UBC Social Ecological Economic Development Studies (SEEDS) Student Report

Replanting Sustainability Street Tasha Sangha University of British Columbia LARC 515 December 30, 2016

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SUSTAINABILITY STREET

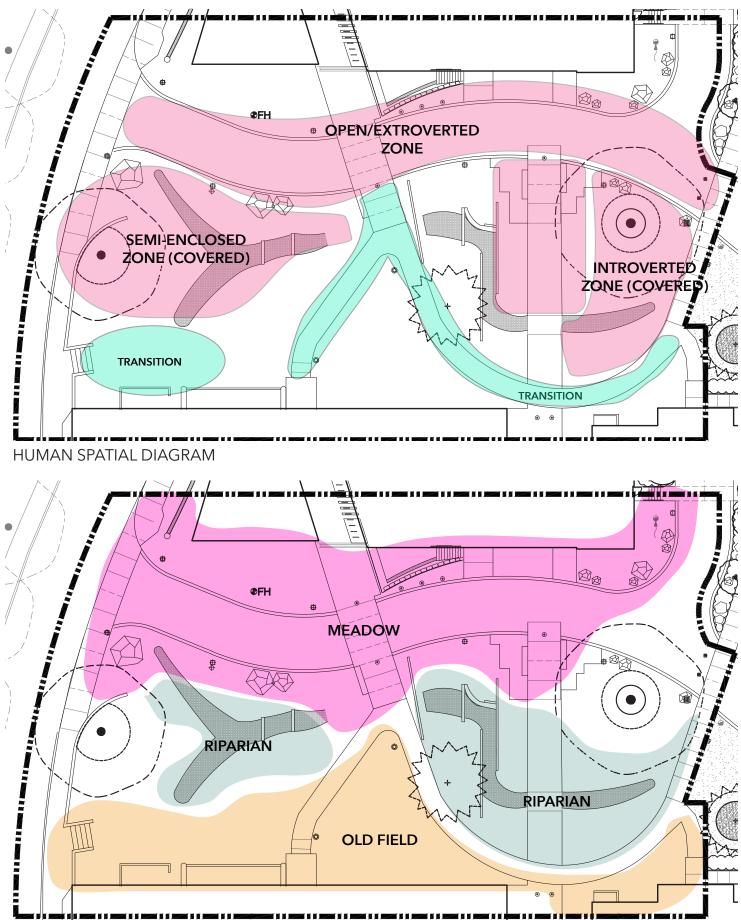
LARC 515: ASSIGNMENT 4

TASHA SANGHA 11.30.16

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SPATIAL DIAGRAM



ECOLOGICAL SPATIAL DIAGRAM

PROGRAM STATEMENT

The following proposed program consists of an aesthetic, ecological, and educational strategy. The planting design will transform Sustainability Street into a bio-diverse "gateway" - an ecological and educational feature for the campus, supporting valuable bird nesting and foraging activity. The overall goal is to provide a dynamic, exciting, and functional entry/exit for students traveling in and out of the core of campus. Aesthetically, this will be achieved through a softer, wilder and more organic planting approach that juxtaposes the more institutional plantings surrounding it. In addition, its proximity and relationship to the CIRS building positions it as a valuable learning opportunity. Interpretive signage and implementation of a variety of ecological strategies within the planting would allow it to become a 'living laboratory' in the same way the CIRS building is considered a living building. It provides a chance for students and teachers to study the diversity of bird species and other wildlife that it could potentially support.

Site Analysis

The following are some of the major observations seen during our site visit and their implications for planting design:

A. The site is very infrequently maintained

<u>Implication</u>: Consider using low maintenance species (slower growing, less need for constant irrigation) and arrange them in such a way that can allow easy/efficient access with minimal need for a lawn mower.

B. The site is steeply sloped

<u>Implication:</u> Height diversity of the plants should complement the slope, not exaggerate it. In essence, ensure that planting from the bottom to the top of the slope is balanced in terms of height so as to not create a greater perceived slope. Additionally, lawn mowing is on the slope is difficult, so choose low maintenance, non-mown species (especially around the swale). Lastly, consider water flows during rain events. Plants at the foot of

the hill around the swale should be able to tolerant wet feet, as compared to the top of the slope from where water drains.

