Patterns for Rain

Exploring a Stormwater First Pattern Language for Campus Development

Rebecca Shepard

Spring 2016

Patterns for Rain

Exploring a Stormwater First Pattern Language for Campus Development

Rebecca Shepard

June 2016

Patterns for Rain

Exploring a Stormwater First Pattern Language for Campus Development

Rebecca Shepard

June 2016

Submitted in partial fulfillment of the requirements for the Master's of Landscape Architecture in the University of Oregon's Landscape Architecture Department.

Committee Chair: Rob Ribe, PhD Date:

Committee Member: Chris Enright, PhD Date:

Abstract

To robustly implement low impact development stormwater solutions, the University of Oregon would benefit from using a pattern language approach to plan East Campus. Most stormwater on the UO campus now disappears into pipes and is accelerated away to the Millrace and Willamette River. These practices exacerbate flooding, damage water habitats and contribute pollution to stormwater in the Willamette Basin, particularly from streets. Without an integrative stormwater management plan, the UO risks loosing the valuable opportunity to change this age-old habit and use one of their most abundant resources to create a 'campus water aesthetic.' A series of design experiments for creating stormwater infrastructure systems on East Campus were produced. Proposed stormwater runoff management strategies indicated what type of structural development could be built and where. These six alternative designs were evaluated against a set of UO Pattern Language Standards and stormwater issues appropriate to the design concept. The designs were evaluated against a criteria and ranking outcomes were presented graphically to visually show the strengths and weaknesses of each design. This was followed by a final design critique for each of the six-alternative design. The product of this process was a set of Stormwater First Patterns for the University of Oregon's East Campus.

Acknowledgements

A huge thank-you to Rob Ribe, my Committee Chair for guiding me through a very complex research project. This was my most challenging project yet, and I knew the only way I could accomplish it was if I had your support. You contributed an enormous amount of your time and energy to the success of this project. I am fortunate to have been your student.

Thank you to Chris Enright, my Committee Member as well as Dave Hulse and Bart Johnson, for all of your support and guidance during our research sequence. Each one of you took us a little deeper down the rabbit hole, as we uncovered, discovered, chose and worked on our area of focus for our projects.

Thank you to the UO Planning staff, especially Christine Thompson and Emily Eng. Both of you have supported my interests and helped me to pursue my own projects on campus to further my studies. It has been a wonderful and adventurous opportunity to learn about the nuances of campus planning.

Thank you to Eric Grape at UO Campus Operations who supplied all the maps of campus for this project that a girl could need. And I needed a lot! This project would have been very difficult to complete without your help.

I practically lived in Lawrence Hall for the past five years. Many of my friends, cohorts and faculty, have become like family. Thank you all for your support and friendships over the years.

Thank you to all of my parents, family members and dear friends for being there when I needed you the most. You have been an ongoing support system of encouragement, distractions, mindless chatter, and always providing chocolate and treats at just the right times.

And lastly, thank you to my husband, Adam and our daughter Ella. You have both given me the time and space to grow into something I never thought I could be. Thank you for believing in me.

Table of Contents

List of Figures + Tables

Figures

Introduction

Method

Results

Application

Tables

Acronyms

EC - East Campus

FVP - Framework Vision Plan (2016)

GD - General Description

ISWMP - Integrated Stormwater Management Plan (UBC)

IWRM - Integrated Water Resource Management

OSF - Open Space Framework

SW - Stormwater

UO - University of Oregon

UO CP - University of Oregon Campus Plan (2011)

UO ECDP - University of Oregon Development Policy for East Campus (2003)

UO ECOSF - University of Oregon East Campus Open Space Framework (2004)

UO SDP - University of Oregon Sustainable Development Plan (2000)

introduction

chapter one

1.1

Whitman College, Walla Walla
greymeter.com

INTRODUCTION

University campus planning has a long history of attention given to landscape aesthetics in order to validate and enrich such places in the experience of students and the eyes of the public. The American frontier campus aesthetic substantially stems from the ideas advocated by A.J. Downing in the mid to late 19th century. The concepts influenced the methods for campus planning by landscape architects such as Beatrix Farrand and Fredrick Law Olmsted (Farrand 1982). Downing's approach to landscape design included buildings set in a pastoral landscape of lawns, shade trees, walking paths and sculptures and water features (1.1). These bucolic settings for learning and social development had no place for stormwater. Early campuses relied on the infiltration of rainwater into lawns from paths and rooftops, but as campuses have filled up densely with buildings and hardscape this no long works.

