

**Replanting Sustainability Street**

**Tamara Bonnemaïson**

**University of British Columbia**

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# Precedent: Smithsonian Pollinator Garden

Tamara Bonnemaïson

The Smithsonian Museum in Washington, D.C. has a series of themed gardens which teach visitors various natural history lessons. These gardens perform multiple roles: they provide habitat, provide education, and also must create pleasant landscapes for visitors to the museum. The Smithsonian Pollinator Garden provides habitat to pollinators while teaching visitors about how they might create their own pollinator garden (Pollinator Garden 2016). This is a similar situation to UBC's Sustainability Street, which serves as a circulation corridor through campus, but also has the opportunity to act as a learning and demonstration environment.

## A FLOWERING WALKWAY

The Smithsonian Museum Pollinator Garden, like Sustainability Street, is centred along a wide walkway. This walkway features many flowering plants that are meant to show people how they might use pollinator-friendly plantings in their own yard (Gagliardi 2016). The plants that are chosen to line this walkway are tall, flowering plants that are either host or nectar plants for pollinators (ibid). The mix of different flower shapes and colours appeals to many different pollinators, but the plants have been carefully selected so that the overall design is harmonious. Fine textures, similar tones of green, and different shades of purple and yellow flowers help the wide variety of plants shown in figure 1 fit well with one another. The plantings are also organized on either edge of the walkway according to height, with shorter plants nearest to the path. This helps to make a landscape that might otherwise appear messy



FIGURE 1: The main walkway is brimming with a people-friendly flower show, which is happily also good for pollinators. (Gagliardi 2016)

look intentional. One aspect of this planting that is difficult to understand from any of the available images is how it appears in the winter. Sustainability Street receives the most use when classes are in session during the fall and winter terms. It may be beneficial to include a greater amount of evergreen plantings in the Sustainability Street plan than what is shown along the Smithsonian walkway in Figure 2.

### **MULTIPLE HABITAT TYPES**

Often, when we think of pollinators, we think of flowers. Pollinators, particularly butterflies and moths, however, require many different types of plants and habitat to thrive. The Smithsonian Pollinator Garden features different habitat types that are important to pollinators. The Smithsonian garden has a woodland habitat component, some planting that are more like meadows, and even some areas that are modeled after a vegetable garden (Gagliardi 2016). By splitting the garden into multiple habitat types, the Smithsonian garden is able to appeal to a wider variety of pollinators, and also can teach people about the roles that different habitats play for pollinators.

The woodland garden uses many native plant species, which are useful to a greater number of pollinators (Pollinator Garden 2016). While the native plant species in Washington D.C. are different than the native plant species that we find in south-western British Columbia, the principal of using natives to support pollinators is sound, and can be employed in the design for Sustainability Street.

### **INTERPRETIVE SIGNS**

The Pollinator Garden at the Smithsonian uses many interpretive signs to teach people about how the different plants and habitat types can support pollinators (Gagliardi 2016). Using interpretive signs on the Sustainability Street garden could help people learn more about pollinator and bird species, and would also indicate to students and other people passing through the site that a level of 'messiness' is an accepted, in fact required, component of this landscape.



FIGURE 2: The woodland portion of the Smithsonian Habitat Garden has a variety of trees that support moths, butterflies, and other pollinators are various stages of their lives.



FIGURE 3: Interpretive signs teach about pollinators, and also about how the landscape should look.

# Program: Sustainability Street (for butterflies, moths, and people)

Tamara Bonnemaïson

Sustainability Street serves as a showcase for how a streetscape can improve the urban environment in terms of energy, water, and waste (Sust. St. 2016). A secondary goal for Sustainability Street is to create wildlife habitat along this corridor (ibid). Aside from meeting its ecological goals, sustainability street must also serve the students, staff, and faculty of UBC. It serves as an important connection between student residences and Main Mall, and should provide a direct and enjoyable walking environment for students going to their classes. Recently, the University of British Columbia has recognized the importance of the built environment and natural areas on campus to the physical, emotional and mental health of UBC students (Built and Nat. Env. 2016). Sustainability Street represents an opportunity to explore ways that streetscape design can simultaneously improve the health of the environment and of people.

## HABITAT FOR BUTTERFLIES AND MOTHS

It is often possible to create habitat for multiple types of wildlife at once. For example, increasing habitat heterogeneity and structure tends to increase biodiversity (Beck 2013, Robinson 2004). Despite some general rules about wildlife habitat, certain species have very specific habitat needs that may be left out when designing for a different group of species. Species that have dramatically different life stages such as butterflies and moths can be particularly exacting in their habitat requirements, as they require different types of vegetation and structure at different stages. This Sustainability Street planting design aims to generally increase the habitat value for birds and pollinators on Sustainability Street, while ensuring that the needs of some key butterfly and moth species are fully met. The resulting planting design will create a biodiversity 'hot spot': a place on the UBC campus that harbours a high level biodiversity, with moth and butterfly biodiversity being a primary goal.

