Valuing Vacancies: temporal productive revitalisation of neglected land

Neglected or underutilised spaces in cities have never been as important as they are today as land is consumed by rapid urbanisation. Landscape architects have been transforming these sites into public places, an example being the repurposing of a disused rail line to create the High Line in New York, testimony to the inherit opportunity that brownfield sites possess. However, these projects require a significant capital injection making them unsuitable for the South African context. This presents an opportunity for an alternative landscape revitalisation model.

This project creates a new landscape architectural model to utilise temporary vacant sites within the urban realm- sites with high land value. This model is based around productive landscapes for growing food and has the potential to address some key challenges that cities face: food insecurity, recreational deficits, limited job opportunities and limited education regarding the production of food.

The project draws inspiration from the unrestrained beauty of the weedscapes that have colonised derelict sites in the foreshore for the past 80 years and been responsible for the transformation of dredged beach sand into fertile soils, rich in opportunity for temporal productivity. The currently vacant site is located within the reclaimed foreshore of Cape Town's CBD and will act as a pilot site for further initiatives within the city. The abundance of vacant land parcels adjacent to the Port of Cape Town has the ability to provide temporary productive landscapes and initiate new pedestrian linkages to the Waterfront precinct.

The project utilises a methodology that begins with detailed transects showing existing relationships between plant communities and the material and soils of the derelict site. It additionally uses the inherit seasonal aesthetic potential that weeds possess, merging it with productive planting compositions and perennial plantings inspired by Piet Oudolf.

Michael Wood
Masters in Landscape Architecture .
2016/12/07
Valuing vacancies : Temporal productive revitalisation of neglected land.

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University of Cape town

Faculty of Engineering and Built environment

School of architecture, planning and Geomatics

University of Cape town

Rondebosch , Cape Town . 7701

Telephone 1: 27 (0)21.

Telephone 2 : 27

Telephone 3 : 27 (0) 21

Dissertation presented as part fulfilment of the degree of masters of Landscape Architecture.

In the school of Architecture, planning and Geomatics

University of Cape town, November 2016.

Sponsored by the National Research Foundation

Sustainable and Renewable Energy scholarship.

Michael Wood .

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APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		Michael Wood
Department		EBE
Preferred email address of applicant:		Wood.mikey@gmail.com
If a Student	Your Degree (e.g., MSc, PhD, etc.)	Bac LArch
	Name of Supervisor (if supervised):	Julian Raxworthy
If this is a research contract, indicate the source of funding/sponsorship		Click here to enter text.
Project Title		Urban agriculture.

I hereby undertake to carry out my research in such a way that:

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
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SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	Michael Wood	Signed	10 Jun 2016

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	Julian Raxworthy	Signed	10 Jun 2016
HOD (or delegated nominee) *Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduate research (including Honours).*	PROF TOMA BERMAN Click here to enter text.	Signed	Click here to enter a date.
Chair : Faculty EiR Committee *For applicants other than undergraduate students who have answered YES to any of the above questions.*	Click here to enter text.		Click here to enter a date.

Page 1 of 1

Valuing vacancies: Temporal productive revitalisation of neglected land

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This project will endeavour to create a new landscape architectural model to utilise temporary vacant sites within the urban realm- sites with high land value. This model is based around productive landscapes for growing food and has the potential to address some key challenges that cities face, including but not limited to recreational deficits, limited job opportunities and limited education regarding the production of food.

The project draws inspiration from the unrestrained beauty of the weedscapes that have colonised derelict sites within the foreshore for the past 79 years and been responsible for the transformation of dredged beach sand into fertile soils, rich in opportunity for temporal productivity. The currently vacant site is located within the reclaimed foreshore of Cape Town's CBD and will act as a pilot site for further initiatives within the city. The abundance of vacant land parcels adjacent to the Port of Cape Town has the ability to provide temporary productive landscapes and initiate new pedestrian linkages to the Waterfront precinct.

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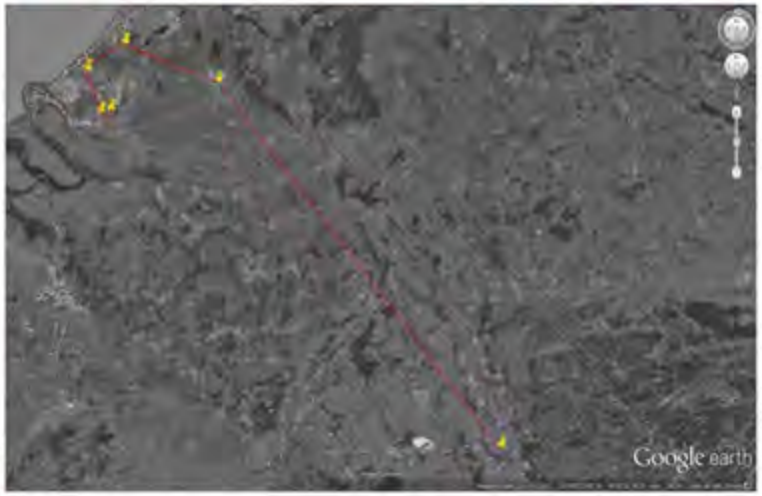
Michael Wood
2016/11/25
MLA
















Urban Agriculture study
Masters- Landscape Architecture

Michael Wood
WDXMIC011

Contents page

Travel log of Urban Agriculture innitiatives in Europe and contextualising them within the City of Cape Town

Introduction

Urban Agriculture (UA) is the practice of growing food within urban environments. UA was formerly regarded as a response to food scarcity, however is increasingly being utilised in an attempt to prevent the aforementioned predicament through closed-loop, no-waste cultivation systems. Such systems have been found to provide mitigation to some of the pressing issues in cities, such as decreasing the urban heat island effect and decreasing the distance between areas of growth and consumption, all the while providing visual amenity to the inhabitants of the city. It additionally provides benefits in the domains of public health as well as education (Bohn & Viljoen, 2013).

The United Nations has estimated that by 2050 over 66% of the world's population will be living in urbanised conditions (United Nations, 2014). It is thus imperative that one's perception of cities must alter. They must no longer be thought of as parasites- merely consuming and producing waste (Broto, Allen & Rapoport, 2012) but instead self-reliant entities which have a symbiotic relationship with urban ecosystems. In many first world countries, UA is becoming increasingly popular for a number of reasons. As stated by European urban planners, it is becoming more important to meet a significant number of society's needs on limited parcels of urban land (Deelstra, Boyd & Biggelaar, 2001). As a result of such, there are currently a number of UA initiatives operating in Europe. Following thorough research I discovered that the city of Cape Town has relatively large pieces of vacant land. Urban needs of the city include appropriate jobs, management of public green space, appropriate ecosystem services, education, therapeutic work, urban water management, climate control, the improvement of water, soil and air quality as well as waste treatment and management (de Graaf, 2013). It therefore became evident to me that Cape Town, much like the cities I researched in Europe, has a great need for comprehensive temporary land-use plans which encompass food production as well as socio-economic structures which are able to assist with the aforementioned demands of the city (May & Rogerson, 1995). In addition, UA can be viewed as a vital component in achieving

sustainable cities, this being a colossal theme in the post-apartheid urban reconstruction era in which we currently find ourselves (Deelstra, Boyd & Biggelaar, 2001).

This document therefore aims to outline the process undertaken to design an UA initiative appropriate for a South African context, specifically the City of Cape Town. This region is considered to be appropriate for such an initiative as it reportedly faces massive socioeconomic challenges as a direct result of rapid urbanisation. Furthermore, the City of Cape Town is committed to investing in solutions that are sustainable in nature (Van Der Merwe, 2015). Having embarked on a trip through Europe with the sole intention to gain a deeper understanding of UA as a whole, an analysis of the various UA initiatives visited will therefore feature- this following a brief overview of my initial research on UA initiatives. The ways in which my understanding of UA were shaped and altered will also be mentioned- this in the form of a reflection on my travels and initial research.

Brief overview of initial research on UA initiatives

One may initially assume that UA is merely comprised of soil based cultivation systems situated in an urban context. However, it is instead far more complex. UA initiatives can essentially be considered on a wide spectrum of sorts, encompassing soil based cultivation, aquaponics, hydroponics, forest gardens and roof top gardens. Soil based cultivation can be considered to be the most accessible form as one may utilise existing resources, meaning that relatively low investment is required in start-up schemes. One should however be aware that a diverse range of knowledge is required to begin as well as manage these schemes, especially with regards to locating appropriate sites where such initiatives are able to manifest. Aquaponics and hydroponics are designed around the concept of closed-loop, nutrient flow cycles and refer to farming within a water based growing medium. The former initiative involves the farming of fish whilst the latter involves that of produce. A great deal of capital as well as specialised knowledge is however required to start and maintain these schemes. Forest gardens refer to soil-bound food forests which are considered to be somewhat self-managing. These gardens are based around small ecosystems and produce varied edible output. Roof gardens refer to the cultivation of produce, optimising the productive use of vacant space available on rooftops in urban environments. Each system is a

response to the current site conditions, feasibility of the project as well as the social dynamics and bottom up approaches that are often required to initiate such projects (de Graaf, 2013).

UA is essentially a successful example of how man and nature can symbiotically benefit from well managed urbanised biological systems. This is often the case in many of the community based UA initiatives that placed significance on enhancing biodiversity and ecological processes on site. These initiatives do not only provide food and recreation for the people involved, but also provide habitat for fauna living in urban environments. This therefore provides an important educational layer to the sites complexity as well as spaces which allow for natural processes to take place such as water infiltration. Urban bee keeping, also allows for the introduction of bees back into the city with direct benefits for pollination of trees and flowers in the city. UA can therefore be considered to have a vital role in increasing environmental functioning in cities (Bohn & Viljoen, 2013).

There has recently been a lot of focus on the idea of multifunctional land use where urban agriculture is combined with other land uses to further enhance its value. This can be seen in the case study of the Upper Bieslandse poulder in Delft. Through combining UA with other infrastructure and functions the results were environmental educational opportunities, health education facilities, recreational space and biodiversity enhancement (Deelstra, 2001). The use of vacant space for multifunctional land use accompanied with UA as a core component requires it to be integrated into city planning policy together with the alignment of various parties with vested interests. The Delft examples' success can be attributed to the alignment of various local and provincial stakeholders. Multifunctional land use that could potentially be incorporated into the city will differ significantly from site to site and will be directly driven by the needs of the people as well as lack of facilities in the area.

Analysis of the various UA initiatives visited

On my travels I visited a total number of 8 UA initiatives, 7 of which were located in the Netherlands with the remainder located in Germany. Leading experts were also consulted regarding UA from a city planning an international perspective. This enabled me to understand the projects planning and access to resources from a governmental perspective.

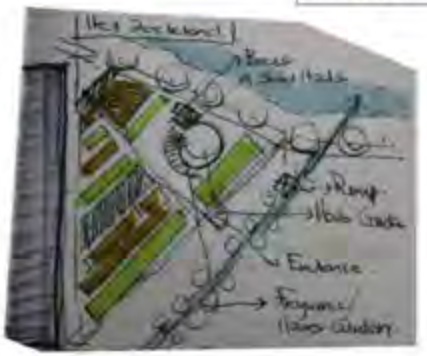
In order to gain a thorough understanding of the complexities as well as the significant differences that exist between the systems criteria had to be established that could be used when visiting projects. A core component of the study considered how innovative the project was in making use of lost or vacant space, space which is in abundance within the foreshore precinct of the city of Cape town . This space can, according to Trancik, be traced back to the modernist approach to city planning that viewed buildings as isolated objects that have no relationship to a greater urban system at play- a system that would generally comprise of pedestrian friendly streets, public squares and viable open space networks (Trancik, 1986). Due to the fact that one of the criteria I wished to assess involved the use of space as well as the overall experience of the project I experienced them from the perspective of a pedestrian navigating the city.

Soil based cultivation systems:

Project 1- **Hetzoeteland (Sweet land)**

Image obtained from google earth

Photos by Author



On site sketch

Photos by Author

Name of project	Hetzoeteland
Date assessed	20 June 2016
Location	Leiden, Netherlands
Scale of project	1750 sqm
Level of complexity	Simple community food garden
Date of origin:	2014
Driving force behind project	Jessica Zwartjies -Bio-dynamic gardener, teacher Mare college – Healthy school initiative
Urban contribution	Social / educational / health
Economic Model	Community Crowd funding / Donations
People benefitting	Middle class community, School children
Consumer class	Middle class
Revenue Sources	Participants in harvest
Replicability in CT	Yes
Status of Land	Lease on City owned land (Singel park) forming part of green corridor within a neighbourhood
Access	Neighbourhood location – Bicycle or car
Key activities	Communal harvesting
Value proposition	Social cohesion between residents of neighbourhood

Information on initiative:

Hetzoeteland is a community based UA initiative in the Dutch town of Leiden. The Project is coordinated by Jessica Zwaartjies. The project makes use of a parcel of land within a middle class residential area. The site is bordered to the North by an extensive green strip that runs through the neighbourhood as well as community sporting facilities to the South.

The project was initiated by the community living in the area who had a desire to produce their own organically grown vegetables. The city of Leiden assisted them in locating a parcel of land that they could make use of. The project currently has a temporary tenure agreement for a period of two years with the city. No formal infrastructure may thus be placed on the land.

There is currently a group of 100 donors involved who share in the costs associated in running and maintaining the project. They are all connected and well informed of the current situation of the garden- this being done through a weekly newsletter. Friday morning a letter is received by all involved that informs them of the quantity and type of vegetables that may be harvested on the day. The site also provides a pleasant and well maintained public space to the greater community who do not have to be directly involved to benefit from this project. Youth often visit the site to enjoy a beer and relax on one of the many benches scattered around the site.

The project also involves two bee keepers who make use of the site as a space to keep their hives. The bees make use of the herb and fragrance garden to gain nectar. This is a prime example of how man and nature can exist in a symbiotic relationship.

The project has permission from the city authority to draw water from a nearby canal in order to irrigate the crops. There is no permanent irrigation system and a hose pipe and pump currently does the job.

The project also provides educational opportunities to those who would like to gain knowledge regarding UA.

The project's success can be attributed to the fact that Jessica is looking for alternative land parcels to expand to as the number of donors is exceeding the lands ability to provide vegetables for all.

The project made an innovative use of land which otherwise would have been vacant and has turned it into a place of productivity, community building and green Publicly accessible space.

Hetzoeteland was funded on a crowd funding strategy.

Knowledge on UA gained:

Temporal nature of the site means that the planting palette consists primarily of annuals and biennials. Jessica hopes that the municipality of Leiden will in the near future provide her with more certainty regarding the land parcel that would enable her to start farming with perennials and include trees into the site design.

Relevance to South African context:

This project is relevant to the City of Cape town due to its temporality and well as the positive benefits that it provides to the surrounding area with regards to accessible green space. Due to South Africa's economic context, a small number of civilians will be able to contribute to funding. The project is thus relevant because everybody can enjoy the space regardless of whether they are able to contribute or not. The project also allows people living within high density residential areas to access land that they can use to produce organic produce. The project is also a good model that can be used to bring people together in a collective fashion to learn, grow and empower themselves.

Project 2 -**Die Stadswijnaard**

Image obtained from google earth

Photos by Author

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Name of project	Die Stadswijnaard
Date assessed	21 Jun
Location:	Den Haag, Netherlands
Scale:	5500sqm
Level of complexity	Medium – Specialised knowledge on grape cultivation
Date of origin	2012
Driving force behind project	Tycho Vermeulen
Urban contribution	Social / educational / job creation
Economic model	Crowd funding initiative in partnership with the city
People benefitting	Low income class upliftment
Consumer class	Middle class
Revenue sources	Courses / sales of wine / guided tours
Cost implications	Soil, vines, labour
Replicability in CT	NA / small scale – High costs involved
Status of Land	Temporary vacant – Rezoning of area
Access	Easy access – Close proximity to train station, bicycle route and main road
Key activities	Grape cultivation, harvest and production of wine
Value proposition	Wine production within an urban environment / education to make wine
Marketing	Sign boards on site / word of mouth

Information on initiative:

The idea of a space within an urban context where people can collectively practice viticulture was driven by a Tycho Vermeulen, a person with passion in horticulture. The project's economic model is based around the idea of pockets of available land being leased to people who have a vested interest in growing various cultivars of grapes within the city of Den Haag. The lessees also receive the necessary training required to successfully cultivate, harvest grapes as well as various processes required in the production of wine. The project comprises of a total of 650 grape vines of various cultivars. They however require 5 years to

mature before the first harvest can take place. The project is expected to yield up to 700 bottles of wine per growth season.