C. The CIRS building creates deeply shaded pockets

<u>Implication:</u> Plants against the building should be shade tolerant, while some of the more exposed areas (around the swale) should be able to tolerate full sun exposure.

D. The horticulture building is concerned about pests and diseases impacting plant species

<u>Implication</u>: Select approved and tested species to plant adjacent to the horticulture building, to prevent unnecessary spread of diseases.

E. Windier tunnel created through passageway

<u>Implication:</u> The street is often quite windy because of the adjacent taller buildings. Plant species, which can tolerate these conditions, and also consider planting that may be highlighted or particularly dynamic in windy conditions (think softer grasses, or trees/shrubs that create interesting sounds in the wind)

F. Some of the existing species on the site are in good condition

<u>Implication:</u> Instead of replacing all the plants, consider how you can save some of the species in order to reduce complexity, cost, and maintenance (for example, the shore pine and maple tree)

Program Rationale:

Human Use: The following are the design considerations when planting for human use and experience:

A. Circulation:

Students and faculty often use Sustainability Street to connect to the core of the campus. Generally speaking, many of the residences and vehicle access occurs on the south end of the street, whereas the north end eventually connects to Main Mall and the heart of the campus. Thus, the main pathway should stay clear of and view obstructions. In addition, if this area is used as an outdoor classroom, there is the potential to include

a soft tertiary path system that could allow students to explore plant species as well as provide maintenance staff with easier access through the beds. A diversity of plant heights can also create a more enjoyable walking experience, as the perceived slope of the site is quiet steep, so different barrier heights could remedy that.

B. Views and Enclosure

As safety is of top priority and concern in a campus setting, baffles, screens and any other view-obstructing elements should be kept at a minimum to ensure students and other visitors feel safe walking through the area at night. However, there is an opportunity to use baffles to frame views and create enclosure without compromising safety. I have done this by selecting broadly branching tree species (or baffles) that allow people to see through them, while still creating intimate space and sense of mystery or extent.

C. Gateway

As one of the programmatic goals is to establish a gateway into the campus, some of the strategies that can be used to achieve this is use of bright, colourful planting, soft and organic plant textures and forms. By using strategies not typically seen on the adjacent sites, the gateway becomes an element of surprise and enjoyment in an otherwise grey and green campus. This is illustrated throughout my "meadow" zone on the plan.

Non-Human Use: The following are the design considerations I integrated when planting for biodiversity and specifically, bird nesting and foraging. I also anticipate supporting pollinator species through some of the avian strategies used.

- **A. Structural Diversity:** providing nesting opportunities at canopy, sub-canopy, shrub and herbaceous level
- **B. Seasonality:** provide a range of species that provide food for birds throughout the entire year (even winter)

C. Diversity of Species: creating a rich, complex shrub layer can also support greater avian species, rather than monocultures or mass drifts of the same plant species.

Overall, some of the design considerations above support both human and non-human functions. For example, a diversity of plant heights can support bird habitat but also create a more dynamic, interesting walking experience for students. However, occasionally, they are at odds. For example, one of the challenges will be to balance a wild, more organic planting aesthetic to support biodiversity against human perceptions of what successful landscapes should be. As mentioned in class, one of these strategies could be to use colour. One of the goals of my project is to reconcile these differences, creating an effective, functional, yet also beautiful space for humans and birds.