There are so many types of animals that are in need of habitat, so why choose butterflies and moths? These types of organisms were selected for this project for two main reasons. Firstly, butterflies (and even some moths and certain caterpillars) can bring a lot of joy to people. There is little that is more fascinating than the sight of a large, colourful butterfly perched on a flower. Butterflies are not seen very frequently on the UBC campus (personal observation) so the introduction of a site that is rich in butterflies could provide a unique amenity to students and other people on campus. Secondly, designing for butterflies and moths poses a challenging design problem. While adult butterflies or moths often require showy flowering species that are easy to include in a garden setting, this is not the case for their larvae. Many moth and butterfly caterpillars require a very specific host plant, and these host plants tend to be unattractive. For example, clouded sulphur (*Colias philodice*) caterpillars eat white clover (*Trifolium repens*) and the Isabella tiger moth's 'woolly bear' caterpillars eat nettles (*Urtica dioica*) and plantains (*Plantago* spp.) (Butterflies and Moths of N.A. 2016). These are hardly plant species that most gardeners wish to highlight! To make matters worse, a truly great butterfly and moth garden provides food for a high number of caterpillars - resulting in a garden filled with chewed leaves and possibly even caterpillar tents. A butterfly and moth garden challenges the designer to find ways of making messy and perhaps even ugly plants fit into an aesthetically-pleasing landscape.

## DIVERSITY OF HABITATS

The overall design for Sustainability Street creates a range of habitat types on the site. By doing so, it is hoped that the landscape will be useful to many types of wildlife (Mooney, n.d.). Like the Smithsonian Pollinator Garden, the Sustainability Street planting has a flowering walkway that forms the spine of the design. A deciduous forest, meadow, dense swale, and oak understory joins the walkway to create a landscape with many habitat patches. Within some of these patches, higher habitat potential is created by incorporating a diversity of structures (Robinson 2004). The Sustainability Street planting design prescribes the full range of plant heights, from short grasses to large trees, and nearly every size in between.

## PLACES FOR PEOPLE

The planting plan for Sustainability Street aims to provide places that will be both educational and enjoyable for the people who use the site. One of the most important 'people places' on the site is Sustainability Street itself. This street is busy with students coming and going from class, and is experienced by many people. The goal for the edges of Sustainability Street are to create valuable habitat for butterfly and moth species, while creating a restorative garden atmosphere for the students who use the site all year long. In order to ensure that Sustainability Street fits into the existing context of the University, a row of evergreen shrubs lines both sides of the street. This creates an 'orderly frame' for the wilder looking plantings on the site, and also employs the UBC campus vernacular to ensure that the plantings are accepted and favoured by people walking through (Nassauer 1995). These shrubs, *Lonicera ligustrina* var *pileata* and *Gaultheria shallon*, are commonly found in landscape plantings throughout the campus, and are also important host plants for spring azure butterflies and hummingbird clearwing moths (BAMONA 2016). Flowering borders are positioned in front of and behind these evergreen frames. The deciduous flowering species are selected for their preference by butterfly and moth species, as well as by their complementing colour, texture, and flowering times. A mix of complementary purple and yellow flowers lines Sustainability Street to the south-west. At the centre of the Street, a purple and pink palette takes over, transitioning to a bright pink composition along the north-east edge of the street. Throughout the flowering borders, ray flowers contrast with the spiky flower shapes of goldenrod, *liatris*, and *salvia*, or with the flat-topped umbels of *eupatorium* and *sedum*.

While the Sustainability Street plantings are meant to be enjoyable to people passing through the site, two spaces are designed to be used for longer periods of time. The first is a deck under the existing oak tree on the south corner of the site. This deck is placed so that it takes advantage of the canopy offered by the oak, and so that it nestles into shrubbier plantings along its north side. These shrubs not only provide a windbreak to people (or butterflies!) using the deck, but also create a condition of prospect-refuge by allowing people on the deck to be partially hidden but to still have views out to people passing along the sidewalk (Kaplan and Kaplan 1998). The plant species chosen for the oak understory and deck edges have finely-textured, glossy green leaves to complement those of the oak tree. These species flower with light pink or deep purple blossoms that are richly-scented, and will draw both people and pollinators to this space.

The second space that is designed for longer use is the meadow. The meadow is potentially the most restorative space in this landscape, as it is surrounded on most sides by natural features and provides extent through its relatively large size and sweeping form (Kaplan and Kaplan 1998). Being surrounded by nature has deeply therapeutic effects for people, and can be particularly beneficial to people who are mentally overwhelmed, as is common in a university setting (Kaplan 1995). Honeysuckle vines are planted along the edges of the neighbouring agricultural building to add to the sense that one is in a relaxing, natural space that is removed from the hustle and bustle of campus life. Flowering

amelanchiers and large boulders provide focal points, and also draw attention to the passageways into or out of the meadow. These boulders are moved from their existing location on site, and are fitted with slow drip emitters so that they create drinking spots for butterflies and other pollinators. The boulders are placed so that they are easily visible by people walking along the granite stepping stones or seated at one of the benches in the meadow.