As campuses have had to manage stormwater, they have largely followed the norm of making it disappear into pipes and accelerating it away to rivers and lakes. These methods acerbate flooding, damage water habitats and contribute pollution to stormwater, particularly off streets. Campus water features remain mostly aesthetic and isolated from stormwater. Can we do better?

1.2

University of Sydney, Australia
sydney.edu.au

HISTORY OF CAMPUSES

Campus Planning Through Time

The campus structure, which formed the setting for universities, stems from the traditional monastic setting, where student and teacher lived and studied in the same quarters. Typically there was a main building for academics and social gatherings with adjoining wings for lodging (1.2). The Buildings were connected by arcades forming inner quadrangles.

Later, in the 18th century, campuses for teaching higher education were established, usually situated in rural settings, away from active cities. To take advantage of expansive views and natural surroundings, campuses were commonly located near water bodies or on hilltops to capture the essence of their regional landscape (Chapman 2006).

In the beginning, such campuses didn't have a cohesive form.

As time progressed and campuses expanded, a need for a campus form was vital. The Beaux-Arts era emerged and with it came the formal geometry of organizing buildings. Strong axial arrangements of quadrangles with buildings placed along the edges strengthen views and connections out to the city and connecting parks (1.3). This use of open spaces also encouraged malls, and greens for multi functional areas (Chapman 2006) (1.4).

Fredrick Law Olmstead was an active campus planner in the mid to late 1800s. A Landscape Architect with a passion for designing with pastoral nature, Olmstead introduced large scale structural ideas to campus plans. Olmstead believed that the physical environment for teaching was a vital element in the education of students. The campus setting provided a sense of place through connecting to nature and the community (Chapman 2006). Andrew Jackson Downing, a rough contemporary of Olmstead's also participated in campus design during this time. A trained horticulturists and landscape designer, Downing introduced shade trees, pastoral lawns and veered away from the traditional pattern of quads.

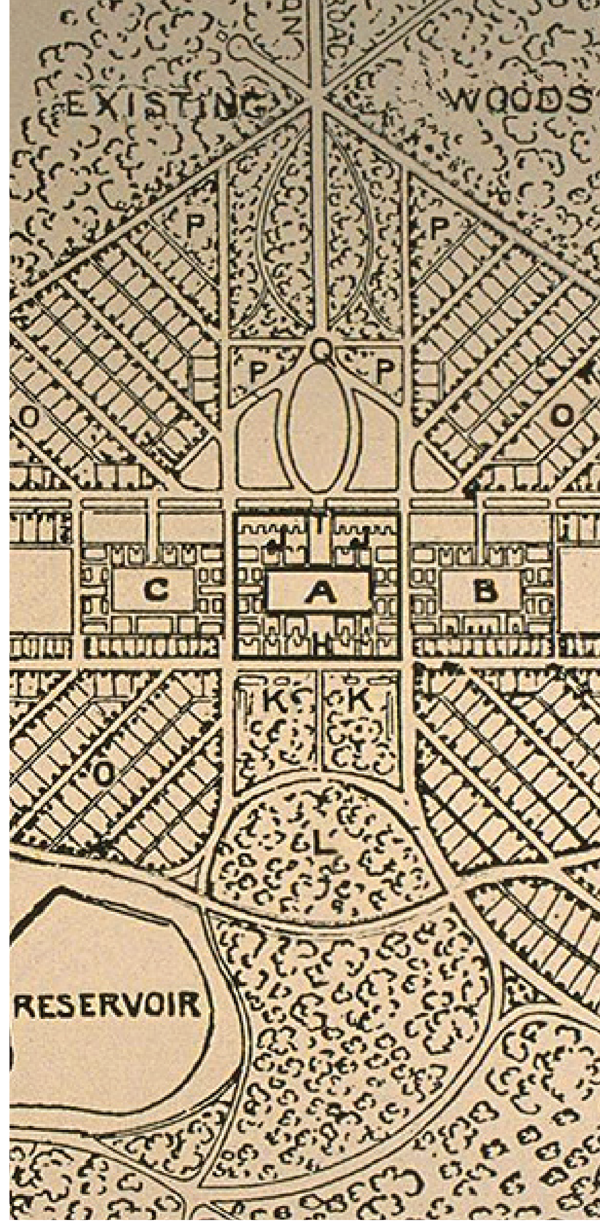
As universities expanded, these traditional patterns, still prevalent in campus landscapes today, set the stage for how contemporary campus planning began.