Although the project doesn't directly create employment opportunities, the courses that it provides in grape cultivation and wine making produce enough income that can be used to pay the cities social upliftment workforce that is contracted to maintain the land. The cities contractual agreement with the founder of the garden ensures the land can be leased free of charge but the project needs to hire the social upliftment work force.

The soil conditions on site are also nutrient deficient shallow soils and the project relies on the vines to be propagated in containers, this also informally suggests the informality and temporality of the intervention.

Various cultivars of Grapes in bags with specialised growing medium

The site is located within the inner harbour area of Den Haag that is surrounded by residential areas. The industrial zone is currently in the process of being rezoned and redeveloped by the city. The pocket of land that the project is located on will be the last to be developed. This project is therefore temporary in nature but requires the land to be undeveloped for a minimum of 5 years. Due to the nature of the site being within close proximity to residential area it makes it assessable to people loving within the city. The project is also located close to a main road, train station as well as bicycle route.

Knowledge on UA gained

The choice of crop in this particular project replies primarily on an extended time period. This particular UA does not result in quick results and requires a substantial initial capital injection which may only pay off over a period of 5 or more years. It is also not a good choice of UA that gives maximum benefits and job opportunities to the public.

Relevance to South African context:

Despite the Western Cape having an excellent climate for the cultivation of vineyards, this particular model is not one that I would find particularly relevant or feasible for the city of Cape Town. This as a result of the specialised knowledge required as well as the seasonal nature of grapes resulting in limited job creation opportunities. The initial years of grape cultivation do not result in "full bodied wines" (Vermeulen , 2012). Due to the temporal productive methodology that will be used when assessing sites within the foreshore this is not a viable crop as the vines are expected to be a minimum of 5 years old before the first harvest can be made. Although the production of wine in the city of Cape Town will not be a model which can be used to empower the underprivileged, the contractual agreement between the city and the garden founder is one that has merit and can successfully be implemented and brought forward in other UA initiatives that may be based around food production.

Project 3-**Uit Jou Eigen Stad**

Image obtained from google earth

On site sketch

Photos by Author

Name of project	Uit jou eigen stad
Date assessed	21 June 2016
Location	Old port area Rotterdam, Netherlands
Scale	7000sqm soil based, 1200sqm poly tunnel, 500sqm livestock, 400sqm glass house
Level of complexity:	Soil based food production sold/consumed in restaurant on site
Date of origin:	October 2012
Driving force behind Project	3 Partners – Bus, Johan , Tuibert
Urban contribution	Social / economical
Economic Model	Commercial Urban agricultural model
People benefitting	Middle class
Consumer Class	Middle class
Revenue sources	Events, sales at market, sales at on site restaurant and others, rental of meeting space
Cost implications	Labour, rent, production costs – Soil, seeds, energy
Replicability in CT	Yes. Revenue generated through market / restaurant makes project economically viable
Status of Land	Old railway depot – Port of Rotterdam
Access	Easy – Bicycle, car or tram.
Key activities	Various UA production technologies, restaurant, shop, market and gardening courses
Value proposition	Transparency between production and consumption, educational benefits to urban dwellers
Marketing	Social media, word of mouth

7000sqm Soil based

1200sqm Polytunnels

500sqm chicken coop

400sqm covered production space

Photos by Author

Information on initiative:

Uit jou eigen stad (UJES) is an UA initiative located within the old port of the city of Rotterdam. The initiative makes use of a post-industrial site to produce vegetables as well as live stock in the form of hens. UJES strives to reconnect city dwellers to their food systems through a transparent production consumption cycle. This is made possible through the diversity of activities that take place on site from growth in the form of simple soil based systems, poly tunnel technologies as well as café and restaurants that make use of the produce grown on site. The project can be viewed as a very successful UA initiative due to its nature of temporality converting a decommissioned railway yard into a thriving productive landscape within the urban realm. The site is leased from the city for a period of 10 years whilst the city is in the process of rezoning the land for future residential plans. The initiative strives to be seen as being organic in nature despite the fact that they are not able to get the

official organic certification due to the importation of soil to the site. The sites isolation has also been directly beneficial to the health of the urban farm as its isolation from other farms has decreased the chance of agricultural diseases.

As a result of the post-industrial nature of the site this particular project uses creativity and innovation to make use of the post-industrial warehouse infrastructure that now house Saturday markets as well as a café that sells produce directly from the site but also connects with a greater UA farming initiatives throughout the city as it also sources products from these initiatives

Knowledge on UA gained:

UJES is directly relevant to the proposed sites within he foreshore precinct of the City of Cape Town. Although the project is relatively complex and expensive if viewed as a complete system, the projects innovative way of using geotextiles and shallow imported soil to overcome the contaminated soils on site is a design methodology that will need to be employed to a certain degree on sites in the foreshore due to the soils infertile nature.

There is also a number of sites which are located alongside railway infrastructure within the port area of the city. The underground water of the foreshore sites will also be saline in nature similar to that of the above-mentioned project which means that additional water harvesting techniques need to be explored on sites within the foreshore precinct.

Furthermore, the importance of having a diversity of activities on site to assist in production costs became evident to me as this particular project in fact runs at a loss of 20 000 euros a year which is balanced by the income regenerated from the restaurant on site .The challenge this project would face is in developing an economically sustainable model where UA production is able to balance its own production costs while the restaurant generating surplus revenue streams which would enable the project to expand / invest in alternative green technologies which often incur substantial initial capital injection .

Relevance to South African context:

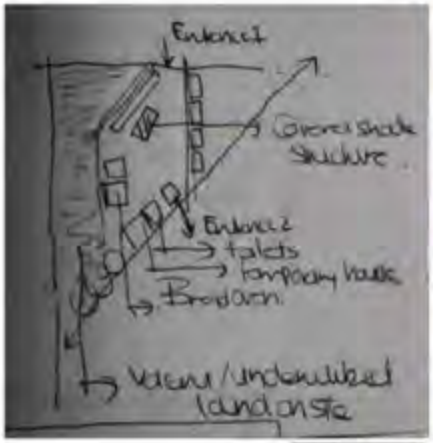
The projects location and industrial nature makes it an ideal precedent to be used to assess sites within the foreshore region of Cape Town.

The methodology employed on site to deal with contaminated soils needs to be explored as a means to produce vegetables on reclaimed sandy soils. The temporal nature of the project is also an idea which I feel is relevant to the ideas that I have for sites within the city of Cape Town. UJES can also be viewed as a project that innovatively makes use of existing site resources to maximize its profit and marketability.

Project 4- **Neuland Koln**

Image obtained from google earth

Photos by Author



On site sketch

Brochure obtained from site

Name of project	Neuland
Date assessed	16 June 2016
Location	Cologne, Germany
Scale	5760 sqm
Level of complexity	Simple temporary community garden
Date of origin	3 July 2011
Driving force behind project	Thomas Eichert
Urban contribution	Social / temporal productivity of Vacant land
Economic Model	Temporal free land to be used by citizens
People benefitting	Middle / low income
Consumer class	Middle / low income classes
Revenue sources	N/A. Citizens manage their own produce.
Cost implications	N/A – Simple soil based planter boxes
Replicability in CT	Yes – simple soil based production techniques as well as sites design around that of temporality
Status of Land	Temporal vacant land owned by provincial government
Access	Easy to access via bicycle, walking or car
Key activities	Growing of organic produce, small café on site
Value proposition	Productive temporal use of vacant land within the city
Marketing	Newsletters, banners on site, social media, website

Information on initiative:

The Neuland UA initiative is located in the city of Cologne between the neighbouring districts of Sudstadt and Bayenthal. In 2011 it was in the pipeline for the site to be the new proposed location for construction of the engineering centre of the University of Applied Sciences. However, in July 2011 this idea fell through due to various provincial government complications. It was at this point that the Neuland UA initiative begun. It began with 170 people of surrounding neighbourhoods coming together to turn a piece of derelict land in the city to one that is innovative and productive.

As a result of the nature of the project and its benefits it offers directly to the city as well as its people, the city has given the UA initiative a temporary permit to make use of the land without any financial repayments.

The design of the garden resonates with temporality from the simple soil based planter boxes to that of the infrastructure such as toilets within containers. Once the site has been rezoned and the necessary proposal has been approved by the city, the garden will be transported to another location.

Knowledge on UA gained:

The temporal productivity of this initiative as well as the benefits it provides to the city in terms of testing ecological agriculture, environmental protection as well as the sustainable use of resources such as water and soil are key points in its overall success as a temporal endeavour. This project shows how land parcels that are in the planning phase can be used productively until a decision by higher level of government has been made. The Neuland project has its similarities to that of the district 6 land within Cape Town that is currently going through land claims that may take a couple of years. Until these decisions have been made the land should be made accessible for community as well as homeless people living within the city to practice UA.

Relevance to South African context:

The Neuland project is directly relevant to the foreshore sites in the city of Cape town as it is extremely innovative in its nature through the design of its production systems to that of the infrastructure all being temporal.

The raised planter boxes can also be used in zones on sites where the soil is too contaminated or infertile for production to take place. Raised planters also offer the added benefit of old or disabled people living in cities to be able to engage with plant material and further receive education regarding these ideas.

The low initial capital input requires and the maximum social benefits that this project provides makes it an extremely valuable initiative to make us of in moving forward with my research

Project 5-**Ghandi Gardeners**

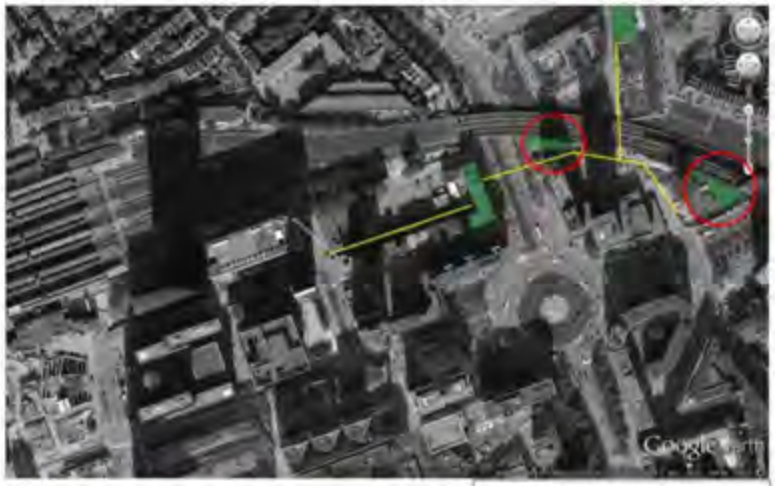


Image obtained from google earth

Photos by Author

Name of project	Schieblock Precinct Revitalisation, Ghandi Gardeners
Date assessed	18 June 2016
Location	Rotterdam, Netherlands
Scale	700sqm
Level of complexity	Simple community / homeless garden
Date of origin	Unknown
Driving force behind project	Local residents
Urban contribution	Social / Food security for Homeless
Economic Model	Middle/ low income citizens making use of land parcels for personal consumption- Excess of food given to the homeless
People benefitting	Middle / low income citizens. City of Rotterdam homeless community.
Consumer class	Middle class
Revenue sources	Capital contribution by people making use of land as recreation / food production
Cost implications	Low – Simple soil based UA initiative
Replicability in CT	Yes – Good use of small vacant land parcel
Status of Land	Land parcel alongside train line / Main road. Wasted land parcel used productively within the urban realm
Access	Easy – Luftsingel bridge, tram, car or bicycle
Key activities	Simple soil based UA initiative
Value proposition	Social, recreational food production for inhabitants of the surrounding neighbourhood, food for the homeless
Marketing	Signs on site. Very little emphasis on marketing of initiative.

Information on initiative:

The Gandi Gardens are a community based UA initiative that makes use of lost spaces between the newly developed Luftsingel bridge project in the Schieblock precinct of the city of Rotterdam. The project further enhances the ideas of the Dakakker rooftop farm as in conjunction they show how UA can form part of a productive system within a city if combined with temporal or permanent infrastructure. The gardeners who make use of the vacant spaces to produce vegetables for personal consumption but also give the surplus of the harvest to the homeless people living in the city. They are however not allowed to sell the produce as to use city owned land as an economic opportunity is a violation.

Knowledge on UA gained:

The idea of UA forming part of a greater system at play is important for the future of such projects within the urban environment. UA cannot exist as well as provide maximum benefits to the city when it occurs in isolation. It however becomes a powerful tool that can be used to restructure and give back positively when it is applied at a larger urban planning scale where pockets of land are linked for urban food production. The future of UA in cities will be determined by its flexibility and its ability to react to current economic as well as infrastructural challenges that occur within our cities. UA does provide the opportunity to revitalise parts of the city

Relevance to South African context:

It is evident from this precedent that this way of thinking could be incorporated into the foreshore precinct of Cape Town, reactivating historical connections with the sea whilst providing opportunities to stitch the reclaimed foreshore precinct to that of the historical centre.

Forest gardens:

Project 6- **Food for Good**

Image obtained from google earth

Source:food for good , Pijl ,2015.

Name of project	Food for Good Garden
Date assessed	23 June 2016
Location	Park transwijk Utrecht Netherlands
Scale	2500sqm
Level of complexity	Forest food garden – management of ecological functions – medium complexity
Date of origin	2012
Driving force behind project	Hans Pijls
Urban contribution	Social / educational / health
Economic Model	Rental, sale of produce, consultation fees
People benefitting	Low /middle income
Consumer class	Middle / low
Revenue sources	Rental space, sale of produce, catering, consultancy work, sponsorship
Cost implications	Building costs, salary, garden running costs
Replicability in CT	Yes. Simple well-structured garden with maximum social and environmental benefits
Status of land	Temporal lease of Park land (Transwijk park.)
Access	Easy access - Car, by foot or bicycle
Key activities	Production vegetables, catering, consultancy
Value proposition	Connecting community, physical, social, environmental health. Sense of purpose for elderly people
Marketing	Word of mouth, website, banners on fence of initiative

Information on initiative:

The Food for good UA initiative makes use of a portion of space of the Transwijk park in Utrecht Netherlands. The original park was built in the 1960s that the UA initiative now forms part of. The surrounding area is that of businesses and lower income resadential areas. The project temporarily uses a portion of the park which was previously just grass and required intensive maintenance. The lease of the land is through the city of Utrecht and is of 5 years that can be renewed annually thereafter. The design of the UA initiative consists of a

Name of project	Food for Good Garden
Date assessed	23 June 2016
Location	Park transwijk Utrecht Netherlands
Scale	2500sqm
Level of complexity	Forest food garden – management of ecological functions – medium complexity
Date of origin	2012
Driving force behind project	Hans Pijls
Urban contribution	Social / educational / health
Economic Model	Rental, sale of produce, consultation fees
People benefitting	Low /middle income
Consumer class	Middle / low
Revenue sources	Rental space, sale of produce, catering, consultancy work, sponsorship
Cost implications	Building costs, salary, garden running costs
Replicability in CT	Yes. Simple well-structured garden with maximum social and environmental benefits
Status of land	Temporal lease of Park land (Transwijk park.)
Access	Easy access – Car, by foot or bicycle
Key activities	Production vegetables, catering, consultancy
Value proposition	Connecting community, physical, social, environmental health. Sense of purpose for elderly people
Marketing	Word of mouth, website, banners on fence of initiative

Information on initiative:

The Food for good UA initiative makes use of a portion of space of the Transwijk park in Utrecht Netherlands. The original park was built in the 1960s that the UA initiative now forms part of. The surrounding area is that of businesses and lower income residential areas. The project temporarily uses a portion of the park which was previously just grass and required intensive maintenance. The lease of the land is through the city of Utrecht and is of 3 years that can be renewed annually thereafter. The design of the UA initiative consists of a

central path that divides the site into 6 plots all of which have a variation in crops as a response to crop rotation. 10 -25 percent of the produce is shared among the 3 germanely employed staff as well as the 35 volunteers whilst the remainder is sold to customers as well as surrounding restaurants.

The sites relationship to ecological systems is further enhanced through the way in which the bee hives on site are positioned below a green roof structure. The green roof is planted with species that flower throughout summer, providing a constant source of nectar.

Knowledge on UA gained:

This particular project is unique in the way it places significant attention to the environmental systems and makes use of a wetland system to control run off on site whilst providing a rich learning experience for school children and surrounding community. From a social point of view the project also places emphasis on its ability to connect people not only with one another but also with plants and urban environmental systems. The design of certain areas also allows for people in wheelchairs or standing difficulties to site and engage with planting material grown in boxes. The sites relationship to the urban ecological systems is further enhanced through the way in which the bee hives on site are positioned below a green roof structure. The green roof is planted with species of flower that provide the bees with the necessary nectar. This can be seen a good response to small closed loop environmental systems where nature and design can harmoniously coincide within a designed productive urban system.