## **BUTTERFLY MEADOW**

The meadow is a restorative place for people, and it's also a refuge for butterflies. Butterflies are unable to fly in cold weather, as they are ectotherms and require the sun to warm their muscles for flight (Lamb, Chambers and Allen 2002). They also require shelter from the wind to be able to fly freely (ibid). The planting plan at Sustainability Street employs shrubs and small trees that block the wind on the north side of the meadow, creating sunny sheltered locations for pollinators, and also for people. The meadows are planted with grasses and flowering herbs that are important host and nectar plants for the butterfly and moth species targeted in this design (see Appendix 1). The species selected for the meadow are also all drought-tolerant, grow easily, can handle some mowing, and bloom in tones of pink, purple, and white.

## **DECIDUOUS FOREST**

Few people think of forest when they think of butterflies and moths, yet many species from the Lepidoptera require trees and shrubs during their larval stage (Lamb, Chambers and Allen 2002). A mostly deciduous forest structure was chosen for the east corner of Sustainability Street planting design. This forest contains fast-growing tree species such as red alder and black hawthorn, which are important caterpillar foods during the growing season (Mooney 2016). Providing for an abundance of caterpillars is not only good for butterfly and moth diversity; it also supplies an important food source for the many bird species that feed caterpillars to their young (ibid). The forest designed for this project is modelled after the designed deciduous forests described by Robinson (2004). The edges of these forests are planted with lower species that signify the woodland edge, including creeping snowberry and salal. Deeper within the forest patch, larger shrub and tree species such as cascara and hawthorn create over-wintering habitat for butterflies, offer winter berries for birds, and provide pollen-rich early spring flowers to pollinators.

## **SWALE**

A 6" layer of topsoil is added to the existing swale, which is then planted with sword ferns, dogwoods, and willow species that can handle fluctuating water levels. The edges of the swale are planted with species that require a little more moisture than those used on much of the site. These species, including spreading dogbane and showy milkweed, are important to the larval stages of many of our native butterflies (BAMONA 2016). This planting proposal is carried out under the assumption that the swale continue to be used for its purpose of rainwater management, and that ideally it be connected to a greater volume of rainwater runoff, by routing downspouts from neighbouring buildings into the swale. Doing so will have the dual environmental benefit of cleaning and infiltrating more stormwater and supporting a greater variety of plant species on site.

## **MAINTENANCE**

One major criteria for the Sustainability Street planting design is that it should be low-maintenance. Two strategies have been used to achieve this goal. Firstly, dense shrubs and canopy plantings are used in the forest habitat and along the edges of the meadow and oak understory plantings. These dense

plantings will out-compete weeds, and do not require any on-going pruning, fertilizer, or irrigation. The shrubs and trees in this section are expected to change over time as natural succession occurs. Thus, spontaneous re-seeding of fast-growing *Alnus* or other forest species should be encouraged, and this approach should save on time spent 'weeding' this section of the garden. Secondly, the meadow is grown from seed, and can inexpensively re-seeded when it occasionally requires rejuvenation. All that is required of the meadow is a mowing every second year (explained in more detail below). The meadow should be allowed to be colonized by weeds, as many weeds are of benefit to pollinator species. When the meadow begins to appear too disorderly, it can be tilled under and re-seeded.

The flowering border along Sustainability Street will require the highest level of care, as it will need to be cut back each winter. The yearly maintenance activities are listed below.

**EARLY SPRING:** Seed meadow (re-seed every 5-6 years)  
Cut back spent flowers on Sustainability Street

**SUMMER:** Irrigate plantings on Sustainability Street; irrigate newly-established plantings  
Cut back spent flowers on sustainability street, if second-flush desired

**AUTUMN:** Selectively cut back flopping/unnattractive flowering perennials in flowering border (best)  
OR  
Cut back all flowering perennials in flowering border (least maintenance approach)

**WINTER:** Mow ½ of the meadow (only mow either the portion to the east of the pathway, or the portion to the west of the pathway, each year. This is important so that pollinators that are overwintering on the grass stalks and spent flower heads are not all killed)  
Prune old branches from *Cornus stolonifera*  
Prune all willows to 30 cm.