Inspired by Habitat Types: Riparian, Meadow, and Old Field

To inform my design along the edge of the curved road, I have considered and drawn inspiration from the **meadow** habitat type. That is, I want to create colourful, dynamic linear gateway that also supports avian habitat and foraging. To do so, I have used feathered edges, and a range of herbaceous perennials and grasses. In addition, the planting strategy for the rest of the site draws from the **old field and riparian** habitat types. The proposed design would embrace biotic succession and a constantly changing landscape, especially the old field habitat. I have created pockets of woody vegetation that are surrounded by softer herbaceous drifts (fescues and sagebrush), as well as created height and species diversity within the pockets to provide a range of habitats and food sources for birds (Darwin's barberry, Sitka mountain ash). The swale would also be retrofitted to act as a rain garden - accommodating both wet and dry conditions and integrating a pebble layer along the rain garden bed. Along the wetter areas of lower elevation areas, water-loving species have been selected that are conducive to the riparian habitat type. A common selection of grasses weaves its way through each habitat type to tie each area together (see the use of *Stipa arundinacea, Panicum virgatum, Calamagrostis x acutiflora 'Karl Foerster'*). Because some of the meadow areas die

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down significantly in the winter, I have tried to select species with interesting structure or seed heads to provide winter interest.

Innovation

Currently, the site appears messy and neglected. Many species were improperly planted in unsuitable conditions or grew too quickly for the rate of maintenance the site receives. My proposed plan will address these issues by selecting the appropriate low maintenance plants that, when planted together, complement and do not out-compete each other. Additionally, uninspired planting and a large concrete walkway create a "boring" and un-enjoyable walk for students exiting and entering the campus. As a result, the site will be transformed into a softer, more organic "gateway" to the university that complements but contrasts the institutional planting around the adjacent buildings. The beds will be buzzing with life, supporting a range of birds and other pollinators that students can enjoy as they walk by. Biodiverse, but "messier" looking areas will maintain order by using a selection of grasses as a "common denominator" as well as groundcover as borders around the edges. Overall, the design will be easier to maintain and ideally, be a long-term solution that does not require the area to be replanted for many years to come. This will allow it to mature into a lush, vibrant gateway, and remain easy to maintain for campus staff.

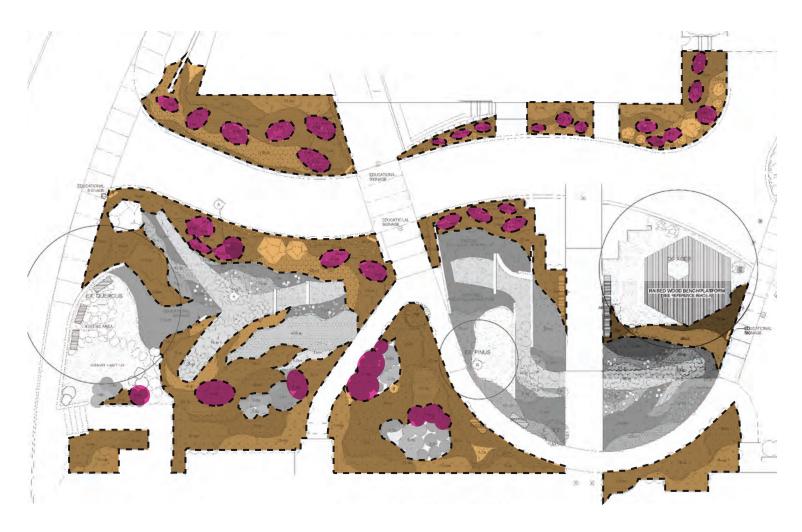
This proposal also seeks to build on Cornell Plantation's strategies by integrating a more comprehensive avian strategy through introducing plants of varying types, heights, and fruiting times. The focus of the precedent was predominantly on water and human use, so my proposal seeks to move beyond that, thinking about how birds can use the site to nest and feed throughout the entire year.

At the same time, I need to acknowledge the scale of my site. It is quite small and so any strategies relating to bird nesting and foraging should consider what a site of my scale is actually capable of supporting (perhaps not supporting entire populations, but rather stepping stones of refuge or food instead).

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MAINTENANCE REGIME

The maintenance regime of the proposed planting design calls for the plants to be mown twice per year. Perennials would be sheared in the fall and grasses mown in the early spring. The maintenance regime is illustrated below:







TO BE MOWN IN SPRING

PRECEDENT



PRECEDENT

Project: Cornell Plantations Brian C. Nevin Welcome Center Location: Cornell University, Ithaca, New York

The Cornell Plantations is a university-based public garden that sits on 4000 acres on the Cornell University Campus. In an effort to create a **formal entrance** for the botanical garden, the Brian C. Nevin Welcome Center was created, which establishes a gateway for the gardens. Within this new plan and reorganization of the gardens, a large bio-swale, green roof, and innovative LID practices serve as the highlights and focal points of the project.