History of the Campus Master Plan

During the City Beautiful Movement, many campuses were established and smaller campuses expanded into larger universities (Dennis 2016). "The instruments that guided their formation were usually a plan, which described the physical layout; an aerial perspective, which described the intended character and three-dimensional development; and a president, or university governing body, that interpreted the plan and image" (Dennis 2016).

As time passed, most original Master Plans for campuses became outdated and were disregarded. The Master Plan, which was intended to design and create a cohesive whole for the campus through a design process, was typically lost and replaced with fragmented development to support rapid enrollment. The consequence of ignoring the Master Plan can be seen throughout American Universities, where the original intention of a design process to unify the campus was lost and replaced by the high demands of development, usually resulting in disconnected campuses of accumulated ad-hoc development (Dennis 2016).

One response to an unplanned campus approach was the introduction of the Pattern Language for the University of Oregon. In theory, the Pattern Language provides a holistic approach to



1.3

Stanford University's axial arrangements
lbre.stanford.edu

1.4

The Lawn at the University of Virginia
uvaclubs.virginia.edu

campus planning where decisions for designs are based on a set of principles that if followed correctly, can create a cohesive campus. (See Pattern Language below).

1.5

Traditional ways to manage stormwater
westcas.org

HISTORY OF STORMWATER ON CAMPUSES

Campus Water Aesthetic

With the establishment of the Clean Water Act (CWA), enforced by the US Environmental Protection Agency, the CWA requires hefty demands for protecting water quality. This "create[s] new opportunities for cost savings, habitat restoration, and campus design" (Bruce 2012). Due to these mandates, universities everywhere are required to manage their own stormwater runoff, in some way or another.

The issue of stormwater management in the past has largely been overlooked when it comes to campus planning. "Over the past 20 years, universities have focused their primary conservation efforts on energy usage. While such initiatives are productive and easy to validate, the water-energy nexus has been largely overlooked" (Bruce 2012). Historically, it has been acceptable to pipe away untreated stormwater to city sewers or directly out to waterways (1.5).

Campuses located near waterways (rivers, lakes, creeks etc.) are at higher risk of damaging their reputation by not making efforts in protecting waterways from pollution. Society cares about matters such as these, and campuses should incorporate an ethical plan for future treatment of their polluted runoff. Some universities are now beginning to look ahead to how they can incorporate campus-wide plans for stormwater management (1.6).

Figure 1.6

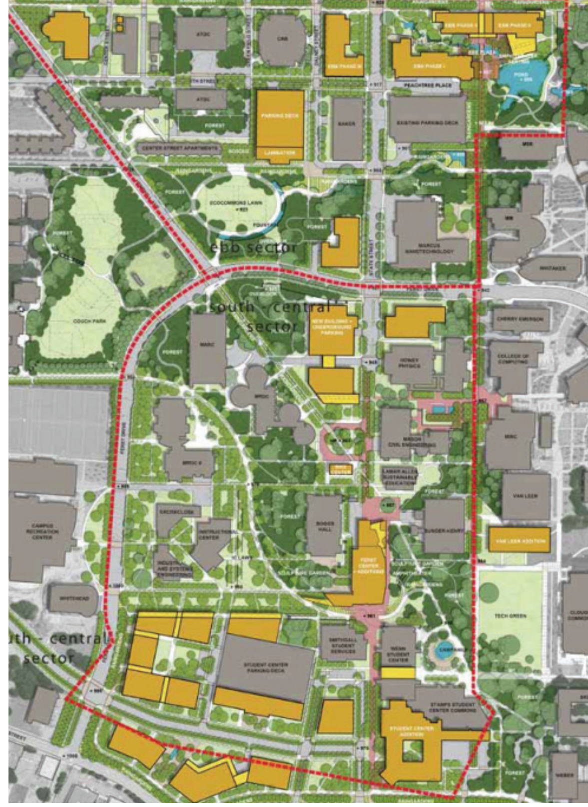
Dell Stormwater Management System
at Philadelphia University
philau.edu

Each building or area on campus that is developed typically must now include individual stormwater facilities to manage runoff. "Many campuses are now incorporating rainwater gardens, bioswales, permeable pavements, green roofs, and green walls when planning major facilities. Yet, such projects are often one of a kind and not coordinated in a long-term vision… "(Bruce 2012) Even though these disjointed green infrastructure strategies are helpful, they do little "to envision a unified campus water aesthetic" (Bruce 2012) for the university as a whole. However, there are a few universities that have taken the opportunity to create a sense of place through large-scale, integrative, robust and beautiful stormwater management designs.