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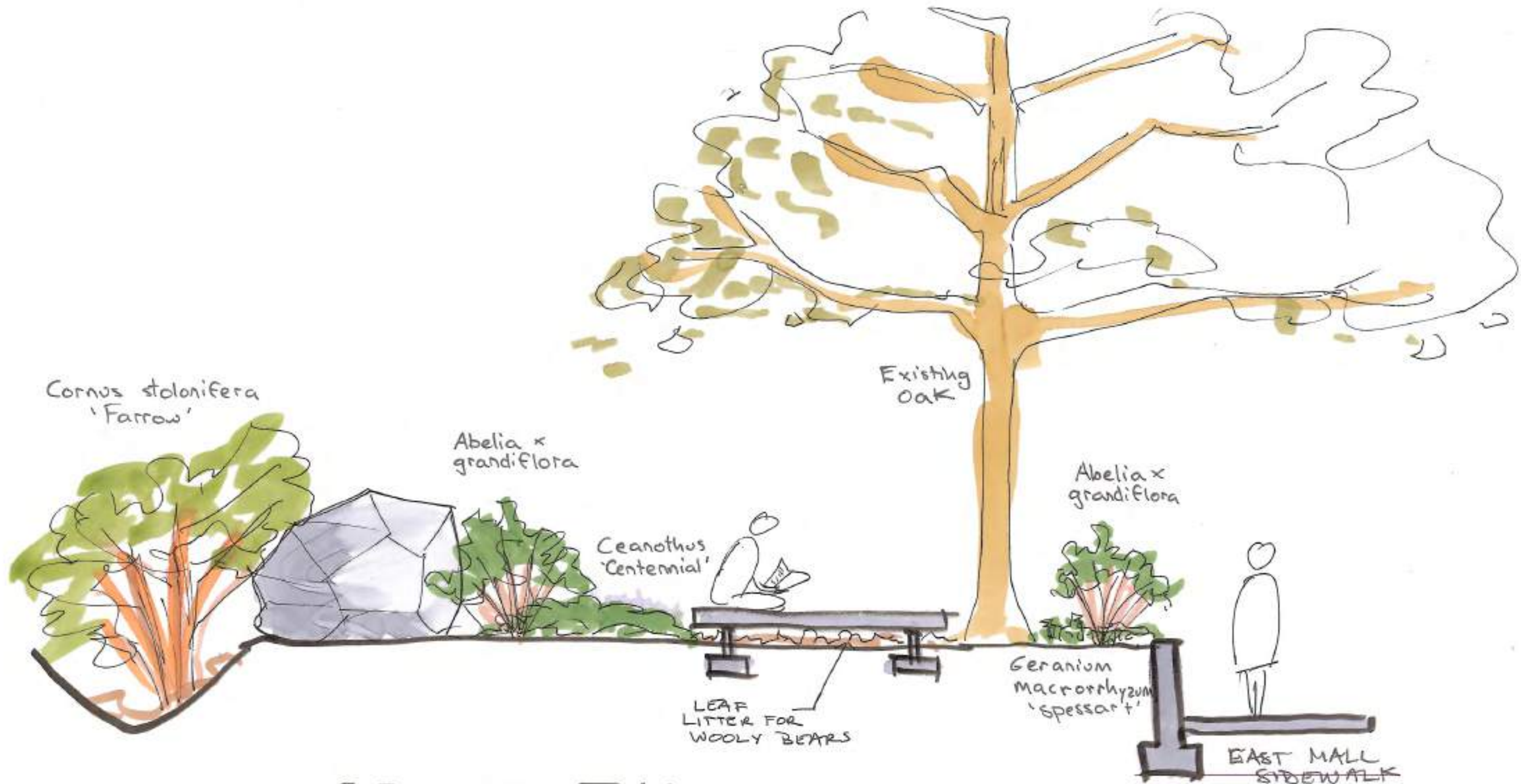
- MEADOW GROUNDCOVER
- GROUND COVER
- DECIDUOUS CANOPY
- EVERGREEN BARRIER
- EVERGREEN CANOPY 1:100
- DECIDUOUS BARRIER
- DECIDUOUS BAFFLE
- DECIDUOUS SCREEN
- EVERGREEN SCREEN
- DECIDUOUS FLOWERING BARRIER