I was particularly interested in this precedent because it attempts to create a pedestrian friendly **gateway** that harmoniously exists within a biodiversity-rich landscape. Additionally, the 12,000 square foot bio swale uses hardy, drought and inundation tolerant perennials and grasses around it, which is also an important consideration as I design around the swale on Sustainability Street.

What is more, the swale garden contains a **diversity** of shrubs and perennials (more than 50 species) and they were all selected for their ability to grow in both wet and dry conditions. They also provide valuable habitat for birds and reduce stresses on the irrigation system.

With respect to storm water **runoff**, the swale uses plant species to cleanse and filter run-off from the adjacent parking lot. The landscape has also reduced peak flow rates and in turn pressures on the city system.

Signage has been integrated along the site to **educate visitors** about the valuable contributions of the swale, green roof and other features of the re-design.

IMAGES:

- A http://www.twm.la/portfolio/cornell-plantations-welcome-center-peony-garden/
- B http://www.twm.la/portfolio/cornell-plantations-welcome-center-peony-garden/
- C http://www.cornellbotanicgardens.org/visitor-info/welcome-center/about
- $D \ \ http://www.sustainablecampus.cornell.edu/blogs/events/posts/tour-of-the-cornell-plantations-leed-gold-certified-brian-c-nevin-welcome-centerry and the state of the$
- E http://landscapeperformance.org/case-study-briefs/nevin-welcome-center
- F http://www.twm.la/portfolio/cornell-plantations-welcome-center-peony-garden/

HABITAT TYPE: **MEADOW**

STRATEGY: Meadow to be located along irrigated corridor, which allows more water loving species to be used // meadow habitat type calls for herbaceous species of medium to low height, with almost no woody vegetation // species selected for their ability to attract pollinators // perennials bunched together to ensure grasses don't out-competecolour used to provide enjoyable human experience.

TALL GRASSES:





variegated maiden grass

New Zealand wind grass

SHRUB LAYER:



rusty foxglove



blazing star



purple coneflower 'Magnus'



Frikart's aster



reed feather grass

tufted hair grass





crocus 'Yellow Mammoth'



penstemon 'garnet'



sea blush



chamomile



gold leaf bleeding heart

threadleaf coreopsis



STRATEGY: this zone uses species that tolerate wetter conditions // many of the species can handle wet feet, while also tolerating dry conditions (ie. juncus) // ferns are used to stabilize steep banks // a range of grasses are used to support ground nesting habitat

CANOPY / BAFFLE/ SCREEN



Pacific ninebark

SHRUB LAYER:





common rush



western swordfern

deer fern

SMALL SHRUBS / GROUNDCOVER:



Oregon iris



camas



creeping myrtle



alpine azalea



autumn crocus



sea blush



wood lilly

HABITAT TYPE: OLD FIELD

STRATEGY: fescues, sagebrush and other grasses comprise the base of the old field habitat, with pockets of woody vegetation scattered to provide bird habitat // conifers mixed into canopy to support greater avian diversity // area is drier and typically more exposed to the sun, so species selected for ability to tolerate sunny, dry conditions.