The site can essentially be viewed as a closed loop system as waste from the plants is composted on site and then fed back into the beds. The initial issue however was that the soil was very clay like and did not allow for rapid infiltration. There was initially a lot of work done in preparing the soil to change its composition to that of a loamy kind.

The site has made an innovative use of land that has not only catered for the production of vegetables but has also given back to the environment through the creation of habitats within the urban context.

Relevance to South African context:

The projects relevance to the city of Cape Town is that of how large expanses of areas of lawn in many of our parks should be converted into productive social enhancing entities within the urban context. Large lawned areas within the South African context often require intensive management and often this is out of the city parks departments budget. The projects further show cases the strength multi-functional UA initiatives have within the urban realm where people can come together and engage socially, produce food as well as learn about the diversity and importance of urban ecosystem services that are present in our cities .

Temporary permanence. UA formimg a core component to the revitilisation of schieblock. UA forming a part of a greater infrastructural system in the city.

The Luchtsingel is a crowd funded initiative within the city of Rotterdam. The bridge was an urban design response to how a part of the city which had previously been cut off by transport infrastructure could be reinstated to the greater urban fabric.

The temporary infrastructure was aimed at connecting the main train station with that of the historical laurenskwartier district. Whilst seeking to link these two areas the project also provided links to other public spaces as well as two Urban agriculture initiatives. The Project has made the area allot easier to access from a pedestrian point of view but has also resulted in various bars and shops reoccupying this area as a response to the increase in pedestrian traffic along this bridge.

The structure has also given access to the old train station which has been converted to a rooftop space that can facilitate events.

The spaces alongside the bridge and train tracks have been occupied by a group that are known as Ghandi Gardeners who make use of this vacant space to produce vegetables for themselves as well as give the reminder to the homeless people living in the he city. They are however not allowed to sell the produce as this will be a violation to use city land as an economic opportunity.

The idea of Urban agriculture forming part of a greater system at play is important for the future of such projects in the urban environment. UA cannot occur in isolation as it is not financially viable however it does form a very important part of the city when operating at a larger planning scale where pockets can be linked that provide opportunity for food production. The Future of UA in cities will be determined by its flexibility and ability to react to current economic as well as infrastructural challenges that exist in our cities.

UA does provide the opportunity to revitalise parts of the city. It is evident from this precedent that this way of thinking could be incorporated into the foreshore precinct of Cape town , reactivating historical connections with the sea, providing opportunity to stitch the cities broken fabric.



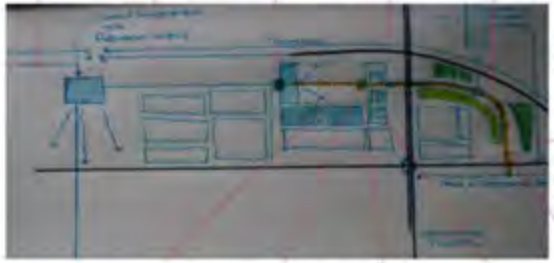
Photos by Author

Source Ossip Van duivenbode,














Photos by Author







Source Ossio Van duivenbode.

Photos by Author

Roof top gardens:

Project 7- **Dakakker**

Image obtained from google earth

On site Sketch

Source Ossio Van duivenbode.


Photos by Author

Name of project	Dakakker
Date assessed	18 June 2016
Location	Rotterdam, Netherlands
Scale	1000sqm
Level of complexity	Medium complexity – specialised knowledge in management of rooftop systems
Date of origin	April 2012
Driving force behind project	Wouter Baumann
Urban contribution	Health / Education / Rooftop productivity
Economic Model	Sale of produce (flowers / herbs), café
People benefitting	Children, citizens of city. Citizens making use of the Luchtsingel
Consumer class	Middle class
Revenue sources	Produce sold. Rooftop Café serving meals made using produce from the Roof
Cost implications	Production costs
Replicability in CT	Yes, although high costs involved in retrofitting extensive green roof technology
Status of land	Productive use of rooftop space in the city
Access	Easy – Luftsingel has made the project very accessible by foot from Rotterdam Central station.
Key activities	Urban rooftop farming, café, bee keeping
Value proposition	Pilot to test various rooftop technologies
Marketing	Part of Luftsingel marketing strategy – Website, banners, word of mouth, brochures

Source Ossip Van duivenbode,

Photo by Author

Information on initiative:

Within the city of Rotterdam the success of UA initiatives has been directly linked back to the cities willingness to facilitate private initiatives within the city as well as its open minded approach to assist creative UA strategies (Keeton, 2013.) This is evident in the process that was undertaken in the Dakakker rooftop initiative. The project formed part of larger urban revitalisation project at play within the schieblock area of Rotterdam. The revitalisation project was initiated by architects who saw the inherit opportunity within this neighbourhood. The entire project was based around the idea of temporary permanence. As part of the revitalisation of the area, the architects involved moved their offices into the building- this rooftop space is now known as Dakakaker. Environmental specialists that already had an office in the building teamed up with architects to develop a rooftop farm for the building.

The Rooftop farm is brilliant in the sense that it brings with it a vertical dimeson to the overall scheme. The rooftop of the building is now freely accessible to the public. The rooftop spaces experience is further enhanced by the café that serves food from the garden. After conducting an interview with Wouter Bauman who is responsible for the gardens overall management it became evident to me that the rooftop UA initiative would not have been financially viable without the cafe.

There were also a lot of constraints that were placed on the design and layout of the gardens due to weight restrictions. The position of beds had to be related to the position of underlying columns. The boxes that surround the roof were a response to the need for a safety balustrade but also provided for additional growing space. The roof also had a composting facility as well as an urban bee hive.

The projects can be viewed as being innovative in the way that it makes use of vacant rooftop space but also formed part of a greater urban design scheme at play. The project also provided a great view of the city whilst enjoying a coffee and meal at the café.

Knowledge on UA gained:

The Dakakker rooftop project presented various green roof technologies that are used today in projects that are retrofitted to buildings. The weight limitations resulted in a shallow soil mix that consisted of volcanic rock that is very light. The soil depth limitations as well as the position of existing structural columns of the building is what determined the layout and design of the garden. The gardens choice of crop was also determined according to economics as it consisted of primarily flowers and herbs which could be sold at high prices to surrounding restaurants. The rooftop café also assisted the project to not run at an economic loss.

The project was a good example of how rooftop space in cities can provide green space as well as educational benefits to the city. The project also combined ecological systems of a city on a rooftop as there was also a number of bee hives on the rooftop space.

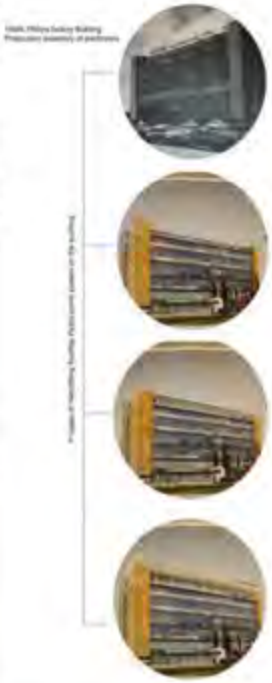
Relevance to South African context:

Although there are numerous buildings in the CBD of cape town with rooftop space, the cost implications with such a scheme require significant initial capital input. The project does not pay itself off as it does not produce enough revenue through selling of vegetables from limited roof space. The projects could however be incorporated into future buildings going up in the city as the cost of designing a building capable of upholding rooftop loads way outweighs the economics of retrofitting intensive green roof infrastructure. The roof gardens also provide insulation to the building, keeping it warm in winter and cool in the summer.

Aquaponics & hydroponics:

Project 8- **De schilde**

On site Sketch



Photos of Images on display at Rooftop Farm by Author

Photos by Author

Photos by Author

Name of project	De Schilde
Date assessed	20 June 2016
Location	Den Haag, Netherlands
Scale	1500sqm
Level of complexity	High – Scientific knowledge required
Date of origin	31 March 2016
Urban contribution	Pilot for food production within buildings in high density cities
Economic Model	Sales of fish and vegetables to restaurants. Tours, event space to be rented
Driving force behind project	Mark Durno – Managing director – Urban farmers
People benefitting	High income people visiting restaurants within the city
Consumer class	High income
Revenue sources	Sales of produce to restaurants in the city
Cost implications	High – substantial capital injection required
Replicability in CT	N/A – Cost implications are too high for the return.
Status of land	1950s Philips telecommunications building
Access	Limited – Tours
Key activities	Fish farming / Hydroponics
Value proposition	Low to greater community.
Marketing	Intensive – Social media, press, brochures, magazine articles, newspaper and websites . Second project of swiss based company urban farmers.

Urban Agriculture study
Masters- Landscape Architecture
Michael Wood
WDXMIC011

Information on initiative:

De Schilde is a high tech retrofitted rooftop farm located in the Dutch city of Den Haag. The project forms part of the Urban farmers' portfolio. Urban farmers being a swiss based company that specialise in the design and construction of commercial food growing products. The first of their farms is located in Basel Switzerland. The second version is De schilde a project which serves to act as a template as to the possibilities that exist within cities rooftop space. The project was initiated through collaboration between the city of Den Haag and a swiss company Urban Farmers. The project is one of two rooftop farms that Urban farmers have developed, the first being within the swiss city if Basel.

The project was initiated by the City as a response to the empty office spaces in an old 1950s building which had previously been a production facility for the Phillips electronic company. In order for the building to showcase the possibilities of using rooftop space for aquaponics and fish farming technologies, the building needed to be modified at a cost of 2.7 million euros which saw the top floor slab being replaced with high load bearing concrete. The greenhouse structures were also retrofitted to the building but needed to be extra reinforced due to the gale force winds experienced at these heights.

The project showcases how a closed loop productive cycle may work, where nutrient rich water from fish is passed through tanks containing the bacteria Nitro Simosa that convert ammonia into nitrates and phosphates which are good nutrients needed for plant growth. The water is also passed through a process where oxygen is pumped into the water to convert liquid carbon dioxide into a gas. This gas is then fed into the green houses above which is a favourable gas for plant growth.

This UA initiative supplies fresh organic produce and fish to 10 high end restaurants in the city. The Urban Farmers believe in sending food directly from where it is grown to where it will be consumed. They believe the future sustainability of cities will be determined by our ability to grow food in an urban environment as more and more people become urbanised. The project has also had allot of interest from Eastern country's whose cities have no space for food to be grown on the ground.

Knowledge on UA gained:

The cost implications involved in Rooftop production systems far outweigh the positive benefits these projects give back to the city as a whole. The De schilde project was not accessible to the public and was so technologically advanced that a farming system comprising of 350sq of fish farming and another 700sqm of rooftop hydroponics required only 3 people due to the systems automation.

The project's success also replied on the marketing of the produce to expensive restaurants within the city in order to make it financially viable.

Relevance to South African context:

This particular provided me with valuable knowledge regarding the technologies that exist within the hydroponic and aquaponic farming industry, however it would be too costly to be used within the city of Cape Town. The project also had very little job creation opportunities associated to it due to the level of technology that has been developed to run the systems.

The project also showed very little innovation that could be applied to vacant lots within the city to make maximum use of the existing site conditions as it was structed and designed around scientific knowledge.

Reflection on my travels and the initial research undertaken

Having conducted thorough research on UA before departing on my travels, I was confident that I was relatively knowledgeable on the topic at hand. However, reflecting on my travels has caused me to admit just how drastically my perceptions have altered.

In my opinion, the projects that were most successful were projects that were innovative in nature, required very little capital input and had significant positive outcomes. These were often projects that were driven directly by the urban farmers themselves and had adopted bottom up approaches in their start up phases. These projects were the ones that I focused my attention on as I thought about my potential site located within the foreshore precinct of Cape Town. These projects although innovative in nature were also temporal in nature. The notion of temporality could be seen in the design of planters as well as the plant selection that was planted as they tended to be annuals and biennials.

Sites consisting of social uplifting food production in an urban realm were not deemed to be particularly successful as I began to understand that the most comprehensive and impactful projects were those that had a multi-functional site design or formed part of a greater urban frame work that was in place. The multi-functional nature of the site ensured that the projects could be economically viable as UA occurring in isolation typically runs at a loss due to the limitations of scale and mass production.

Conclusion

As the world becomes increasingly more urbanised, it is of the utmost importance that we act in a responsible manner and alter our perceptions and corresponding actions relating to not only food production, but how we tackle the inevitable issues faced in urban contexts. It would be ignorant to assume that our current practices are sufficient to support the foreseeable changes which the near future holds. UA can thus be considered a viable solution to seriously consider implementing in urban contexts worldwide, as initiatives in this domain target an innumerable number of these inevitable issues.

Through my initial research, as well as my travels, I have learnt a great deal of invaluable knowledge about UA. This knowledge encompasses, but is not limited to, knowledge on scale, complexity, economics, productivity and urban ecological systems related to UA. My travels additionally provided me with insight that I would not have been able to gather by merely academic research alone, as visiting the projects myself allowed me to not only experience them as a civilian in that particular city would, but also allowed me to form a subjective view on the project and its objective.

South Africa, a developing country, has a vast number of issues which require urgent solutions. As a result of our economic standing, a large sum of money is not available. It is thus imperative that the solutions to these issues are as innovative as possible, making maximum use of resources and being sustainable in nature. I therefore feel that UA is ideal for the South African context as initiatives in this domain target a great number of issues, all the while working towards an inclusive city which favours no specific income group.

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Michael Wood
Urban agriculture reserach
Netherlands
Germany

