notes, tape, scale rulers
- legends to follow for consistency in presentation
- a detailed daily schedule
- a facilitator guide
- a list of deliverables

Students were also introduced to the Touch Table tool, which allowed for using cases in elements db to test out design formations, metrics, and get a sense of the site with more control.

Collaboration with the UBC Campus and Community Planning and SEEDS

The decision to undertake the design of UBC South Campus as the charrette topic was developed with consideration from Campus and Community Planning. The idea for UBC South Campus to be imagined as an eco-district was based on the UBC Okanagan Infrastructure Plan, which deploys a whole systems thinking approach.

Through the process of the charrette, students collaborated with various guests with areas of expertise and interest in the site as stakeholders. and design students whom attended to help develop and inform ideas. The final design proposals for a future eco-district in South Campus that were developed through the charrette were digitized and given to Campus and Community Planning. This project was a partnership between Campus and Community Planning and the SEEDS program. It was a grant provided by the Teaching and Learning Enhancement Fund.

A charrette team working in the early stages of the design process

Appendix 1: Introduction to the Site

A walking tour of UBC South Campus was conducted before the background research. This allowed for students to get a sense of the area and see some of the prominent features and characteristics of the site. The tour began on Wesbrook village amidst the low-mid rise commercial and residential development and ended at the composting facility on the southern tip covering some landmarks such as the UBC Farm, Triumf, the Preservation and Archives Facility, and the Pacific Spirit Regional Park trail-heads.

The walking tour took place a month before the charrette took place and in the early stages of the course.

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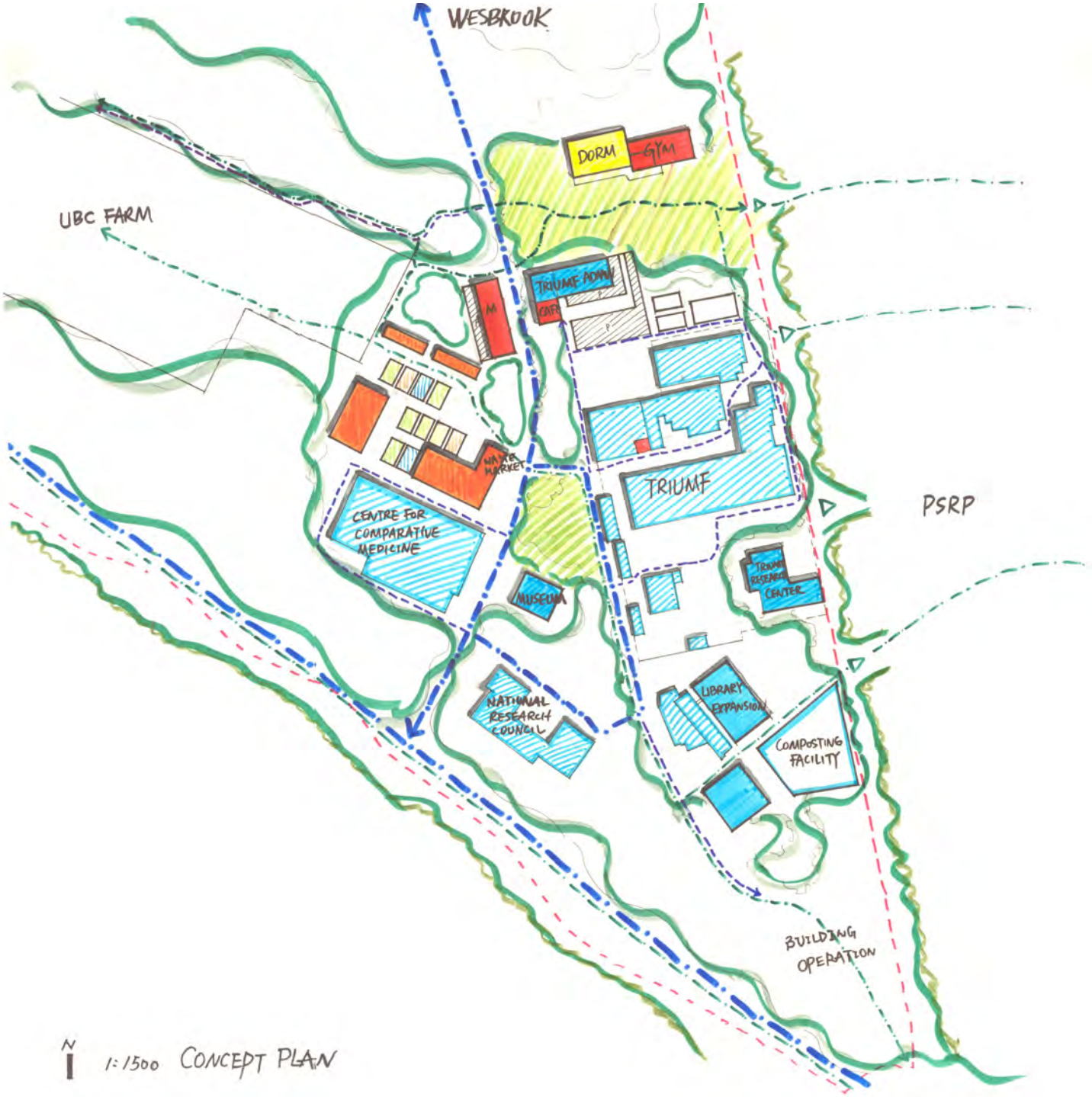
Living Lab

Team 1: Jenna Jooyeoun Joung, Liping Dong, Ru Jia, Tory Michak, Xuewei Ju



Concept Plan 1 Executive Summary

Goal

The goal of Team Living Lab is to create an inviting place for residents, workers, and visitors to experience the research and reuse principles that are celebrated, studied, and practiced in the community.

Principles

1. A main greenway will lead through the heart of South Campus creating jumping off points that demonstrate the sustainability principles that are the backbone of the Living Lab and making visible the ways that water, materials, and energy are reused and recycled.

2. New buildings, public spaces, and markets create anchor points, increase walkability and lead to a greater feeling of community.

3. Greenways, smaller path systems, and a public transit will support human connectivity, especially through walking and biking, and create stronger links with Pacific Spirit Regional Park.

4. Enhanced edge conditions clarify buildings and wayfinding, and increasing exposure to park entrances.

5. Some of the North Campus and Wesbrook Village elements, such as street lighting, are replicated, making the unique experience of south campus coherent with the entire UBC campus.

6. Sustainable treatments are exposed and explained.

7. Add a greater diversity of habitat, including mixed forest, deciduous forest, and meadow, in order to enhance biodiversity and habitat corridors throughout the site.

Near Term Action Items

Near Term Action Items

Farmers' Market: The Market can be pulled out from the UBC Farm and placed closer to the center of South Campus in order to become more visible and attract more people.

Shuttle Bus: A bus route along the length of Wesbrook Avenue could increase connectivity for the entire campus.

Stormwater Management: A bioswale can be built along Wesbrook Avenue and act to ameliorate possible flooding in the event of a large rainstorm.

Signage: Wayfinding will improve with better signage to clarify circulation routes and make the public more aware of public areas that they are welcome to visit.

Building Tenants: The Opera Storage Warehouse and be converted into a museum. MT Innovations can be converted into a dormitory and gym.

Triumf Improvements: Open some areas of Triumf up to the public, add corridors through Triumf into Pacific Spirit Park, and advertise that the coffee shop located within Triumf is open to the public.

Triumf Park: Convert the space between Triumf and the MT Innovations building into a park for those working in the area to eat lunch and take walks. The park will additionally serve as an attractor for Pacific Spirit Park and will retain a detention pond to mitigate potential flooding in the area.

SEEDS Research Opportunities

Compost Expansion: As the composting facility is nearing capacity, how could this operation be most effectively expanded in order to respond to growing demand? How else could the compost system become more effective? How can we give the composting facility more prominence on campus and make it more visitor friendly?

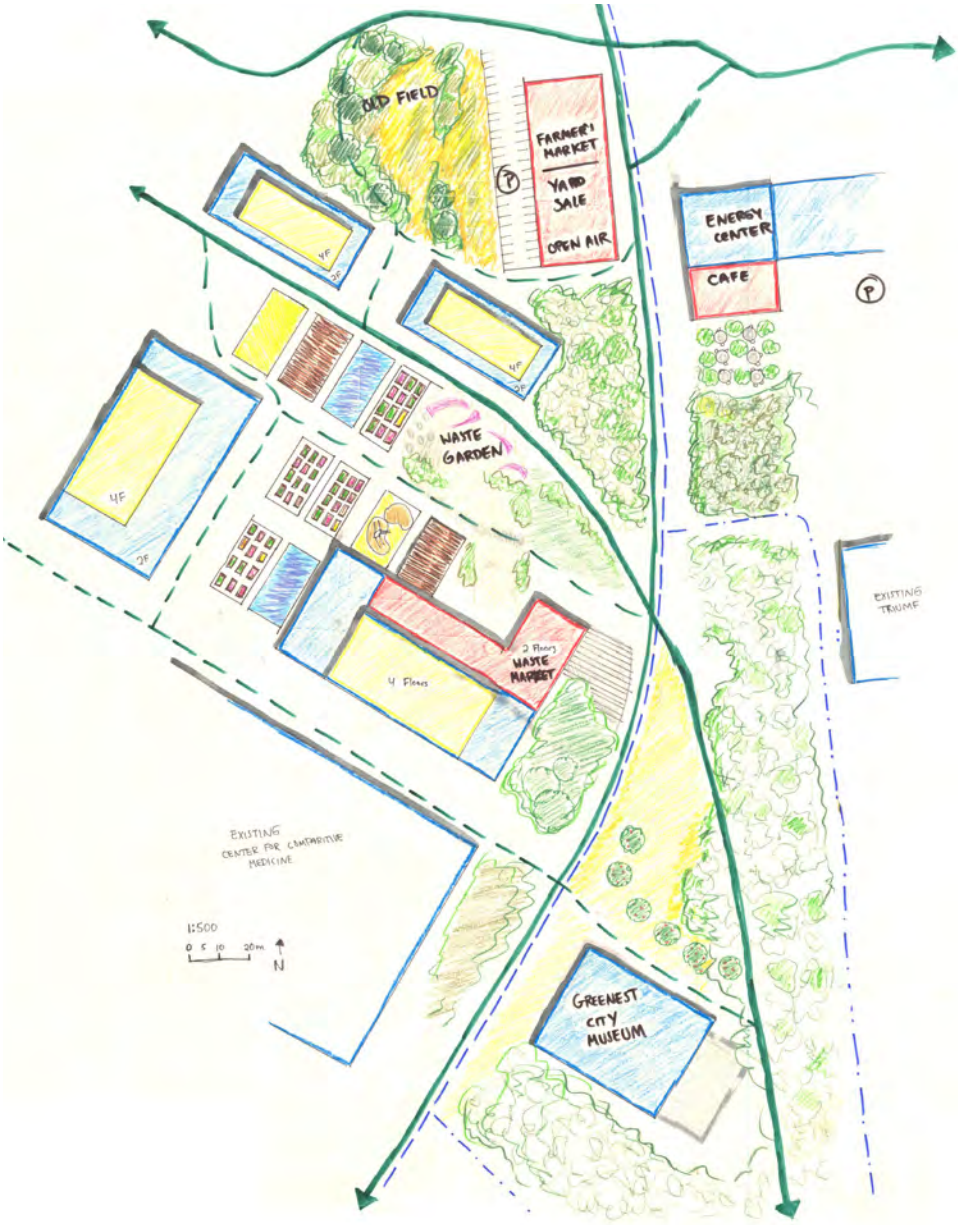
Mapping Biodiversity: Closely map the various habitat regions and functionality of corridors in and relating to South Campus.

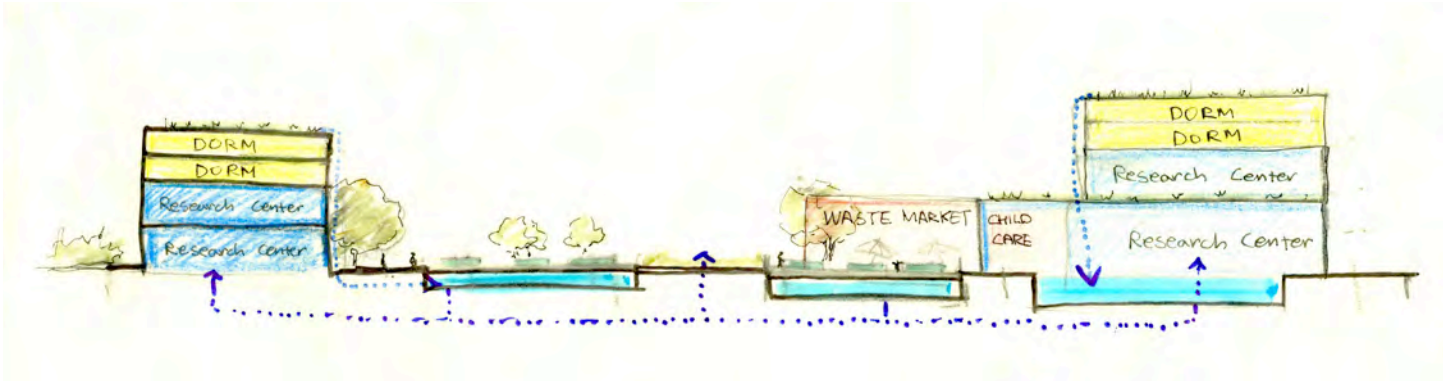
Reuse Art: Explore the ways in which objects can be reused to create public art. Items can come from the waste center or be found in piles near or in garbage bins across campus.

Transportation Study: Look at the various ways to improve public transit, such as adding a shuttle along the length of Wesbrook Avenue, as well as increasing active transportation.

Public Hub

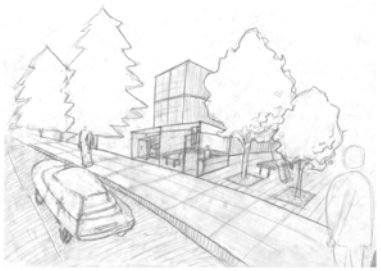
This area is expected to be the most active public space on South Campus. It is surrounded by research centres with domitories and temporary residences on the top two floors. There is also an open covered space for a farmers market and yard sale.

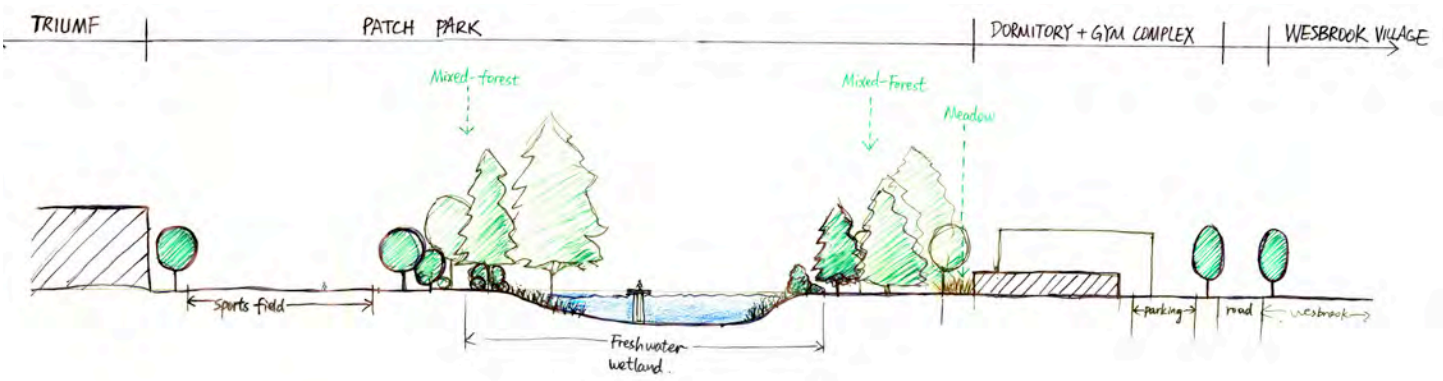




Triumf Park

This park will be an attractive place for those working/living in the area eat lunch and take walks and will also attract people to venture further into PSRP. Several new habitats are introduced in this area as well as a retention pond to mitigate potential flooding in the area.

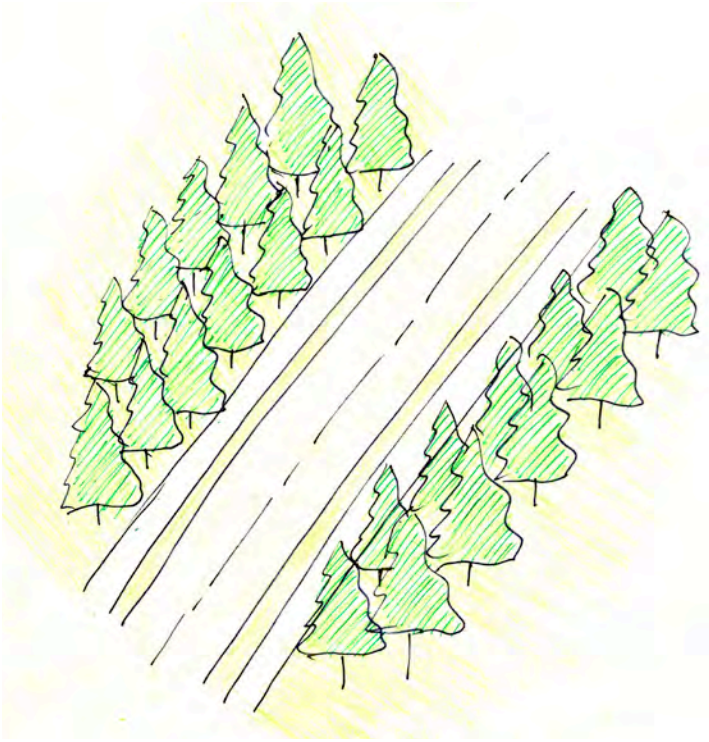




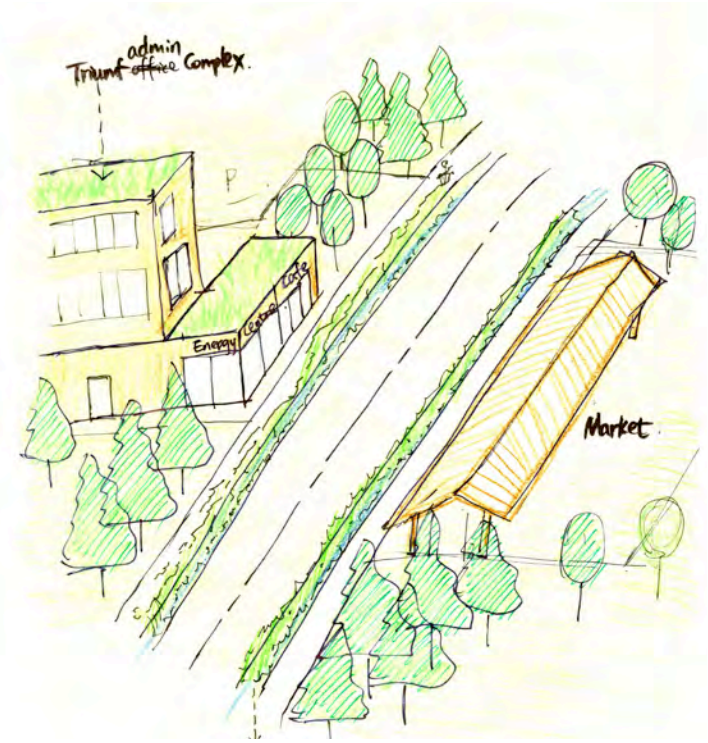
Wesbrook Mall Retrofit

The existing condition of Wesbrook Mall is uninviting and boring with large coniferous screens on both sides. New amenities and public spaces are pushed to the roadside in order to enhance building exposure and create a sense of place.

Before

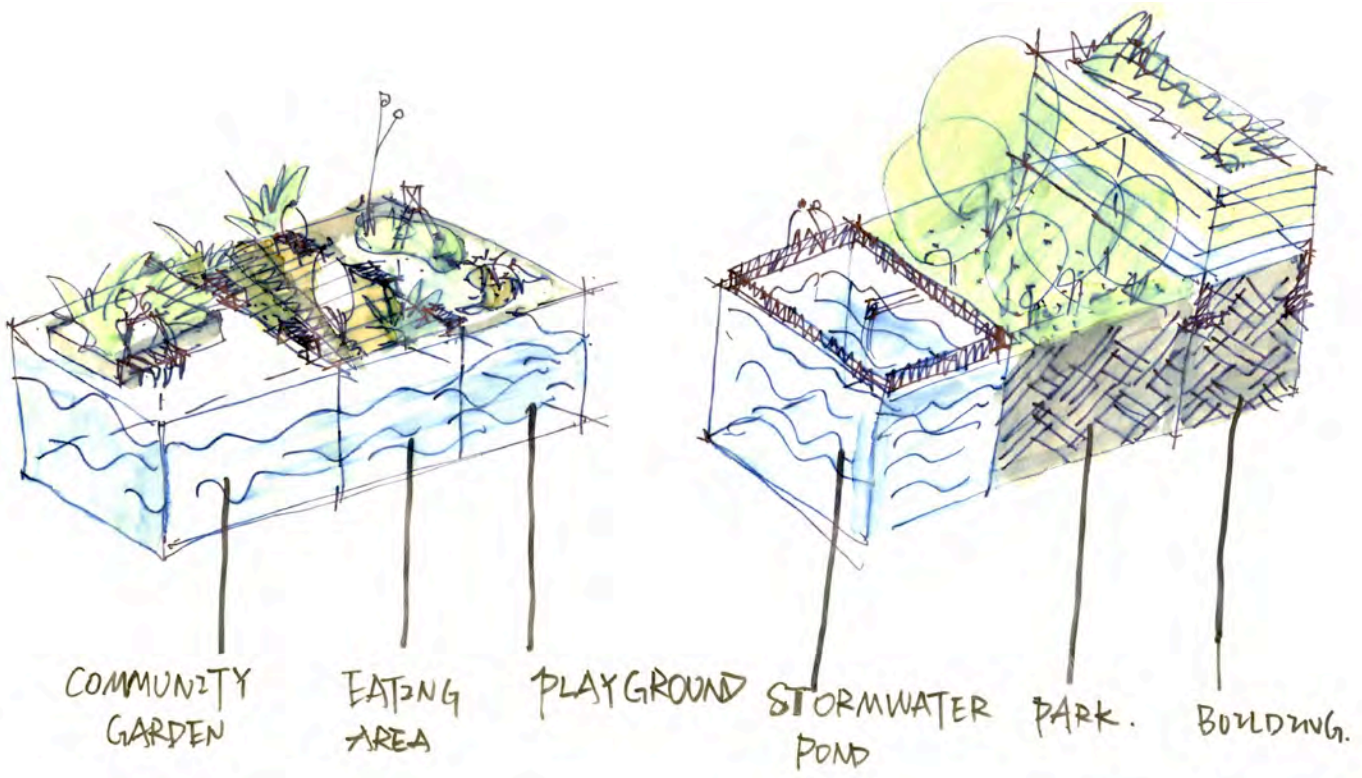


After



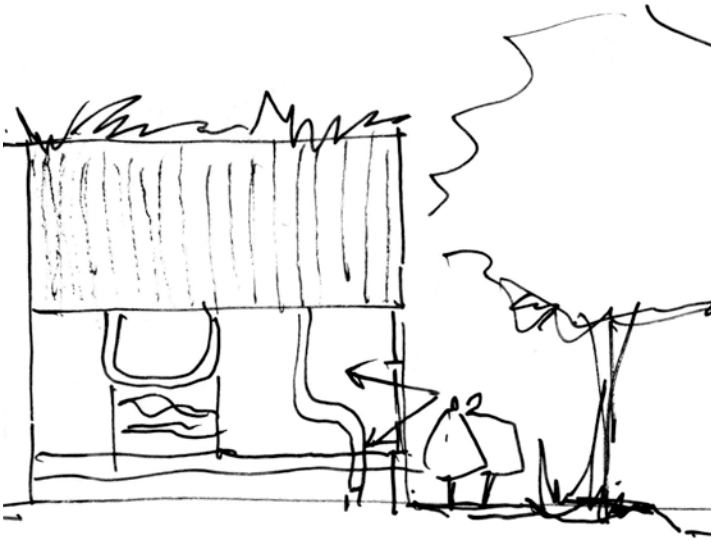
Fishponds Retrofit

The existing fishponds will be retrofitted into different public spaces. Some will feature various coverings on top including, while others will be kept for use of detention ponds in the case of a large rain event.



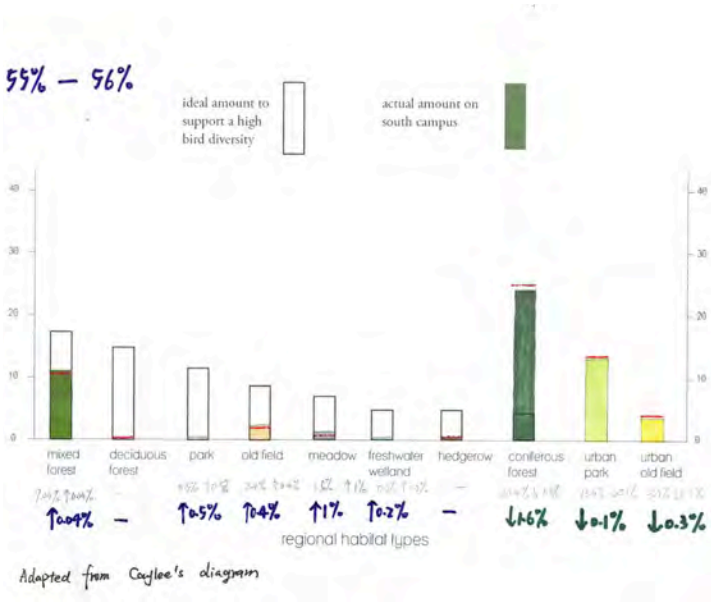
First-floor View Exposure

To achieve the goal of inviting residents, workers, and visitors to experience the sustainable research and reuse principles that are celebrated, studied and practiced, large glazed windows will expose the machinery and labs on the first floor of all the new proposed research centres.



Habitat Adjustment

The addition of new habitat zones and the transformation of others will even out the mix of habitats in this area.



Biodiversity

- Try to increase or at least maintain the existing green areas.
- Adjust habitat levels. Increase habitat with high habitat value.