CANOPY / BAFFLES / SCREENS





Mcminn's manzanita

snowbrush ceanothus



Pacific rhododendron



compact Japanese black pine



variegated maiden grass

New Zealand wind grass

POCKETS OF WOODY VEGETATION



Darwin's barberry



Sitka mountain ash



wormwood

DRIFTS OF GRASSES



tall fescue

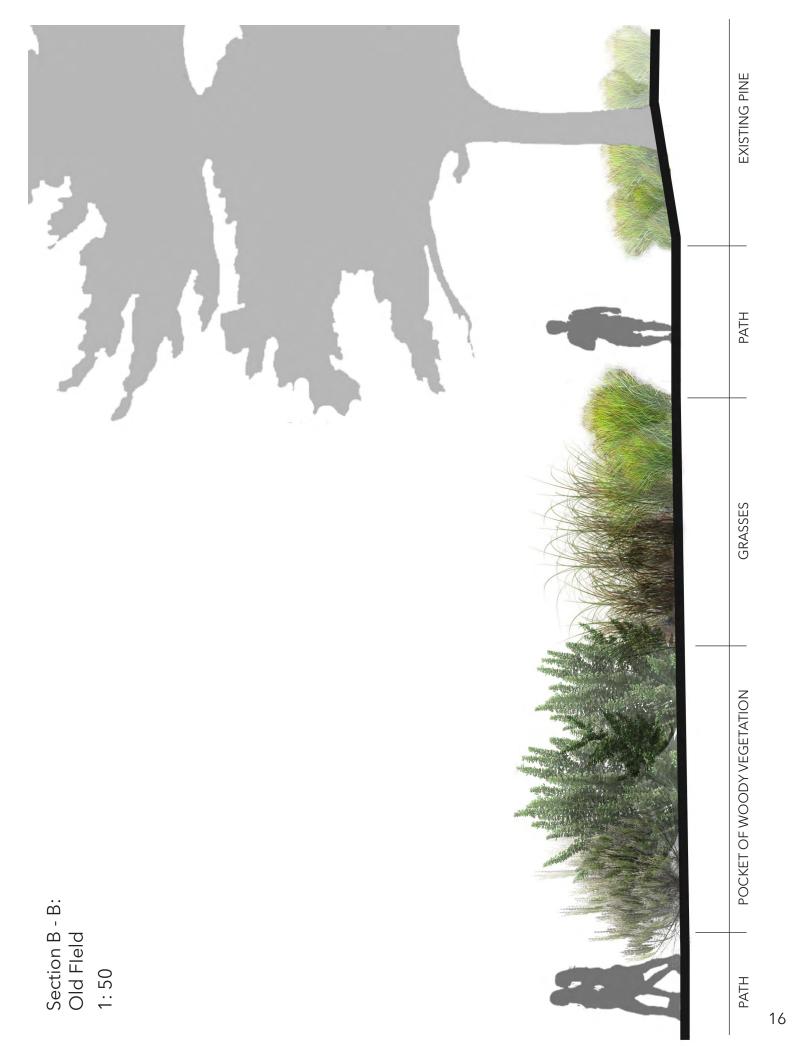


western fescue

switch grass

Section A - A: Meadow and Riparian 1: 50





SEASONALITY: MEADOW

Species	D/E/H	January	February March	April	May	June	July	August	September	October	August September October November December	December
Aster	herbaceous perennial											
Blazing Star	herbaceous perennial											
Variegated Maiden Grass	ornamental grass											
Karl Foerster	ornamental grass											
Purple Coneflower	herbaceous perennial											
Dechampsia cespitosa	semi-evergreen											
Rusty Foxglove	herbaceous perennial											
Threadleaf coreopsis	herbaceous											
Gold leaf bleeding heart	deciduous perennial											
Penstemon	herbaceous											
Crocus Yellow Mammoth	pulb											
Chamomile	herbaceous											
Sea blush	herbaceous annual											
New Zealand wind grass	evergreen grass											