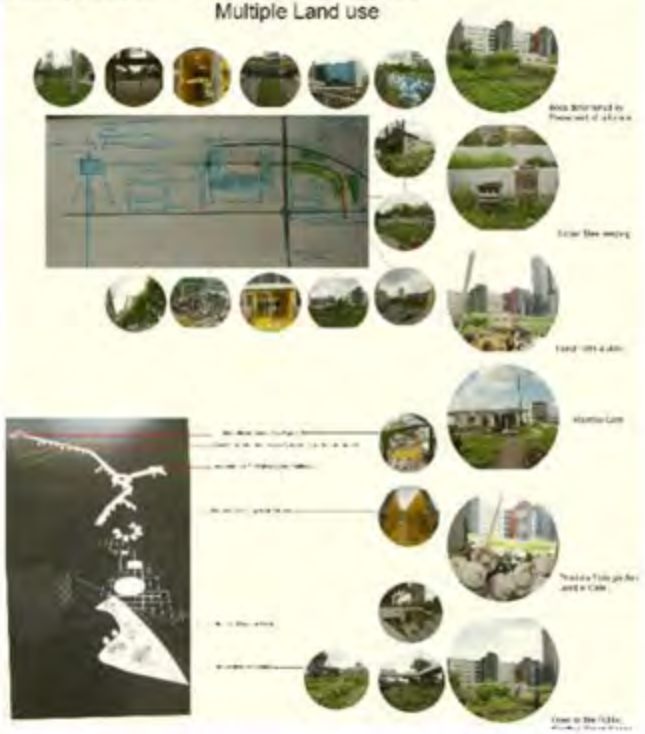
Sites visited

Food for good - Utrecht Netherlands

Neuland - Cologne

Luchtsingel- Rotterdam

Temporal infra-structure
Multiple Land use

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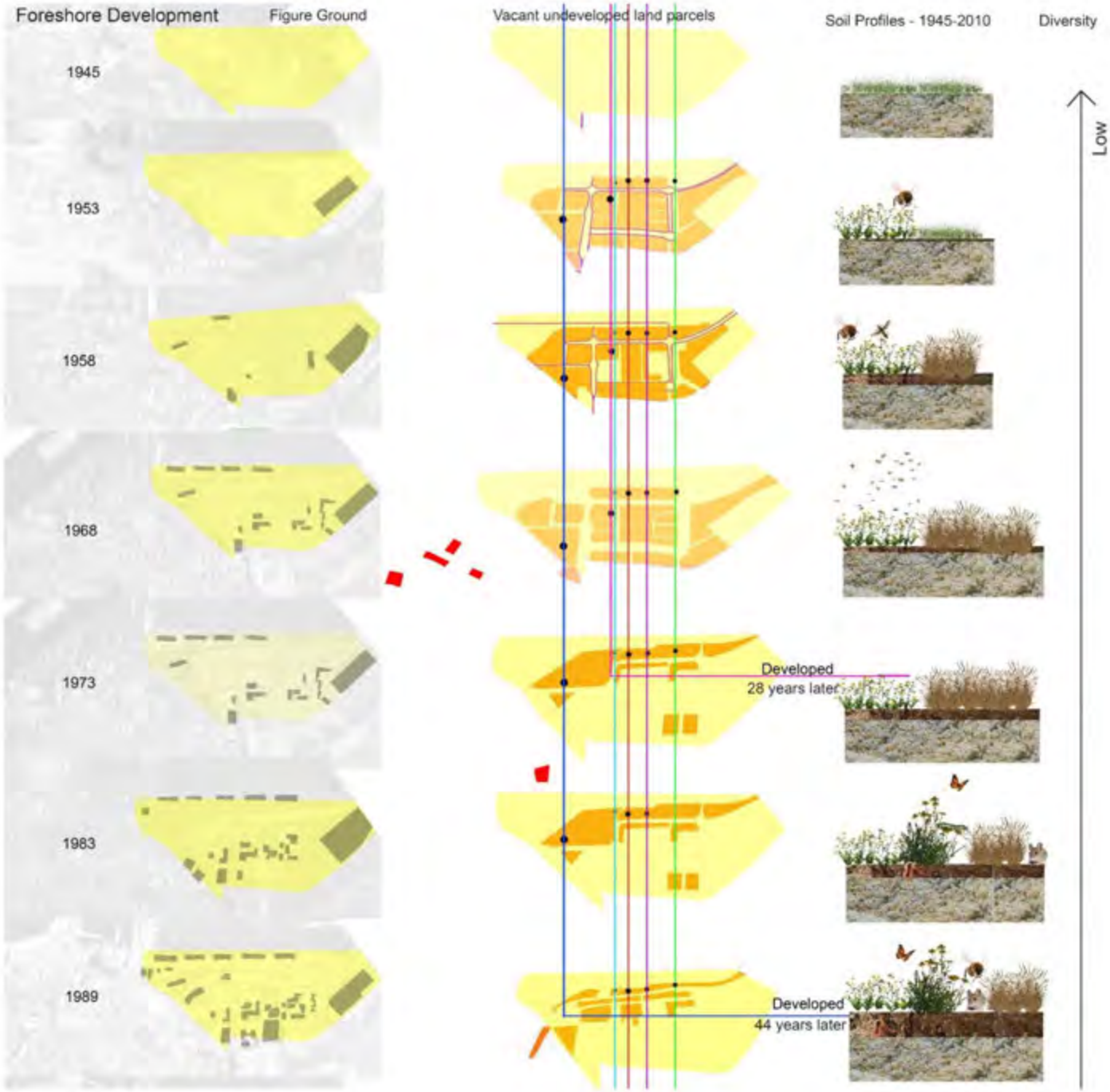
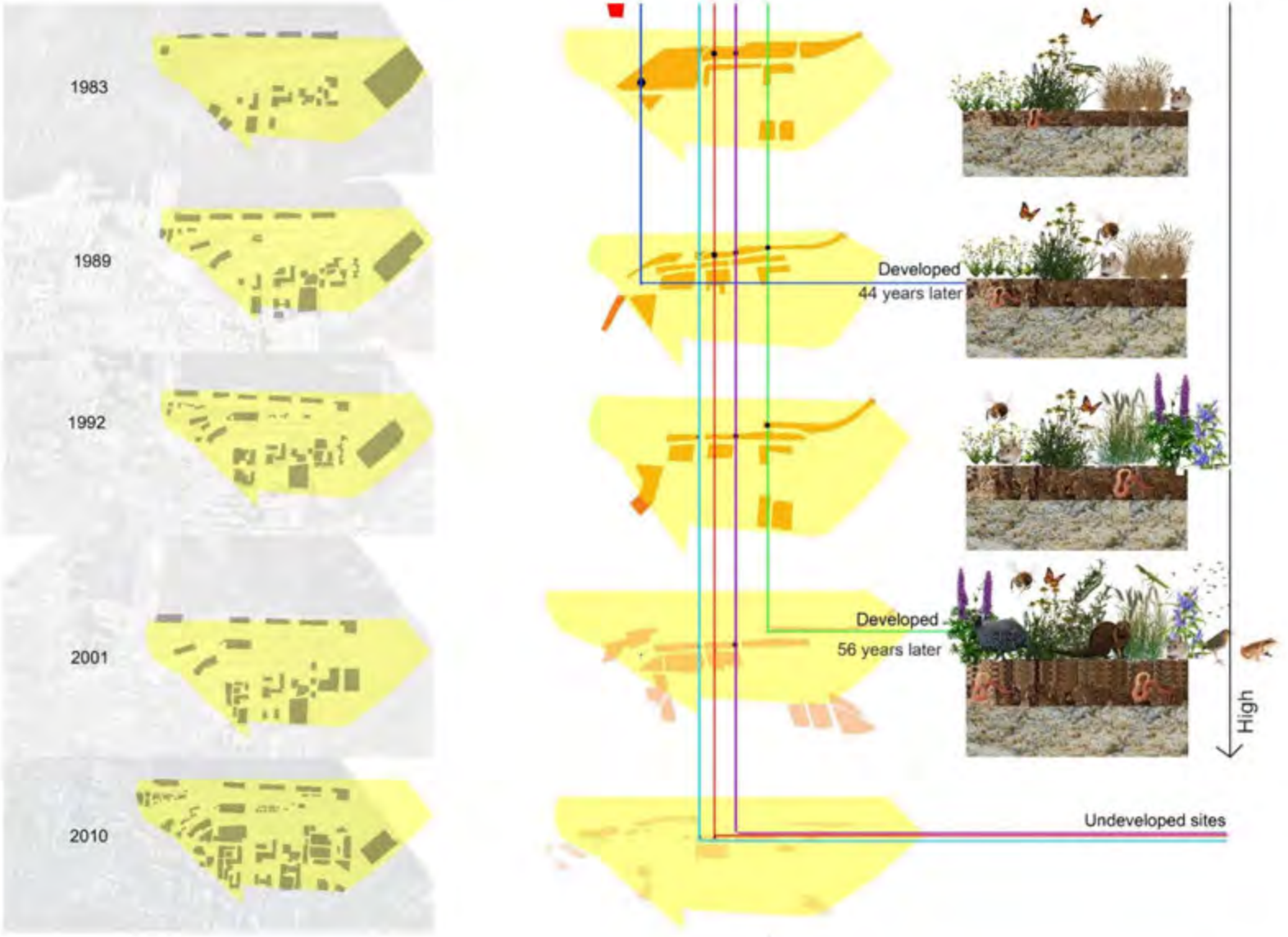

Foreshore Development
Figure Ground
Vacant undeveloped land parcels
Soil Profiles - 1945-2010
Diversity
Low
1945
1953
1958
1968
1973
1983
1989
Developed
28 years later
Developed
44 years later


1983
1989
1992
2001
2010
Developed
44 years later
Developed
56 years later
High
Undeveloped sites

2016

Notes

Site is in the process of being remediated through he weedscapes that have colonised it .

Sites story - remnants

2012

Pioneer weed species begin to colonise the site

Left over construction material

2010

Remnants of gravel and other contruction materials are clearly visible on the site . There are also areas which have been contaminated by concrete .

Concrete slab

2008

Site is used as a construction yard .Temporal shipping container infra-structure is visible on on the site .

2006

The site is used as a construction yard for the development of the adjacent building

2004

Remaining material from construction is spead across the sites surface . Note areas furthest away from the canal have less rocky surface material

Coal dust

2002

The site is sued to store materials such as aggregate which was used to construct the canals. The aggregate is still plentiful on the site

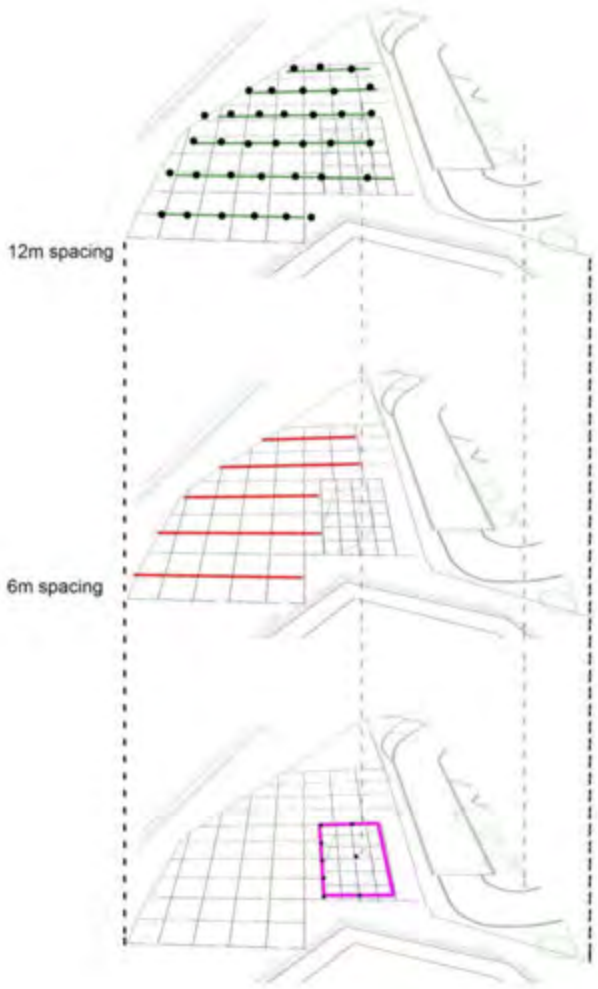
Soil profile with Coal

2000

The site formed part of a train storage line .
The site was industrial in nature with thick layers of coal material visible .
Note the lack of weeds or vegetation due to the contamination of the soils .

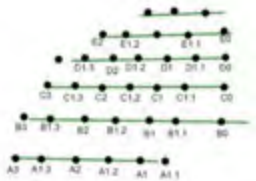
Industrial remnants

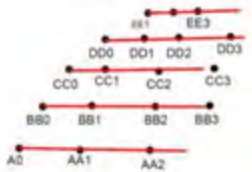
Site analysis Grid methodology

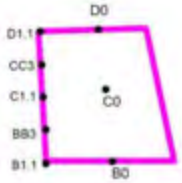


Initial mapping area of species diversity /establishment of grid system

Grids

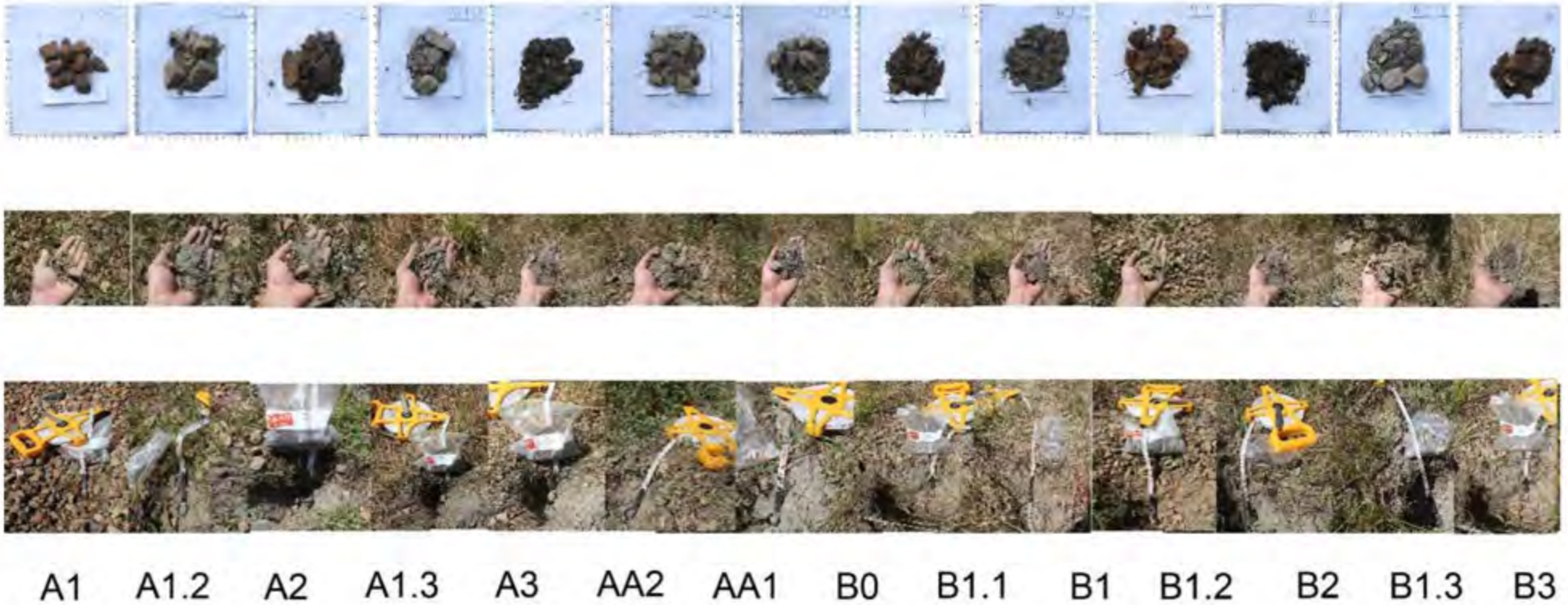


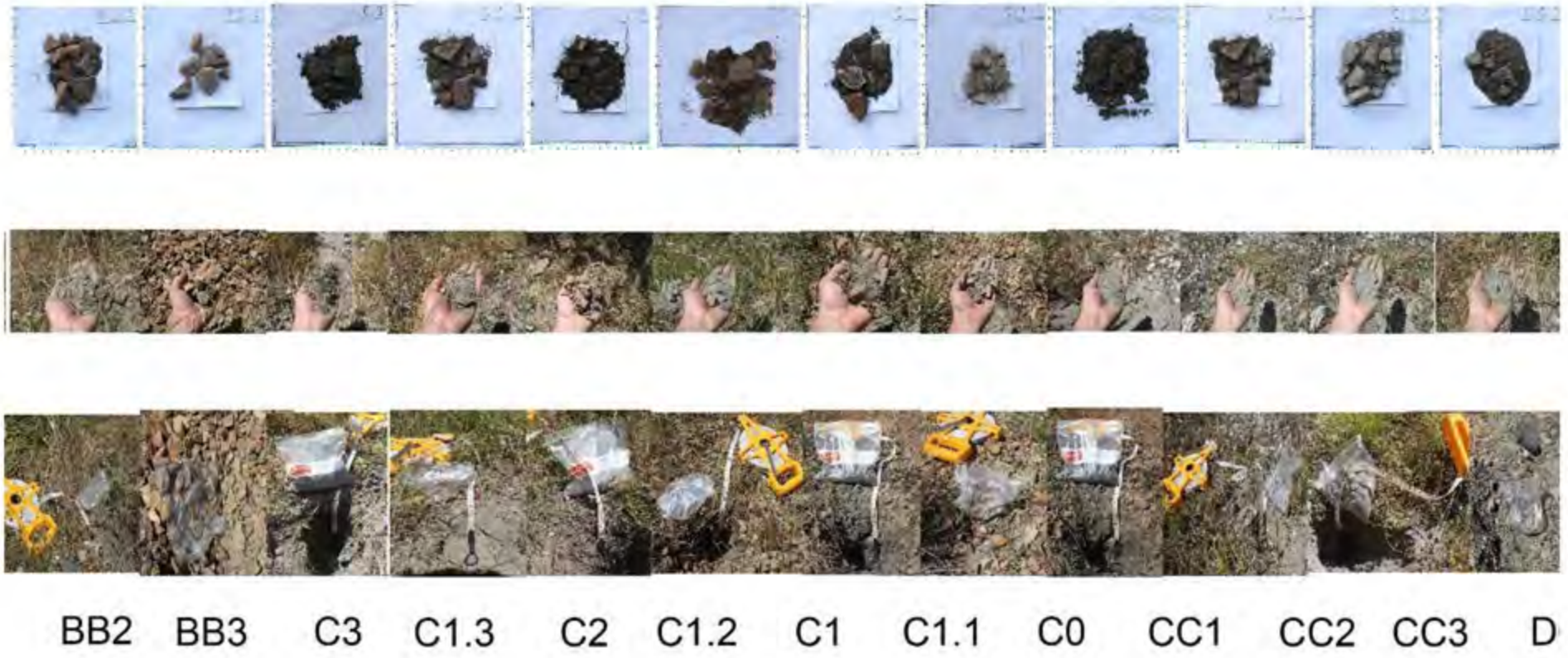




Site Grid mapping technique


A3
AA0
B3
C3
A1.3
AA1
B1.3
BB1
C1.3
D1.3
A2
B2
C2
CC1
D2
A1.2
AA2
B1.2
BB2
C1.2
D1.2
DD2
E2
A1
B1
C1
CC2
D1
E1.2
EE2
E1
B1.1
BB3
C1.1
CC3
D1.1
DD3
E1.1
EE3
B0
C0
D0
E0