# MASSING DIAGRAM

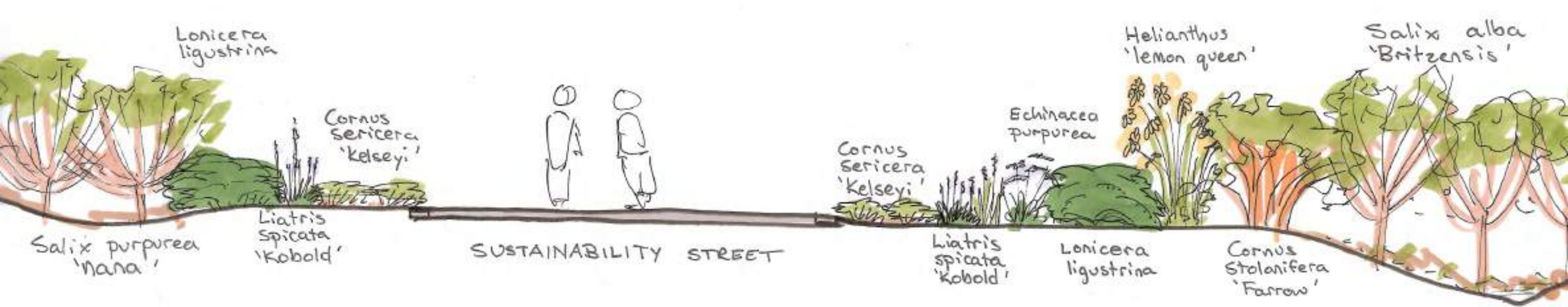
SUSTAINABILITY STREET PLANTING PLAN  
 TAMARA BONNEMAISON  
 TAMARA BONNEMAISON





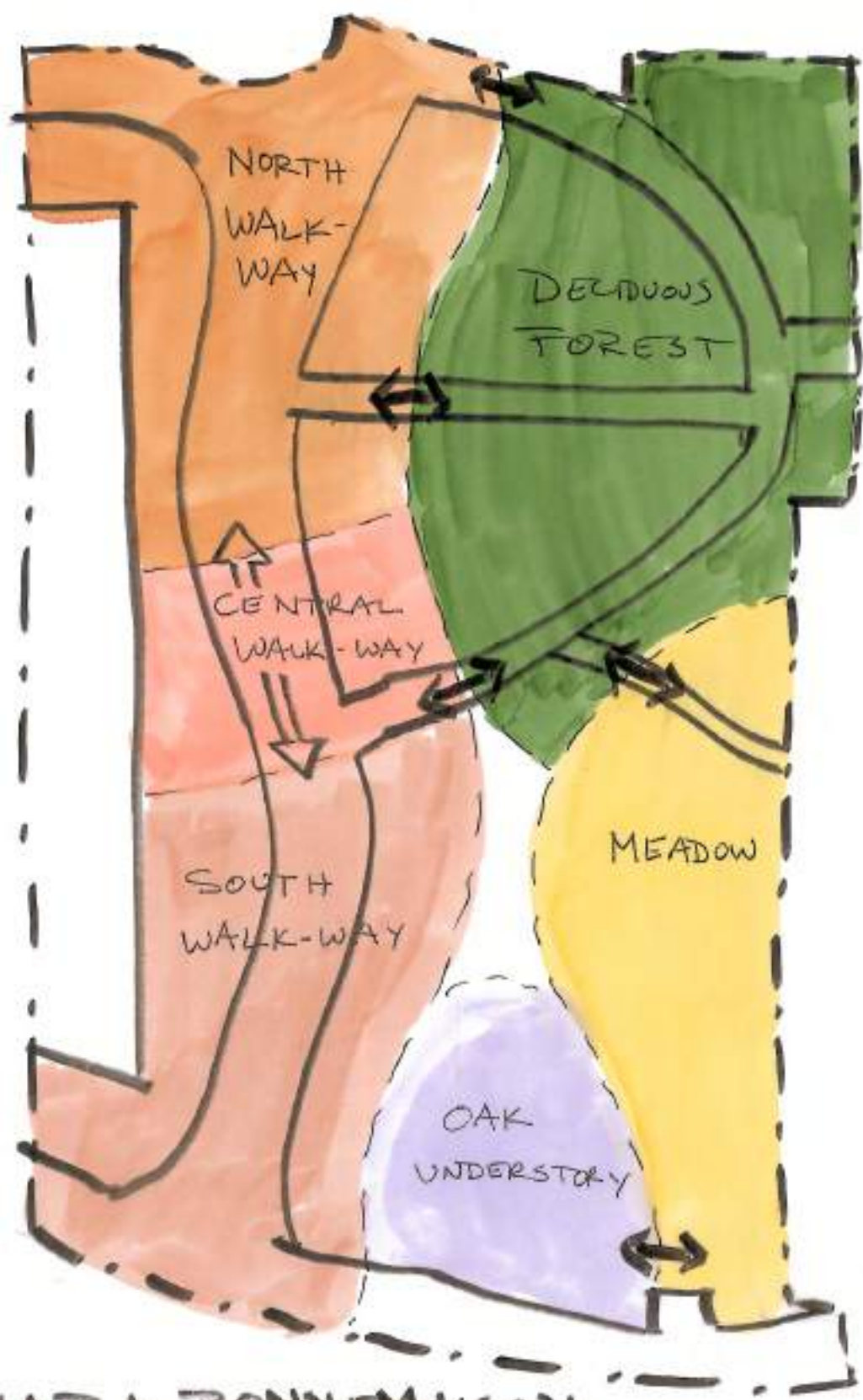


SECTION THROUGH OAK UNDERSTORY DECK  
TAMARA BONNEMAISON  
1:50



SECTION THROUGH S. WALKWAY  
TAMARA BONNEMAISON 1:50

# SPATIAL DIAGRAM



TAMARA BONNEMAISON

NORTH WALKWAY  
early bloom

mid-season bloom

late bloom



*Aster novae-angliae* 'Harrington's Pink'  
New England aster



*Echinacea* 'sensation pink'  
pink coneflower



*Sedum* 'Autumn joy'