SEASONALITY: RIPARIAN

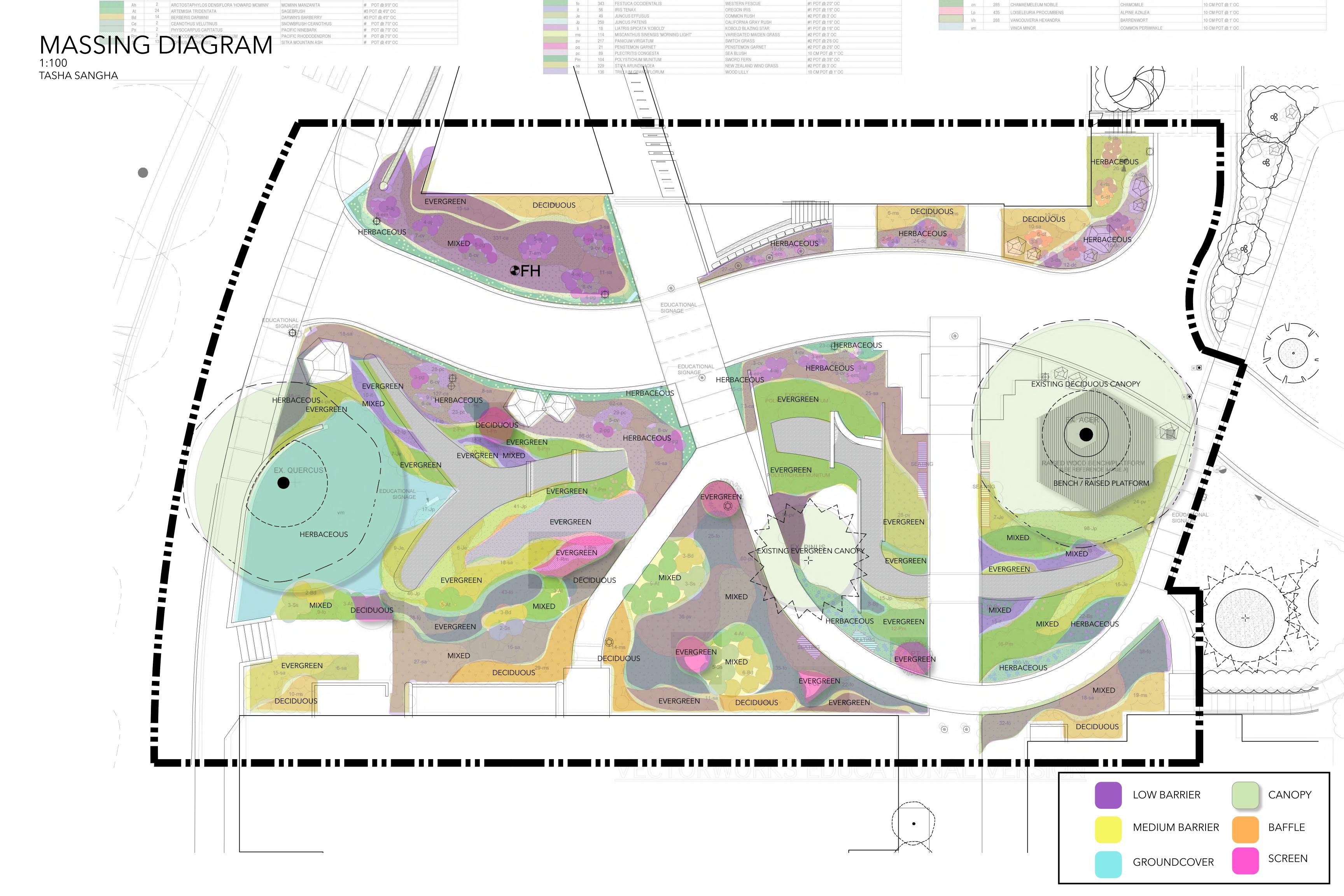
Species	D/E/H	January	February March April	March	April	May	June	July	August	August September October November December	October	November	December
Western swordfern	herbaceous												
deer fern	herbaceous												
oregon iris	evergreen perennial												
camas	pulb												
california grey rush	evergreen grass												
common rush	evergreen grass												
pacific ninebark	deciduous shrub												
sea blush	herbaceous annual												
wood lilly	deciduous perennial												
alpine azalea	evergreen shrub												
autumn crocus	bulb												
creeping myrtle	evergreen groundcover												

SEASONALITY: OLD FIELD

Species	D/E/H	January	February March April	March	April	May	June	July	August	September	October	August September October November December	December
Pacific rhododendron	evergreen												
Darwin's barberry	evergreen												
Mcminn's manzanita	evergreen shrub												
Western fescue	perennial grass												
tall fescue	perennial grass												
wormwood	herbaceous perennial												
Variegated maiden grass	ornamental grass												
switch grass	ornamental grass												
compact Japanese black pine conifer	conifer												
Sitka mountain ash	decideous shrub												
snowbrush ceanothus	evergreen shrub												
New Zealand wind grass	evergreen grass												