INTEGRATED WATER RESOURCE MANAGEMENT

Stormwater Management Program

Since many campuses have not yet taken steps in adopting a campus wide stormwater management program, an Integrated Water Resource Management (IWRM) approach can assist in reshaping development in systems such as stormwater management (Bruce 2012) (1.7). IWRM addresses the complete management of potable water, stormwater and wastewater as part of watershed planning (Bruce 2012). Universities that are interested in sustainability issues, but not ready to commit to managing all the water on their campus, can still benefit from this holistic approach by taking the first steps by managing their stormwater runoff. “The recognition of the connection between water management and energy conservation is creating a new opportunity for integrated management systems. At the same time, integrated planning will also help develop and efficiently manage limited water resources to foster increased urban stainability” (Bruce 2012).



1.7

2013 Georgia Institute of Technology Campus Wide Water Management Plan
space.gatech.edu

The University of Oregon (UO) recognizes itself as being a sustainable campus. However, their main Campus Plan that guides most decisions for development on campus does not address the issue of stormwater runoff. According to the Sustainable Development Plan for the UO, the focus of water is a recent addition to the plan. The plan states “Water is one of Oregon’s most precious resources. Every building site is in a watershed connected to waterways and wetlands (1.8). Therefore: All development will protect and augment natural drainage and will treat storm-water runoff on site to maximum extent possible” (UO SDP 2000). The Sustainable Development Plan regarding water is therefore more technical in form and addresses individual designs rather than pursuing an integrative campus-wide water management program.

The UO Campus Plan works through a Pattern Language approach (see below).Unfortunately the Pattern Language, which influences and guides most design moves on campus is not formulated to address stormwater. This aspect of campus planning is left up to the developer and campus planners to decide the form of stormwater treatment, if any, even if it does not blend in with the rest of campus. The Framework Vision Plan (VFP) is a new advisory study to guide future expansion on the UO campus. Although the plan is very extensive, there is very little to no thought given to how the UO should address stormwater.

Unless campuses, such as the UO, make conscious choices in developing a stormwater management program on their campus, the probability of integrating water management into a successful plan seems slim.

1.8

Willametter River, Eugene
R. Shepard

1.9

1921 Aerial of UO Campus, open campus grounds
library.uoregon.edu

1.10

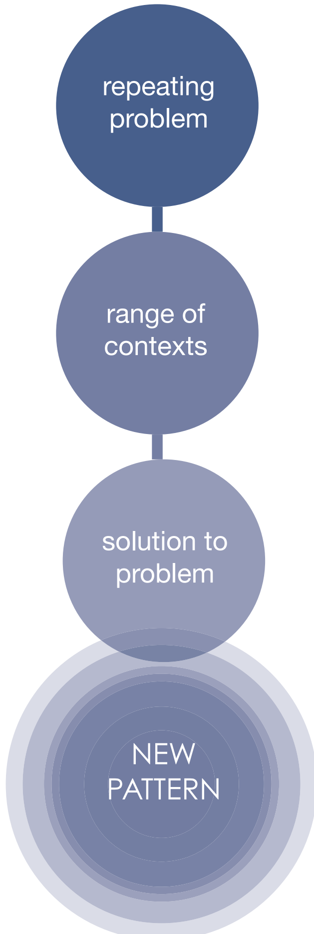
1940 Memorial Quadrangle , UO
library.uoregon.edu

CASE STUDY

University of Oregon, East Campus

In the early 1870s, eighteen acres of farmland were the first of many parcels to be purchased for the establishment of the University of Oregon (Rottle 2008). The parcels of land obeyed the Jeffersonian grid, however, they were not platted and developed by the city's standard street grid system and thus the open and expansive grounds set the stage for a unified university campus (1.9).