A1
A1.2
A2
A1.3
A3
AA2
AA1
B0
B1.1
B1
B1.2
B2
B1.3
B3


BB2
BB3
C3
C1.3
C2
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D2
D1.3
DD2
DD3
E0
E1.1
E1
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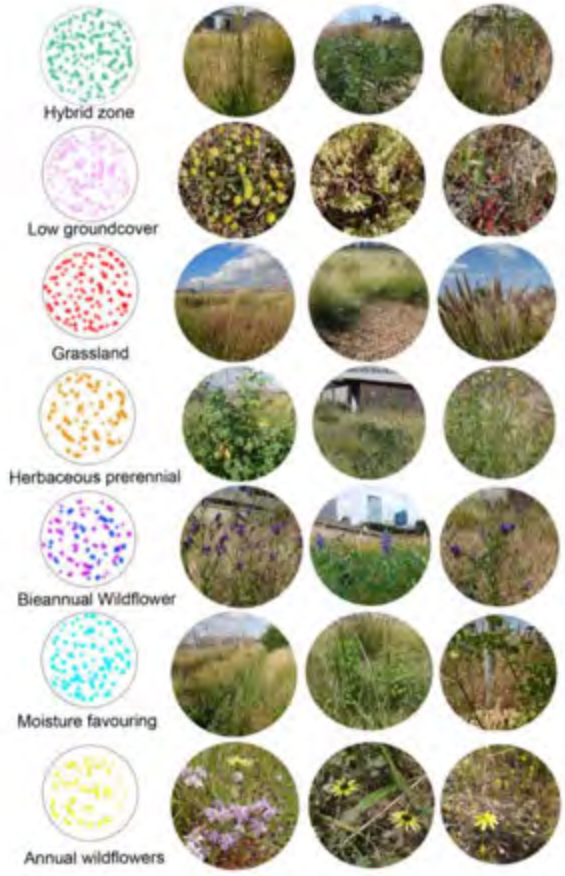
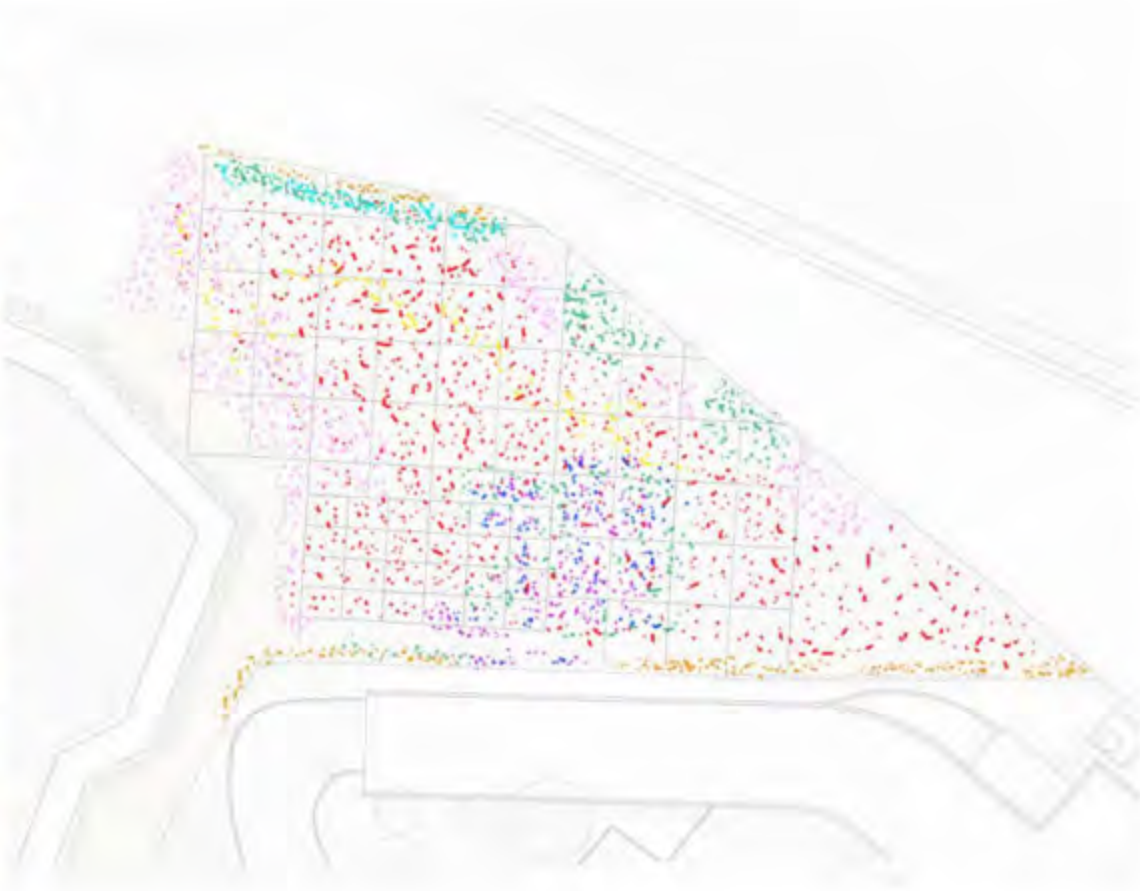
E2
EE2


A3
B3
C3
A1.3
AA1
B1.3
C1.3
D1.3
A2
B2
C2
CC1
D2
A1.2
AA2
B1.2
BB2
C1.2
D1.2
DD2
E2
A1
B1
C1
CC2
D1
E1.2
EE2
E1
B1.1
BB3
C1.1
CC3
D1.1
DD3
E1.1
EE1
B0
C0
D0
E0