BIODIVERSITY VALUE (Please Note: This is not an exhaustive list of all the wildlife each species can support, but an internal tool I have used to develop the planting plan)

	BIRDS	BEES	BUTTERFLIES
RIPARIAN		·	
ATHYRIUM FELIX-FEMINA			
BLECHNUM SPICANT			
CAMASSIA QUAMISH			
LOISELEURIA PROCUMBENS			
PHYSOCARPUS CAPITATUS			
POLYSTICHUM MUNITUM			
TRILLIUM GRANDIFLORA			
PLECTRITIS CONGESTA			
COLCHICUM 'THE GIANT'			
JUNCUS PATENS			
JUNCUS EFFUSUS			
IRIS TENAX			
MEADOW			1
PENSTEMON GARNET			
ECHINACAEA PURPUREA 'MAGNUS'			
CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'			
MISCANTHUS SINENSUS 'MORNING GLORY'			1
DICENTRA SPECTABILIS 'GOLD HEART'			
COREOPSIS VERTICILLATA			
CROCUS 'YELLOW MAMMOTH'			
DIGITALIS FERRUGINEA			
CHAMAEMELUM NOBILE			
DECHAMPSIA CESPITOSA			
LIATRIS SPICATA 'KOBOLD'			
ASTER X FRIKARTII 'JUNGFRAU'			
STIPA ARUNDINACEA			
OLD FIELD			
CEANOTHUS VELUTINUS			
PINUS THUNBERGII 'THUNDERHEAD'			
LOISELEURIA PROCUMBENS			
PANICUM VIRGATUM			
FESTUCA OCCIDENTALIS			
FESTUCA ARUNDINACEA			
ARTEMESIA 'POWIS CASTLE'			
ARCTOSTAPHYLOS DENSIFLORA 'HOWARD MCMINN'			
SORBUS SITCHENSIS			
RHODODENDRON MACROPHYLLUM			
CEANOTHUS VELUTINUS			
BERBERIS DARWINII			