*Eupatorium purpureum*  
joe pye weed



*Epimedium x rubrum*  
barrenwort



*Monarda* 'Raspberry Wine'  
'Raspberry wine' beebalm



*Phlox subulata* 'Scarlet flame'  
creeping phlox



*Ribes sanguineum*  
red flowering currant



*Holodiscus discolor*  
oceanspray



*Cornus sericera* 'kelseyi'  
Kelsey's dwarf dogwood



*Gaultheria shallon*  
salal

CENTRAL WALKWAY  
early bloom

mid-season bloom

late bloom



*Aster x frikartii* 'Jungfrau'  
Frikart's aster



*Echinacea purpurea*  
purple coneflower



*Liatrix spicata* 'Kobold'  
dense blazing star



*Monarda 'bradburniana'*  
Eastern beebalm



*Eupatorium purpureum*  
joe pye weed



*Phlox subulata* 'Pink'  
creeping phlox



*Ribes sanguineum*  
red flowering currant



*Alcea rosea* 'halo blush'  
halo blush Hollyhock



*Lonicera fragrantissima*  
winter honeysuckle



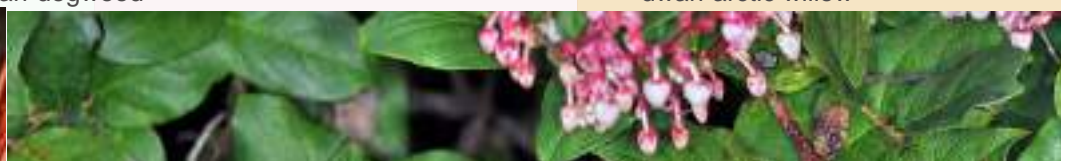
*Cornus sericera* 'kelseyi'  
Kelsey's dwarf dogwood



*Salix purpurea* 'nana'  
dwarf arctic willow



*Cornus stolonifera* 'Farrow'  
arctic fire dogwood



*Gaultheria shallon*  
salal

SOUTH WALKWAY  
early bloom

mid-season bloom

late bloom



*Liatris spicata* 'Kobold'  
dense blazing star



*Salvia x sylvestris* 'Mainacht'  
Violet meadow sage



*Monarda* 'bradburniana'  
Eastern beebalm



*Phlox subulata* 'emerald blue'  
creeping phlox



*Helianthus* 'lemon queen'  
perennial sunflower



*Solidago rugosa* 'Fireworks'  
rough-stemmed goldenrod



*Aster x frikartii* 'Mönch'  
Frikart's aster



*Lonicera ligustrina* var *pileata*  
privet honeysuckle

*Cornus sericera* 'kelseyi'  
Kelsey's dwarf dogwood



*Salix purpurea* 'nana'  
dwarf arctic willow

*Cornus stolonifera* 'Farrow'  
arctic fire dogwood

*Salix alba* 'Britzensis'  
Coral Bark Willow

OAK UNDERSTORY  
early bloom

mid-season bloom

late bloom



Ceanothus 'Victoria'  
'Victoria' California lilac



Ceanothus 'Centennial'  
'centennial' california lilac



Salvia x sylvestris 'Mainacht'  
Violet meadow sage



Abelia X grandiflora  
glossy abelia



Urtica dioica  
stinging nettle



geranium macrorrhizum 'spessart'  
'spessart' cranesbill



Cornus stolonifera 'Farrow'  
arctic fire dogwood



Salix alba 'Britzensis'  
Coral Bark Willow



Existing oak



MEADOW SEED MIX  
early bloom

mid-season bloom

late bloom



*Achillea millefolium* 'lilac beauty'  
lilac beauty yarrow



*Hesperis matronalis*  
Dame's rocket



*Daucus carota*  
Queen Anne's lace



*Plantago lanceolata*  
ribwort plantain



*Lupinus perennis*  
perennial lupin



*Trifolium pratense*  
red clover



*Trifolium repens*  
white clover



*Centaurea cyanus*  
bachelor's buttons



*Festuca idahoensis*  
Idaho fescue



*Stipa tenuissima*  
Mexican feather grass

MEADOW PLANTED  
early bloom



*Lonicera tatarica* 'honeyrose'  
honeyrose honeysuckle



*Apocynum cannabinum*  
spreading dogbane



*Symphoricarpos albus*  
snowberry



*Asclepias speciosa*  
showy milkweed



*Symphoricarpos mollis*  
creeping snowberry



*Ribes sanguineum*  
red flowering currant



*Amelanchier x grandiflora* 'Autumn Brilliance'  
Autumn brilliance serviceberry



*Cornus stolonifera* 'Farrow'  
arctic fire dogwood



*Salix alba* 'Britzensis'  
Coral Bark Willow

mid-season bloom

late bloom

DECIDUOUS FOREST  
early bloom



Ribes sanguineum  
red flowering currant



Epimedium x rubrum  
barrenwort



Rhamnus purshiana  
cascara



Lonicera fragrantissima  
winter honeysuckle



Salix alba 'Britzensis'  
Coral Bark Willow



Crataegus douglasii  
black hawthorn



Amelanchier x grandiflora 'Autumn Brilliance'  
Autumn brilliance serviceberry



Alnus rubra  
red alder



Pinus contorta var. contorta (existing + 1)