The University of Oregon was founded in 1876 and consisted of a few buildings scattered on the 18 acre campus. In 1914 Ellis Lawrence, an Architect and Planner was hired to create a new vision for the University. Lawrence, the founder of the AAA School, was a major player in designing a series of plans for the ever-evolving Campus. Lawrence took a unique view at designing the campus. He saw the value in open spaces, and subsequently preserved those areas and built around them. The landscape had a formalized picturesque feel, due to the influence of the era of Fredrick Law Olmsted (Rottle 2008). Lawrence "integrated a combination of Gothic quadrangles with the axial arrangement espoused by the Beaux-Arts style (1.10). This combination of design principles has proved to be very effective for the campus, with quadrangles anchoring the plan and axes accommodating future growth" (Rottle 2008). These styles are still the quintessential elements of UO campus planning today, for the original core campus area.



Patterns are design statements that describe and analyze issues and suggest possible ways to resolve those issues.

- UO Campus Plan 2004

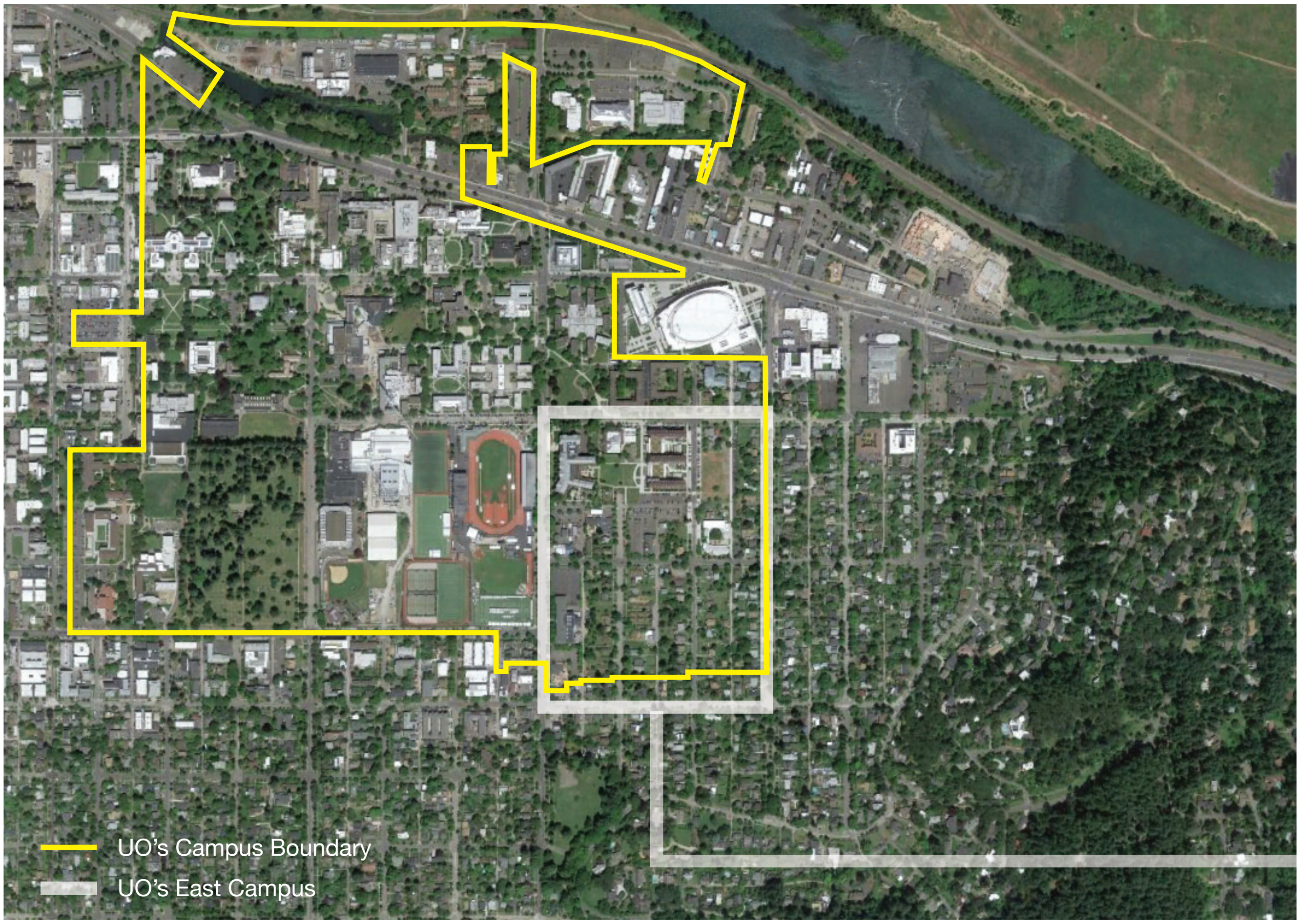
1.11

Pattern Language diagram
R. Shepard

Pattern Language

In the mid 1970s, Christopher Alexander was hired as a UO Campus Planning consultant. Alexander created the Oregon Experiment, a unique design process that created a Pattern Language, specific only to the UO. This process would set UO Campus Planning apart from other university planning processes by creating a design system that was a process verses a fixed-image master plan. The Campus Plan is considered similar to a living plan, with the idea that the campus planner would never know the complete outcome of the campus form into the future (UO CP 2011).