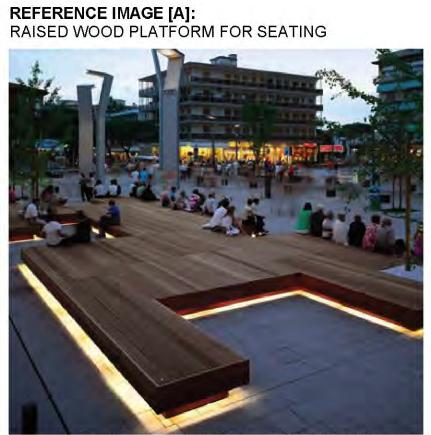


REES							PERENNIAL	S, GRASSES	3			
	D	QUANT	ITY LATIN NAME	COMMON NAME	SCHEDULED SIZE	COMMENTS	COLOUR	ID Q	JANTITY	LATIN NAME	COMMON NAME	SCHEDULED SIZE
- F	٧N		2 PINUS THUNBERGII 'THUNDERHEAD'	COMPACT JAPANESE BLACK PINE	B+B, 8' TALL			aj	30	ASTER X FRIKARTII 'JUNGFRAU'	FRICKART'S ASTER	#2 POT @ 2'6" OC
								bs	46	BLECHNUM SPICANT	DEER FERN	#1 POT @ 2' OC
1000 / 201								ca	976	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS	#1 POT @ 1' OC
IRUBS		Discussion of the						CV	73	COREOPSIS VERTICILLATA 'ZAGREB'	THREADLEAF COREOPSIS	#1 POT @ 1'6" OC
DLOUR	ID	QUANTITY	LATIN NAME	COMMON NAME	SCHEDULED SIZE			dc	302	DECHAMPSIA CESPITOSA	TUFTED HAIR GRASS	#1 POT @ 1'6" OC
	Ah	1	ARCTOSTAPHYLOS DENSIFLORA 'HOWARD MCMINN'	MCMINN MANZANITA	B+B, 8' TALL @, 9'0" OC			ds	18	DICENTRA SPECTABILIS 'GOLD HEART'	GOLD LEAF BLEEDING HEART	#1 POT @ 2' OC
	Ap	41	ARTEMISIA 'POWIS CASTLE'	WORMWOOD	#2 POT @ 3'0" OC			df	38	DIGITALIS FERRUGINEA	RUSTY FOXGLOVE	#1 POT @ 1'6" OC
	Bd	14	BERBERIS DARWINII	DARWIN'S BARBERRY	#3 POT @ 4'0" OC			em	39	ECHINACEA PURPUREA 'MAGNUS'	PURPLE CONEFLOWER	#1 POT @ 1'6" OC
	Ce	2	CEANOTHUS VELUTINUS	SNOWBRUSH CEANOTHUS	B+B, 5' TALL @ 7'0" OC			fa	481	FESTUCA ARUNDINACEA	TALL FESCUE	#1 POT @ 1'0" OC
	Pn	2	PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	B+B, 6' TALL @ 7'0" OC			fo	215	FESTUCA OCCIDENTALIS	WESTERN FESCUE	#1 POT @ 2'0" OC
	Rm	2	RHODODENDRON MACROPHYLLUM	PACIFIC RHODODENDRON	B+B, 6' TALL @ 7'0" OC			it	56	IRIS TENAX	OREGON IRIS	#1 POT @ 1'6" OC
	Ss	13	SORBUS SITCHENSIS	SITKA MOUNTAIN ASH	#5 POT @ 4'0" OC, 4' TALL			je	66	JUNCUS EFFUSUS	COMMON RUSH	#2 POT @ 3' OC
								ip	438	JUNCUS PATENS	CALIFORNIA GRAY RUSH	#1 POT @ 1'6" OC
								li	18	LIATRIS SPICATA 'KOBOLD'	KOBOLD BLAZING STAR	#1 POT @ 1'6" OC
								ms	114	MISCANTHUS SINENSIS 'MORNING LIGHT'	VARIEGATED MAIDEN GRASS	#2 POT @ 3' OC
								pv	239	PANICUM VIRGATUM	SWITCH GRASS	#2 POT @ 2'6 OC
								pg	21	PENSTEMON GARNET	PENSTEMON GARNET	#2 POT @ 2'6" OC
								pc	89	PLECTRITIS CONGESTA	SEA BLUSH	10 CM POT @ 1' OC
								pm	106	POLYSTICHUM MUNITUM	WESTERN SWORD FERN	#2 POT @ 3'6" OC
								sa	223	STIPA ARUNDINACEA	NEW ZEALAND WIND GRASS	#2 POT @ 3' OC
			/ //	4//				ta	136	TRILLIUM GRANDIFLORUM	WOOD LILLY	10 CM POT @ 1' OC



COLOUR	ID	QUANTITY	LATIN NAME	COMMON NAME	SCHEDULED SIZE	
0	cq	36	CAMASSIA QUAMISH	COMMON CAMAS	BULB @ 1' OC	
	cg	131	COLCHICUM 'THE GIANT'	AUTUMN CROCUS	BULB @ 9" OC	
	су	179	CROCUS 'YELLOW MAMMOTH'	LARGE FLOWERING CROCUS	BULB @ 9" OC	

GROUNDCC	VERS	1				
COLOUR	ID	QUANTITY	LATIN NAME	COMMON NAME	SCHEDULED SIZE	
	cn	459	CHAMAEMELEUM NOBILE	CHAMOMILE	10 CM POT @ 1' OC	
	lp	435	LOISELEURIA PROCUMBENS	ALPINE AZALEA	10 CM POT @ 1' OC	
	vh	288	VANCOUVERIA HEXANDRA	BARRENWORT	10 CM POT @ 1' OC	



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Re	visions:
	N
	Planting Plan
	Sustainability Street
	University of British Columbia
	Vancouver, BC
	Drawn by: Tasha Sangha
	Deviewe al Low DM MD
	Reviewed by: PM, MR