Legend

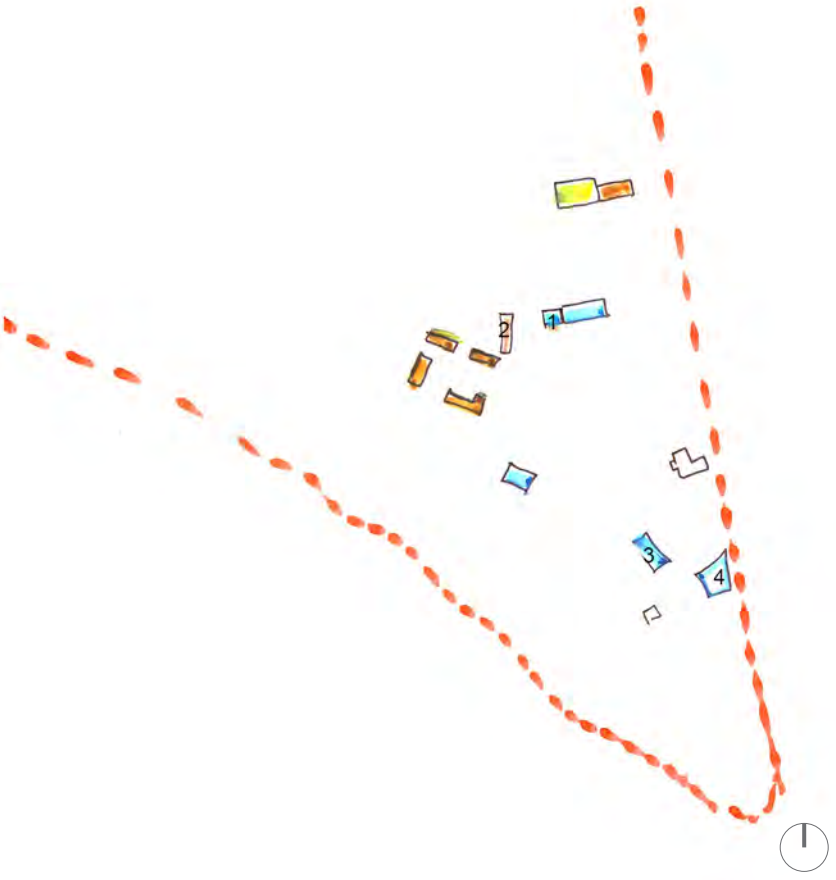
- Existing Habitat
- Buildings with green roof
- Mixed forest
- Meadow
- Old Field
- Park
- Freshwater wetland
- Removed habitat

Buildings

- 86% walkable to ammenities in 5 minutes
- Increase total 1030 people

Legend

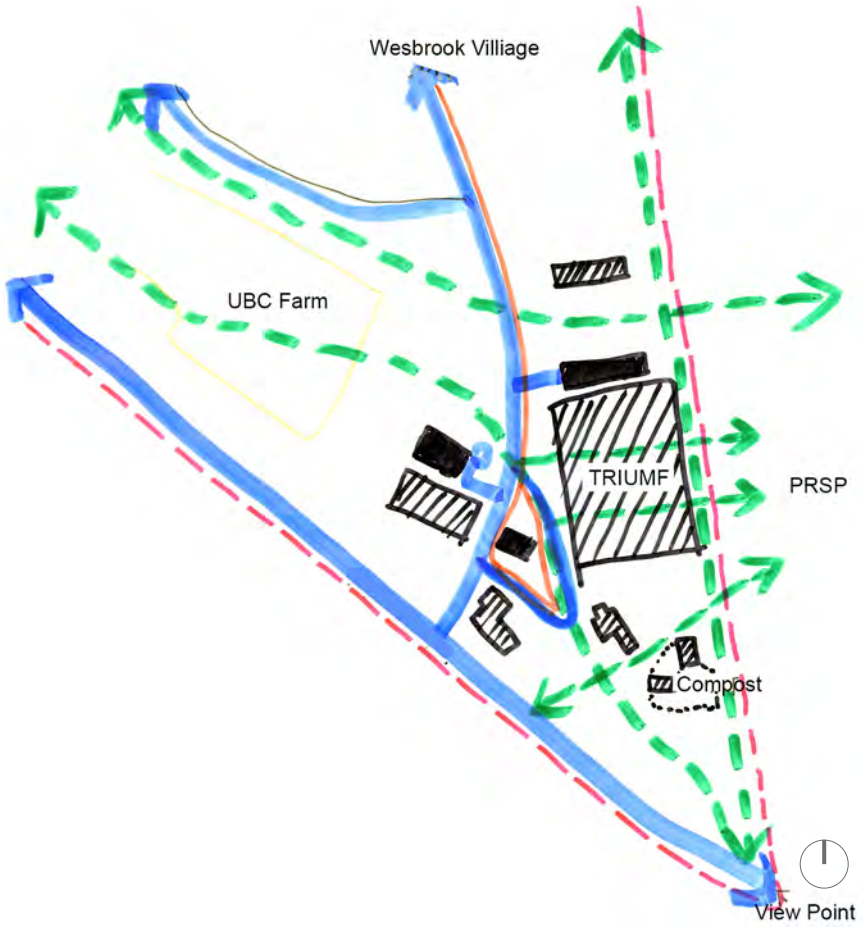
	Dormitory	690 people
	Research center	240 people
Visitors	1. Energy center	100 people
	2. Farm market	
	3. Museum	
	4. Waste market	



Circulation

- Renew greenway systems to enhance better connections with PSRP and UBC farm
- Introduce a shuttle bus loop to take riders further into South Campus and make it convenient to enter from North Campus

Legend



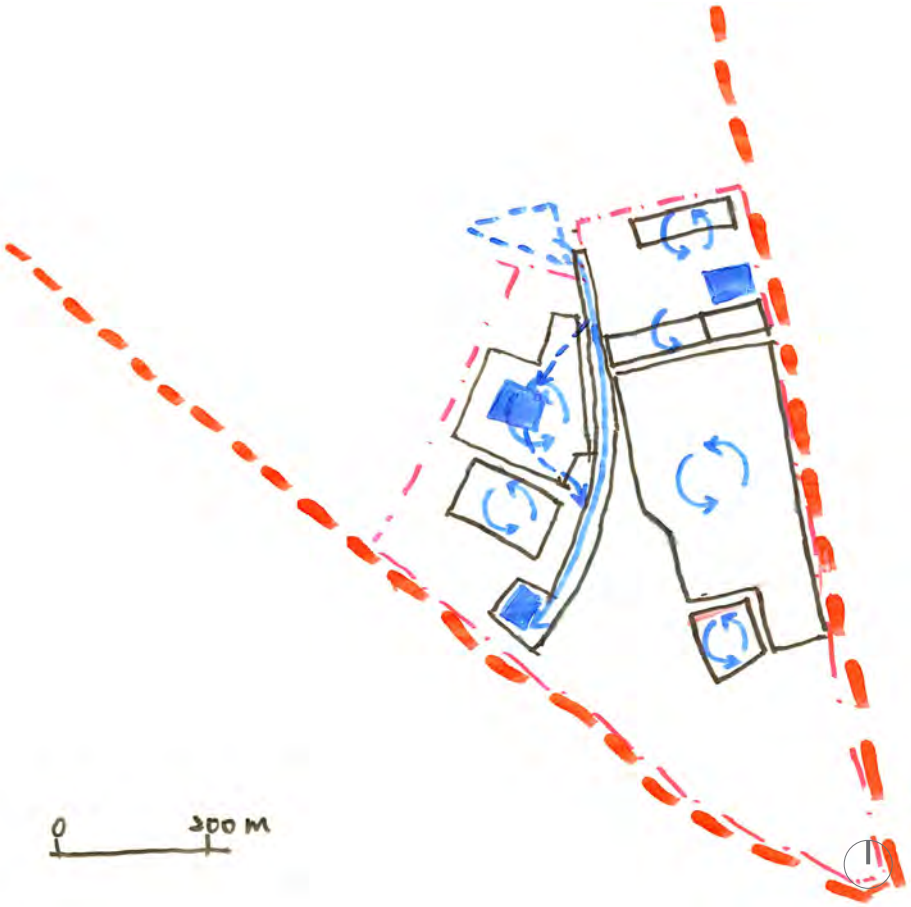
Public Space

- Articulate the active public spaces along the Wesbrook Mall.
- Enhance greenway connections between public spaces
- Intensify security by increasing site lines from surrounding buildings.

Legend

Water

- Rainwater is collected, purified and reused through green infrastructure
- A series of enclosed-loop systems are established to reduce the potable water use and stormwater runoff
- A series of detention ponds for flood protection



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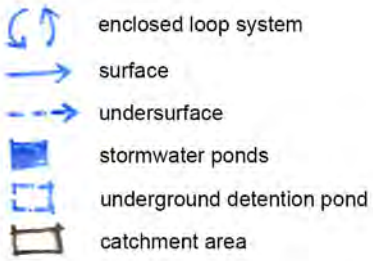
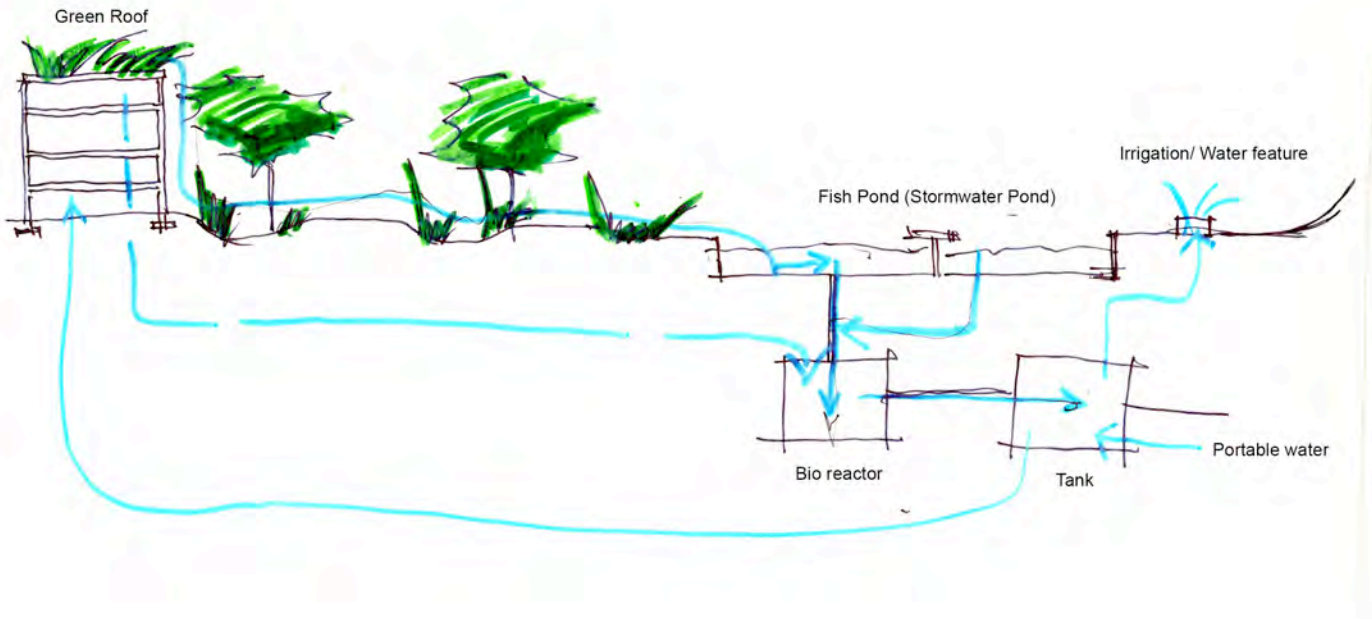
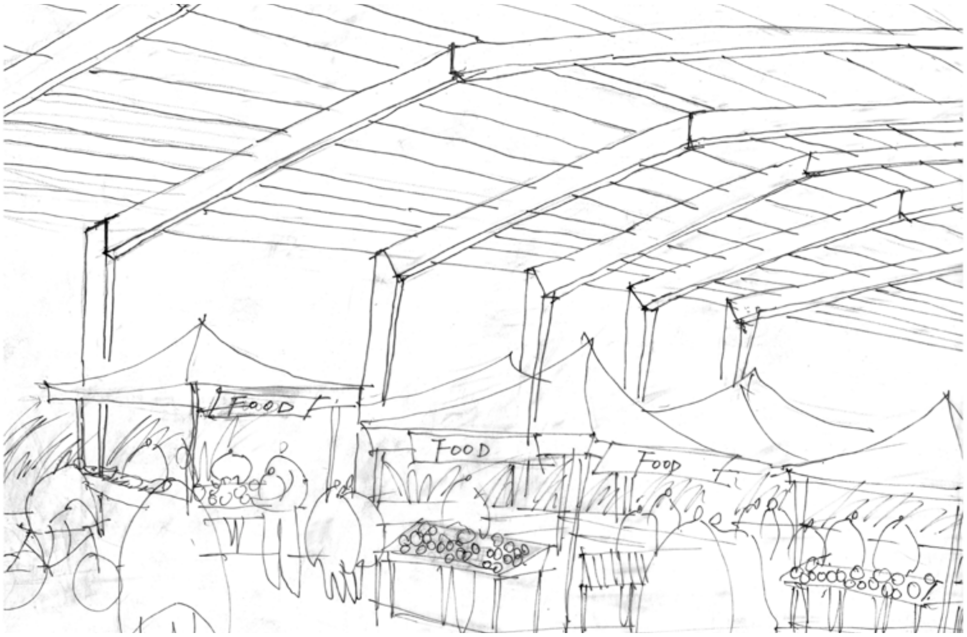


Those small scale water systems in buildings and neighborhoods can link together as a whole water system on the south campus. By addressing these water actions, we assume that the stormwater utilization ratio can reach 58% and the flood risk can be eliminated.

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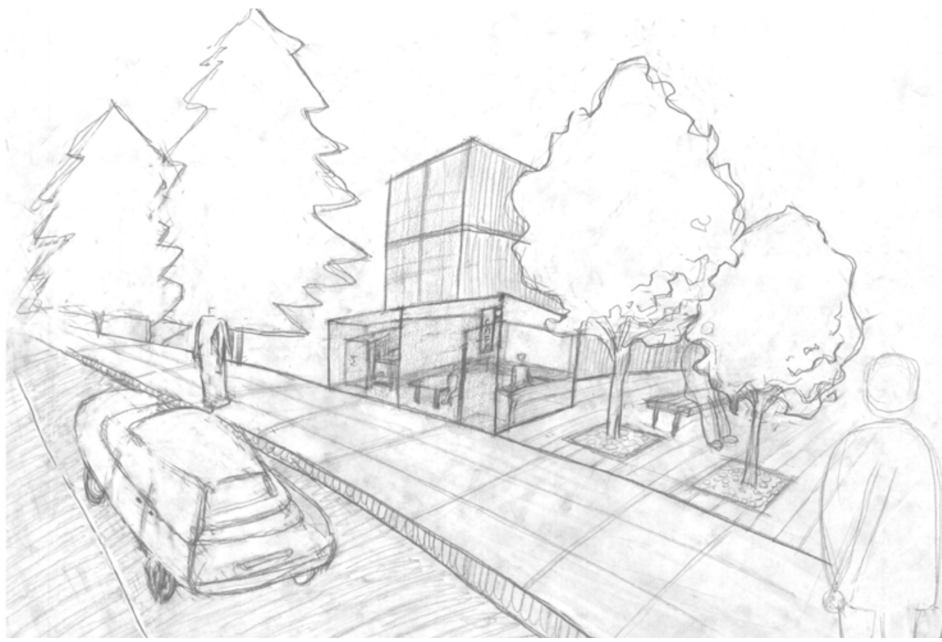

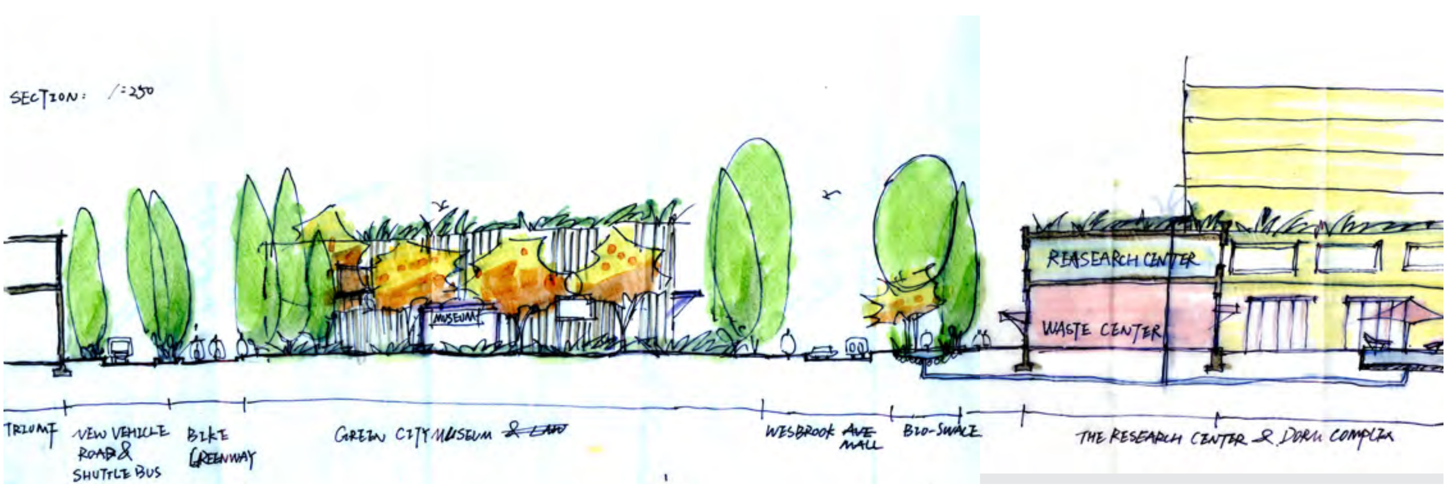
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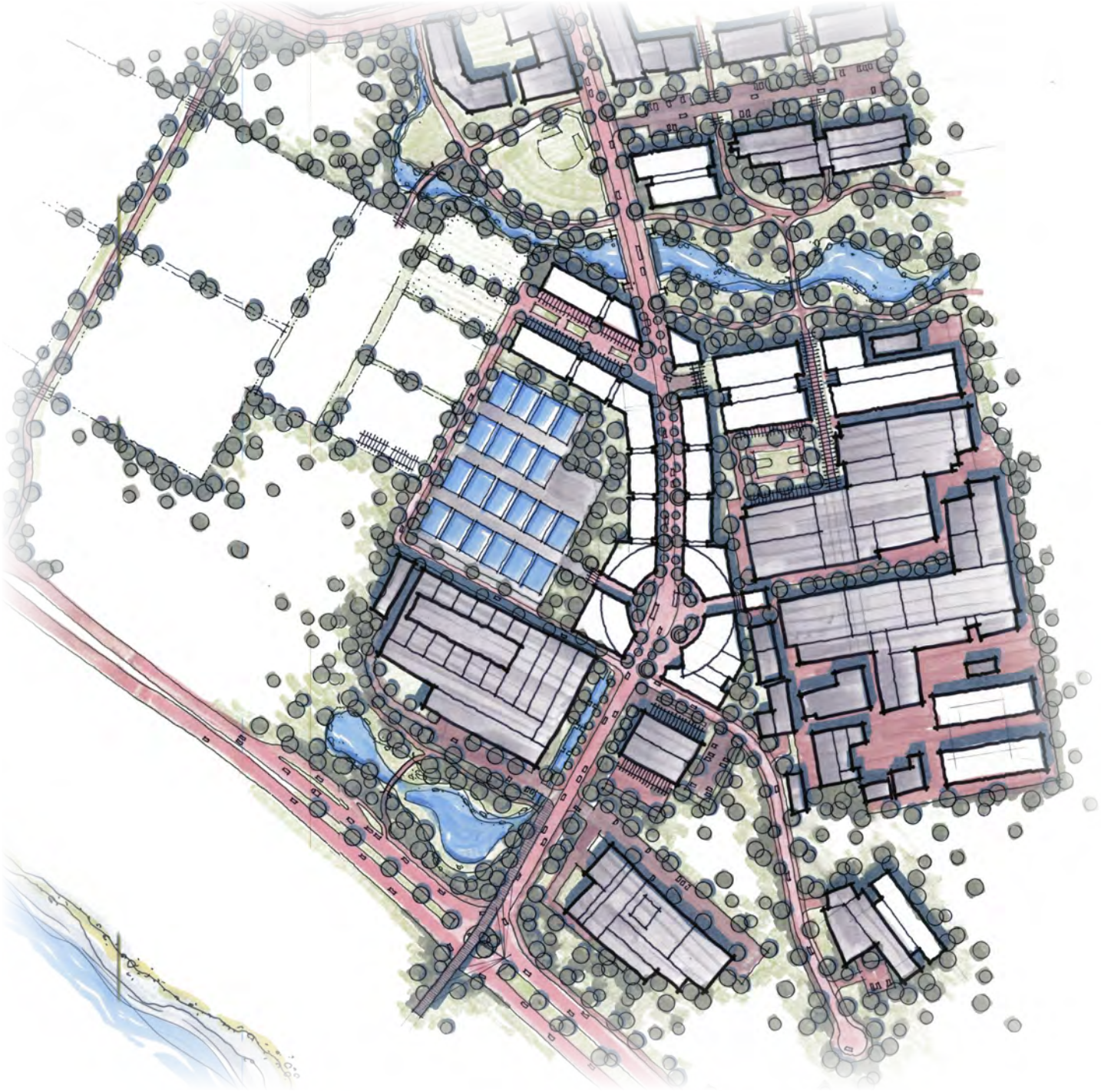
MUSEUM
REASEARCH CENTER
WASTE CENTER
TRIUMF
NEW VEHICLE ROAD & SHUTTLE BUS
BIKE GREENWAY
GREEN CITY MUSEUM & LAB
WESBROOK AVE MALL
BIO-SWALE
THE RESEARCH CENTER & DORM COMPLEX

Collaborative Design of an Eco-District on South Campus, UBC

Group 2: Living Links

Ayishah Chui, Brianne Lee, Celia Winters, Josh Harvey & Scarlett Miao



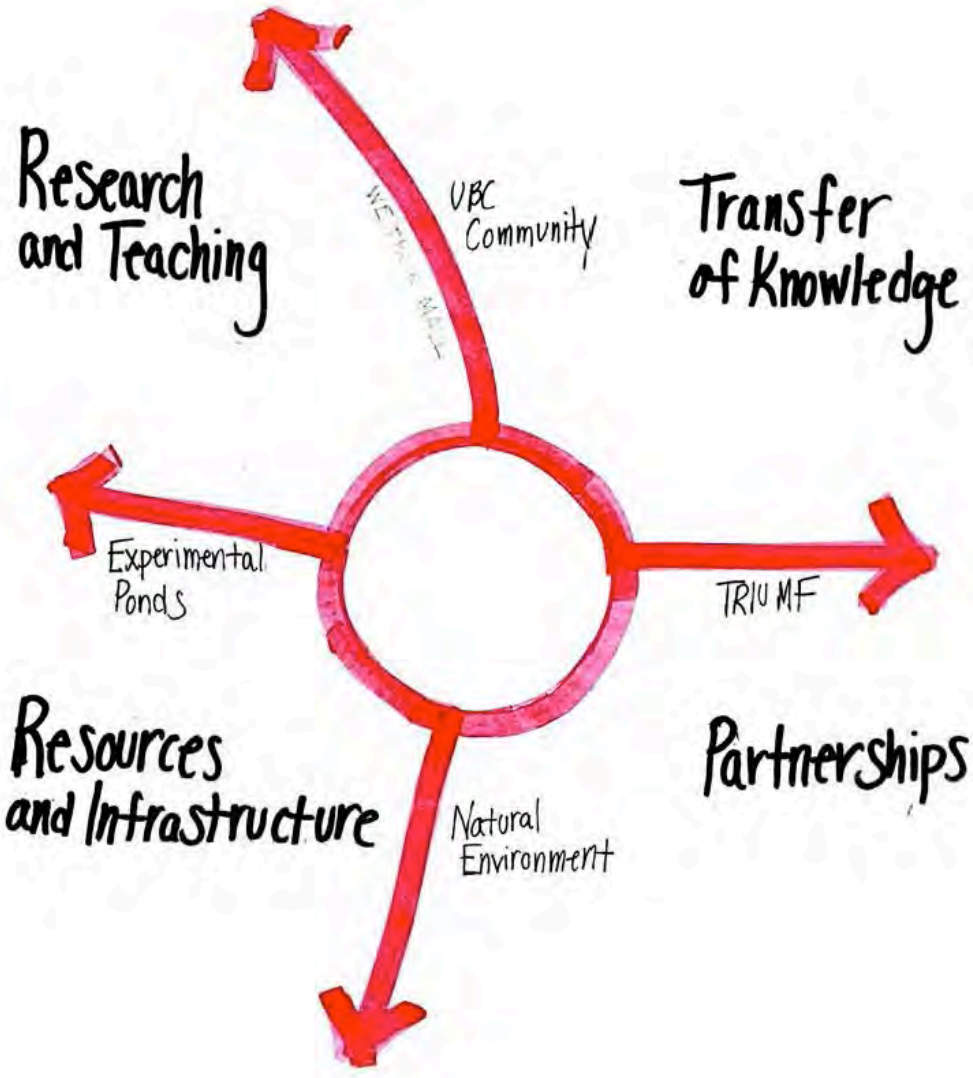
Charrette Conducted July 12-13 & 19-20, 2017
ENDS 482T/LARC 582T Design Charrette

SCHOOL OF
ARCHITECTURE +
LANDSCAPE
ARCHITECTURE

UBC

Concept Design

At the core of our design is a vibrant central hub featuring a public plaza, transit connections and services that residents, students and employees can share. Off of this hub are spokes towards the greater UBC Community and the natural environment of the Point Grey Peninsula, supporting the ‘living’ in living lab. In addition, the spokes towards Triumf and the Experimental Ponds 2.0, serve as key examples of industry innovation and academic research, supporting the ‘lab’ in living lab.