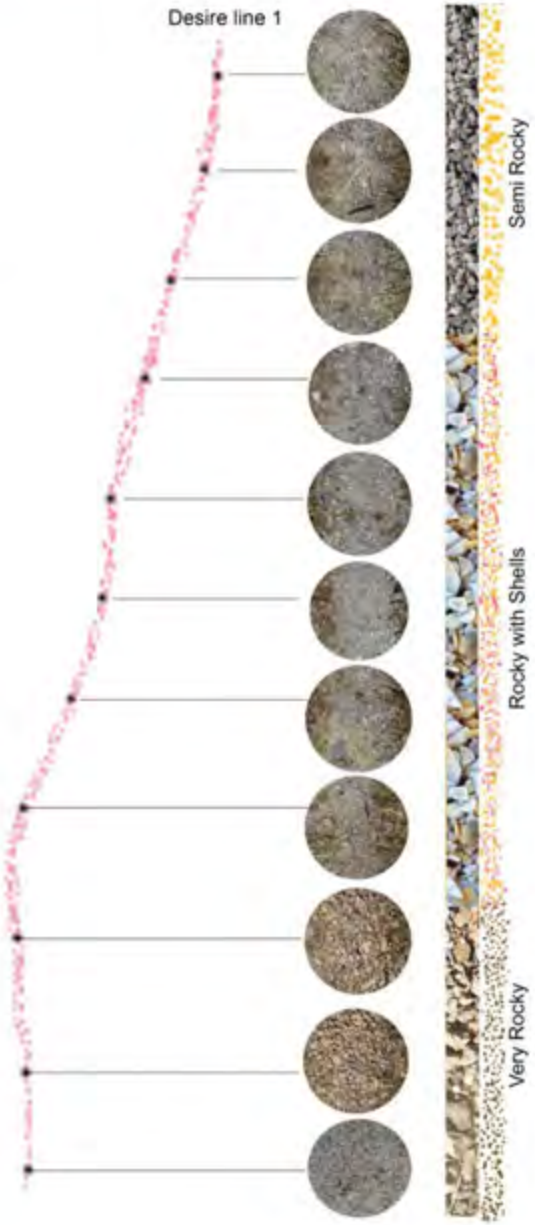
Analysis

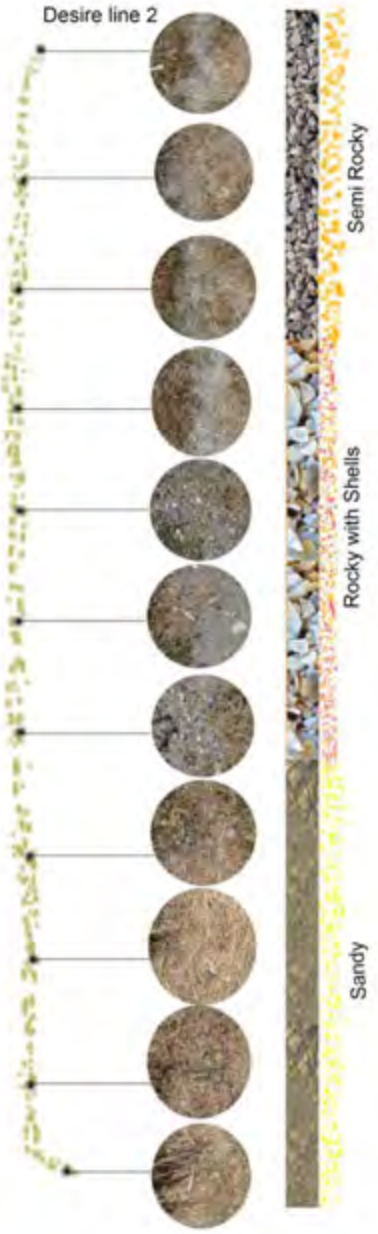
Existing Plant communities

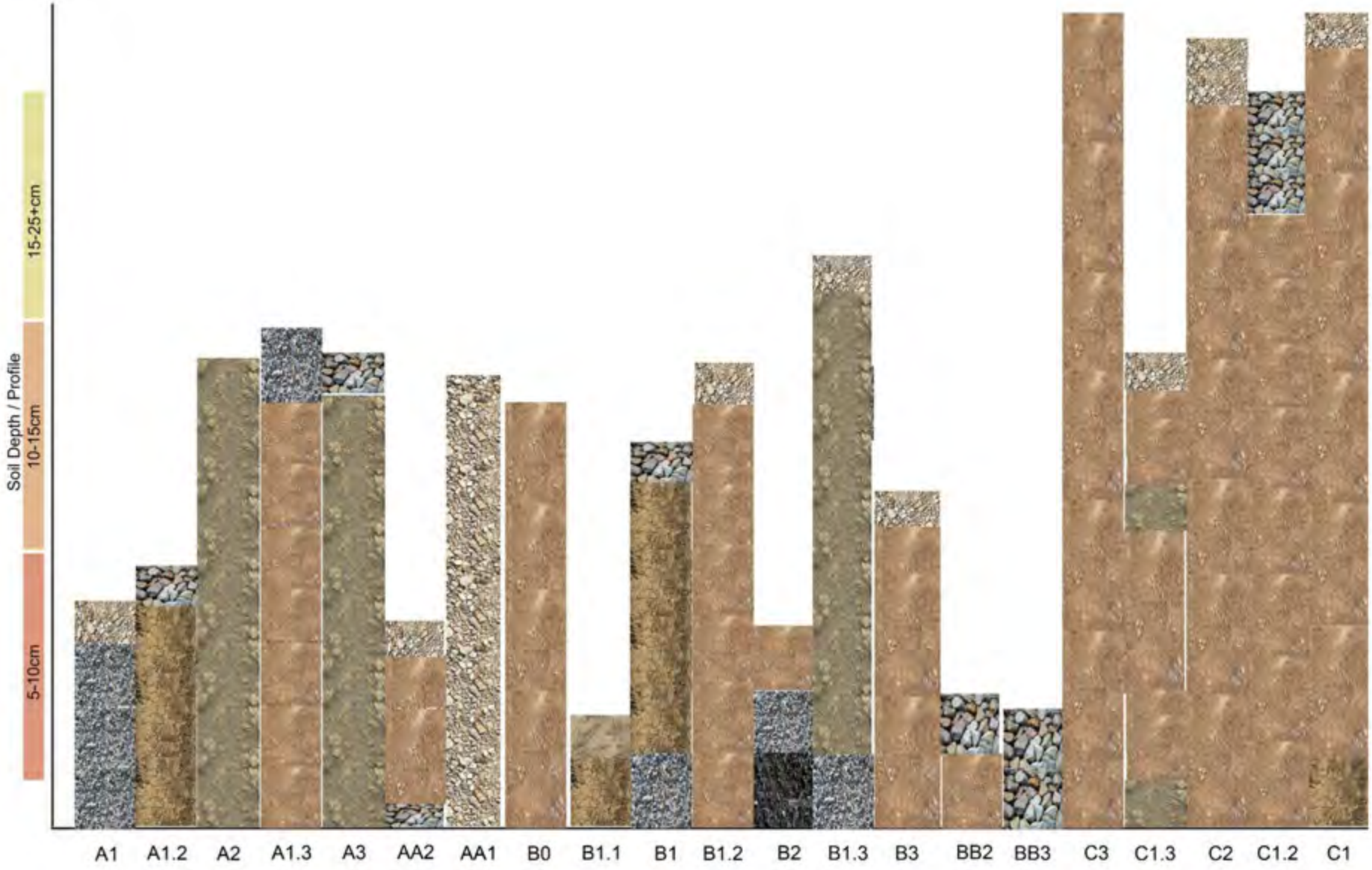


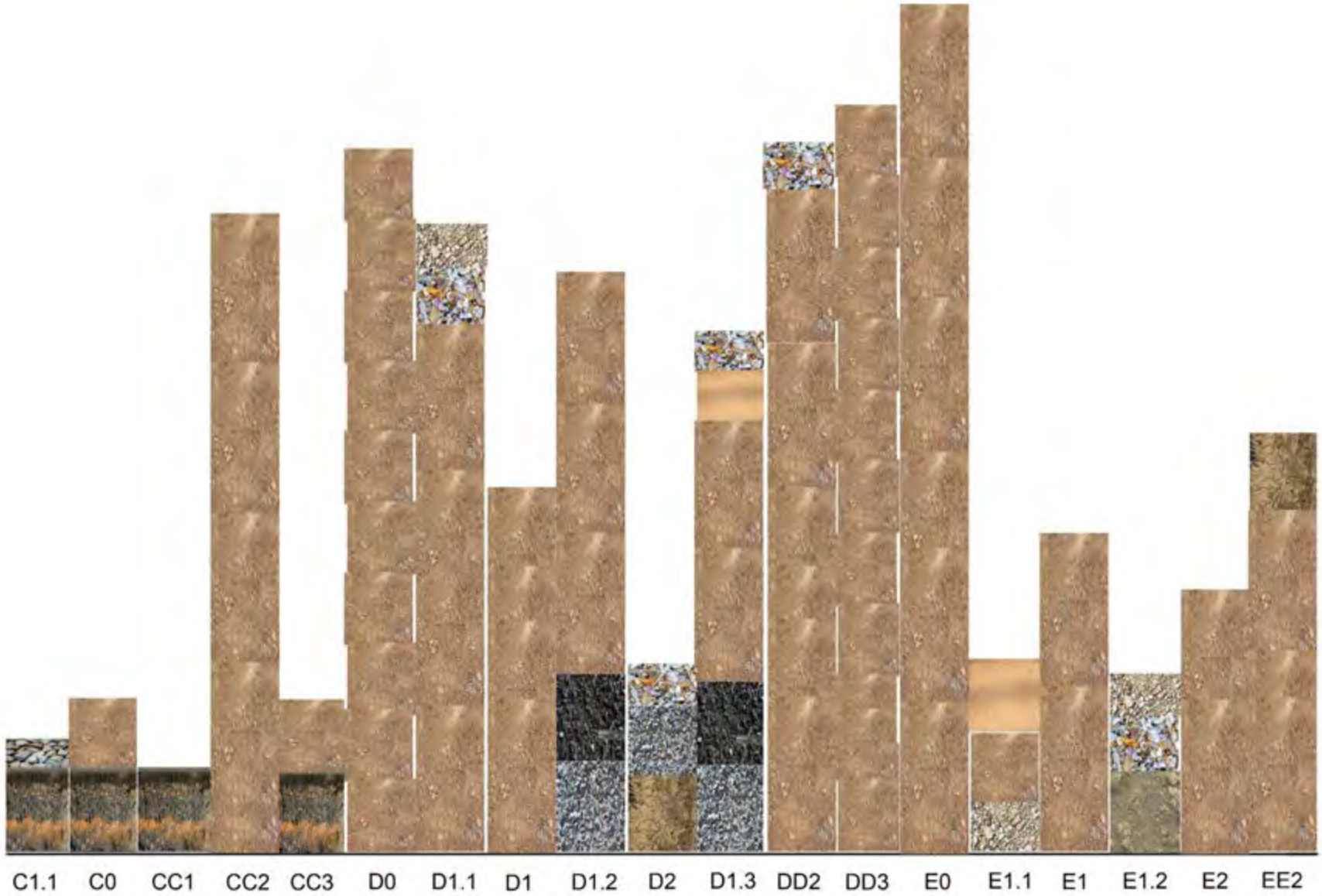


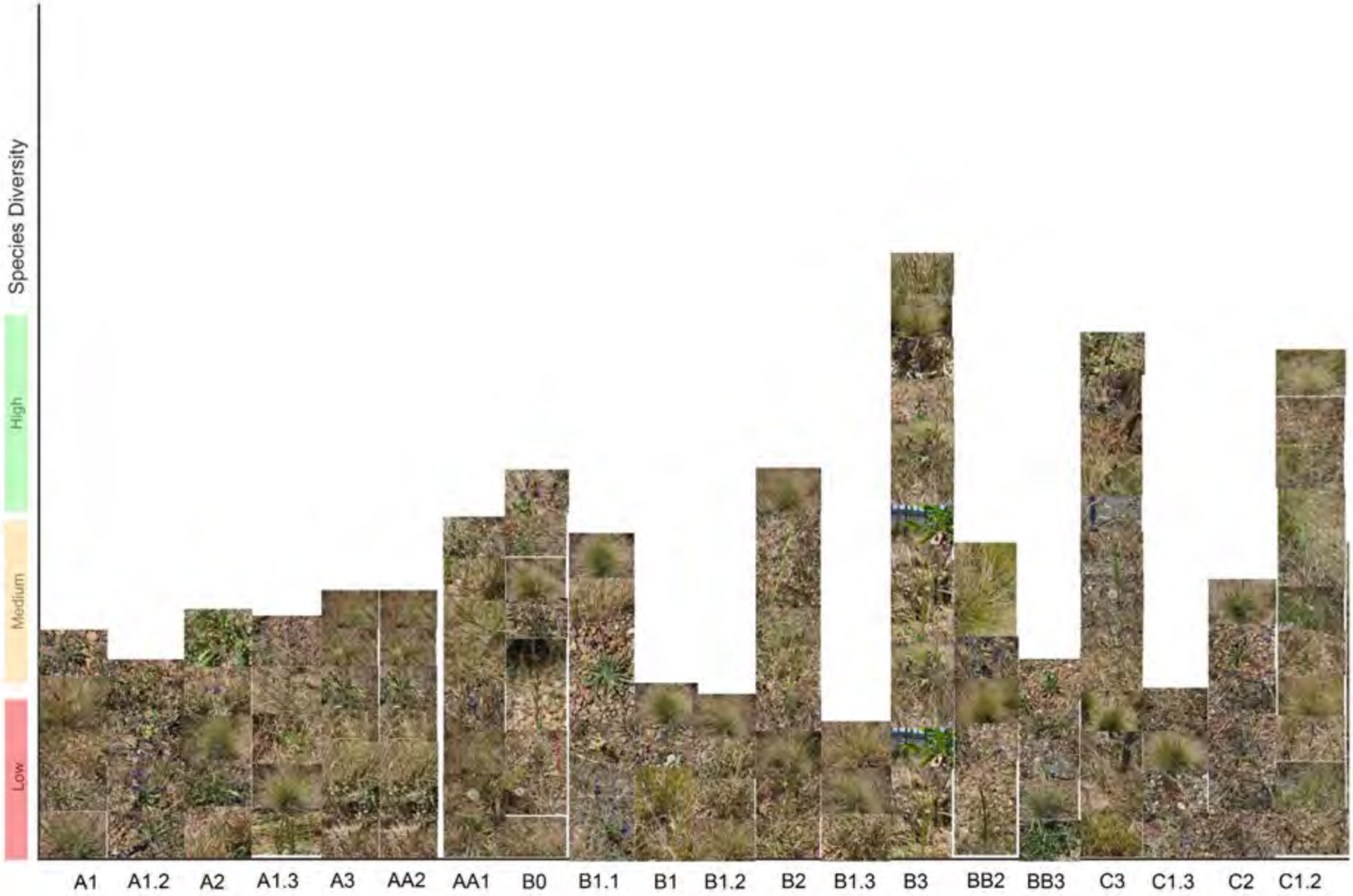

Existing surfaces on site
1
2

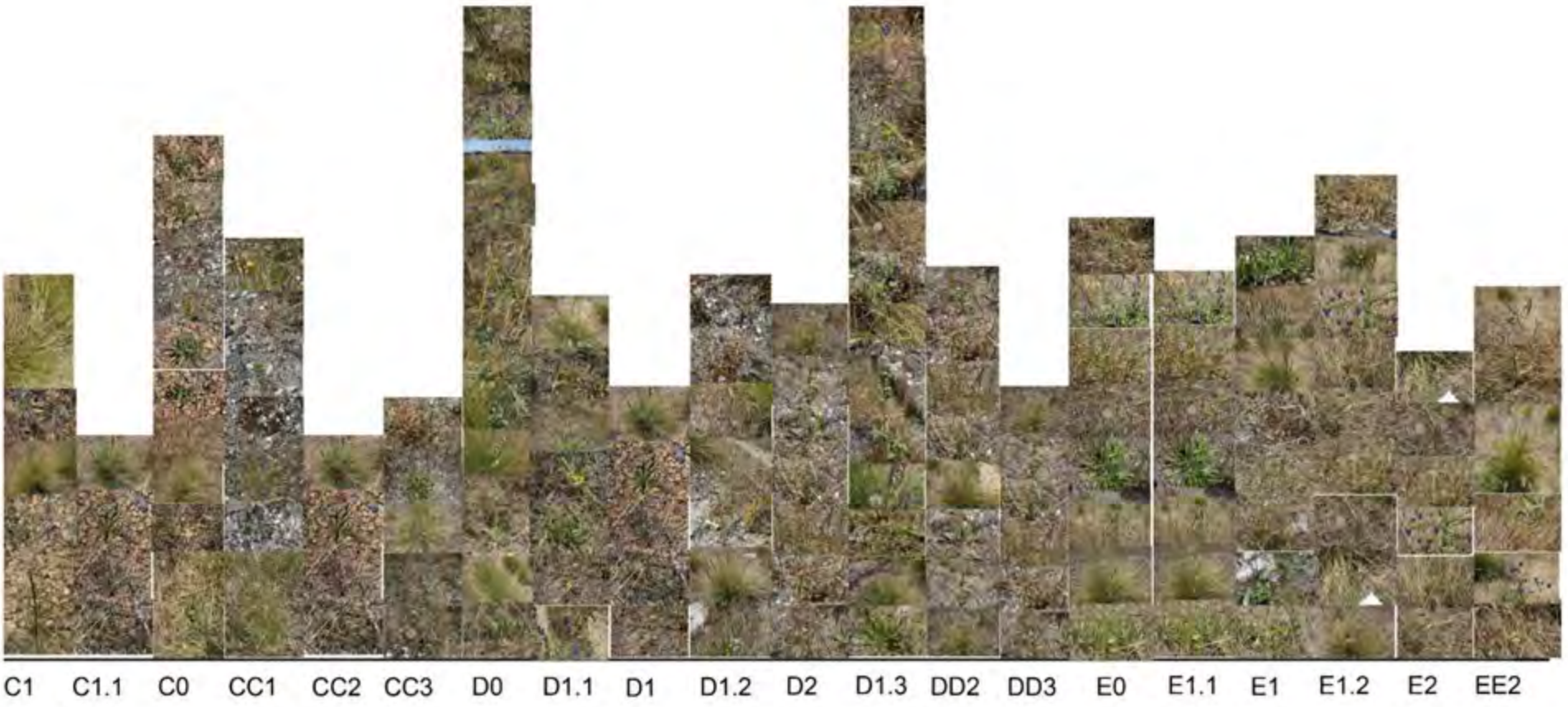

Desire line 1
Semi Rocky
Rocky with Shells
Very Rocky


Desire line 2
Semi Rocky
Rocky with Shells
Sandy

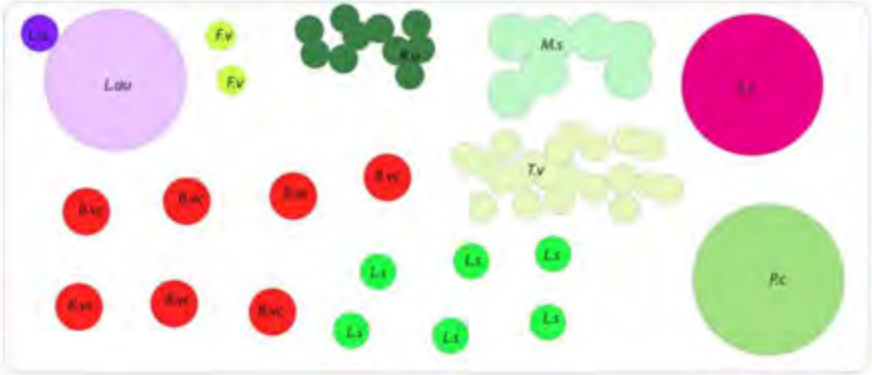

Soil Depth / Profile
5-10cm
10-15cm
15-25+cm
A1
A1.2
A2
A1.3
A3
AA2
AA1
B0
B1.1
B1
B1.2
B2
B1.3
B3
BB2
BB3
C3
C1.3
C2
C1.2
C1


C1.1
C0
CC1
CC2
CC3
D0
D1.1
D1
D1.2
D2
D1.3
DD2
DD3
E0
E1.1
E1
E1.2
E2
EE2

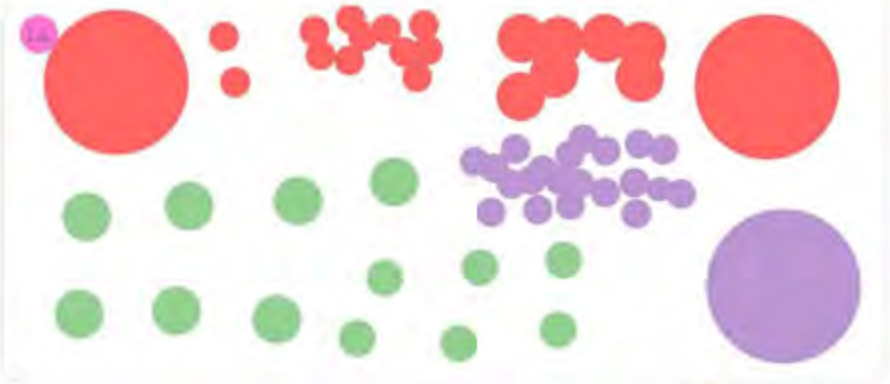

Species Diversity
High
Medium
Low
A1
A1.2
A2
A1.3
A3
AA2
AA1
B0
B1.1
B1
B1.2
B2
B1.3
B3
BB2
BB3
C3
C1.3
C2
C1.2


C1
C1.1
C0
CC1
CC2
CC3
D0
D1.1
D1
D1.2
D2
D1.3
DD2
DD3
E0
E1.1
E1
E1.2
E2
EE2

Productive Planting Methodology
Test 1



L.a - Lupinus angustifolius
L.au- Lavendula augustifoia
F.v - Foeniculum vulgare
R.o - Rosmarinud officinalis
M.s- Mentha spicata
L.a- Lactuca sativa
T.v- Thymus vulgaris
S.e- Salvia elegans
Petroselinum crispum



Seasonal flux Zone
Structural perennial
Structural Annual
Accent Weed
Groundcover / Fillers

Planting Zones -

1. Structural perennials

Lavender angustifolia
Lupinus angustifolia'
Salvia elegans
Foeniculum vulgare

2. Seasonal Rotational

lettuce (Red oak leaf .)
Lactuca sativa var. Crispa
Ruby chard .

3.textural replenishing planting .

Parsely

4. Groundcover / Filler

Mint
Thymus vulgaris

2016/10/23

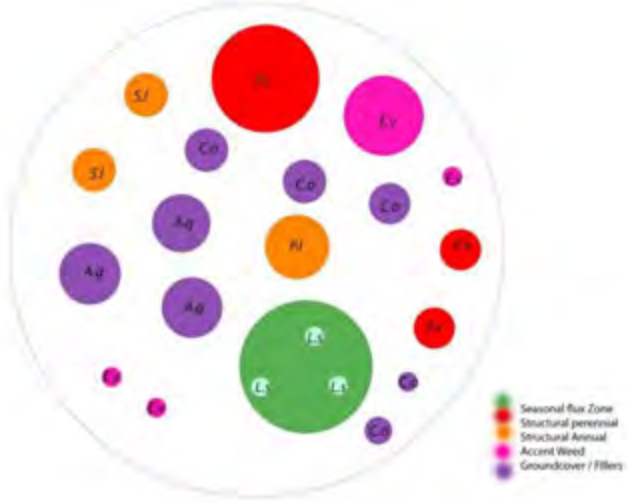
2016/11/05

2016/11/23

2016/11/11

2016/11/19

Productive planting methodology tested




2016/10/10


2016/10/23


2016/11/11
2016/12/05

Productive Planting Methodology
Test 1

Planting Zones -

1. Structural perennials

Lavender angustifolia
Lupinus angustifolia'
Salvia elegans
Foeniculum vulgare

2. Seasonal Rotational

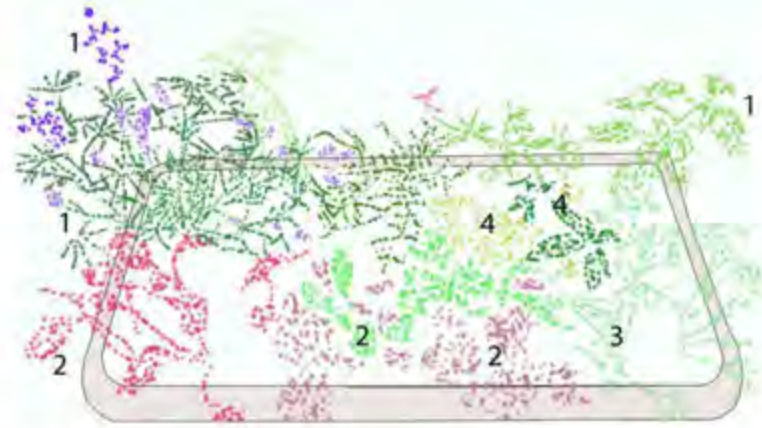
lettuce (Red oak leaf .)
Lactuca sativa var. Crispa
Ruby chard .

3.textural replenishing planting .