mid-season bloom



Symphoricarpos mollis  
creeping snowberry

late bloom



Gaultheria shallon  
salal



Polystichum munitum  
sword fern

# APPENDIX 1: TARGET BUTTERFLY AND MOTH SPECIES

## HOST PLANTS

### Clouded Sulphur



*Trifolium repens*  
white clover

### Mourning Cloak



*Ulmus americana*  
American elm



*Populus tremuloides*  
trembling aspen



*Salix* spp.  
willows

### Spring azure



*Cornus* spp.  
Dogwoods



*Rhamnus* spp.  
buckthorn



*Arbutus* spp.  
madrone



*Gaultheria shallon*  
Salal



*Holodiscus discolor*  
oceanspray



*Prunus* spp.  
cherry/plum

## NECTAR PLANTS



*Vicia cracca*  
cow vetch



*Securigera varia*  
crown vetch



*Asclepias* spp.  
milkweeds



*Apocynum cannabinum*  
spreading dogbane



*Buddleja* spp.  
butterfly bush



*Zinnia* spp.  
zinnias



*Asclepias* spp.  
milkweeds



*Sinapis arvensis*  
wild mustard



*Ceanothus*  
California lilac



*Prunus* spp.  
cherry/plum



*Salix* spp.  
willows

# HOST PLANTS

Isabella tiger moth (woolly bear)  
*Pyrrharctia isabella*



Grasses (ie *Stipa tenuissima*)



*Urtica dioica*  
 stinging nettle



*Plantago* spp.  
 plantains

Painted Lady



*Cirsium* spp.  
 thistles



*Alcea* spp.  
 Hollyhocks



*Helianthus* spp.  
 sunflowers



*Anaphalis margaritacea*  
 pearly everlasting

Common wood nymph



Grasses (ie *Stipa tenuissima*)