Concept Plan 1 Executive Summary

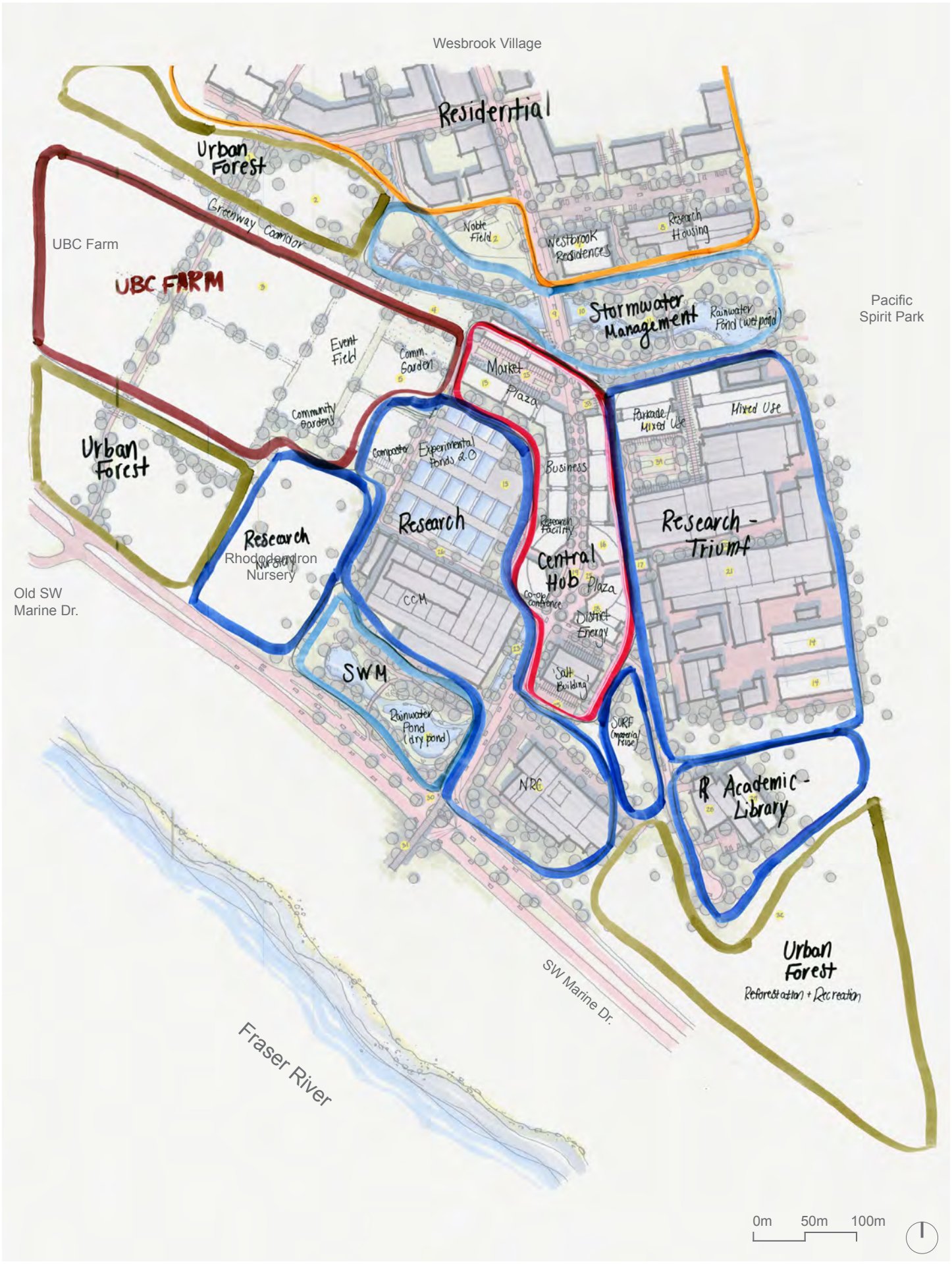
Living Links believes the design of an Eco-District in the South Campus of UBC uniquely implements the University's broader "living laboratory" vision for the campus. The goals of our Eco-District extend beyond the promotion of sustainability; our vision is for University facilities and existing research groups to extend beyond their primary use to become more open, accessible and collaborative. Our design responds to the physical and ideological disconnect that South Campus experiences from the rest of UBC Vancouver.

Our guiding principles are simple yet apparent in all design decisions; to (1) promote sustainable design and use of the lands, (2) prioritize multi-use spaces, and (3) bring a public face and pedestrian vibrancy to street frontages. South Campus is a 30 minute walk for most staff, students and faculty at UBC, and hence we do not endeavor to connect the two 'campuses', however, our goal is to create a complete community that fosters social and physical interaction. In addition, we have given South Campus an identity that is in support of the UBC brand - one which embraces innovation and is intensely collaborative.

Our design is challenged by the idea of "Leaving Landscapes", as prompted by John Madden (from C+CP). In the quest to transform South Campus, we have aimed to preserve, restore and regenerate the natural landscape whenever possible.

Program Diagram

The conceptual design for *Living Links'* design for South Campus stems from the strong spatial adjacency of the functional purpose of each precinct. The orientation of the functional programs create the most efficient use of space, allows for expansions of commercial and institutional use, and allows for easy connection to each precinct.


Wesbrook Village
Residential
Urban Forest
Greenway Corridor
UBC Farm
UBC FARM
Noble Field
Westbrook Residences
Research Housing
Stormwater Management
Rainwater Pond (wet pond)
Pacific Spirit Park
Event Field
Comm. Garden
Community Garden
Market Plaza
Portside / Mixed Use
Mixed Use
Urban Forest
Compost
Experimental Ponds & C
Business
Research
Research Facility
Research - Triumf
Research
Rhododendron Nursery
Nursery
Central Hub
Plaza
Co-op Conference
District Energy
CCM
Old SW Marine Dr.
SWM
Salt Building
Rainwater Pond (dry pond)
SURF (Materials House)
NRC
Academic - Library
SW Marine Dr.
Urban Forest
Reforestation + Recreation
Fraser River
0m
50m
100m

South Campus Plan

Proposed development along Wesbrook Mall creates a new and vibrant street wall where Triumf, UBC Farm, the ponds, and other existing research facilities can display a public ‘face’. A central research hub and plaza create a focal point from which pedestrian paths radiate to principal facilities.

Number Key

1. New footpath and greenway
2. Preserved forest, development re-located (see #7)
3. UBC Farm, production fields
4. Community garden plots
5. Special events field
6. New UBC composting facility with interpretive kiosk
7. New residential development
8. Existing building converted to research/academic housing and Triumf Hotel
9. New ‘gateway’ bridge over collection ponds
10. New rainwater retention ponds with naturalized and accessible edges
11. Restored forest area and footpaths
12. New UBC Farm market
13. New UBC Farm research building
14. New Triumf research/administration building (future expansion)
15. Existing research ponds
16. New conference centre with research facilities above
17. New Triumf pedestrian/bike entry
18. New district energy building with research facilities above
19. Bus depot
20. New greenway through Triumf
21. Existing Triumf research building
22. Existing medical research building
23. Rainwater collection bioswales
24. Existing timber warehouse converted to destination pub/ restaurant/special event space
25. New Public plaza
26. New footpath and service lane
27. Existing research building
28. Existing library archives building
29. Future library archives extension
30. New ‘gateway’ round-about
31. New pedestrian bridge and lookout over Wreck Beach and Fraser River
32. Restored forest area (existing uses relocated)
33. Ramp down to new parkade (main vehicle entry to Triumf)
34. New Triumph ball court/recreation area


Westbrook Village
UBC Farm
Pacific Spirit Park
Rhododendron Nursery
Old SW Marine Dr.
SW Marine Dr.
Fraser River
Legend
Existing building
Proposed Building
0m
50m
100m

Proposed Development

The goal of 'Living Links' is to create a well populated, centralized, and vibrant research community Development of new research and office facilities along Wesbrook Mall will greatly increase the number of people working in South Campus. This population will demand basic amenities, such as cafes, a restaurant, shops, and outdoor leisure spaces.

Floor Area (excluding Wesbrook Village):

Existing:	55,000 m2
New:	60,000 m2 (research, office, CRU)
Total:	115,000 m2

Legend

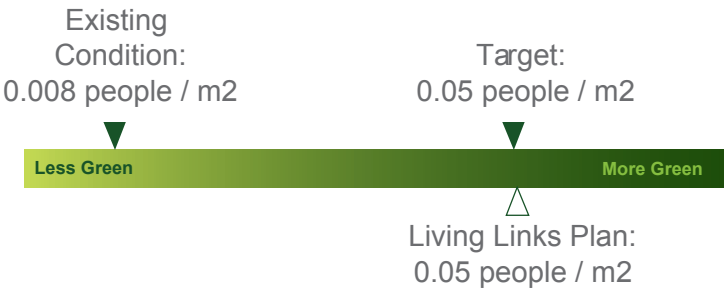
Existing Building

Proposed Building

Related Goal: Increase Population Density

Indicator: Employee and resident density

Measure: Number of people per square metre



Note: 0.05 people/m2 is an average of the densities observed in several precedent buildings with programs similar to those envisioned for South Campus. It is used to estimate population based on proposed floor areas.

Related Goal: Create Vibrant Daytime Community

Measure: Employee Density

Indicator: At least 1800 additional people are required to support basic amenities.

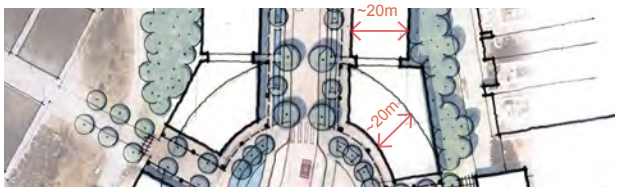
Existing: 450 people, supports 1 cafe

New: +/- 3000 people (0.05 x 60,000 m2)

Total: +/- 3450 people, supports at least 2 cafes and 1 convenience store. This, plus existing Wesbrook Village, supports an additional pub/ restaurant.

Related Goal: LEED Gold Buildings

New buildings are restricted to 18m - 20m wide for daylight penetration and to encourage natural ventilation.

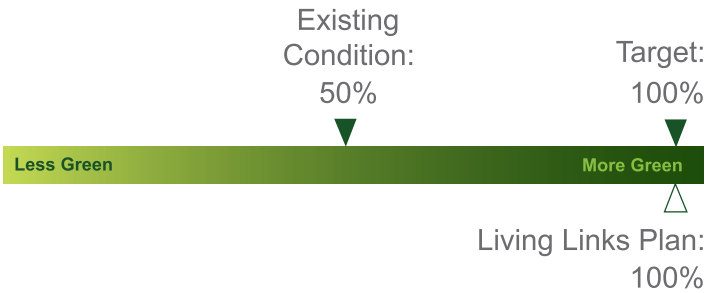


Large East and West facing facades should be designed to include vertical exterior sun shades.

Related Goal: Local Amenities Close To Jobs

Indicator: Jobs located within a 5 min. walk of services

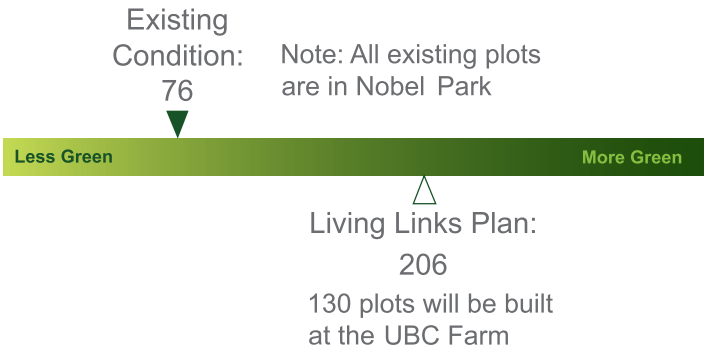
Measure: Percent of buildings containing jobs within 400 m of services (cafe, convenience store, ATM)



Related Goal: Build Community Capacity

Indicator: Community Garden Plots

Measure: Number of community garden plots available to the public



Green Space System

All existing forested areas are preserved. By moving the existing waste management facilities into a proposed new complex, the south end of South Campus is also able to be reforested. These allow the east and west portions of SPRP to be better linked in a green system.

Legend

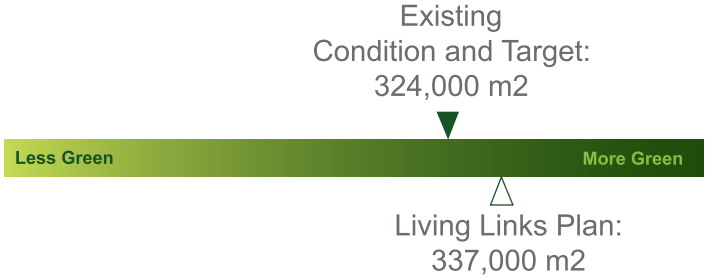
Coniferous Forest

Reforested Land

Related Goal: Diverse and Resilient Habitat

Indicator: Preservation of natural area

Measure: Area of land that is preserved as natural area or reforested into greenspace



Note: Cultivated Green Space (parks, UBC Farm, etc.)
Existing 141, m2
Living Links Plan: 152,000 m2

Roads and Greenways System

Having most proposed new buildings sited along Westbrook Mall, these buildings transportation needs could likely be met. Having the major greenway crossing Westbrook Mall also helps indicate the entry point of the Eco-District, as well as making the greenway visible to public.

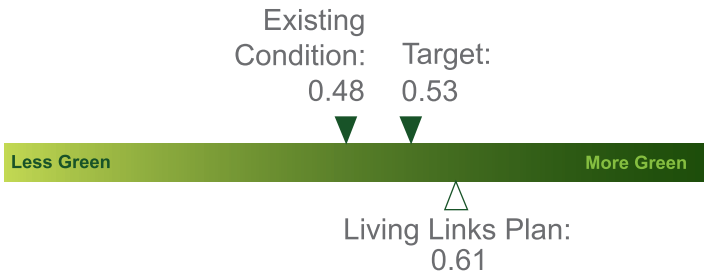
Legend

- Arterials Road
- Local Road
- Major Greenway
- Minor Greenway

Related Goal: Create a fine grain pedestrian and cycling network

Indicator: Intersection density

Measure: Intersections per hectare (number of intersection divided by total study area)



Related Goal: Connected Community

Indicator: 5 min walk to nature

Measure: Percentage of people that live or work within a 5 minute walk of a trail head in a natural area

Achieved metric through the addition of trails on the NW part of South Campus

Rainwater Management System

Greenroofs with rainwater harvesting capacity is proposed for all the proposed new buildings. This harvested rainwater could not only replace the use of potable water for irrigation and toilet flushing, but could also reduce the load of South Campus's stormwater management system.

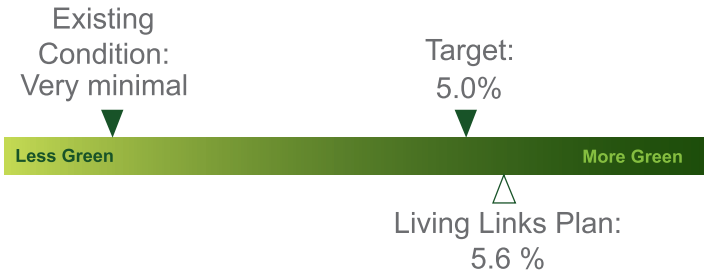
Legend

Potential Rainwater Harvesting Roof Area

Related Goal: Decrease the impact on the water shed

Indicator: Amount of rainwater collected

Measure: Percent of land allocated to green infrastructure (to capture runoff at 80% utilization)



Note: 36,237 m2 of green roof infrastructure from all new developments and 25% of existing developments

Stormwater Management System

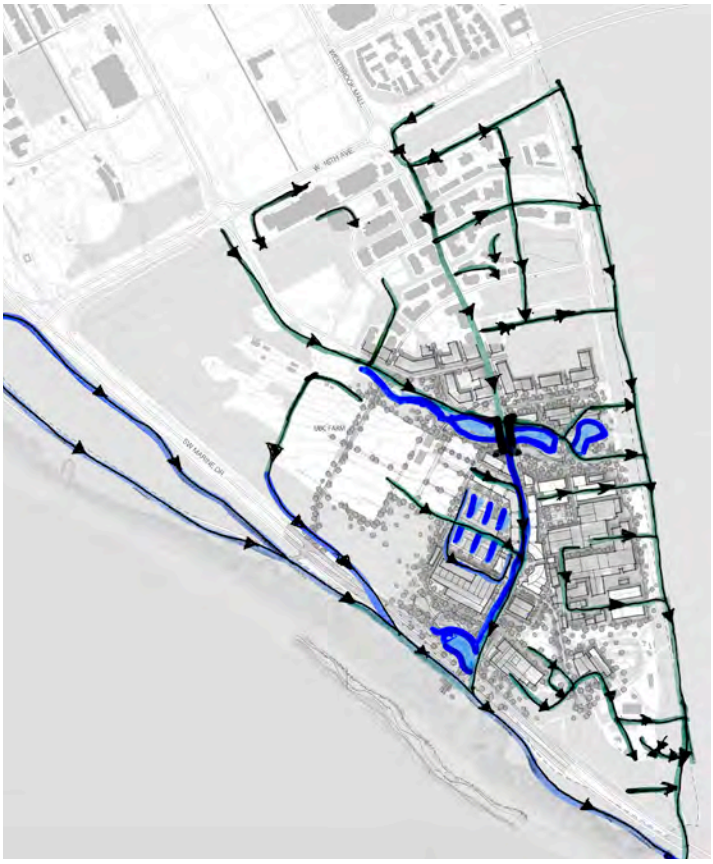
Based in the existing stormwater flow pattern, two new concentration areas of stormwater management detention/retention ponds are proposed. These stormwater management systems are also integrated into the greenways and serve as part of the entryway marking landscape.

Legend

Ditches

Storm mains

Proposed Stormwater Retention/ Detention Pond

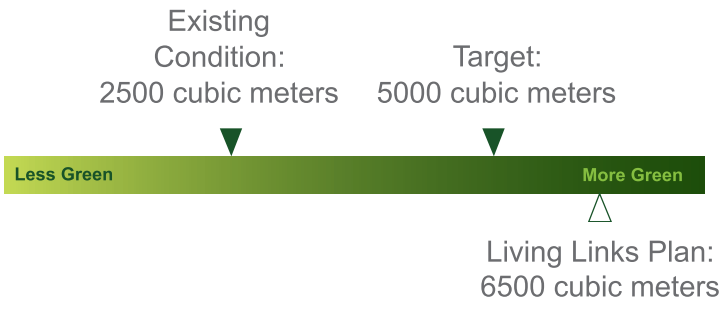


Reference: GeoAdvice Engineering Inc. (2012) UBC Stormwater Collection System TECHNICAL MEMORANDUM 2 - Draft

Related Goal: Create a resilient watershed

Indicator: Stormwater retention ponds to stand up to a 100 year storm

Measure: Volume of stormwater detention ponds



Note: Plan includes a pond at SW Marine Drive (2500 cubic meters of storage: 3m deep with a 1200 m2 footprint) and smaller ponds (1500 cubic metres of storage north of Central Hub

View System

View corridors and viewing points are created with the proposed building arrangement. These view corridors will allow easy wayfinding and promote the publicity of on-site research facilities. Viewing points will serve as destination points, which in turn attracts more visitor to South Campus.

Legend

Key Buildings

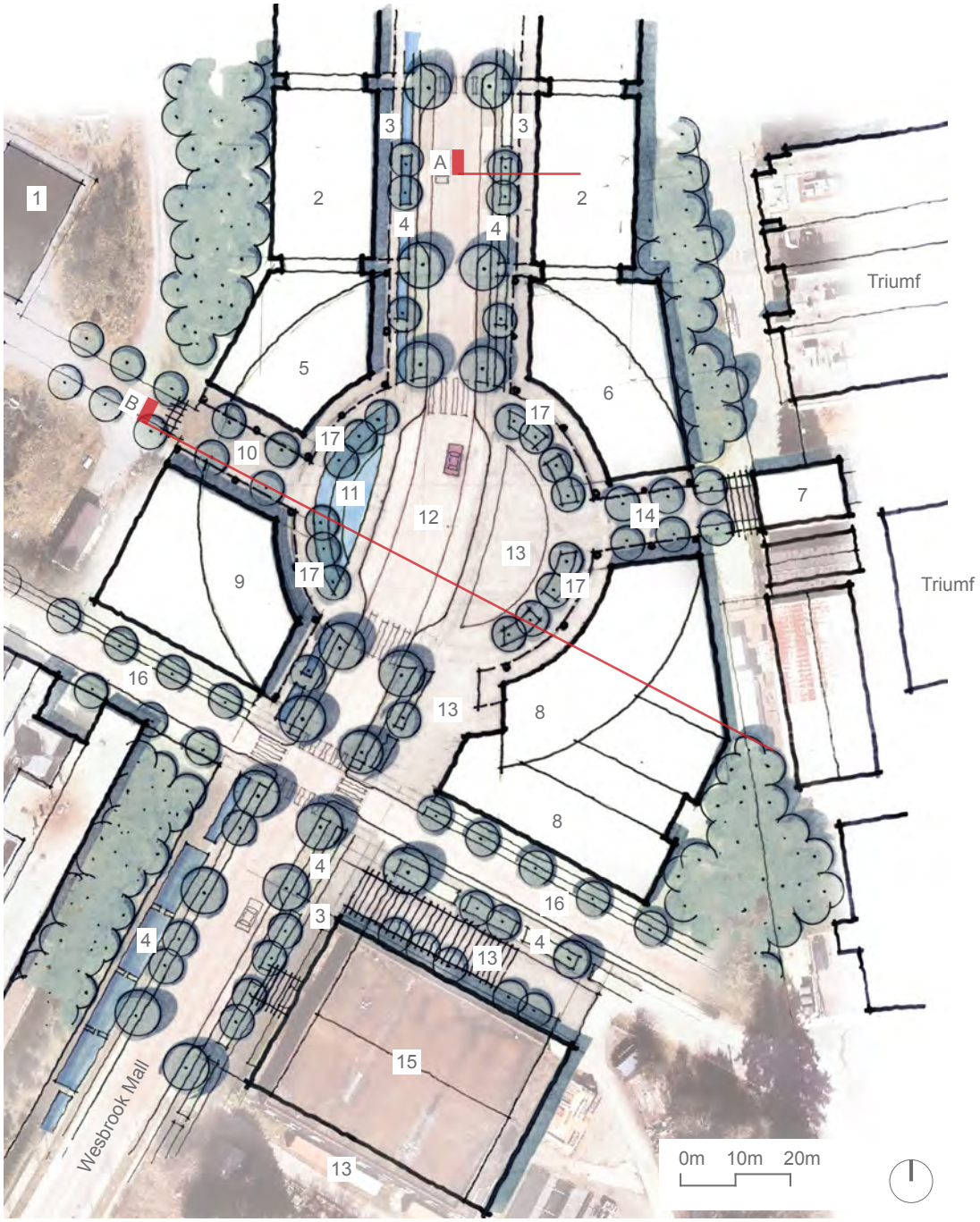
View

Zoom In - Central Hub

A new research hub and public plaza are central to this scheme. View corridors and pedestrian paths radiate from the hub, connecting it directly to primary research facilities. The plaza includes a bus depot, sunny and shaded seating areas, a large rainwater bioswale, and Newton's apple trees.

Number Key

1. Existing research ponds
2. Rentable research/office space
3. Paved sidewalks
4. Rainwater bioswales
5. Commercial at grade, research above
6. Conference space and cafe at grade, research above
7. Triumf pedestrian/bike entry
8. District energy plant and cafe at grade, research above
9. Commercial at grade, ponds research above
10. View corridor and access to ponds
11. Feature rainwater bioswale
12. Bus depot
13. Public plaza and seating
14. View corridor and access to Triumf entry
15. Existing timber warehouse converted to pub/restaurant/special event space
16. Footpath and service lane
17. Newton's apple trees, relocated

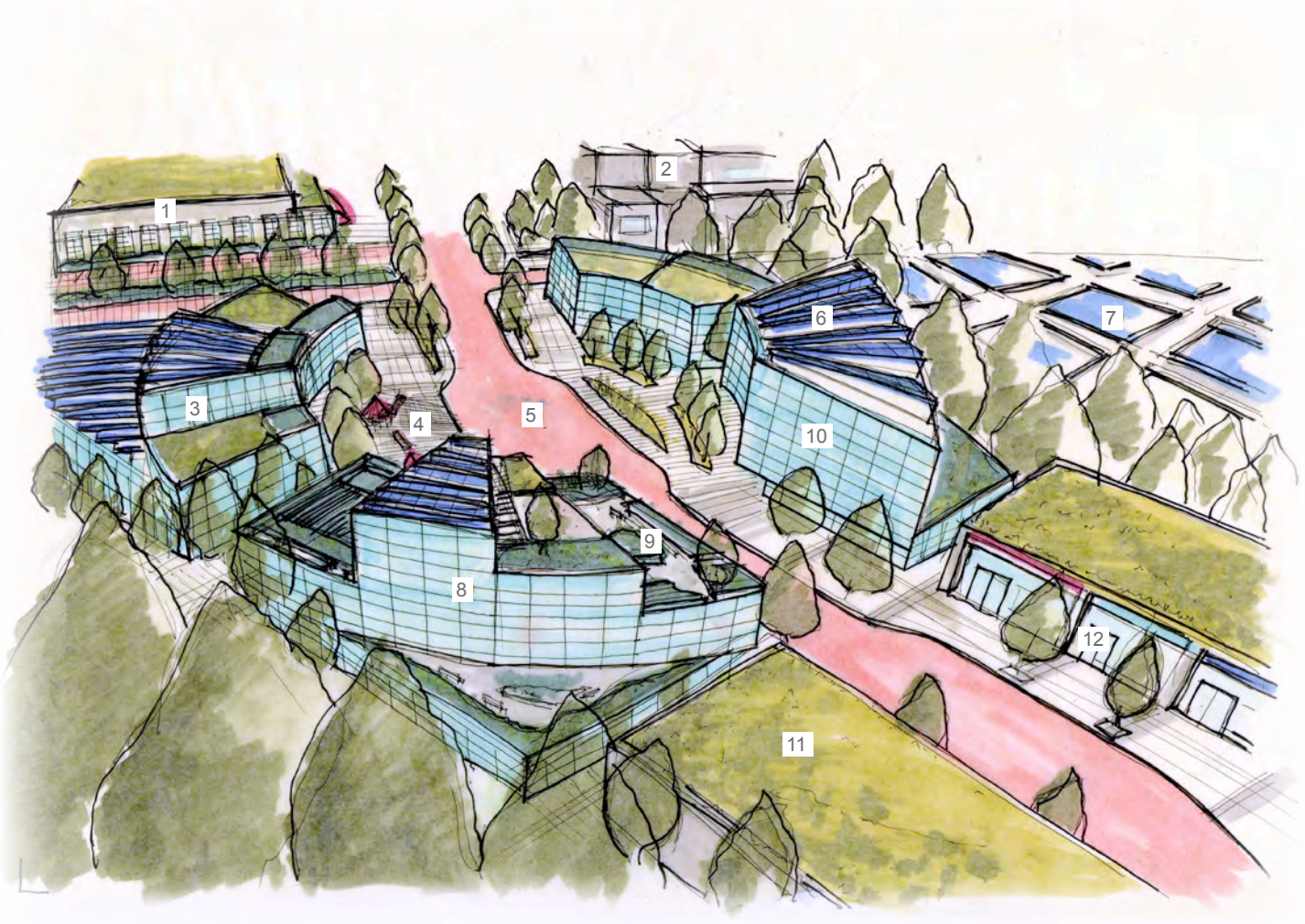


Zoom In - Central Hub - Aerial View

At the core of our design is a vibrant central hub featuring a public plaza, transit connections and services that residents, students and employees can share creating a focal point from which pedestrian paths radiate to principal facilities.