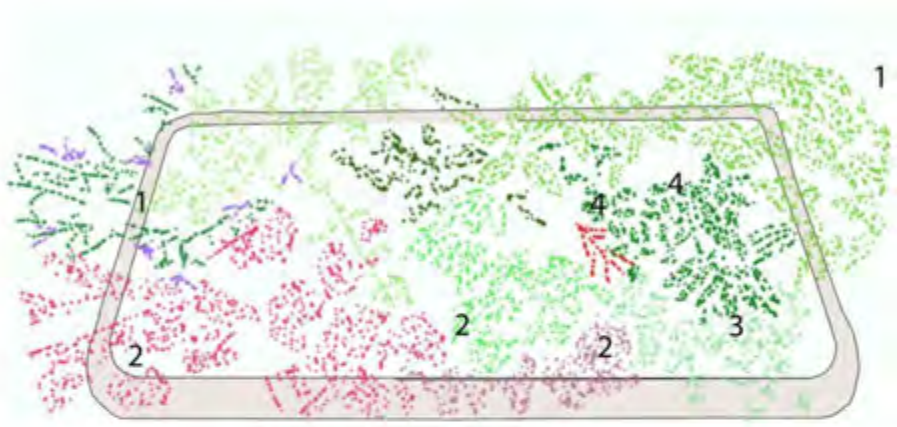
Parsely

4. Groundcover / Filler

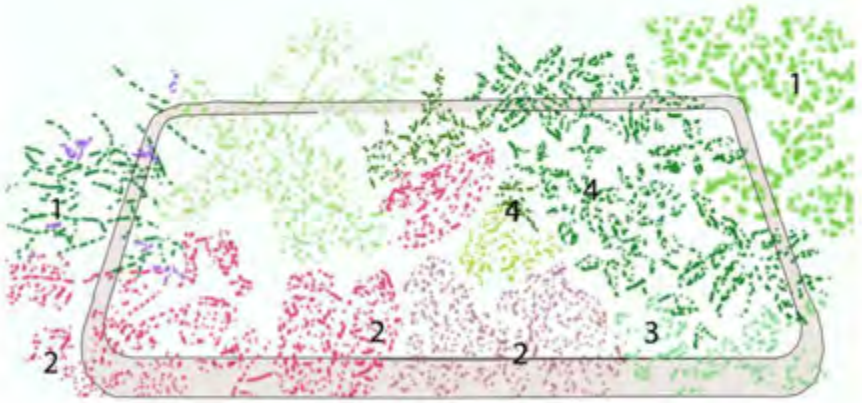
Mint
Thymus vulgaris



2016/09/23



2016/10/23

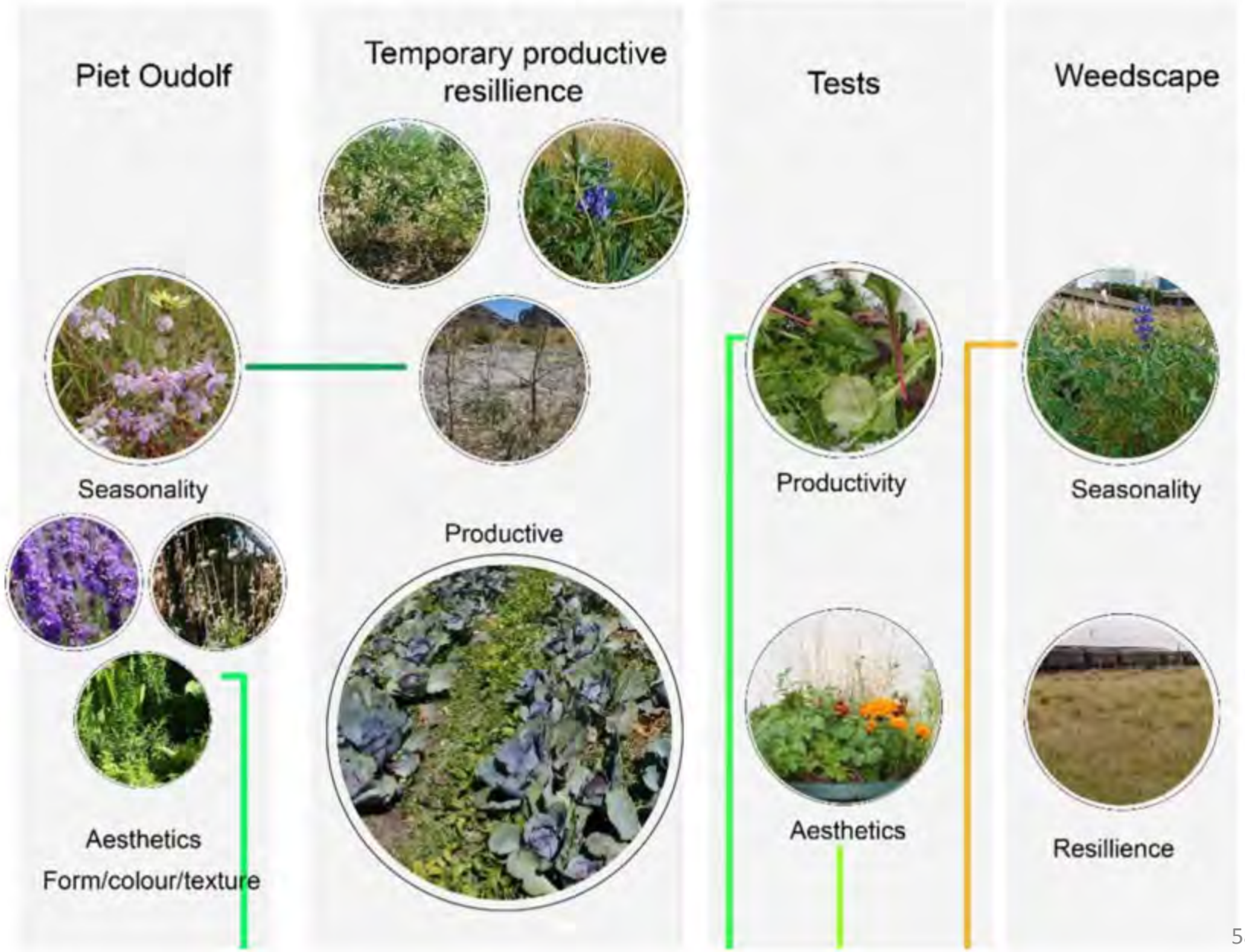


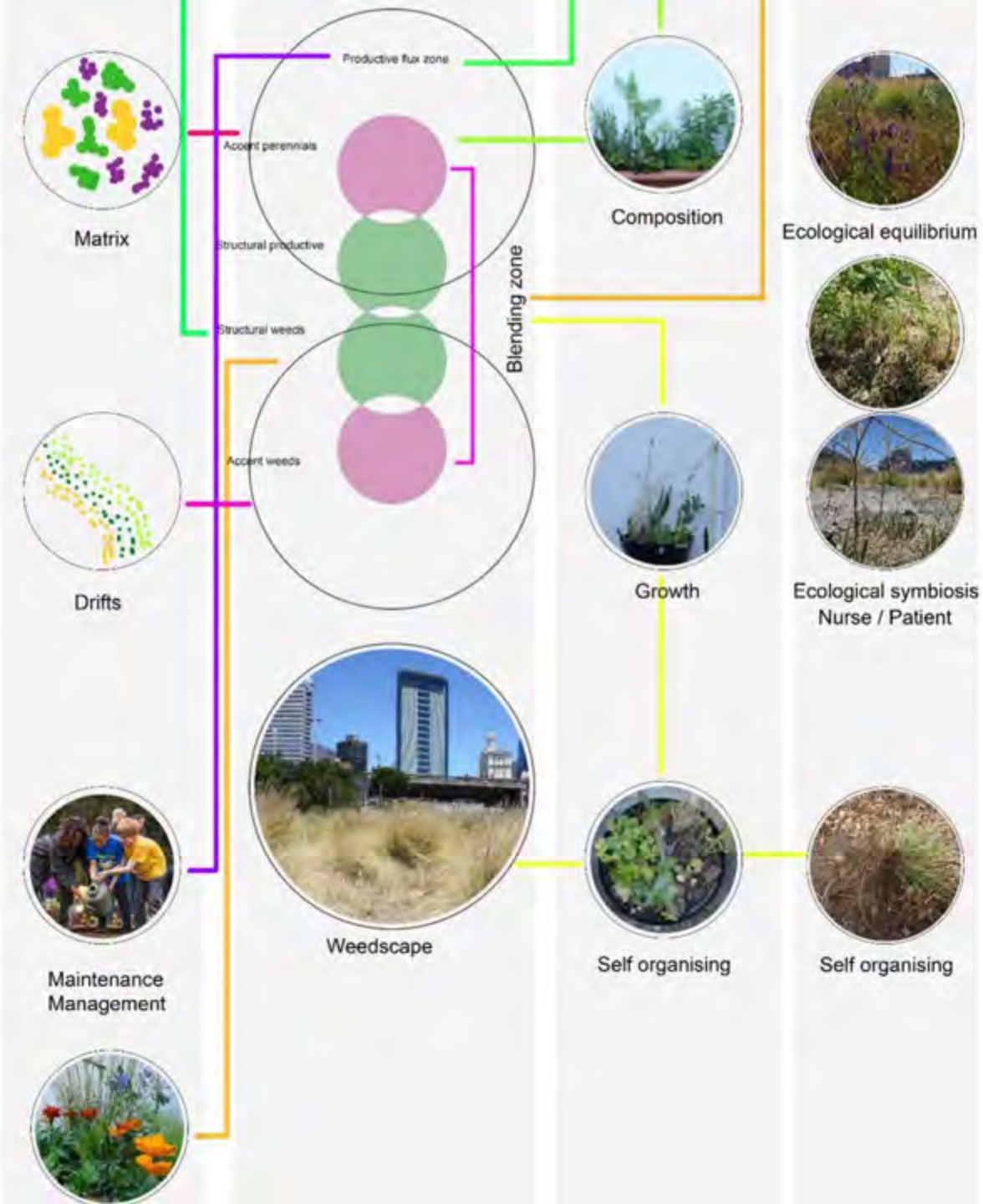
2016/11/5

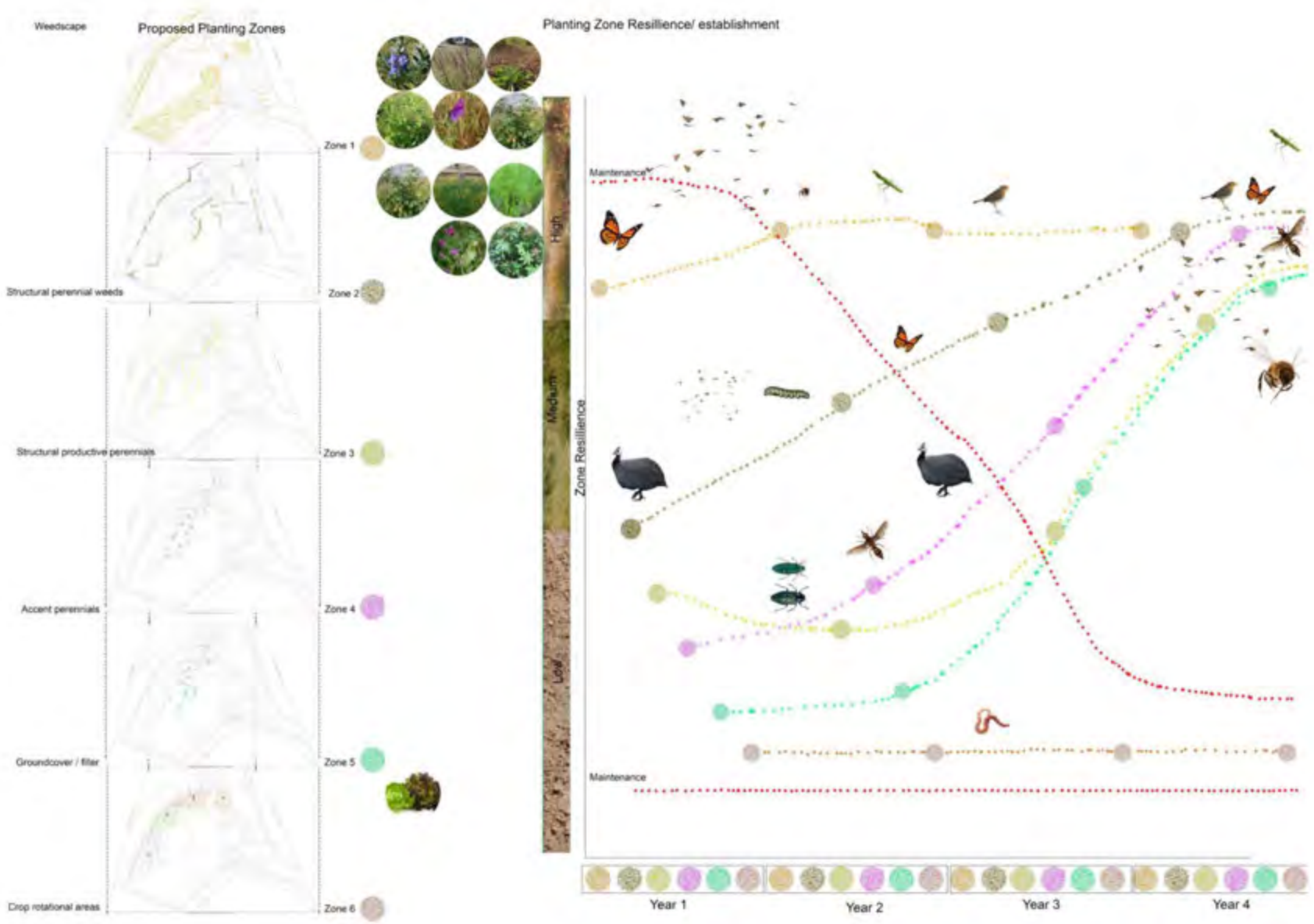
2016/11/11

2016/11/19

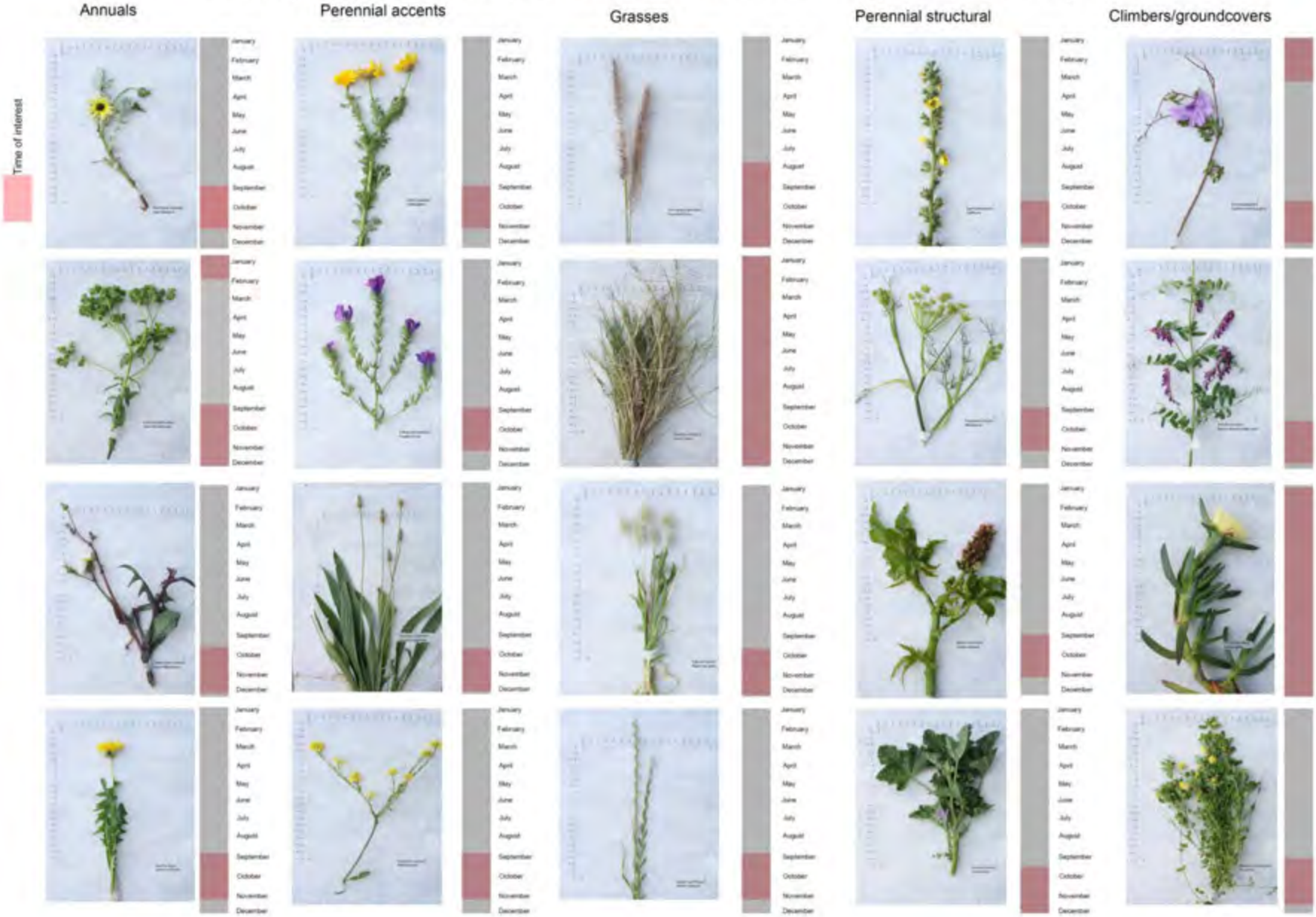
Hybrid productive planting methodology



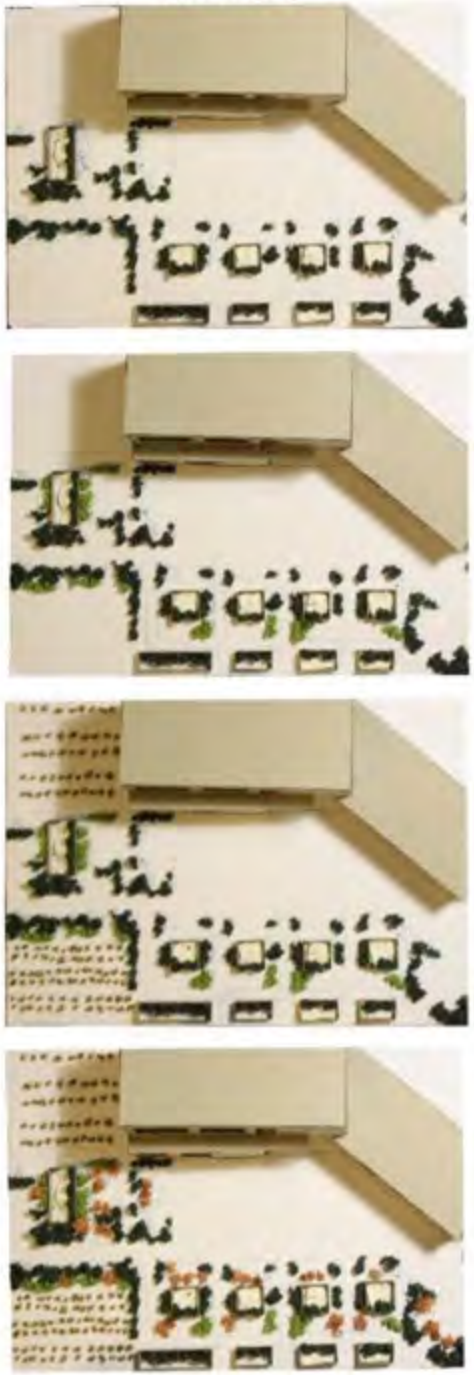

Productive flux zone
Accent perennials
Structural productive
Structural weeds
Accent weeds
Blending zone
Matrix
Drifts
Composition
Growth
Weedscape
Maintenance
Management
Self organising
Ecological equilibrium
Ecological symbiosis
Nurse / Patient
Self organising