# NECTAR PLANTS



*Asclepias* spp.  
 milkweeds



*Zinnia* spp.  
 zinnias



*Aster* spp.  
 Asters



*Prunus* spp.  
 cherry/plum



*Echinacea purpurea*  
 purple coneflower



*Mentha* spp.  
 garden mint



*Helianthus* spp.  
 sunflowers



*Echinacea purpurea*  
 purple coneflower



*Erigeron* spp.  
 fleabane



*Clematis* spp.  
 clematis



*Penstemon* spp.  
 penstemon

# HOST PLANTS

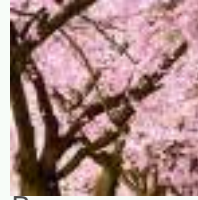
## Hummingbird Clearwing Hemaris thysbe



Apocynum spp.  
dogbane



Craetagus douglasii  
black hawthorn



Prunus spp  
cherry/plum



Lonicera spp.  
honeysuckle



Symphoricarpos spp.  
snowberry

## Western Tiger Swallowtail



Acer macrophyllum  
bigleaf maple



Populus tremuloides  
trembling aspen



Salix spp.  
willows

# NECTAR PLANTS



Lonicera japonica  
japanese honeysuckle



Trifolium pratense  
red clover



Symphoricarpos spp.  
snowberry



Phlox spp.  
phlox



Monard spp.  
bee balm



Vicia spp.  
vetch



Cirsium spp.  
thistles



Asclepias spp.  
milkweeds



Lonicera japonica  
japanese honeysuckle



Philadelphus lewisii  
mock orange



Asclepias spp.  
milkweeds



Lavendula spp.  
lavender



Cirsium spp.  
thistles



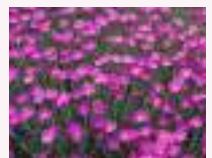
Rhododendron



Syringa vulgaris  
lilac






Verbena

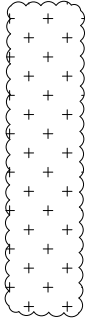


Dianthus

# PLANT LIST

Symbol	Key	Qty	Botanical/ Common Name	Size	Notes
Trees & Large Shrubs <sup>+</sup>					
AR	1		<i>Alnus rubra</i> / red alder	5cm cal	B&B
RP	2		<i>Rhamnus purshiana</i> / cascara	5cm cal.,	B&B
CD	3		<i>Craetagus douglasii</i> / black hawthorn	5cm cal.	B&B
PC	1		<i>Pinus contorta</i> var. <i>contorta</i> / shore pine	200 cm tall	B&B
PM	2		<i>Prunus emarginata</i> / Oregon cherry	5cm cal.	B&B
AG	9		<i>Amelanchier x grandiflora</i> 'Autumn Brilliance' / Autumn brilliance serviceberry	#5 pot	specimen
Shrubs					
Csk	0		<i>Cornus sericera</i> 'Kelseyi' / Kelsey's dwarf dogwood	preserve exist.	
Agr	17		<i>Abelia X grandiflora</i> / glossy abelia	#2 pot	
Gs	22		<i>Gaultheria shallon</i> / salal	#2 pot	
Sa	10		<i>Symphoricarpus albus</i> / snowberry	#2 pot	
 Sm	570		<i>Symphoricarpus mollis</i> / creeping snowberry	#1 pot	600 o.c.
Hd	4		<i>Holodiscus discolor</i> / oceanspray	#2 pot	
Lf	9		<i>Lonicera fragrantissima</i> / winter honeysuckle	#2 pot	
LI	95		<i>Lonicera ligustrina</i> var. <i>pileata</i> / privet honeysuckle	#1 pot	
Ac	13		<i>Apocynum cannabinum</i> / hemp dogbane	#1 pot	
Rs	13		<i>Ribes sanguineum</i> / red flowering currant	#1 pot	
Sp	0		<i>Salix purpurea</i> 'nana' / dwarf arctic willow	Preserve exist.	
Csf	23		<i>Cornus stolonifera</i> 'Farrow' / arctic fire dogwood	#1 pot,	
Sal	17		<i>Salix alba</i> 'Britzensis' / coral bark willow	1m stake	plant 800 deep
Cv	5		<i>Ceanothus 'Victoria'</i> / Victoria California lilac	#2 pot	
Cc	19		<i>Ceanothus 'Centennial'</i> / prostrate california lilac	#1 pot	
Vines					
Lt	18		<i>Lonicera tatarica</i> 'Honeyrose' / honeyrose honeysuckle	#2 pot staked	full
Perennials / groundcovers					
ep	12		<i>Echinacea purpurea</i> / coneflower	#2 pot	500 o.c.
es	20		<i>Echinacea 'sensation pink'</i> / pink coneflower	#2 pot	500 o.c.
ls	471		<i>Liatris spicata</i> 'Kobold' / dense blazing star	#1 pot	200 o.c.
sr	40		<i>Solidago rugosa</i> 'Fireworks'	#1 pot	400 o.c.
ut	15		<i>Urtica dioica</i> / stinging nettle	#1 pot	400 o.c.
sa	11		<i>Sedum 'autumn joy'</i> / autumn joy sedum	#1 pot	200 o.c.
mr	3		<i>Monarda 'raspberry wine'</i> / raspberry wine beebalm	#2 pot.	200 o.c.
mb	54		<i>Monarda 'bradburniana'</i> / Eastern beebalm	#2 pot.	200 o.c.
hl	18		<i>Helianthus 'lemon queen'</i> / perennial sunflower	#2 pot.	500 o.c.
as	35		<i>Asclepias speciosa</i> / showy milkweed	#2 pot.	500 o.c.
up	17		<i>Eupatorium purpureum</i> / joe pye weed	#2 pot.	500 o.c.
pss	13		<i>Phlox subulata</i> 'Scarlet flame' / scarlet creeping phlox	#1 pot.	200 o.c.
psp	6		<i>Phlox subulata</i> 'pink' / pink creeping flox	#1 pot.	200 o.c.
pse	28		<i>Phlox subulata</i> 'emerald blue' / blue creeping flox	#1 pot.	200 o.c.
 er	661		<i>Epimedium x rubrum</i> / barrenwort	#1 pot.	600 o.c.
an	84		<i>Aster novae-anliae</i> 'Harrington's Pink' / New England aster	#1 pot.	400 o.c.
afj	18		<i>Aster frikatii</i> 'Jungfrau' / jungfrau Frikart's aster	#1 pot.	400 o.c.
afm	27		<i>Aster frikatii</i> 'Monch' / monch Frikart's aster	#1 pot.	400 o.c.
ar	1 packet		<i>Alcea rosea</i> 'halo blush' / halo blush hollyhock	Seed in early winter	
ss	112		<i>Salvia sylvestris</i> 'Mainacht' / violet meadow sage	#1 pot.	400 o.c.
 gm	972		<i>Geranium macrorrhizum</i> 'spessart' / cranesbill	#1 pot	200 o.c.
pm	54		<i>Polystichum munitum</i> / sword fern	#2 pot	500 o.c.

# MEADOW MIX

Symbol	Key	Botanical/ Common Name	% of mix	# Seeds/100 g.	Total needed (32 m2)
	Meadow Mix	<i>Dauca carota</i> / Queen Anne's lace	15	700	.82
		<i>Trifolium repens</i> / white clover	5	600	.32
		<i>Trifolium pratens</i>	10	750	.51
		<i>Plantago lanceolata</i>	5	350	.55
		<i>Achillea millefolium</i> / common yarrow	10	6000	.06
		<i>Lupinus perennis</i> / perennial lupin	15	45	12.8
		<i>Hesperis matronalis</i> / dame's rocket	5	700	.55
		<i>Festuca idahoensis</i> / Idaho fescue	10	3000	.06
		<i>Stipa tenuisima</i> /Mexican feather grass	5	3000	.06

Note: Mix with an inert carrier such as rice hulls in order to facilitate an even spreading over entire area.