Number Key

1. Existing timber warehouse converted to destination pub/restaurant/special event space
2. Existing medical research building
3. New district energy building with research facilities above
4. New public plaza
5. Bus depot
6. Rooftop solar energy panels
7. Existing research ponds
8. New conference centre with research facilities above
9. Rooftop garden
10. New research facilities and office space
11. New green roofs with rainwater harvesting capacity
12. Business incubator retail space / office space

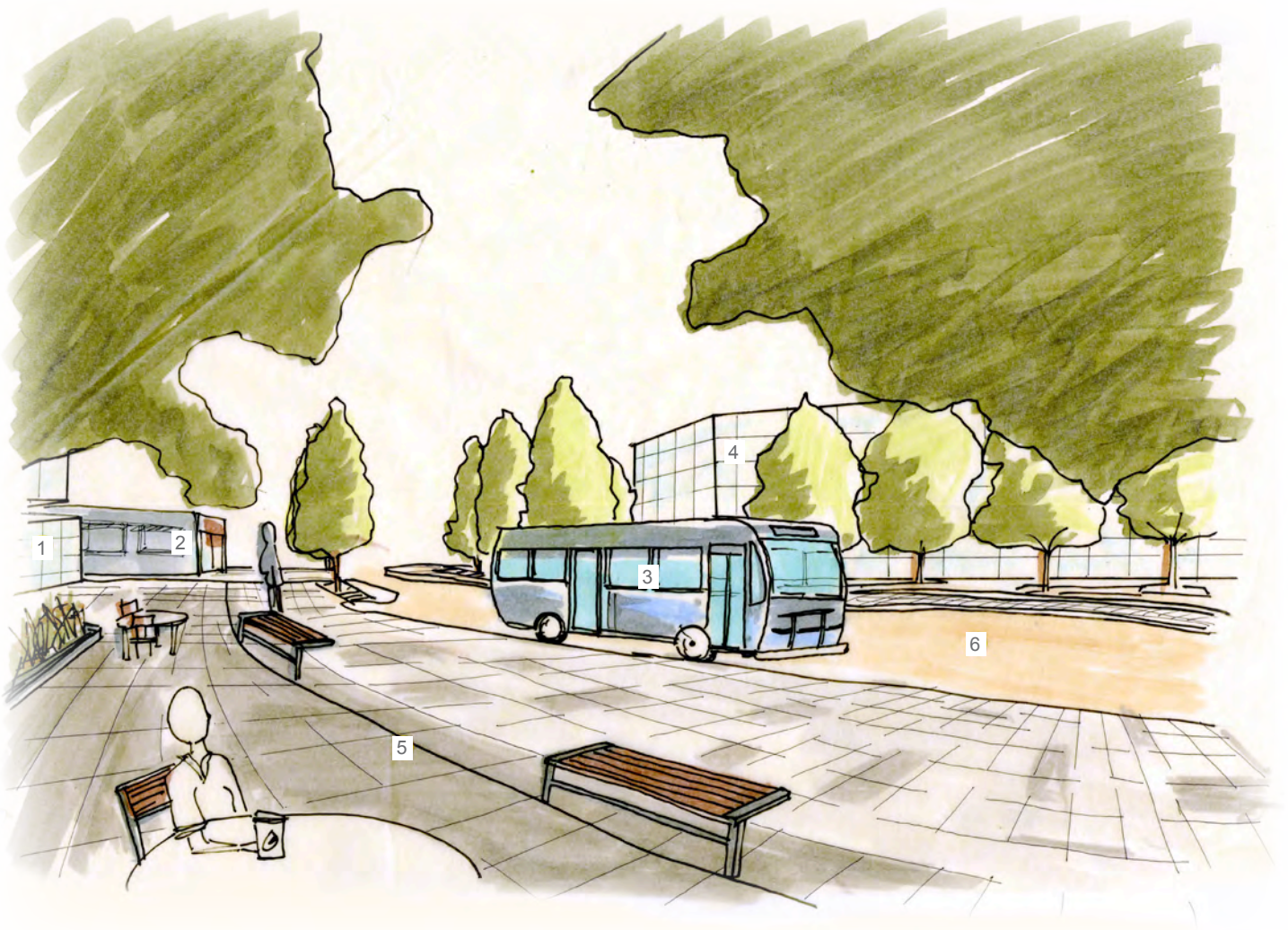


Zoom In - Central Hub - Eye level View

By removing the existing roundabout, traffic conditions for pedestrians and cyclists would be improved. Having the bus depot located next to the new plaza, the plaza space is also promised to be activated by transit users.

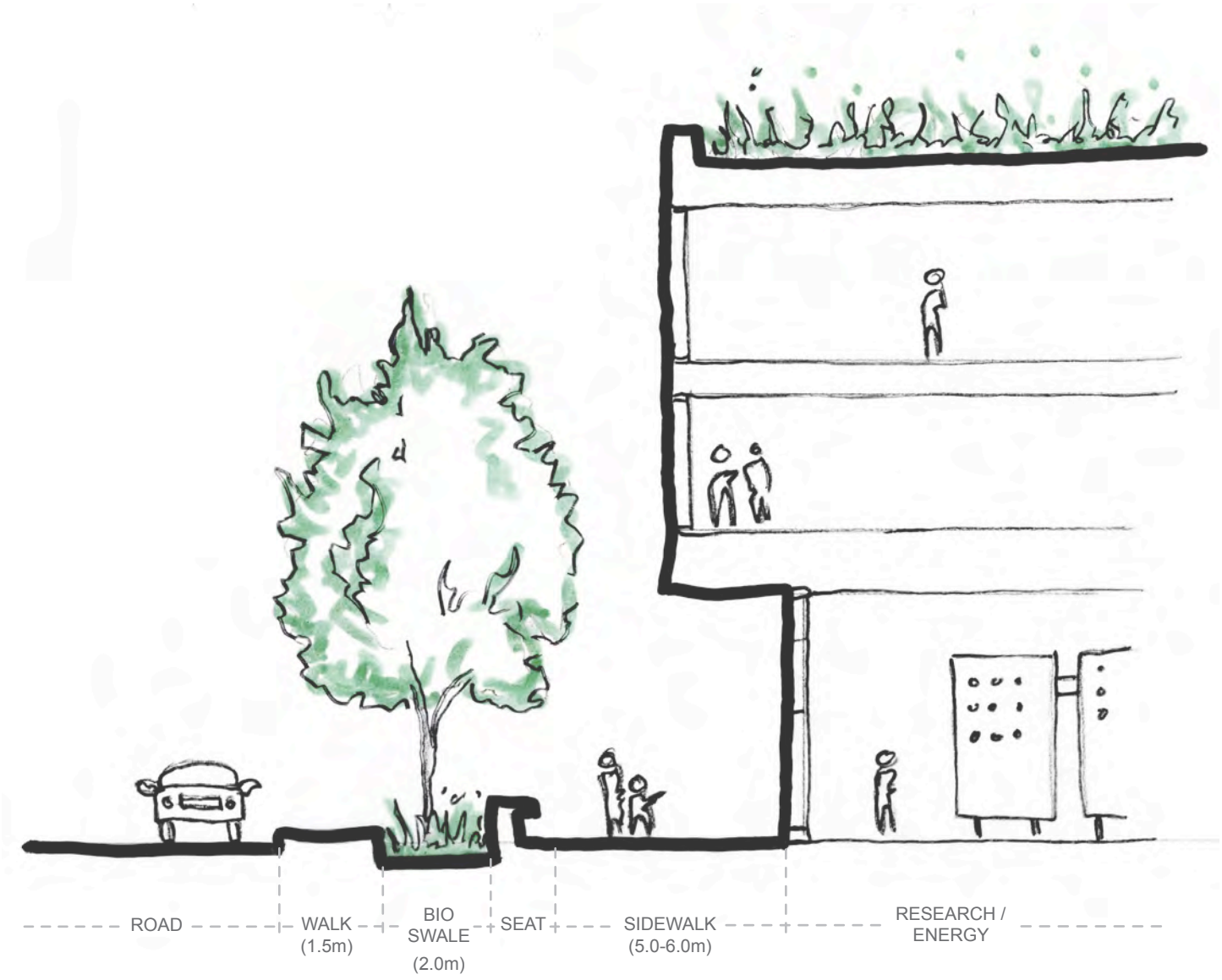
Number Key

1. New district energy building with research facilities above
2. Existing timber warehouse converted to destination pub/restaurant/special event space
3. Bus 41 at bus depot
4. New research facilities and office space
5. New public plaza
6. Bus depot



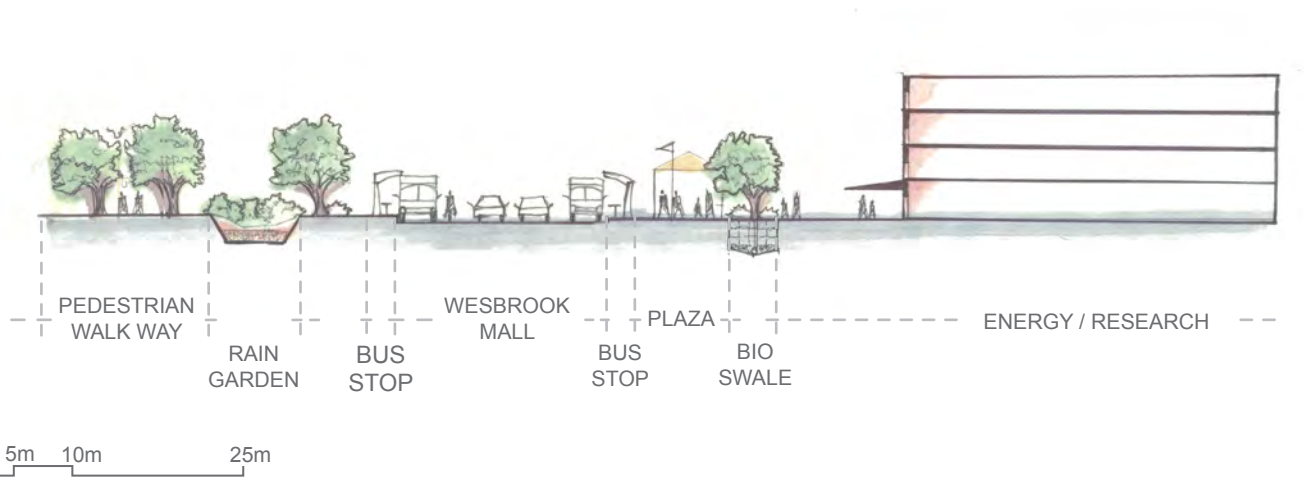
Zoom In - Building Edge Condition - Section A

New buildings at the Central Hub is visioned to have glass glazing facades to allow better indoor-outdoor visual permeability. Visitors on sidewalks and public plaza would be able to see the indoor conditions of research or energy reclaiming facilities, hence promoting South Campus's identity as an Eco-District.



Zoom In - Central Hub - Section B

A variety of spatial conditions are visioned at the Central Hub. These conditions range from open urban hardscape plaza with immediate transit access to tree-lined pedestrian walk way. The Central Hub also has multiple stormwater mitigation features to cleanse runoff on site.

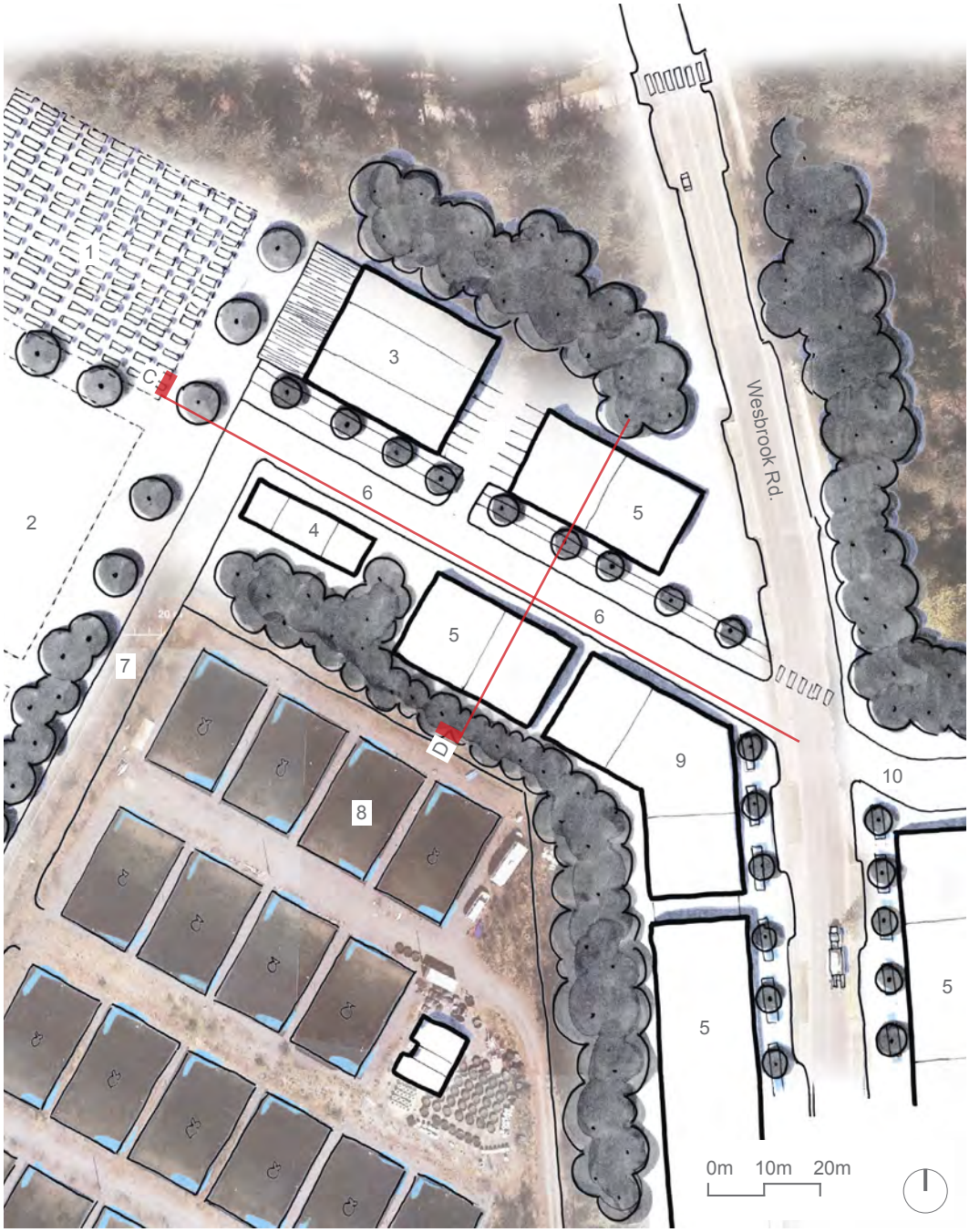


Zoom In - UBC Farm Market Plaza

As the new public face of UBC Farm, the plaza is flanked by a Farmer's Market, facilities for farm research, and other commercial spaces, including a corner cafe. The plaza creates a visual connection from Wesbrook Mall to community garden plots and UBC Farm beyond. The plaza is pedestrian friendly and not open to through-vehicle traffic.

Number Key

1. Community garden plots
2. Special events field
3. UBC Farm Market
4. UBC Farm research building
5. Rentable research/office building
6. Public farm market plaza and view corridor to UBC Farm (car-free, pedestrian and special event zone)
7. Footpath and service lane
8. Existing research ponds
9. Cafe at grade with research above
10. Ramp down to new parkade



Zoom In - UBC Farm Market Plaza - Eye Level View

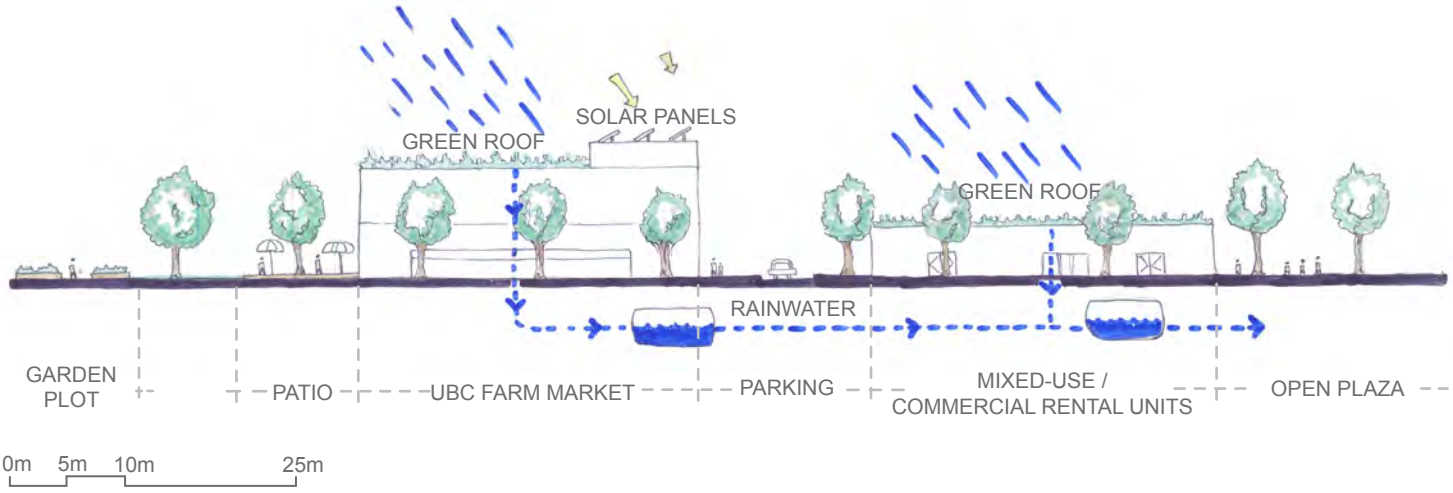
The Community Plaza serves as a view corridor linking Wesbrook Mall and the proposed community garden plots visually. While the Community Plaza is framed by the new UBC Farm Research Building and UBC Farm Market, it allows leaves spaces for pop-up stores or festivals to take place in the Plaza, further activating the plaza.

Number Key

1. UBC Farm Research Building
2. Pop-up Stores in Flexible Market Space
3. Community garden plots
4. Community Plaza view and circulation corridor
5. Pop-up Stores in Flexible Market Space
6. UBC Farm Market

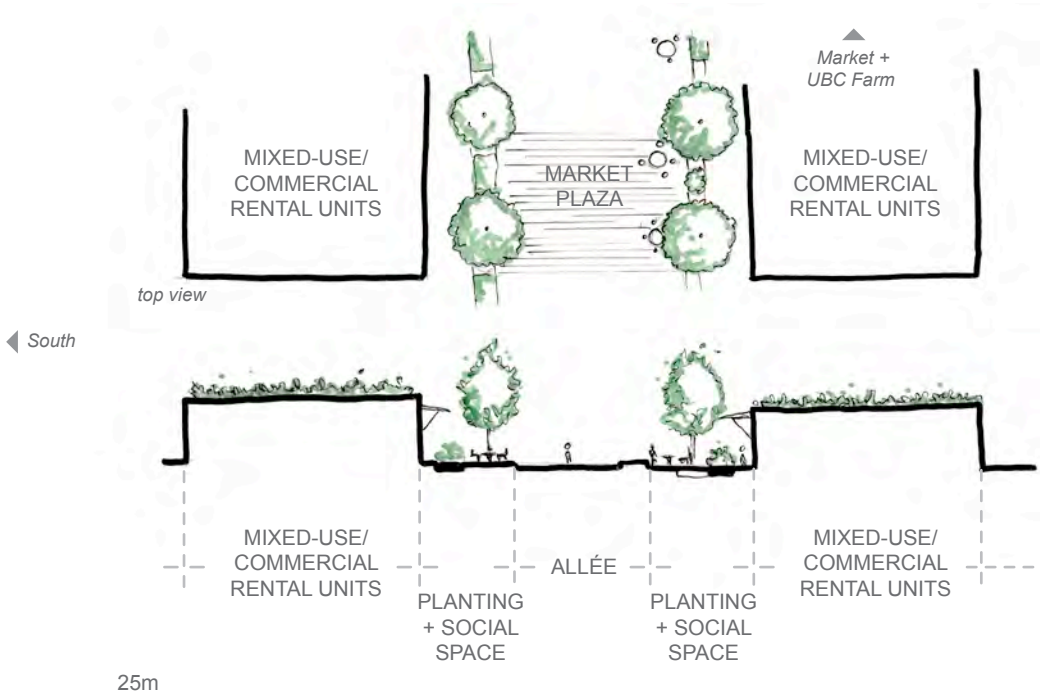
Zoom In - UBC Farm Market Plaza - Section C

UBC Farm Market Plaza is visioned to be flanked by a line of trees in addition to the new UBC Farm Buildings in order to create a sense a direction through the view corridor. Rainwater harvesting system is also visioned along the Market Plaza.



Zoom In - UBC Farm Market Plaza - Section D/Plan

When no festival or pop-up stores are happening in the Market Plaza, the two sides of the Market Plaza could serve as informal social space for the community or research staffs. Trees and planting beds are also visioned in the Market Plaza to provide comfortable micro climate for its users.



Near Term Action Items

There is no single formula for a successful community, but Living Links' exploration of a potential Eco-District on South Campus brings to life a multitude of sustainability and place-making opportunities. Our design proposes significant changes to South Campus and provides opportunities to better conserve water, soil and energy, and transform an extant part of the campus into a complete community. The Living Links design serves only as a grand hypothesis, and as such, many additional investigations must be carried out to turn vision into reality. We propose the following action items to explore Living Links' potential as an Eco-District for South Campus

Building:
To establish a Program for South Campus development, UBC must:

- Determine the market demand for rentable research and office space
- Understand the future expansion needs of existing research facilities
- Assess the long term viability of existing research facilities and
- Determine the viability of repurposing existing buildings

Biodiversity:
To establish a Biodiversity Plan for South Campus Development, UBC must:

- Develop a comprehensive database of all relevant existing South Campus-specific biodiversity research across different faculties and disciplines, highlighting identified action items and stakeholders.
    - Who: SEEDS project - to support the new Biodiversity Portal managed by the SEEDS Program
- Undertake a full audit of South Campus to record current ecological features and wildlife and to identify measures required to support the protection of ecological features.
    - Who: An umbrella of Graduate Research Projects/Theses

Transportation:
To achieve the goals and targets outlined by UBC Transportation Plan, UBC should:

- Undertake a traffic study that considers increasing modal splits (percentage of auto traffic versus pedestrian, cycling and transit usage) over time to determine required road and intersection designs.
- Explore the potential of a bike-sharing system on campus, especially along the development of greenways.
- Assess the demand for electric vehicle (EV) charging stations on South Campus.

Water:
To establish a Water Management Strategy for South Campus development, that aligns with UBC Targets and Goals, UBC must:

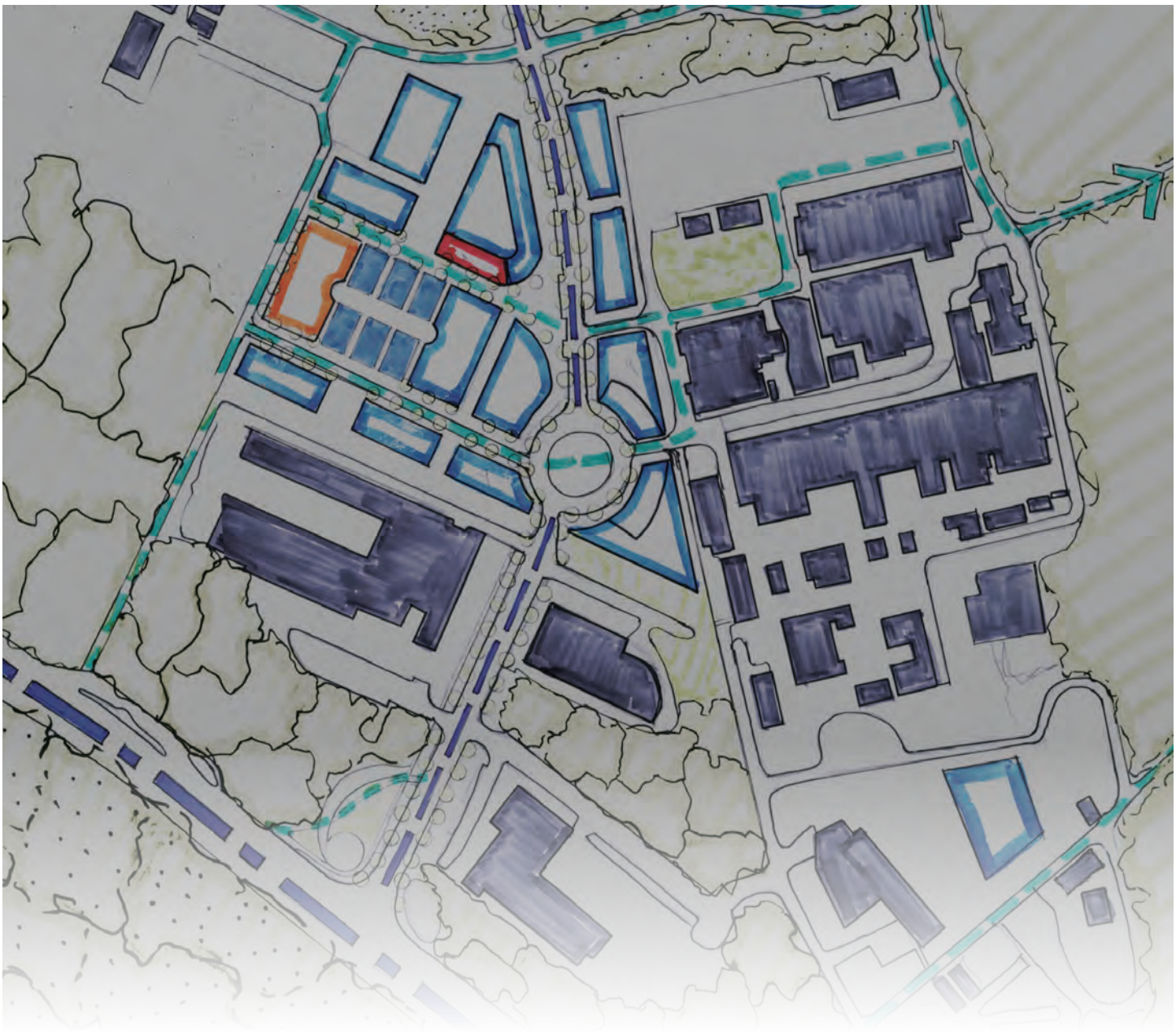
- Determine the viability of new infrastructure and systems for the treatment and collection of rainwater
- Develop systems and policies that will increase stormwater detention and reduce the velocity of stormwater runoff
- UBC and GVRD will need to jointly address slope stability and erosion issues on the south coastal edge

Waste:
To achieve the UBC Zero Waste Target, the following actions and research directions are highly recommended during the planning of UBC South Campus:

- Assess the logistical and financial viability of establishing a new Waste Facility (management and education) at South Campus
- Plan for the use of reclaimed building materials during pre-design phrase
- Assess the possibility of establishing a district wide underground waste transporting and collecting system at South Campus as a pilot project

GROUP 3: PACIFIC RESEARCH DISTRICT

Abdulrahman Refaei, Erin Boa-Brown, Jim Dema-ala, Julia Lorimer, Qin Yin, Samaneh Gharehdaghi



SCHOOL OF
ARCHITECTURE +
LANDSCAPE
ARCHITECTURE

UBC

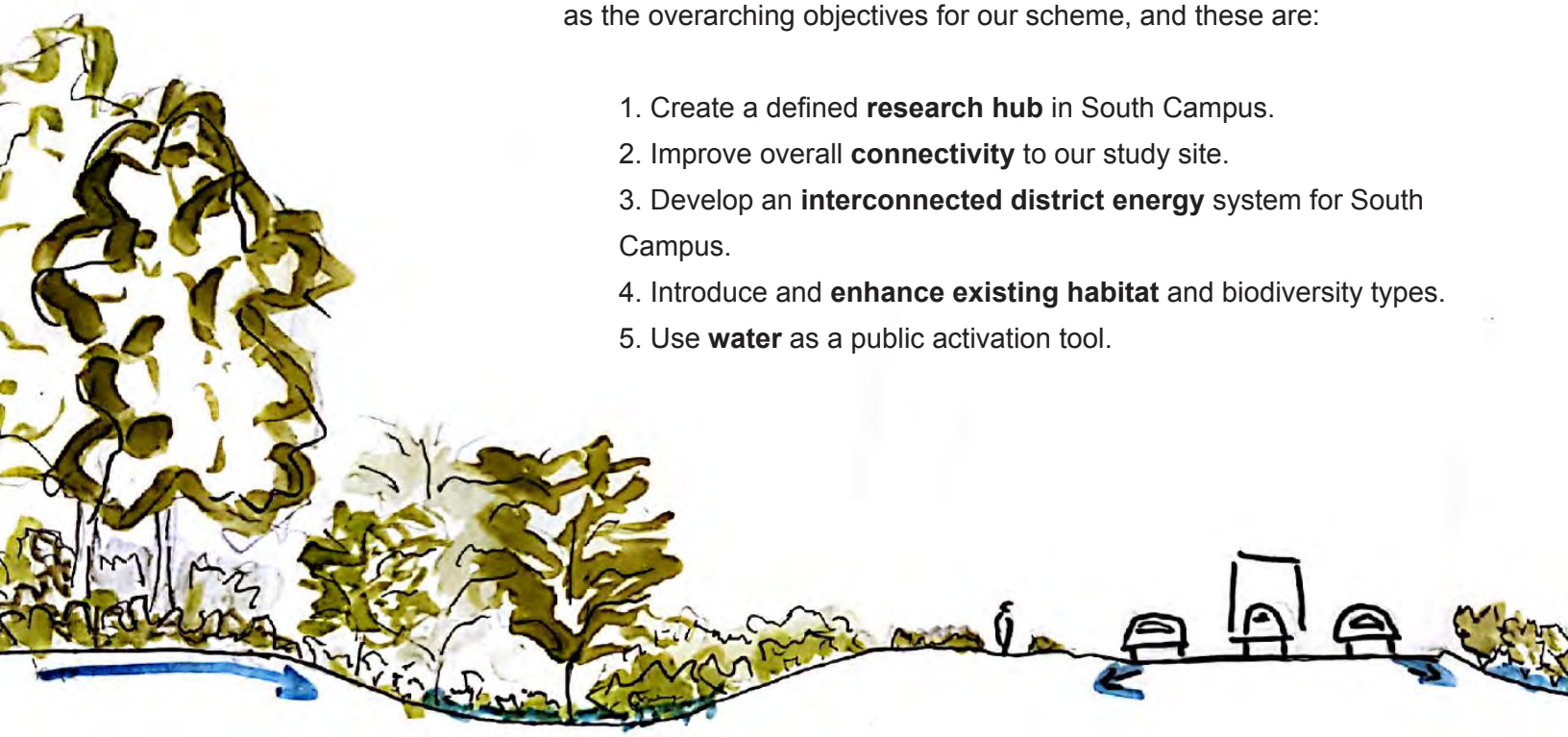
OVERVIEW

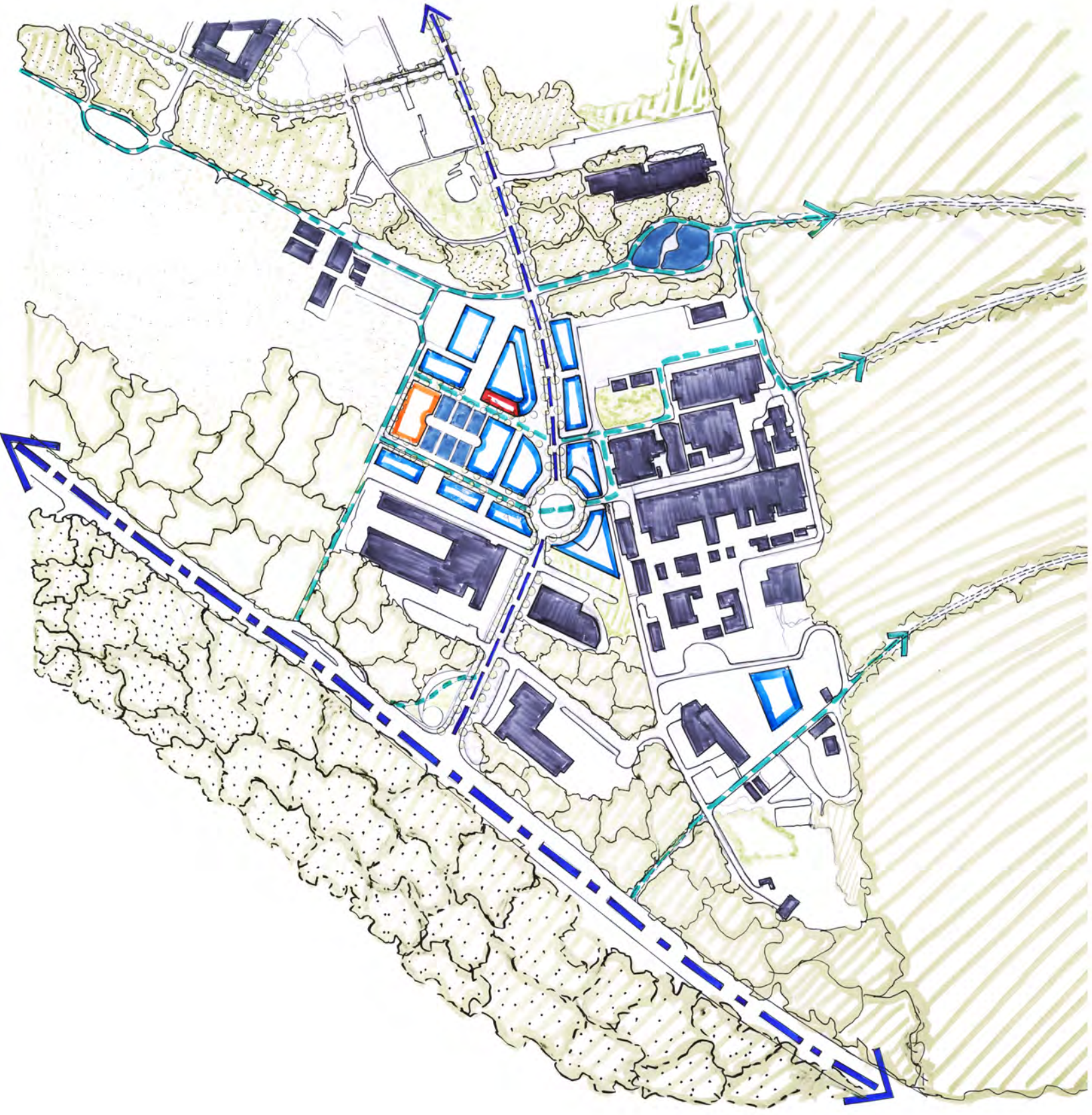
Executive Summary

The **Pacific Research District** scheme aims to accommodate UBC's vision to bring a **world class academic hub** to south campus while providing amenity rich spaces that serve proposed and existing infrastructure. The scheme illustrates strategies of bringing new infrastructure dedicated to academic use, expanding the TRIUMF office spaces, and introducing a synergized district energy system.

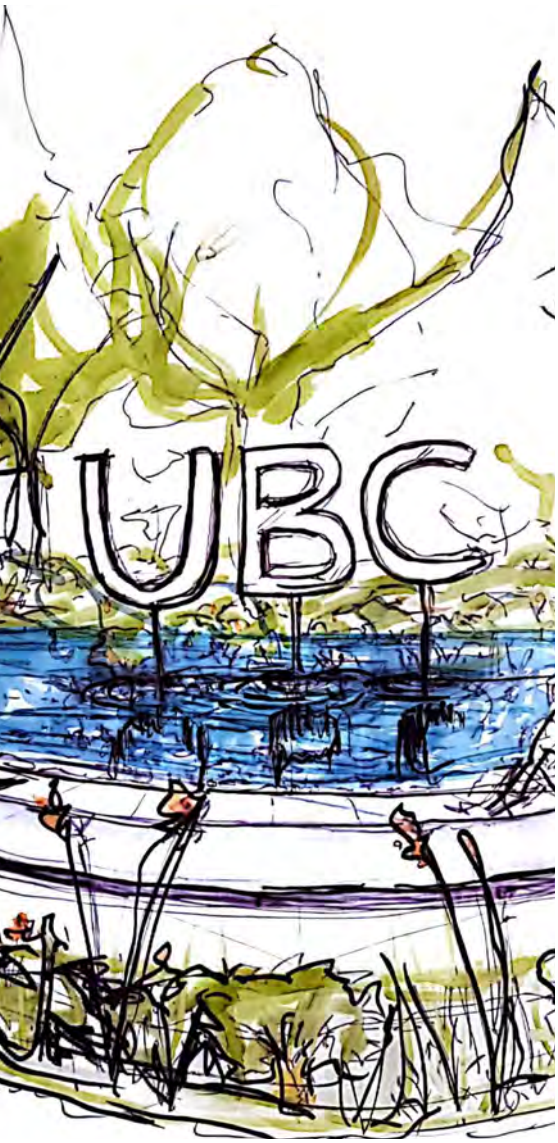
Our team has developed a list of design and guiding principles that act as the overarching objectives for our scheme, and these are:

1. Create a defined **research hub** in South Campus.
2. Improve overall **connectivity** to our study site.
3. Develop an **interconnected district energy** system for South Campus.
4. Introduce and **enhance existing habitat** and biodiversity types.
5. Use **water** as a public activation tool.





UBC Pacific Research District Plan



Near Term Action Items

Blue + Solar Roof Pilot Project

Precedenting Ayo Smart Home Project

UBC South Gateway

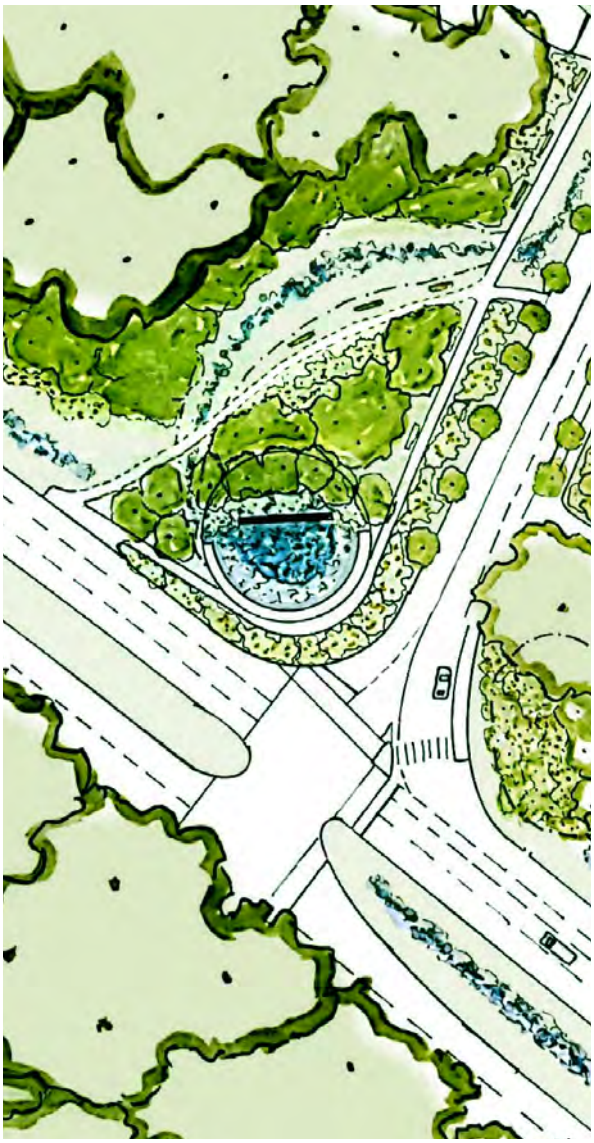
Construction of gateway design featuring stormwater detention

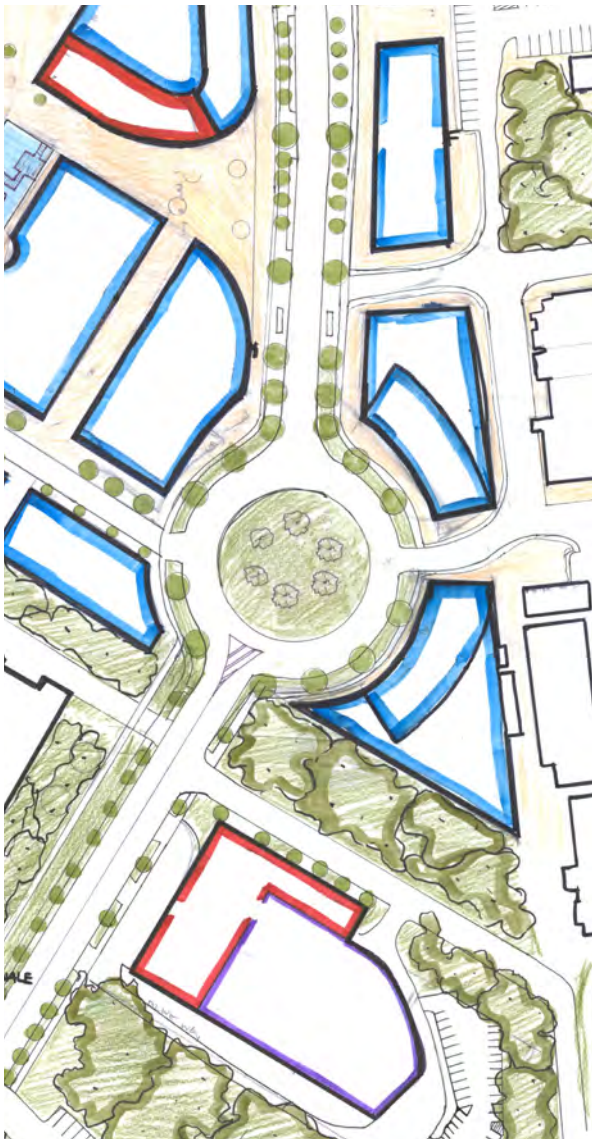
SERF+ Pilot Project

Temporary location near South Campus Warehouse. It may be in a shipping container or in the existing building.

C18/C20 Route Extension

Community Shuttles extending services south of Wesbrook Mall upto the roundabout near TRIUMF Centre stop.





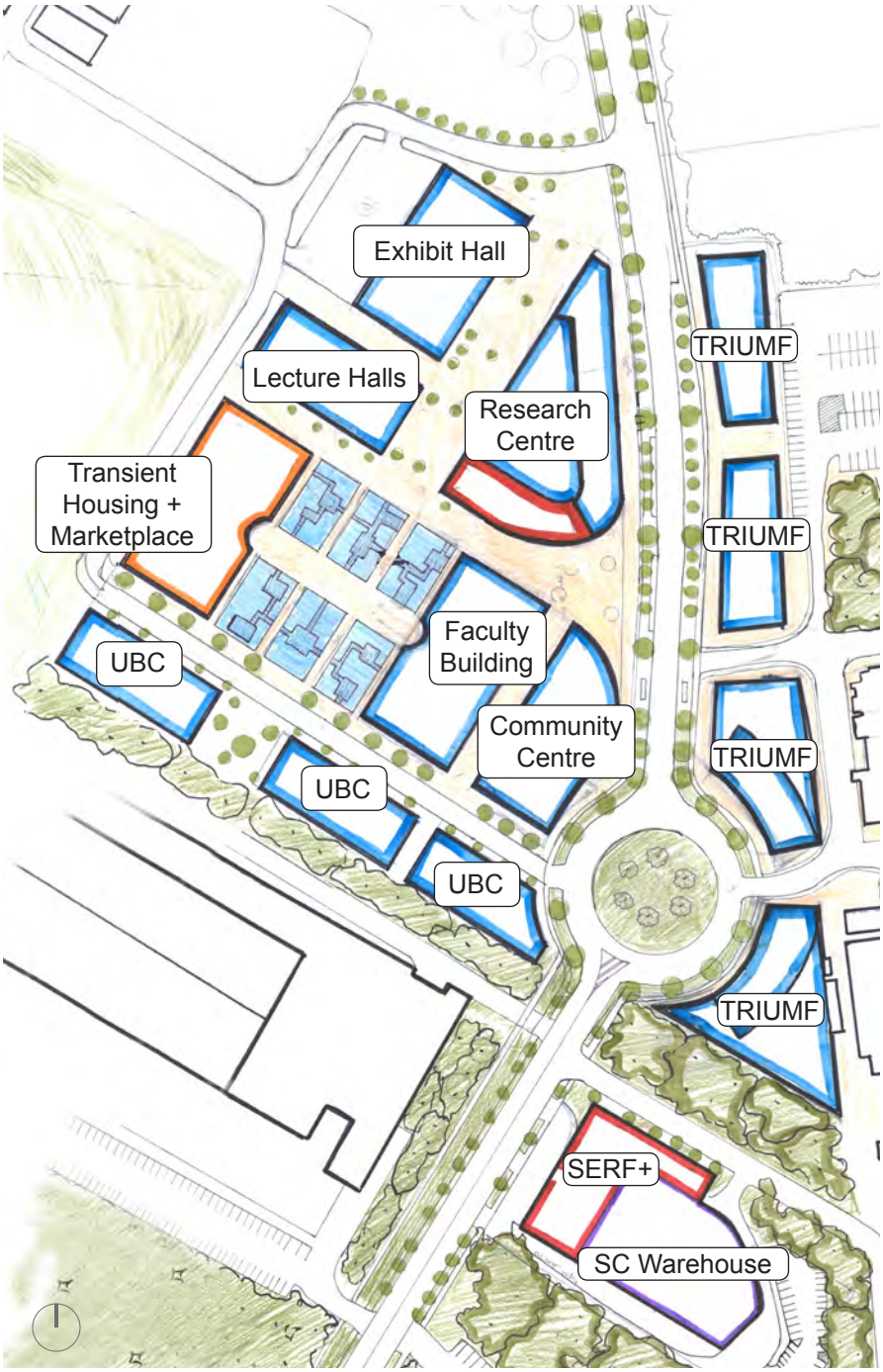
RESEARCH

Research Hub

The research hub brings together higher density academic building dedicated to accommodate UBC's administration services and diverse faculties. These faculties would utilize the farm land for research and attract a population of researchers and atudent in South campus. The research hub also includes transient housing to host PhD students and researchers within the district. A proposed community centre offers recreation rooms and a gym for surrounding employees of the district and TRIUMF, along with a cafe in close proximity to the bus stops. Overall this research district furthers UBCs commitment to bringing world standard academic buildings to the campus and the learning experience while providing a variety of public amenities to the surrounding employees.

Legend

- Existing Buildings
- Academic Buildings
- Residential Buildings
- Commercial
- Industrial



Zoom Study - Research Hub
Not to Scale

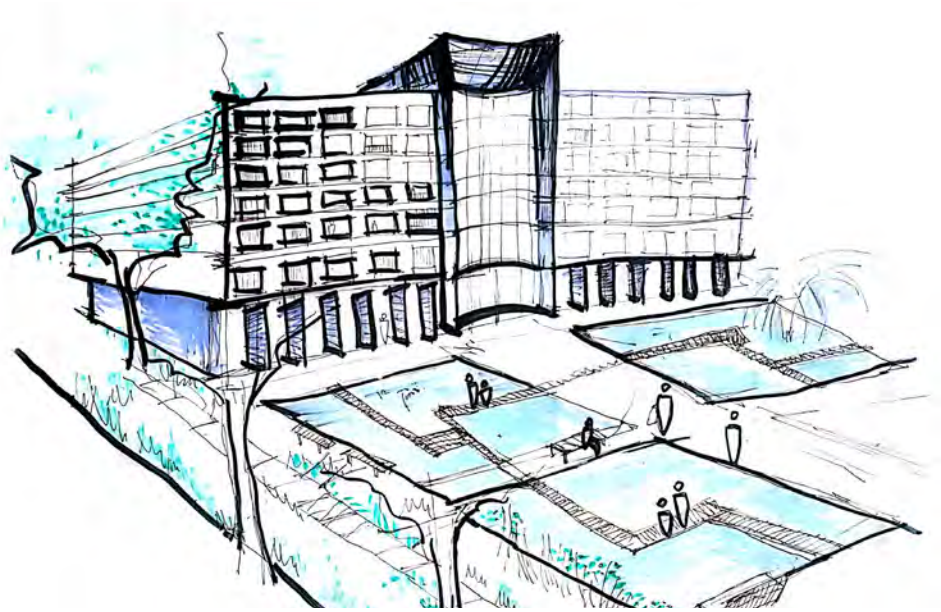
HUB

Total People	**2,449**
UBC Offices + Faculty	**35,450m²**
TRIUMF Offices	**10,200m²**
Transient Housing	**4,950m²**
Convention Space	**3,000m²**
Community Centre	**2,240m²**
Retail	**450m²**

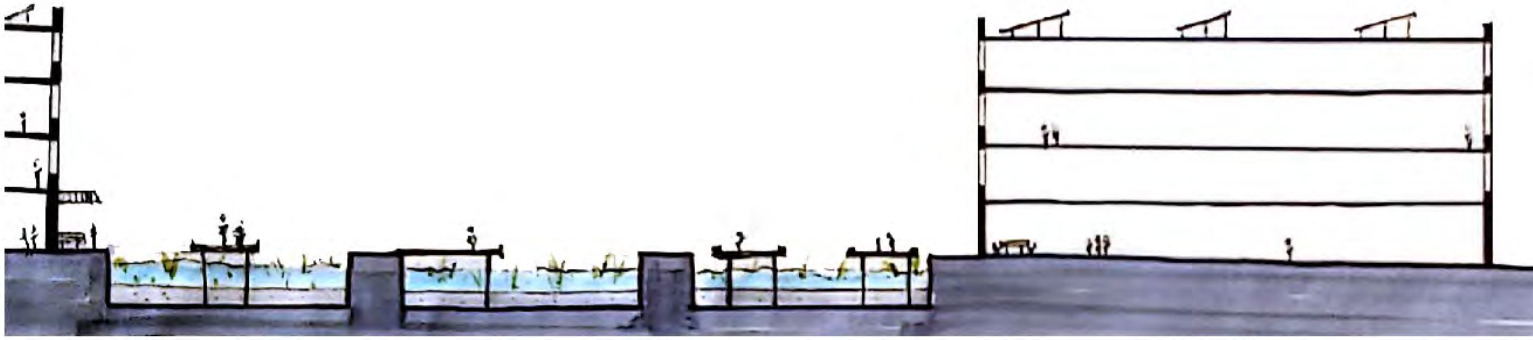
Preserved some of the research ponds for recreational use within an open plaza.