Weedscape
Proposed Planting Zones
Planting Zone Resilience/ establishment
Zone 1
Zone 2
Zone 3
Zone 4
Zone 5
Zone 6
Structural perennial weeds
Structural productive perennials
Accent perennials
Groundcover / filler
Crop rotational areas
High
Medium
Low
Zone Resilience
Maintenance
Maintenance
Year 1
Year 2
Year 3
Year 4

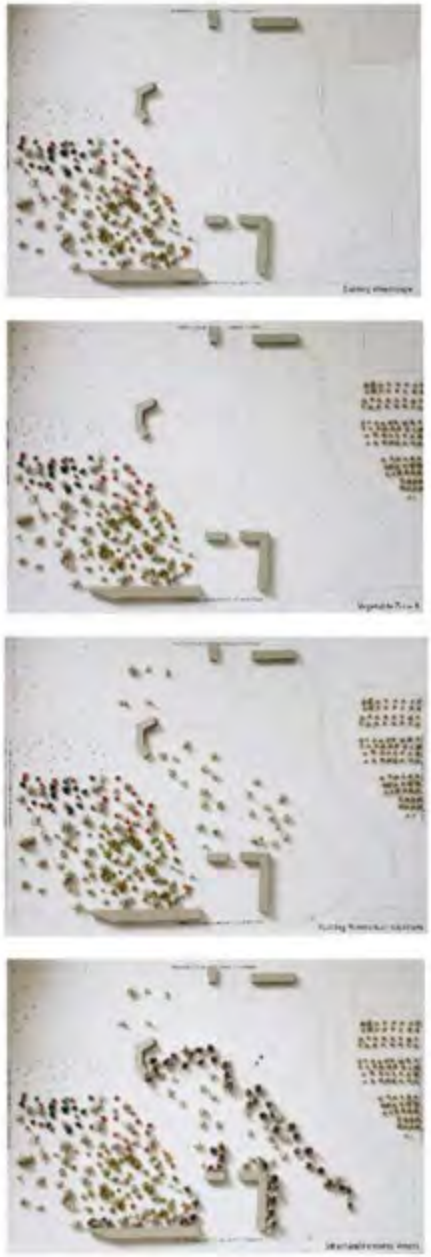
Standard planting transect weed species collected from colonised weedscape sites within the city



Model 1



Model 2



Model 3

Design process drawings

Grid mapping

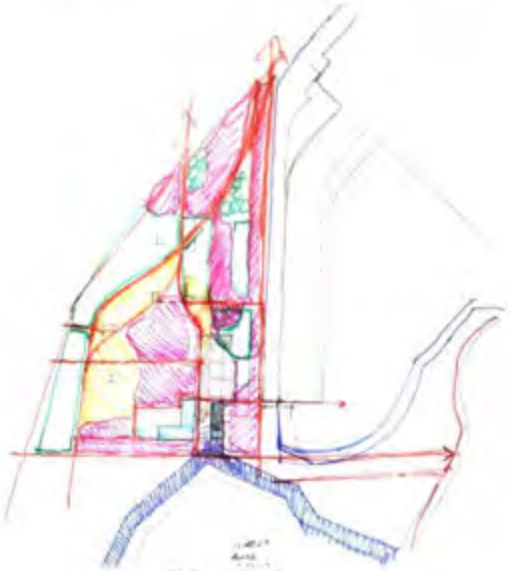
Weedscape diversity

Soil samples

Zones

Blending zones

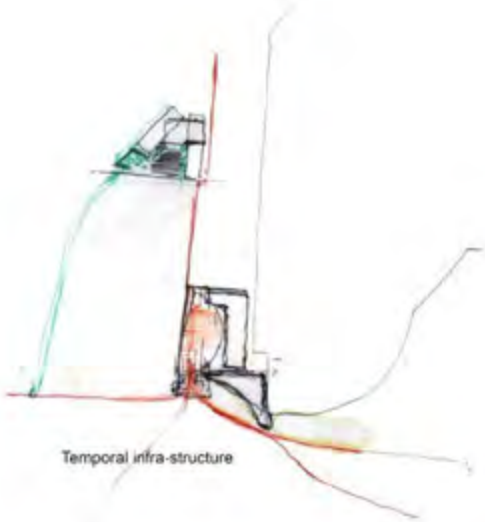
Design sketch 2



Design sketch 3

Design sketch 4

Access movement



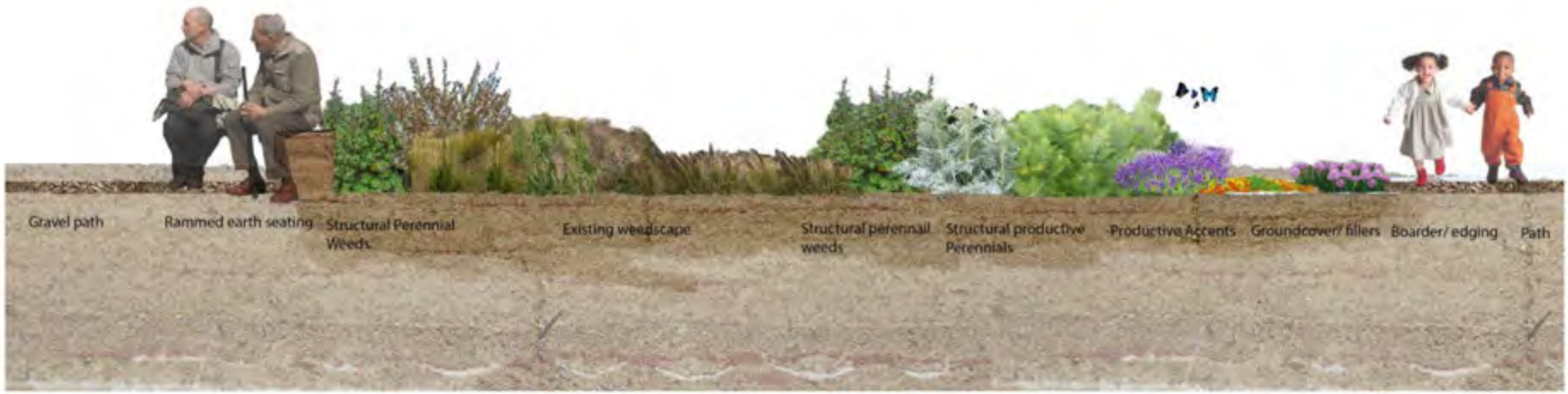
Temporal infra-structure

Design sketch 1

Design sketch 5

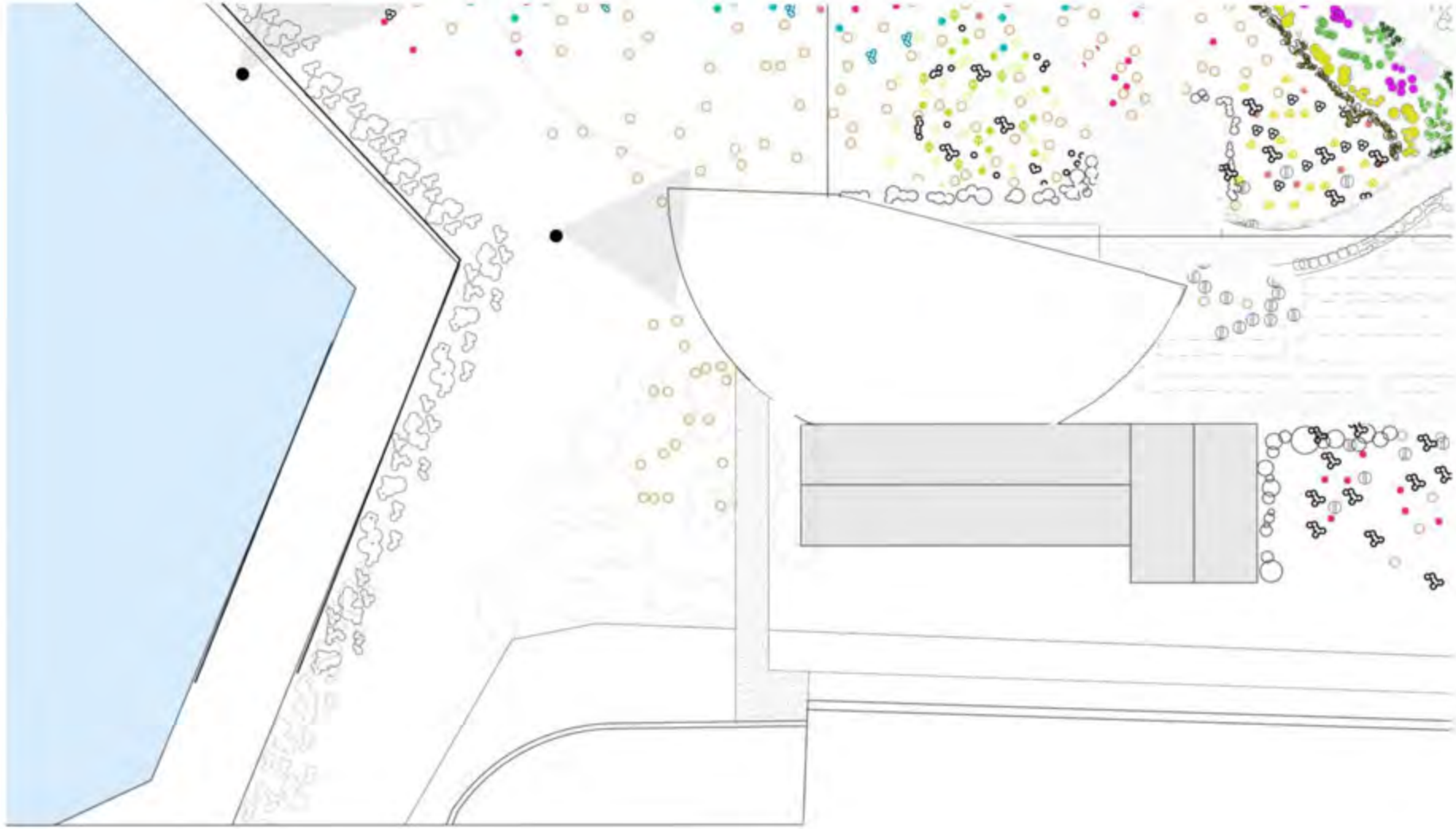
Design finalised

Planting methodology

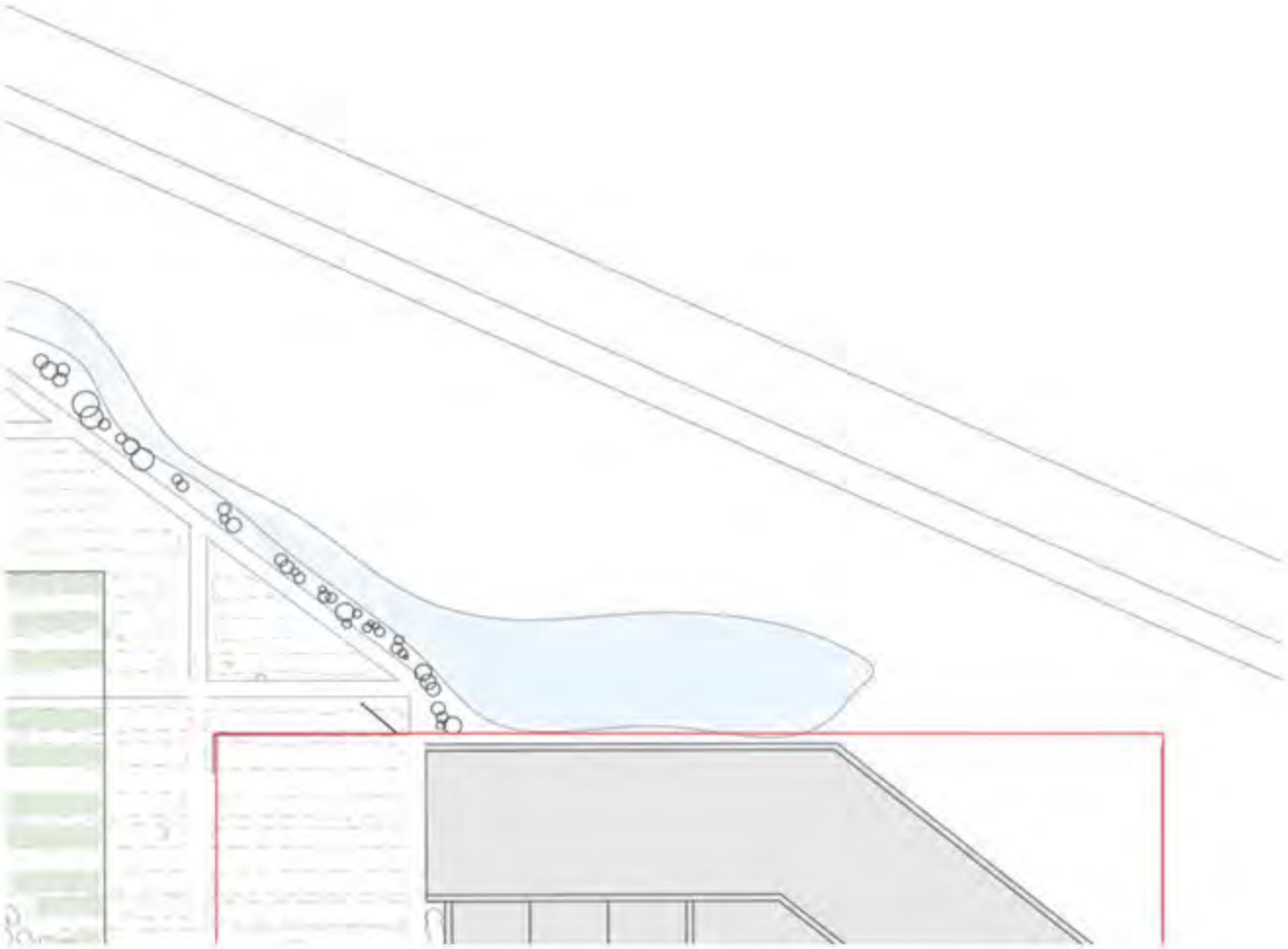

Gravel path
Rammed earth seating
Structural Perennial Weeds
Existing weedscape
Structural perennail weeds
Structural productive Perennials
Productive Accents
Groundcover/ fillers
Boarder/ edging
Path


PRODUCED BY AN AUTODESK EDU


EDUCATIONAL PRODUCT
Scale 1:50



- Perennial accents
- Structural productive
- Productive flux zone
- Groundcover/filler
- Edging/ boarders
- Structural weeds



Existing Weedscape Species

- *Pennisetum setaceum*
- *Hyparrhenia hirta*
- *Medicago polymorpha*
- *Lolium perenne*
- *Echium vulgare*
- *Misopates orontium*
- *Hypocharis radicata*
- *Rumex acetosella*
- *Lupinis angustifolius*
- *Lavatera arborea*
- *Marva parvifolia*
- *Chloris gayana*
- *Stenotaphrum secumdatum*
- *Trifolium dubium*