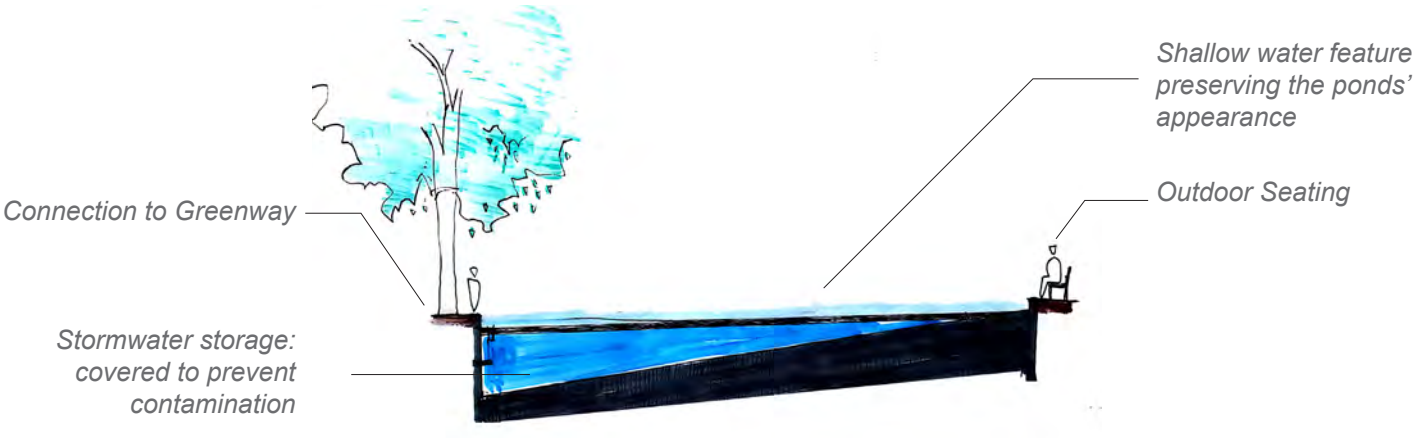
Introduced a variety of buildings types for research use by UBC

Proposed a community centre surrounded with small retail/food stores to provide amenities for employees

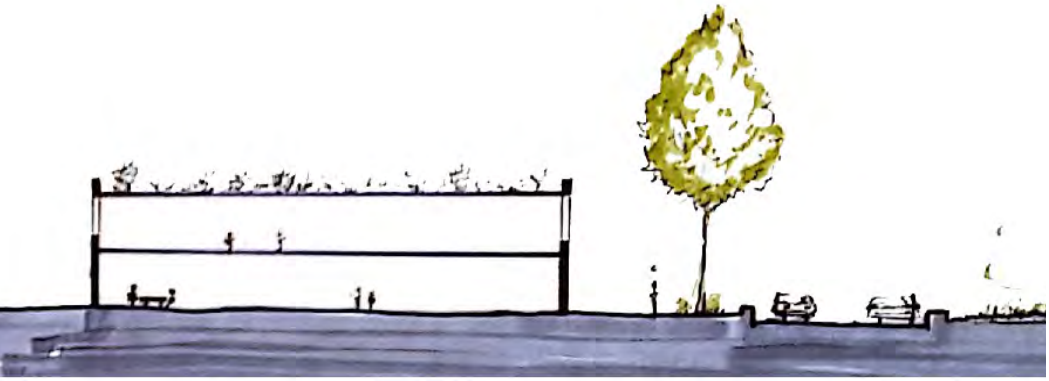


Short Term Residence Building, Weekend Farm Market and Research Ponds

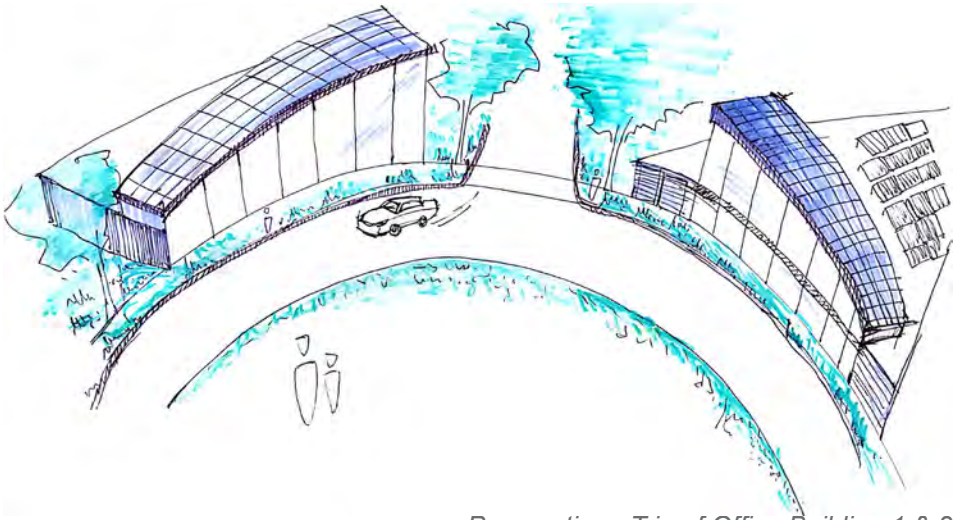




Section Diagram: Modified Research Ponds



Longitudinal Section - Research Hub / Wesbrook Mall



Perspective - Triumf Office Building 1 & 2

Proposed 4 new office buildings as part of the extension adjacent to the road

SOUTH GA

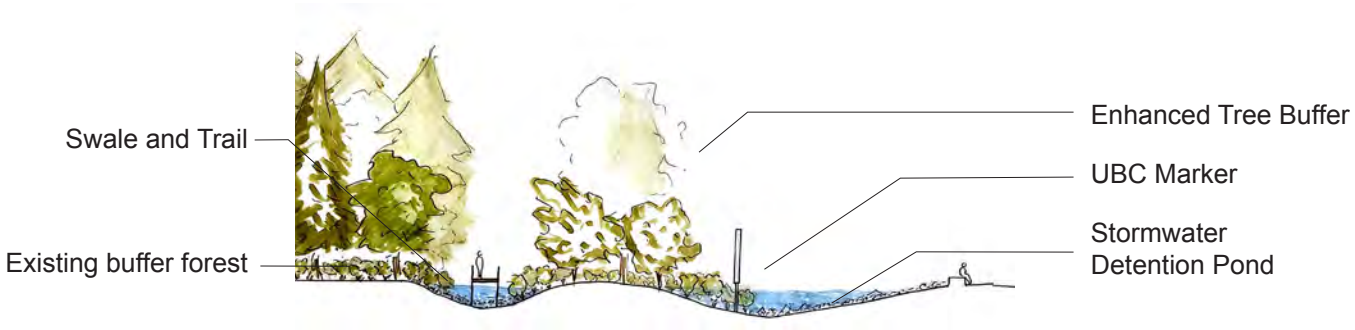
South Gateway

The focus for the new Southern Gateway was to define a new entrance to South Campus but also to detain 2500m³ of stormwater in the event of a 1:100 year flood. As depicted in the diagram, four areas of detention accommodate this volume of stormwater but are primarily dry ponds or sunken vegetated areas. To aid with the conveyance of water from the north, a swale runs along the road creating a more pleasant experience for pedestrians. Behind the entrance sign, a pathway allows for direct access to the bus stop as well as to give nearby workers a place to go sit and rest in the forest.

Legend

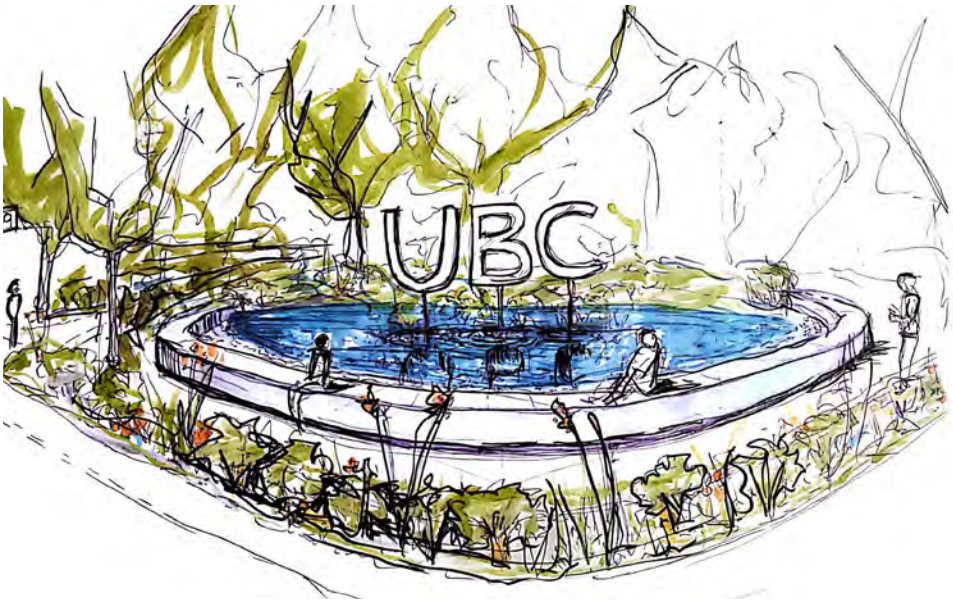
- Existing Buildings
- Stormwater
- Trees
- Forest

Zoom Study - South Gateway
Not to Scale

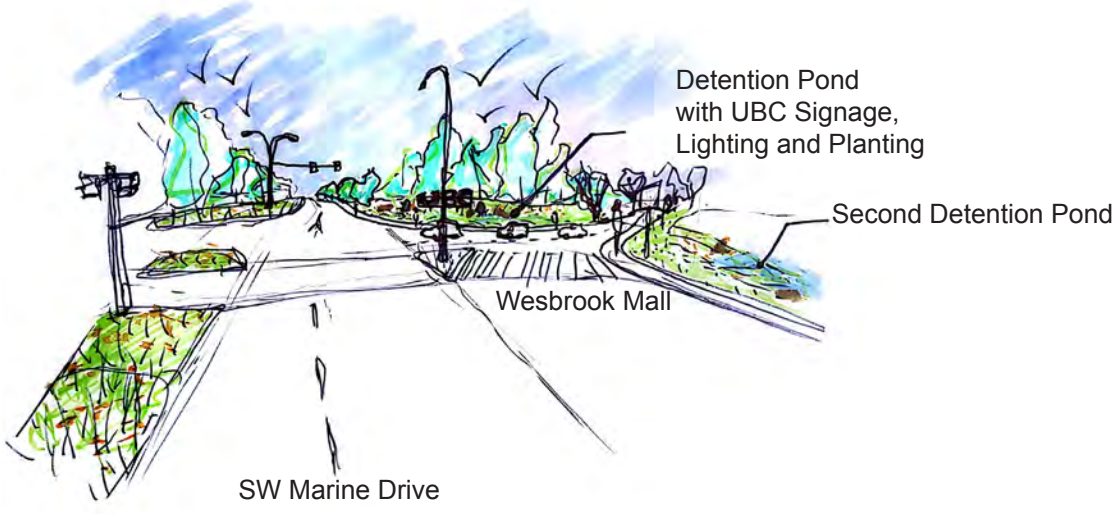


Section Diagram - UBC Marker and Detention Pond

Section - Wesbrook Mall and Swales facing south

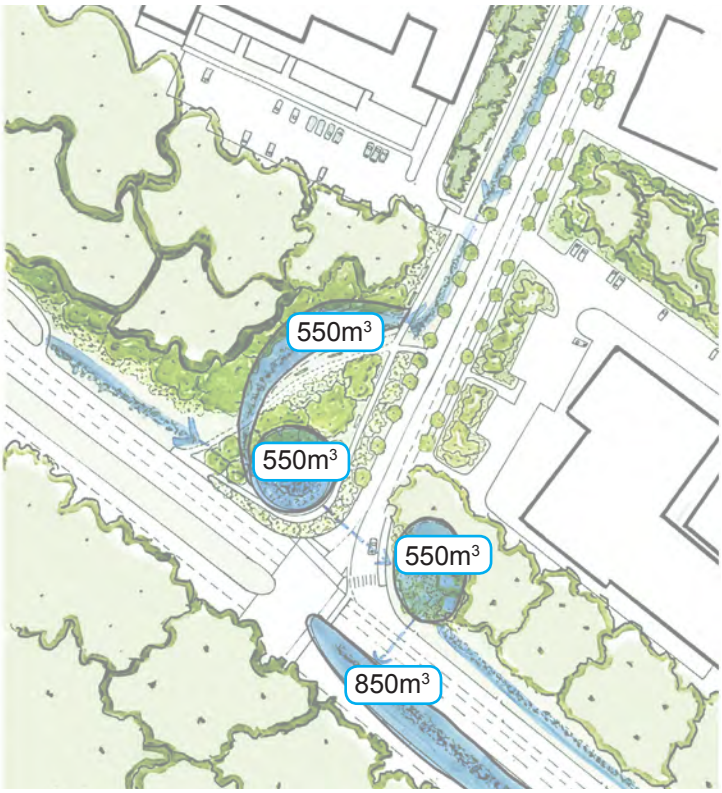


New UBC name marker propped on top of the water detention pond



Perspective - Marine Drive corner Wesbrook Mall

Section - SW Marine Drive facing southeast



Biodiversity

As shown two parallel streams have been defined to achieve the biodiversity enhancement:

The first is for introducing new habitat types including old field for green roofs,

The second is focused on enhancing the amount of existing habitat types like mixed forest and deciduous forest for swales and green corridors.

Legend

- *Green Corridor*
- *Green Roof*
- *Swales*
- *Trees*

ITY

Green Roof

Greenway

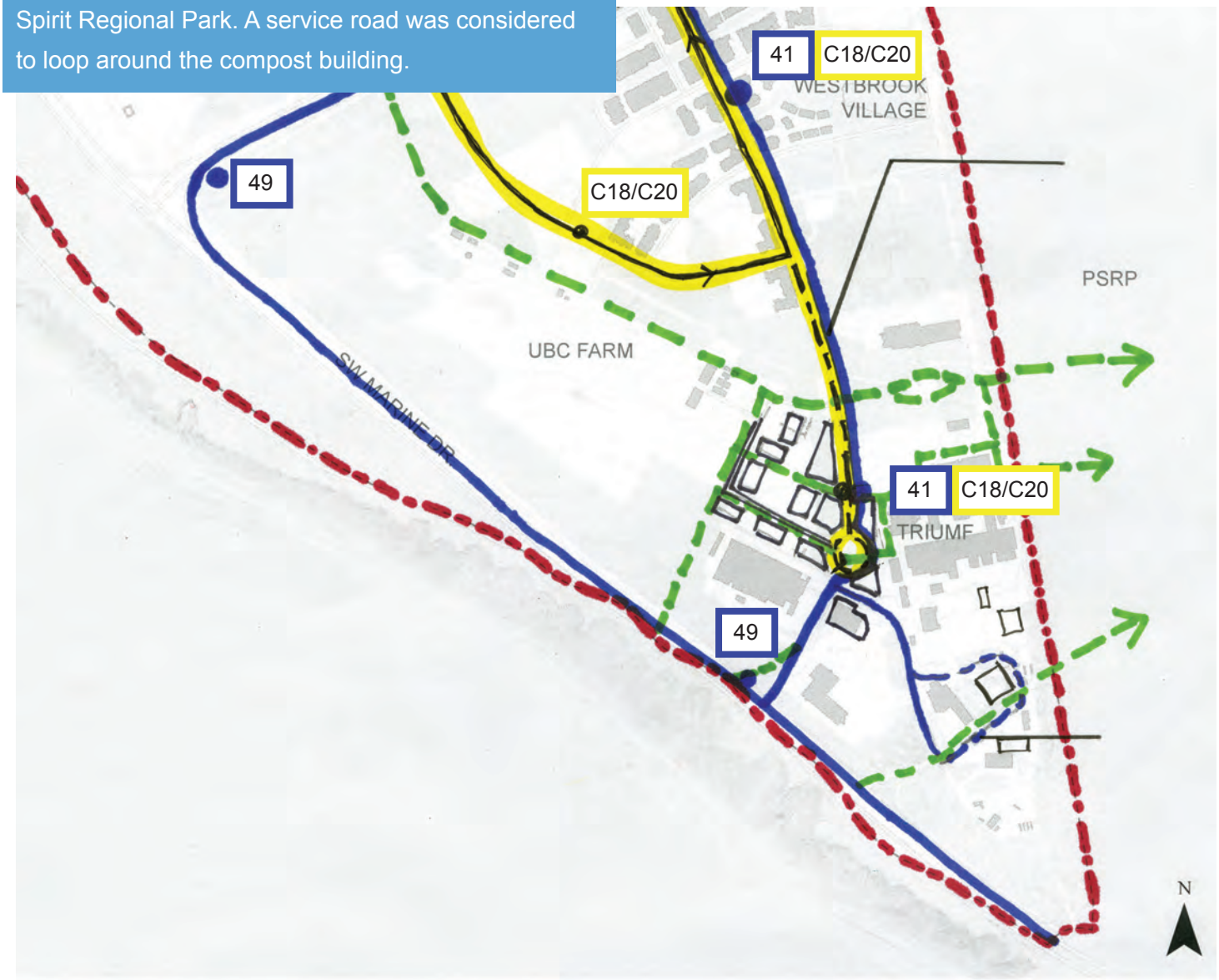
Swales

Transportation

To improve connectivity, the community shuttle bus route was proposed to extend to the TRIUMF area, providing better access to the north campus for people in south area. Also, the greenway system was suggested to continue in south campus. One was designed to go along the boundary between UBC farm and the new proposed hub area, promoting a connection to South Marine Drive area which is close to the seaside. Other greenways were designed to go across the TRIUMF center and connect the Pacific Spirit Regional Park. A service road was considered to loop around the compost building.

Legend

- *Community Shuttle (existing)*
- *Community Shuttle Extension*
- *Bus Line*
- *Greenway*
- *Secondary Road*
- *Proposed Roadway Loop*

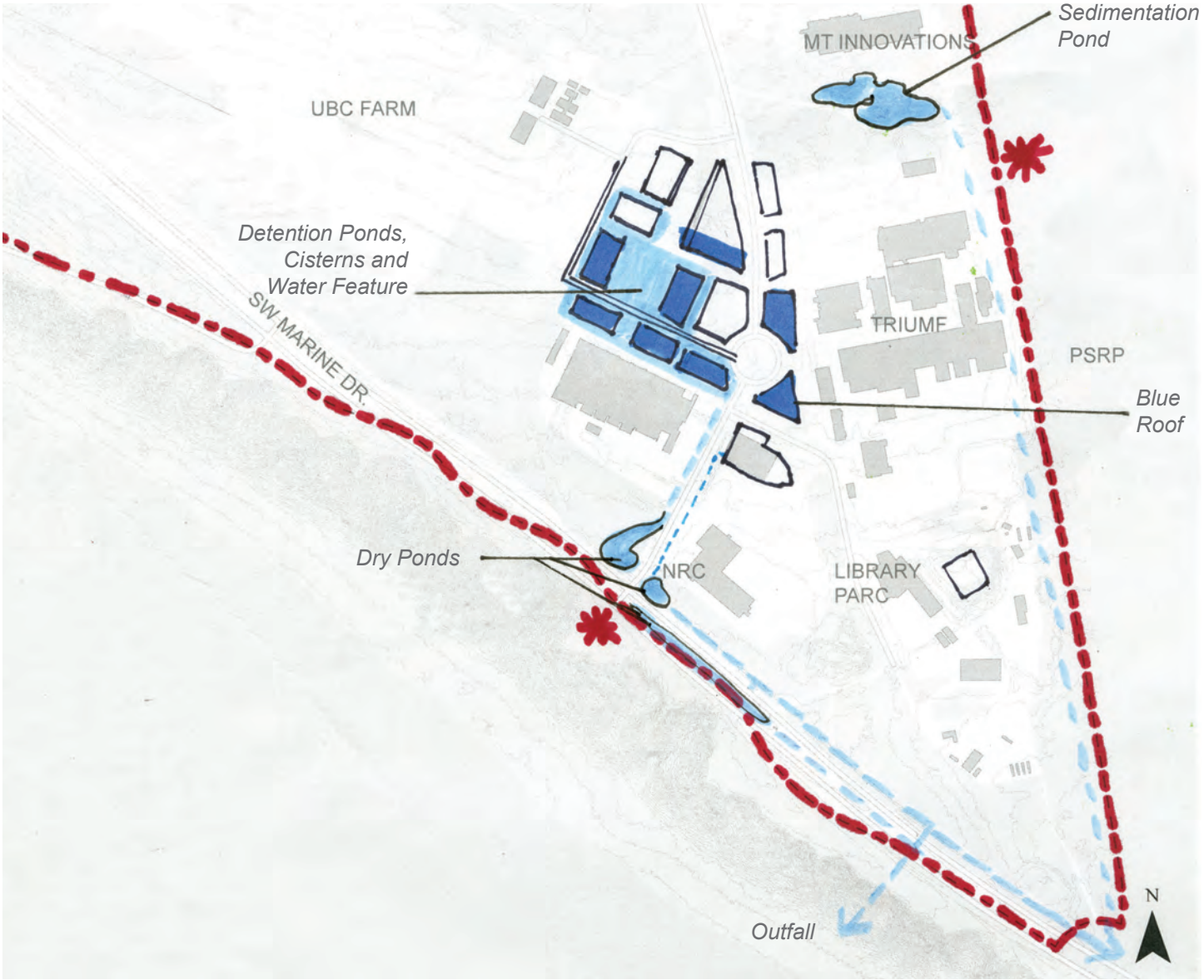


Water

With the capacity of the research ponds, our design allows for the storage of rainwater collected from the roofs of our proposed buildings which could be reused by washroom facilities, drip irrigation systems, process cooling in labs and showers if the water is cleaned through uv filters. By replacing these potable water uses with rainwater, we would reduce potable water consumption by about 69%. Based on estimates from the water team's research, we estimate that we meet the 80% utilization ratio for rainwater or stormwater as our blue infrastructure covers over 5% of our newly developed site.

Legend

- *Flood Zones*
- *Swales*
- *Water Detention Areas*
- *Subsurface Pipes*
- *Blue Roof*



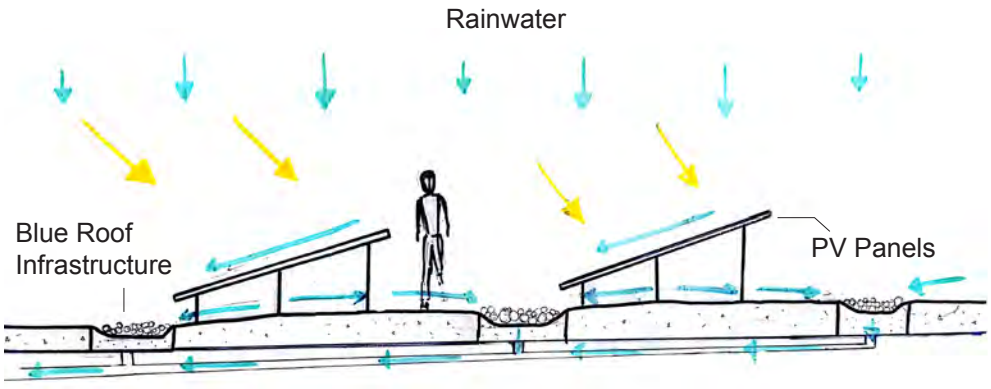
Energy and Waste

The research hub will be a part of the Neighbourhood District Energy System. These buildings will benefit from the heat energy provided by the TRIUMF cooling towers and waste infrastructures, as well as return the waste heat to the district energy centre to be re-utilized.

In response to UBC's 'Zero Waste Action Plan' this proposal integrates two main strategies:

1. Renovate the South Campus Warehouse to provide a public surplus store.
2. Install a small-scale anaerobic biodigester (adjacent to the existing composting system) to facilitate new research opportunities

Perspective - District Energy Centre



Section Diagram - Solar + Blue Roof

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Collaborative Design of an Eco-District on South Campus, UBC

Group 4 RECONNECTED

Alexandra Scott, Ee Jay Loo, Glen Chua, Jaclyn Simon, Jiaxi Xie

Charrette Conducted July 12-13 & 19-20, 2017
ENDS 482T/LARC 582T Design Charrette

SCHOOL OF ARCHITECTURE + LANDSCAPE ARCHITECTURE

UBC

Reconnected Concept Summary

Reconnected is a design proposal that envisions a vibrant, green South Campus. The “R” in its name represents the design’s emphasis on (i) research facilities, (ii) recycling and (iii) rainwater reuse, while the “eco” reflects the creation of an eco-district. In addition, the design emphasizes connectivity for sustainable transportation modes within UBC South Campus.The design principles for this proposal are as follows:

- Encourage walking and cycling through greater greenway and street network permeability
- Increase biodiversity
- Create a vibrant public realm
- Celebrate and make visible recycling processes
- Increase activity and awareness of UBC Farm and TRIUMF

The key design interventions of the proposal are summarized below:

- Development of a comprehensive greenway network to enhance connectivity to UBC Main Campus and Pacific Spirit Regional Park trails
- The creation of quality habitat through devoting area to natural spaces.In addition to maintaining most of the coniferous forest on site, the design proposes creating mixedwood forest, meadow, and old field habitat to enhance biodiversity.
- An expansion of TRIUMF that includes relocating the administrative facilities, adding a new physics building, and building a district energy plant. The new administrative building would be integrated with new amenities, a bike sharing station, and a public plaza. Built in place of the relocated TRIUMF administrative building, the district energy plant will recover waste heat energy from the TRIUMF Particle and Nuclear Physics Laboratory facility in South Campus to provide thermal energy for surrounding buildings.
- Development of the Commons to provide a mix of temporary accommodation for visiting researchers, student accommodation and street-oriented retail. Rainwater is captured from the roof and would flow down the columns. Captured rainwater from TRIUMF commons is transported for treatment and then stored in the existing research ponds to be adapted for this purpose. The stored water is recirculated back to the commons for usage, while excess water is transported to the detention pond at the South Campus entrance gateway through a network of bioswales.
- A new facility with shared research spaces located opposite Nobel Park hat will accommodate future demand for research space on campus, as well as expand South Campus’s identity as a research hub at UBC.
- Expansion and landscaping of the existing sedimentation pond near the Powerline Trail head that will function as a detention pond within the new stormwater management network, a habitat area, and an attractive landscape feature. The pond would provide wetland habitat for native species.
- The relocation of the warehouse to the south-east portion of South Campus. Natural area will be restored in its place that will also provide space for forestry research purposes.
- A Recycling facility and Scuplture Garden to celebrate recycling and facilitate the reuse of waste materials from campus. The building would include a store where used items from campus could be sold instead of ending up in a landfill. The park will merge green space with art and celebrate the acts of reuse and recycling, thereby inspiring users about the possibilities of waste.

- A Sculpture trail leading from Wesbrook Mall to sculpture garden to draw people to the sculpture garden
- A new entrance gateway at SW Marine Drive too enliven the entrance to South Campus
- The relocation of UBC Farm's Farmers Market next to Nobel Parkto facilitate a stronger connection with the community. The space would include hardscape and softscape elements, and permanent stall structures.

In terms of vehicular parking, the area of South Campus south of Westbrook Place will be primarily served by a new public parkade co-located with the new shared research facility. This parkade will also have secure bike parking that is conveniently accessible from the greenway. Some vehicular parking will also be provided at the district energy system building for TRIUMF staff. In addition, Wesbrook Mall will continue to have some on-street parking.

A new local street will connect to Wesbrook Mall between the National Research Council building and the forestry research space. This would allow maintenance operation vehicles and waste collection trucks to bypass the more active spaces nearer the roundabout. In addition, lane access is provided from the roundabout to address loading and servicing needs for the TRIUMF commons, water treatment plant, rhododendron nursery and potentially UBC Farm.

Near Term Action Items

Within the next 5 years, UBC could implement a few design elements, as well as conduct research on the feasibility of the larger projects that have been proposed. The design elements that could begin construction in the shorter term are:

- South Campus entrance gateway at SW Marine Drive
- Relocation of UBC Farm's Farmers Market
- Sculpture Garden near the PARC Library - parts of the Sculpture Garden could be construction. The full completion will only be completed when the Plant Operations Nursery moves out of its current site.
- Parts of the greenway network, such as the sections near the UBC Farm and the Sculpture Garden.

Future potential SEEDS research projects include:

- Reuse of waste materials to create sculptures
- Feasibility study on the rainwater harvesting system proposed for the TRIUMF Commons; and
- Feasibility study of a potential recycle centre and store on campus.

Concept Plan

Focussing on south-South Campus, the Reconnected plan shows the overall vision for the new Eco-District, including greenways, new buildings, public space, and natural areas.
Cuts for the section drawings on the last pages are shown here.

Legend


UBC Farm
Farmers Market
Nobel Park
Research Facility
Parkade
Nursery / Future Green Space
Tree Commons
Amenities
TRIUMF Admin
Physics
TRIUMF
Treatment Facility
District Energy Plant
Rhododendron Wood
Centre for Comparative Medicine
Restoration Forestry Research
NRC
Library PARC
SC Warehouse
Research Centre
Compost
ESP
PSPR

PLAN 1:1500

Habitat Hub

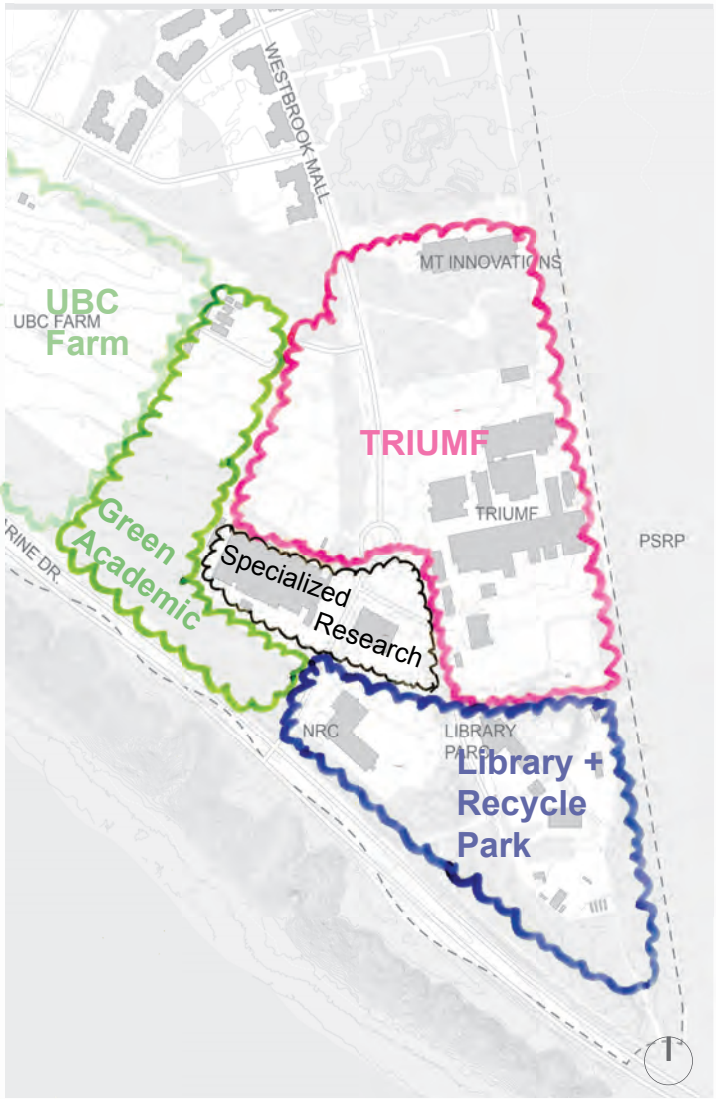
The Habitat Hub is the interface between Pacific Spirit Park, TRIUMF, Wesbrook Mall, and proposed greenways. It proposes a public plaza, habitat spaces, and a detention pond to increase biodiversity and help create a vibrant public realm.

SW Marine Entrance

To enliven the entrance to South Campus, a gateway comprising a detention pond, an entrance sign, and a pollinator garden is envisioned.

Districts

Spatial programming would be clustered into 5 major districts that contain buildings and public spaces of similar uses.



Buildings

This diagram shows the proposed changes made to buildings on south-South Campus.

Legend

- Existing Building
- New Building
- Demolished Building
- Roads

Transportation

This diagram shows the proposed and existing transportation network on South Campus, and how the collector roads and greenways connect across 16th Ave. to North Campus. The variety of routes creates a fine-grained, walkable area.

Legend

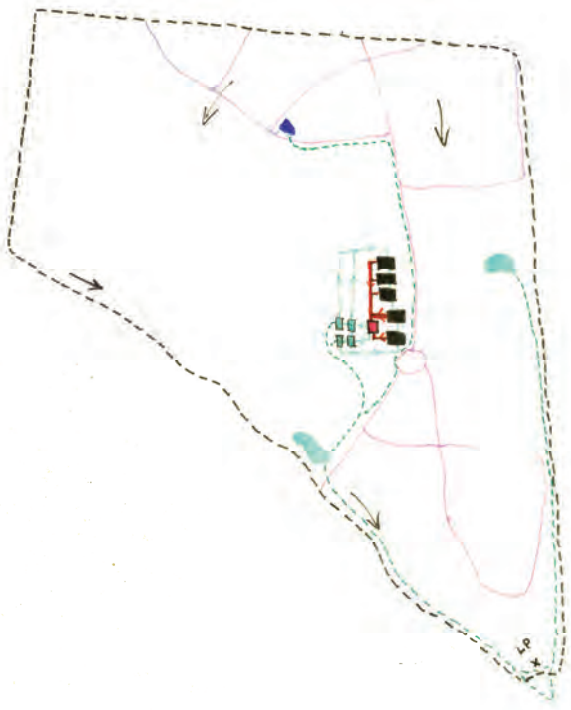
- Greenway
- Arterial Road
- Collector Road
- Local Road
- Trail Connections to PSRP

Stormwater

This diagram illustrates the proposed stormwater management network on south-South campus, and how the Commons connects to the water treatment facilities located in the old research ponds.

Legend

- Commons Building
- Storage
- Water Treatment
- Grey water
- Reclaimed water
- Detention Pond
- Excess water in bioswale
- Water Feature
- Road
- Direction of Flow

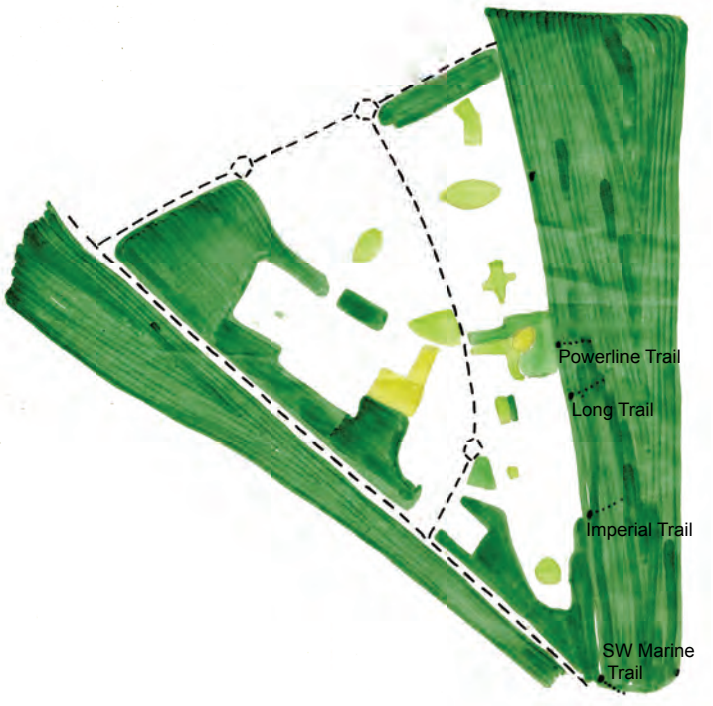


Green Space

Evaluated on the amount of natural area, the design achieves a figure of 63%, which exceeds the 55% target. This was achieved by preserving coniferous forest, clustering buildings and programs, and creating new habitat areas.

Legend

- Coniferous Forest
- Mixed Wood Forest
- Park
- Meadow/Old Field



Metric: Amount of Natural Area

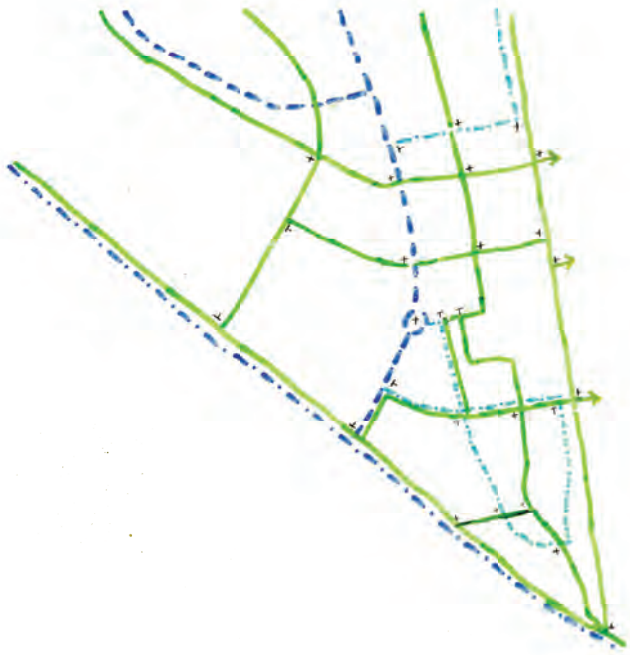
Goal: 55%
Actual: 63% of south-South Campus

Intersection Density

A higher value reflects a more walkable, fine grained street network. In the proposed design, the intersections per hectare is 0.61, exceeding the target of 0.53 intersections/ha target corresponding to the LEED for Neighbourhood Development prerequisite standard.

Legend

- Greenway
- Arterial Road
- Collector Road
- Local Road
- Trail Connections to PSRP
- Intersection



Metric: Intersection Density

Goal: 0.53 intersections/Ha
Actual: 0.61 intersections/Ha

Farmer's Market

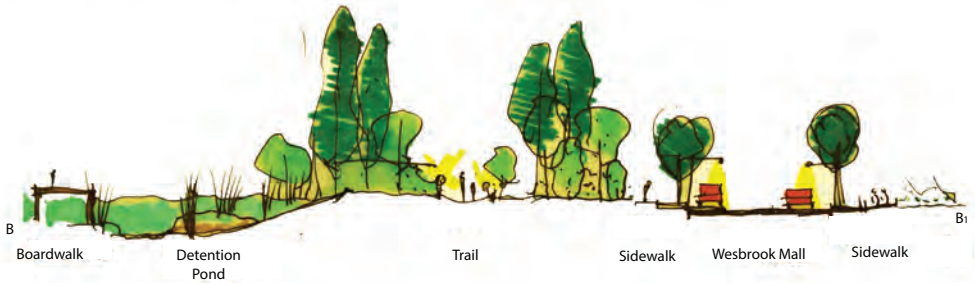
The new Farmer's Market is envisioned as having community garden plots, market stalls, shade structures, and spaces for people to sit and enjoy their food.

Sculpture Garden

The Sculpture Garden and Recycling Facility would celebrate waste on campus. Master of Fine Arts students and community members could be commissioned to build the sculptures out of waste materials.

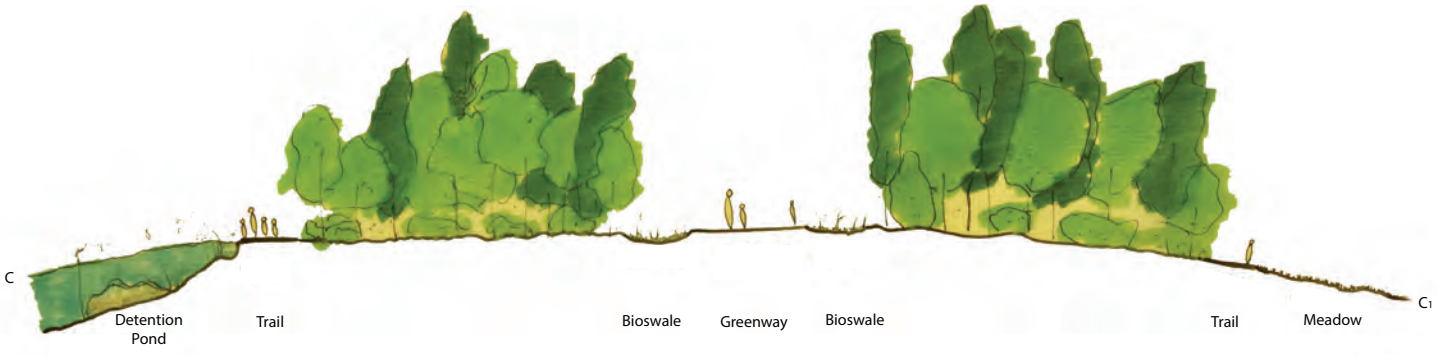
SW Marine Entrance Sections

These drawings describe the SW Marine entrance in section view.



Greenway Section

This drawing describes the Habitat Hub in section view. It also illustrates what a typical greenway in this scheme would look like.



Commons Section

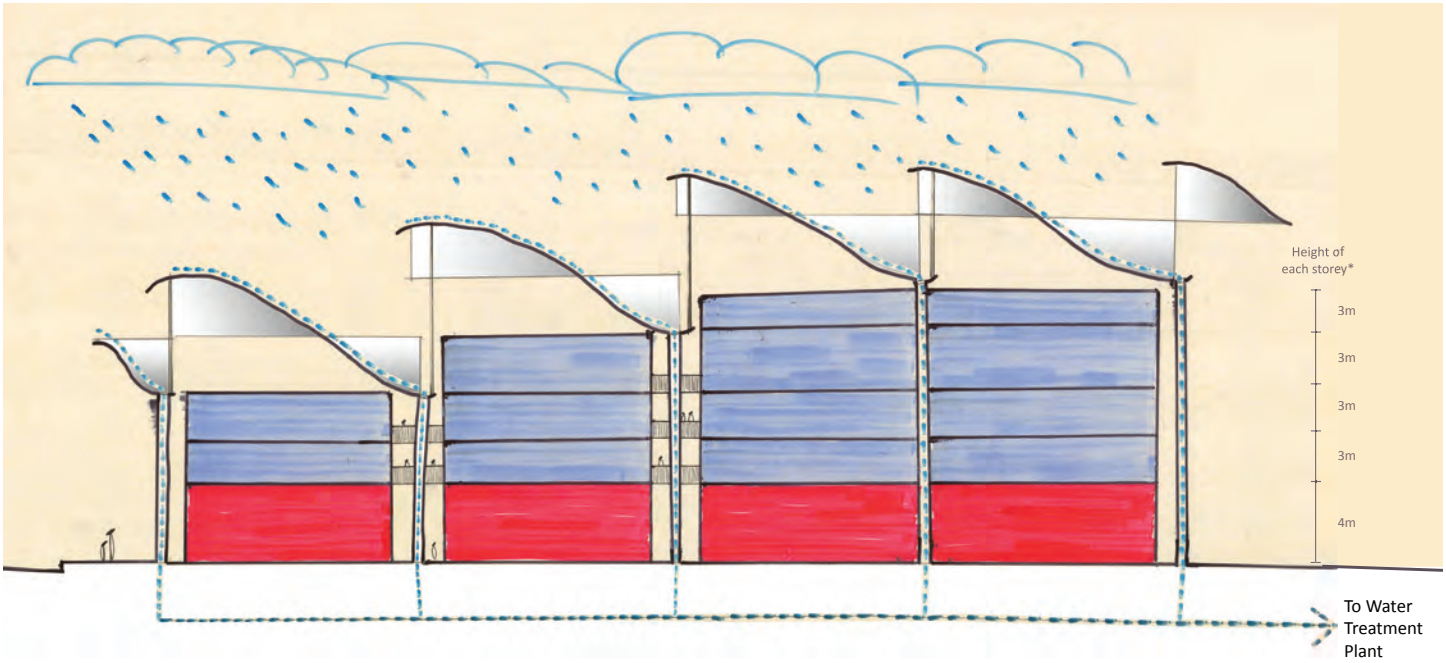
Legend

Mix-used

Residential

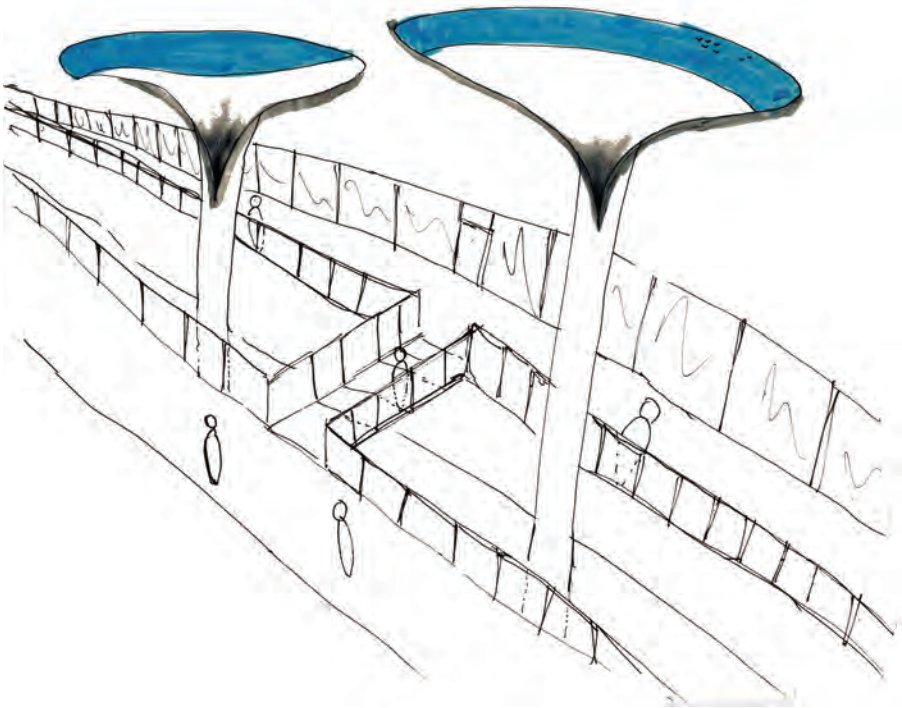
Rainwater

The building will include residential and street-oriented amenities. Using the concepts of modular curved roof and gravity, rainwater is captured and would flow down the columns.



Common Perspective

Bridges between the columns allow people to experience the sound effects of flowing water.



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Appendix 1 : Detail Schedule

Day 1 - Wednesday July 12th				
	Schedule	**Invitees**	**Facilitation**	**Deliverables**
9:00	**Overview and Objectives -** video 15 min + 6 min Q+A	Public invited		
	Presentations - 50 min total			
10:00	**Icebreaker** - Introduction to Methods. Review group handouts and posters			
11:00	**Team discussion** - objectives and title, develop a list of resources required		Meet with charrette team during coffee break	
			Brainstorm questions for C+CP people - check attendee list	
12:00	Lunch			
1:00	**Brainstorm and draw** - develop targets	C + CP and other experts invited to provide input, help strategize, and answer questions	Develop a plan and divert tasks to keep track of and assess targets	Design name, goals or principles
2:00				
3:00	**Brainstorm and draw** - think about required diagrams		Facilitator meeting with C+ CP people to discuss general feedback and next steps	
4:00	**Debrief** - groups discuss ideas with class		Lead class discussion about progress and ideas	

During day 1 students had the opportunity to meet with Campus and Community Planning and other invited experts who were able to answer questions and inform the students about considerations for the site.

Appendix 1 : Detail Schedule

Day 2 - Thursday July 13th					
	Schedule	**Invitees**	**Facilitation**	**Deliverables**	**Due on the 19th at 9:00 am:**
9:00	Display work		Meet with charrette team		
	Design - schematic designs, diagrams, and map iterations. Each team uses Touch Table to develop scenarios		Intro to Touch Table to help facilitate use in group		Summary of comments from presentatior
10:00					Evaluate design plans against targets
11:00			Ensure team assesses and modifies targets		Create a set of tasks for the morning of the 19th
12:00	Lunch				
1:00	**Design with advising**	C + CP and other experts float to different tables and work with teams	Time management for presentation	- Draft of systems diagram(s) - Draft of 2 scale plans - Refine design name, goals/ principles	
2:00					
3:00	**Condolodate work**	C + CP people meet with charrette team to discsuss the next steps	Facilitator meeting - discuss progress and the following week		
4:00	**Mid-point presentations**	Various attendees	Set meet times and divert tasks for the 19th		

On day 2 students were starting to understand which directions their designs were going and what was important to them. They were required to start producing deliverables for the end-of-day discussion. In between day 2 and 3 students were required to meet to see if their designs were meeting the targets that they laid out before the charrette.

Appendix 1 : Detail Schedule

Day 3 - Wednesday July 19th				
	Schedule	**Invitees**	**Facilitation**	**Deliverables**
9:00	**Refine designs**		Meet with charrette team	
10:00			Consolodate and divert tasks developed during the week away	
11:00	**Design** - develop metrics		Coordinate tools for metrics, when requried	
12:00	Lunch			
1:00	**Brainstorm and draw** - develop targets	Stakholders work with teams to provide input and feedback	Brainstorm questions for stakeholders - check attendee list	Start visualization drawings; Sketches Perspectives Sections etc
2:00				
3:00	**Modify designs** - with stakeholders		Develop a plan to tackle deliverables for the final day	
4:00	**Debrief** - class talk	Overall feedback		

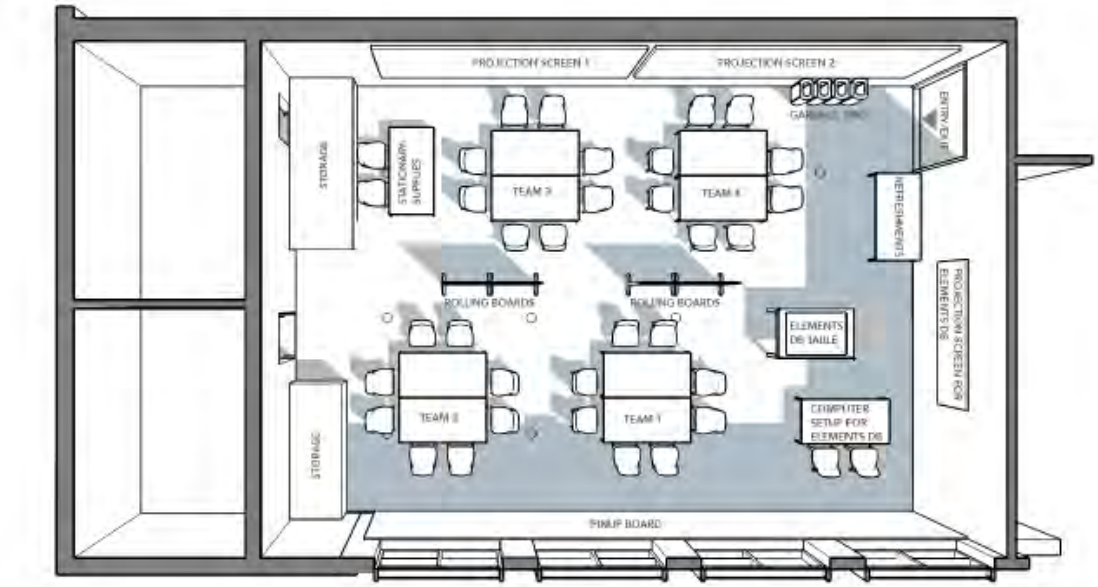
On day 3 stakeholders were invited to give thoughts and suggestions about the design decisions. Students also continued to develop their metrics and start working at a more detailed scale during the later portion of the day.

Appendix 1 : Detail Schedule

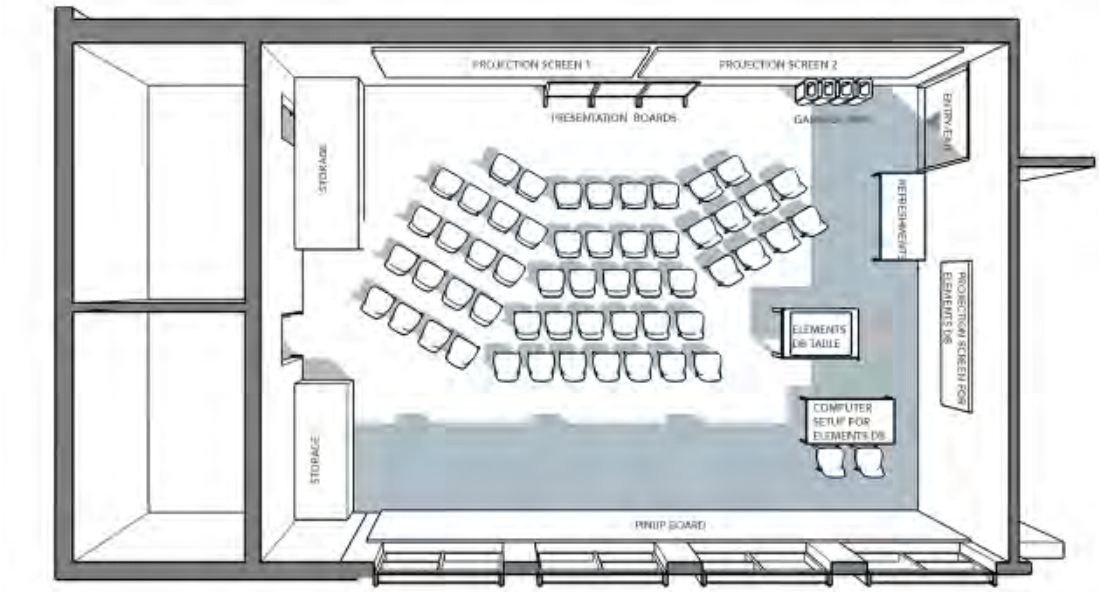
Day 4 - Thursday July 20th					
	Schedule	**Invitees**	**Facilitation**	**Deliverables**	**Final deliverables TBD**
9:00	**Discussion**	A couple C + CP people drop in throughout the day	Meet with charrette team		Please use the template for the final deliverables posted on the blog. Final deliverables will include: executive summary, principles, diagrams, scanned plans, sketches, perspectives, sections **Deadline : 3rd August 2017, 5pm**
10:00	**Finalize design** - work through plan from previous day		Modify plan from previous day based on ongoing design session		
11:00			Check metrics and create a timed plan for the afternoon deliverables		
12:00	Lunch				
1:00	**Finalize design** - finish all deliverables for presentation		Time management for presentation	For presentation: - Systems diagram(s) Scaled plan - Refine design name, goals/ principles Sketches, perspectives, sections	
2:00			Coordinate speakers for presentation, and set-up with charrette team		
3:00	**Set up room for Presentation**	Public and all other attendees invited			
4:00	**Presentations**				
5:00	**Socialize + Food**		Coordinate post-charrette deliverables with team		

Day 4 was the last day of the charrette where teams finalized their design schemes and worked towards producing work for the public presentations.

Appendix 2 : Floor Plans



The room arrangement for July the 12th, 13th, 19th, and 20th.



The room arrangement for the final public presentations on July the 20th.

Appendix 3 : References

American Institute of Architects. 2004. R/UDAT Planning Your Community's Future, A guide to the Rural/Urban Design Assistance Team Program, Washington DC: American Institute of Architects. See also https://www.aia.org/pages/2896-regionalurban-design-assistance-team-program-

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Canada Mortgage and Housing, Sustainable Community Planning and Development: Design Charrette Planning Guide, Research Highlight, June 2002.

Condon, Patrick M., Design Charrettes for Sustainable Communities, Washington DC: Island Press. 2008. (1 copy on reserve at Ike Barber Library, 1 copy in room 279 Macmillan, and available at the Vancouver Public Library)

Girling, Cynthia, Ronald Kellett, Shana Johnstone, (2006) Informing Design Charrettes: Tools for participation in neighbourhood-scale planning, The Integrated Assessment Journal, Vol. 6, Iss. 4 (2006), Pp. 109-130

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Innes, Judith E. & David E. Booher (2004) Reframing public participation: strategies for the 21st century, Planning Theory & Practice, 5:4, 419-436.

Lennertz, B., & Lutzenhiser, A. (2014). The charrette handbook. The essential guide for accelerated collaborative community planning. Second Edition. Chicago: The American Planning Association. (On reserve at Ike Barber Library)

Roggema, Rob, ed., The Design Charrette: Ways to envision sustainable futures, Dordrecht: Springer, 2014 (UBC Library has an ebook)

Senbel, Maged and Sarah P. Church, (2011) Design Empowerment: The Limits of Accessible Visualization Media in Neighborhood Densification, Journal of Planning Education and Research 2011 31: 423

RELEVANT WEBSITES

National Charrette Institute http://charretteinstitute.org/
UBC Design Centre for Sustainability (Patrick Condon's work) http://dcs-jtc-charrettes.sala.ubc.ca/

Collaborative Design of an Eco-District on South Campus, UBC

DESIGN BRIEF

July 12-13 & 19-20, 2017

School of Architecture and Landscape Architecture

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Introduction ... 3

Agenda ... 6

Primer on:

- Land + Biodiversity ...
- Water ...
- Energy and Carbon ...
- Materials + Waste ...
- Transportation + Infrastructure ...
- Buildings + Public Realm ...

COLLABORATIVE DESIGN OF AN ECO-DISTRICT ON UBC SOUTH CAMPUS
A SEEDS Project in collaboration with UBC Campus and Community Planning

A design charrette is:

> *"a time-limited, multi-party design event organized to generate a collaboratively produced plan...."*
> *Patrick Condon in Condon, Design Charrettes for Sustainable Communities, 2008, Page 1.*
>
> *"an accelerated, collaborative, design-based process that harnesses the talents and energies of all interested stakeholders to create and support a feasible plan."*
> *National Charrette Institute, charretteinstitute.org/about*

This design charrette is intended to be a visioning exercise, which imagines UBC South Campus as an eco-district in the future. Inspired by UBC Okanagan's Whole Systems Infrastructure Plan, we are proposing that the South Campus area should be planned using whole systems thinking.

> *The term eco-district is a neologism for ecological district, referring to concepts of neighbourhood or district scale sustainability. "EcoDistricts are neighbourhoods or districts where neighbours, community institutions and businesses join with city leaders and utility providers to meet ambitious sustainability goals and co-develop innovative district-scale projects." Canada Green Building Council*

Over the four days of this design charrette, we will study the future of South Campus at two scales: The entire South Campus area, south of 16th avenue and including Wesbrook Place, The UBC Farm, other green academic areas and the research triangle at the southern tip. The second scale is the research triangle itself, currently home to TRIUMF, the National Research Council of Canada, Centre for Comparative Medicine, the UBC Library PARC (preservation and archives facility), campus operations facilities such as composting, material recovery, and the campus nursery. Pacific Spirit Regional Park forms the eastern boundary.

The future plans for an eco-district include TRIUMF expansion, a district energy plant, new research facilities and additional services, all forming a new type of hub on South Campus. We will also consider the desired South gateway to campus and a new centre for waste reuse, recycling and re-purposing.

Included in this Design Brief are a series of six summaries of background research conducted by the students on the topics of: land and biodiversity; water; energy and carbon; materials and waste; transportation and infrastructure; green buildings and place.

Acknowledgements:
We thank the UBC staff who have assisted us with this project: Catherine Alkenbrack, Doug Doyle, Krista Falkner, Bud Fraser, Dean Gregory, Scot Hein, Orion Henderson, John Madden, Joanne Proft, Liska Richer, Ralph Wells.

A visioning exercise: design UBC South Campus as a future eco-district

THE PROGRAM:

- South campus gateway
- TRIUMF expansion
- a district energy plant
- new research facilities
- more services
- possibly structured parking

IDEAS:

- a new type of hub on South Campus
- a new centre for waste reuse, recycling and re-purposing
- employ water harvesting and re-use
- generate renewable energy
- improve active transportation

Ideas about the future of the TRIUMF campus.

Sketches from a design charrette conducted in Spring 2017. UBC Campus and Community Planning.

Design Charrette Agenda

Design Charrette Schedule				
	DAY 1 - July 12	**DAY 2 - July 13**	**DAY 3 - July 19**	**DAY 4 - July 20**
9:00	**Overview**	Facilitator Meet + display work	Team Meeting	Discussion
	Presentations	**Design**	**Refine Designs** and metrics	**Refine Design**
10:00	Introduction to Methods			
11:00	**Team discussion**			
12:00	*Lunch*	*Lunch*	*Lunch*	*Lunch*
1:00	**Brainstorm and draw**	**Design** with advising	Overview for Stakeholders	**Finalize Design**
2:00			Consult with stakeholders and refine **Design**	
3:00		**Consolodate work**		**Prepare Presentation**
4:00	**Debrief**	**mid-point presentation**	**Debrief discussion**	**Public Presentations**
5:00				

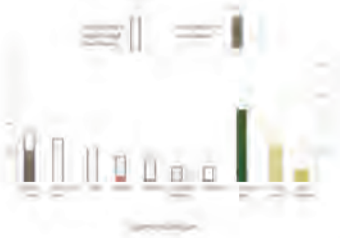
Primer on Land + Biodiversity

Land & Biodiversity - Cheat Sheet

Pacific Spirit Park

High level of biodiversity is found in Pacific Spirit Park, bordering UBC South Campus

from https://ywcavan.org/blog/2016/03/7-beautiful-parks-and-gardens-vancouver



Habitat Type Graph

Shows the ideal amount for the region vs the actual amount of habitat types on South Campus

adapted from Dyck, Caylee, "Branching Out: the socio-ecological potential of campus landscapes"

Background

- Biodiversity refers to the range of life forms on earth across different scales: genetic, species, and ecosystem
- Recognition of the world-wide impact of the decline of biodiversity inspired the global community to negotiate the United Nations Convention on Biological Diversity, signed in 1992
- It is widely acknowledged that land use planning plays a potentially important role in biodiversity conversation
- It's important to preserve biodiversity because it is linked to ecological processes that provide benefits and services to humans (ie. clean water, soil formation)
- Biodiversity is threatened by habitat destruction, pollution, and population growth, amongst other factors

Goals

- Metro Vancouver's Biodiversity Conservation Strategy outlines the following goals for the region:
  - A connected, biologically diverse network of habitats
  - Healthy, resilient ecosystems and ecosystem services across the region
  - Communities actively involved in caring for and conserving diversity

Best Practices

- To preserve and enhance biodiversity in an Eco-District, it's important to:
  1. Create habitat
  2. Build connections using trails, paths, and greenways
  3. Avoid human-made hazards to biodiversity during development
  4. Celebrate biodiversity through education

Biodiversity Indicators & Score

- Natural Areas
  - Percent of land cover devoted to natural space on South Campus (total area of South Campus is 96 hectares) (ie. 50/96 = 52%)
  - Number of ideal habitat types used, as outlined on the left (ie. 8/8 = 100%)
- Connectivity
  - Estimate as a percentage using the formula C= 2L/P(P-1) where C is connectivity, L is the number of links between patches, and P is the number of habitat patches (ie. 40 links, 10 patches = 88.8%)
- 5 min. walk to nature
  - Percent of residents within a 5 minute walk of a trail head in a natural area with a 5 min. walk = 400m distance (ie. 90%)
- Total biodiversity score is the sum of the following components:
  - 0.25 x % of land devoted to habitat
  - 0.25 x % of types of habitat used (ie. 8/8)
  - 0.25 x connectivity
  - 0.25 x % of population within a 5 minute walk
- ie. (0.25 x 52%) + (0.25 x 100%) + (0.25 x 88.8%) + (0.25 x 90%) = 82.7%

Related Goal: Diverse and Resilient Habitat
Indicator: Natural Areas

Habitat Classification Units
Amount and Percentage

Existing Condition ▼ Target ▼

Less Green — **More Green**

△

UBC Main Mall
Little vertical stratification, only a few plant species used, mowed grass

△

SEFC
Man-made Habitat Island has different types of quality habitat

Related Goal: Connected Habitats
Indicator: Connectivity

Connectivity Formula
C = 2L/P(P-1)

Existing Condition: 0.35 ▼ Target: 0.6 ▼

Less Green — **More Green**

△

Coal Harbour Sea Wall
Little marine or terrestrial habitat connectivity to Stanley Park

△

High Point, Seattle
Has green space connectivity to nearby salmon-spawning stream

Related Goal: Connected Community
Indicator: 5 min. walk

Percentage of people that live or work within a 5 minute walk of a trail head in a natural area

Existing Condition: 70% ▼ Target: 100% ▼

Less Green — **More Green**

△

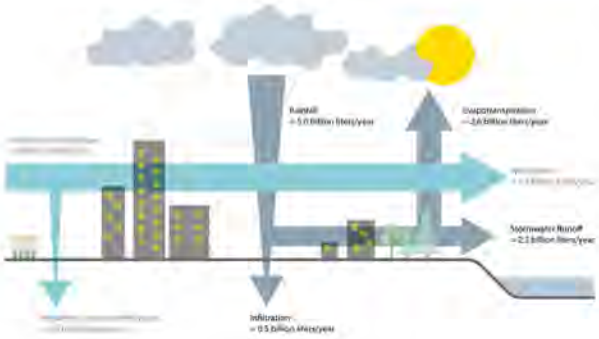
Kerrisdale
Low density housing, large distance to natural area access

△

High Point, Seattle
Neighbourhood parks provided every 2 blocks

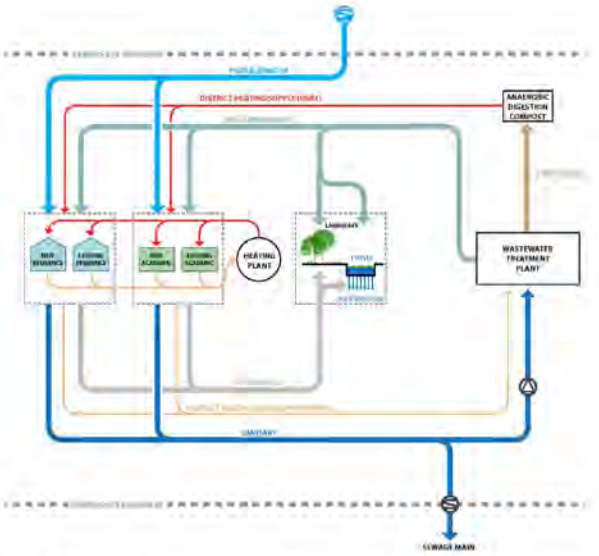
Primer on Water

Theme Research: Water - Cheat Sheet



UBC Existing Water Conditions
Rainwater and potable water are wasted on evapotranspiration, wastewater, and storm water runoff.

Source: University of British Columbia (UBC). (2014). UBC Integrated Storm water Management Plan Draft.



UBC South Proposed Whole System Water Map
Whole System Water Map for South Campus is more feasible at a neighbourhood scale.

Source: The University of British Columbia. (2016). Whole Systems Road Map UBCO.

Best Management Practices

- Reduce water consumption through conservation.
- Reuse and recycle water resources wherever possible, using potable water only for potable needs.
- Manage storm water and building water discharge within the district scale.
- LID tactics are best implemented at the neighbourhood level and provide vital water quality management.

Eco-District High Performance Water Strategies

- Bioswale/Wetlands
- Permeable Parking
- Rain Gardens
- Green Roof
- Rain Barrels
- High efficiency fixtures, appliances and water efficient landscapes.
- Water Capture & Treatment (Rainwater, graywater, blackwater)

UBC Policies

- Storm water management strategies will incorporate a natural systems approach in managing runoff volume (UBC, 2010-b).
- The open space network for UBC's Vancouver campus will be spaces for ecosystem services such as storm water management (UBC, 2010-b).
- UBC and GVRD will need to jointly address slope stability and erosion issues (GVRD, 2005).
- Current policy at UBC is to detain 10-year storm events to a 2-year, 24-hour flow rate (Wesbrook Place, 2015).
- All new buildings and renovations must comply with the LEED Gold, which requires that each new building on campus manage rainwater within the project site (UBC LEED Implementation Guide, 2013).

Goals

- Maximize water efficiency in all systems (ex. Eliminating once-through process water use)
- Reduce potable water consumption through conservation, using potable water only for potable needs
- Make use of wasted rainwater
- Decrease developmental impacts on watershed by reducing the impacts of storm water off of campus
- Celebrate rainwater in the public realm

Related Goal: Reduce potable water through conservation, using potable water for potable needs

Indicator:
the amount of potable water uses

Unit of Measurement:
Gallons or liters of potable water use per year by UBC and estimated potable water per person per day

Existing Condition → Target

Less Green — **Reduce total amount of potable water used on campus by at least 65%** — **More Green**

How to estimate the indicator?
Although it is hard to calculate the exact amount of potable water used on south campus, the whole system water plan provides the chance to reuse gray water and rainwater in some usages, such as irrigation, cooling and toilet use, which occupied more than 41% of the total amount. In contrast, new residents and users will cause the increasing need of potable water.

Related Goal: Decrease developmental impacts on watershed by reducing the impacts of storm water off of campus

Indicator:
Storm water Runoff

Unit of Measurement:
% of land allocated to green infrastructure

Existing Condition → Target

Less Green — **50% Utilization Ratio of storm water** — **More Green**

How to estimate the indicator?
Currently, only several green infrastructures are used on the south campus, which can hold, purify and reuse rainwater. In the future, a 50% utilization ratio of storm water means 50% rain fall on the south campus can be collected and reused, which means 50% of the south campus is the area that allocated to green infrastructure. In the design charrette, we assumed $1m^2$ of green infrastructure can catch and use storm water in $20m^2$ area. Based on this assumption, in the future, at least 2.5% of the south campus should be covered with green infrastructures.

The non-infiltration area should reduce the permeable green infrastructure which water flows to the upper aquifer and cause the erosion.


Source: chimfi.ok.ubc.ca/__shared/assets/okcampus-aerial38997.jpg

Dockside Green
Victoria, BC
Master planned community with LEED Platinum target with a closed loop 100% on-site sewage treatment system that uses treated water for flushing toilets, landscape irrigation and water features. Water consumption is 65% lower than conventional developments.


Source: atlas-anchor.wcom/newsite/wp-content/uploads/2015/06/docks-de-3.jpg

UBC Okanagan Campus
Kelowna, BC
Proposed Whole Systems Plan to use less potable water and realize a net positive impact. Goals for 100% diversion of storm water and by 2030 achieve 64% water use reduction.

Primer on Energy + Carbon

Energy and Carbon

UBC District Energy System

Academic District Energy System

Neighbourhood District Energy System

Google Maps / Snazzy Maps

Current Energy Usage on UBC Vancouver Campus

- UBC Climate Action Plan has set targets for reducing greenhouse gas (GHG) emission to 67% by 2020 and net zero by 2050 from its 2007 baseline.
- UBC owns a natural gas distribution system. In the future, more renewable natural gas will be introduced from FortisBC to reduce GHG emission.
- Electricity at UBC is provided primarily by BC Hydro via two transmission lines through the Pacific Spirit Regional Park that connect to the two UBC-owned sub-stations. There is only one on-campus electricity production that produces 5% of the total electricity supply.
- There is a Bioenergy Research Demonstration Facility (BRDF) on campus, which makes use of biomass to provide 15 GWh heat supply and 15 GWh electricity for UBC's core campus annually.
- The Academic District Energy System (ADES) is a hot water generation and distribution system for the academic campus, completed in 2015. The Neighbourhood District Energy System (NDES) is being developed by CORIX in partnership with UBC which covers the south campus and parts of the residential areas in the east side of University Endowment Lands.
- According to 2016 Annual Sustainability Reports, the new Academic District Energy System will reduce Vancouver Campus' energy use by 24% and its greenhouse gas emission by 22%.

Constrains

- YVR airport is adjacent to South Campus, limiting wind turbine construction due to structures' height limit.
- South Campus is surrounded by a protected land, the Pacific Spirit Regional Park (PSRP), which gives constrains for sourcing energy from the ocean or laying underground piping systems.
- The soil quality by the edge of PSRP is low and potential for soil erosion is high.

UBC South Campus Aerial View

Opportunities

- Waste heat from TRIUMF cooling tower can be captured and contributed in NDES.
- TRIUMF's large roof space is a good potential location for a solar farm.
- There are considerable potential energy sources for NDES within South Campus, such as renewable energy, biomass, stormwater sewers and waste heat from neighbourhood buildings.

Goals

- Reducing up to 15% of outsourced electricity from its current consumption by installing renewable energy resources within the South Campus.
- Future phases of the NDES project can integrate alternative energy sources (minimum 60%) into the district energy system.
- To achieve net zero GHG emissions on south campus by 2050.

Related Goal:	Unit of Measurement
Indicator: GHG Emission	tones of CO2 emission

61,090 in 2007 — 0 by 2050

Less Green — **More Green**

Anshan District Heating Networks, Liaoning Province, China

Anshan District Heating Networks is dominated by the"hybrid public and private" business model. in this precedent, Anshan utilizes some 1 GW of surplus heat produced by the local Angang Steel plant to heat 50 million m², or 70 per cent of the city's total heating area. The industrial plants would become the largest heat source for the city.

Southeast False Creek Neighbourhood Energy Utility, Vancouver, Canada

Southeast False Creek Neighbourhood Energy Utility uses sewer waste thermal energy to provide heat and hot water to the buildings within Southeast False Creek. It since then reduced 60% of the total GHG emissions of the neighbourhood. The project was fully funded by the public, through the initiative of the city government.

How do we estimate this indicator?

We should determine the quality of the energy source that we will be utilizing. In that way we could help lower the initial GHG emissions before getting in to the District Energy system.

Materials and Waste - Cheat Sheet

Waste management hierarchy

http://consult.torridge.gov.uk/events/18097/popimage_d31379e8718.html

Reusables

Picture: Ayishah Chui

Unwanted furniture and materials are often piled in common areas appearing unsightly.

Policy Overview

- The university of british columbia holds high values in relation to sustainability and is striving to become a zero waste campus
- A Zero Waste Action Plan was developed in 2014, that set an upcoming target to divert 80% of waste from the landfill by 2020
- UBC currently diverts 67% of all campus waste from the landfill - latest data from 2015/2016 fails to meet its 2016 target of 70% diversion

Main waste streams at UBC

- **Compostables** such as food and yard waste are processed at UBC's composting facility located on south campus. Compost produced is then used in gardens around campus.
- **Recycling** such as mixed paper, recyclable containers, and cardboard are sent to the Vancouver Transfer Station.
- **Reusables** such as unwanted furniture and office supplies are posted on the re-useit! UBC website. Unwated reusables or those that do not make it on the website are sent to the landfill or recycling.
- **Landfill** garbage including all unrecyclables are sent to the Vancouer Transfer Station off campus.
- **Construction/Building** waste is either recycled and reused in other projects or sent to the landfill.
- **Electronic waste** (E-waste) is sent to the University Services Building on the main campus. From there it is sent to external recycling facilities where materials are reclaimed.

Guiding Principles

- Work towards becoming a zero waste campus.
- Celebrate and make visible the recycling and reusing processes.
- Create an innovative and inspiring recycling and reuse center that acts as a living lab and educational facility.
- Use unrecyclable waste to generate electricity on campus.
- Design principles:
    - Design buildings for user and operational convenience to encourage recycling, proper waste management practices and monitoring
    - Design future infrastructure to enable materials to be reused or easily disassembled at the end of their life cycle on campus
    - Provide space for temporary storage of reusable campus items

Related Goal:
Indicator: Waste diverted from landfilll

Unit of Measurement
Percentage of waste diverted from landfill

TARGET & Existing Condition

BRING Recycling Store, Eugene, OR

An organization in Oregon is working towards making recycling more accessible and enjoyable for the public. Everything from household items to bicycles are brought to the recycling center for a fee and cleaned up by staff. They are then organized in a convenient way for other consumers to use. BRING places emphasis on artistic approaches to re-purposing waste hoping to change attitudes and behaviors concerning waste for the better.

Lion's Park Playscape, Greensboro, AL

A playspace constructed of 2000 recycled 55-gallon drums (recycled mint oil barrels). Lion's Park celebrates the spirit of recycling, creating a unique experience for children to play and explore. Part of Auburn University's Rural Studio, the playscape is part of efforts to revitalize Lion's Park in Greensboro. The project reconsiders the concept of waste. What materials can we reclaim and reimagine into new purposes?

How do we estimate this indicator?

This indicator can be estimated through tracking the tons of waste diverted from the landfill in each indivudal waste streams.

Primer on Transportation + Infrastructure

Transportation & Infrastructure - Cheat Sheet

UBC Goals & Baseline Information

Poor walking conditions in South Campus

- UBC aims to prioritize walking, cycling and transit for travel to, from and within the Point Grey Campus
- Trips to/from Point Grey Campus - target mode share for walking, cycling and transit is at least two-thirds by 2040; baseline figure from 2015 is 55% (52% transit, 2% bike, 1% walk)
- Trips within Point Grey Campus - no explicit target set; baseline mode shares from 2013 is 88% walk, 6% bike and 2% transit.
- In South Campus, walking and cycling mode shares are likely to be much lower due to unfavourable pedestrian and biking environments.

Relevant UBC Policies

Surface parking in South Campus

Campus-wide:

- Create a fine-grained pedestrian and cycling network
- Locate a wide range of amenities near residences and jobs
- Create complete, safe cycling network
- Integrate pedestrian and cycling network with greenway system
- Accommodate vehicles in structured or underground parkades
- Implement traffic calming measures where feasible
- Accommodate servicing, loading and emergency access needs

Specific to South Campus:

- Future greenway connection between South Campus and Main Campus
- Potential need for a future parkade (with secure bike storage) near the existing traffic circle as surface parking lots in South Campus redevelop

Best Practices

Attractive pedestrian realm in Hammarby Sjöstad, Stockholm Source: Flickr

- Close proximity of services to residences and jobs
- Safe, comfortable and attractive pedestrian realms with design elements such as wide sidewalks, tree shade, seating areas and weather protection
- Separated bike facilities and greenways
- Lighting oriented to pedestrians and cyclists
- Accessible, weather protected & attractive transit stops
- Electric mobility services (e.g. driverless electric shuttles)
- Shared mobility services (e.g. bike sharing, electric car sharing)
- Traffic calming measures (e.g. curb extensions and raised crosswalks on local streets)

Goal: Create a fine-grained pedestrian and cycling network

Indicator: Intersection Density

Unit of Measurement: Intersections per hectare

Number of intersections divided by total study area

A higher number of intersections per hectare implies a finer grained street network which is more walkable.

Existing Condition 0.48

Target 0.53

Wesbrook Place 1.12

Less Green — **More Green**

How do we estimate this indicator?

Count the total number of intersections in the portion of South Campus excluding Wesbrook Place and UBC Farm (including off-street pathways/greenways), before dividing the count by its 44 ha area.

Goal: Locate amenities close to jobs

Indicator: % of buildings containing jobs within 400m of services

Minimum services: Café, Convenience Store & Bank Machine

Existing Condition:

The amenities and services in South Campus are currently concentrated near the northern end. This results in long walks from the southern end of South Campus to access services, with walking time as high as 20 minutes to get to the community centre.

By locating amenities and services close to jobs, more walking and cycling trips are encouraged.

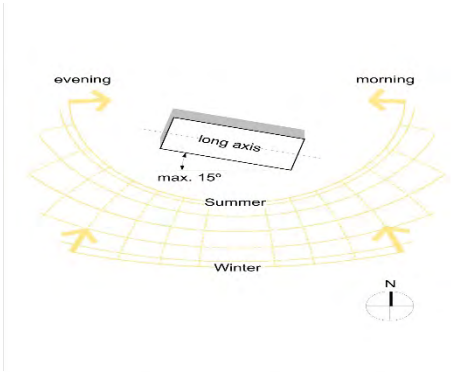
Target 100%

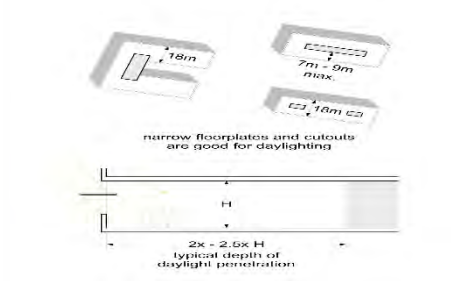
Less Green — **More Green**

How do we estimate this indicator?

For any building containing jobs, look within a 400m crow-fly radius to check if there is a café, convenience store and a bank machine. The number of buildings which have all three services within a 400m radius is then divided by the total number of buildings within the study area.

Place: Buildings and Public Realm - Cheat Sheet





Guiding Design Principles

1. Introduce an anchor building to the site that attracts people and circulation to the south campus
2. Include amenities (food, retail, gym) within a 5 minute walk from research/institutional buildings and employment hubs.
3. Connect triumf and the southern buildings to the existing residential infrastructure to create a complete neighbourhood and provide opportunities to live next to work.
4. Sustainable Building design: Take advantage of natural systems and building orientation/massing to reduce energy demands and increase operating efficiency.

Building Performance Goals

- All new buildings to be LEED Gold certified
- Reduce energy consumed by electric lighting
- Reduce energy consumed by mechanical cooling/heating
- Reduce energy consumed by mechanical ventilation

Building Orientation

- Ideal: East/West axis longer than North/South
- Ideal: Long axis within 15º of East/West
- Increase exposure to useful South/North daylight
- Decrease exposure to East/West glare and heat gain

Building Proportions

- Narrow floor plates increase access to natural daylighting
- Narrow floorplates increase access to natural ventilation

Precedent 1: Bullitt Centre

- 4,800m2
- 500 - 600 occupants
- 6 storeys, mixed use:
- Commercial on first and second floor
- Institutional offices on third to sixth floor
- World’s largest certified commercial Living Building

Precedent 2: NRB, Harvard University

- 48,800 m2
- 800 researchers and many more graduate students, lab assistants, and staff
- 4 storey podium, 10 storey tower
- Medical research

Related Goal:	Unit of Measurement
More density to support public realm	Number of people per square meter

Existing Condition ▼ — Target ▼

Less Green — **More Green**

△ △

• Low-rise / low density • Large footprints • Few amenities within 5min walk  Triumf (0.019 people/m²) Current South Campus • 0.012 people/m² • 787 approximate total workers population	• Mid rise / high rise / high density • Reduced footprints • All amenities within 5min walk  Bullitt Centre (0.14 people/m²) In order to add a corner store • 0.05 people/m² • 1013 more people needed • 20,260 m² gross floor area to add

How do we estimate this indicator?
According to the metrics from Sustainable Urbanism by Douglas Farr, the current density of South campus needs to be increased to 1800 people in order to support a convenient store. We estimated the area of 20,260 m² to be added from the average density of the precedents.

Precedents	**Density**	**Gross Floor Area**
Gates Foundation	0.04 people/ m²	83,612 m²
UBC Brain Research Center	0.03 people/ m²	13,861 m²
Bullitt Centre	0.14 people/ m²	4,830 m²
UBC Ponderosa Commons	0.02 people/ m²	55,300 m²
New Research Building at Harvard	0.02 people/ m²	48,800 m²

SCHOOL OF
ARCHITECTURE +
LANDSCAPE
ARCHITECTURE