Alexander's Pattern Language was composed of many patterns that assisted in decision making for future projects on campus. A pattern is "any general planning principle, which states a clear problem that may occur repeatedly in the environment, states the range of contexts in which this problem will occur, and gives the general features required by all buildings or plans which will solve this problem" (Alexander 1975) (1.11). The reason for the Pattern Language was to "provide a non-technical vocabulary of design principles that would allow building users to communicate effectively with the planners and designers of those buildings" (UO CP 2011). The Pattern Language has successfully helped to solidify a strong framework in which the Campus Plan bases its unique process of design to unify the campus, maintain its qualities, and provide for social needs. The Pattern Language approach does not emphasize technical code standards that architects and landscape architects must obey in filling open spaces with new projects. Instead, these designers must engage in a design process with users and the faculty planning committee driven by conceptual goals and standards. Only the city's building codes constrain designs.



1.12

2014 Aerial of UO Campus + East Campus
Google Earth

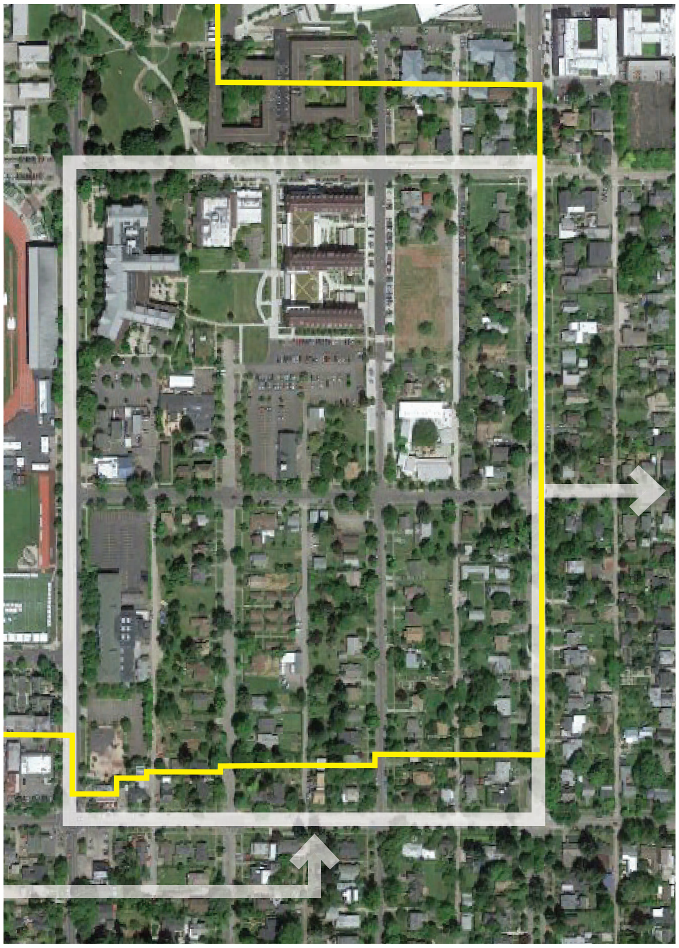
East Campus

As the main campus grew, the need for purchasing more land for expansion was unavoidable. Just east of the main campus was the quiet Fairmount Neighbourhood, nestled into the ecotone of the forested hills. In the 1960's the University of Oregon began purchasing land in the Fairmount Neighbourhood. These newly acquired properties would be holding places for future expansion and development of the campus grounds.

Unlike the main campus that carried with it sense of cohesion, due to the large parcel of land it resided on, East Campus had succumbed to the grid pattern of streets and utilities that was ever present throughout the city. Even though the streets of East Campus remained in city ownership, the urban design bones had been laid down in the area, as if the parcels of land would be in private ownership forever.

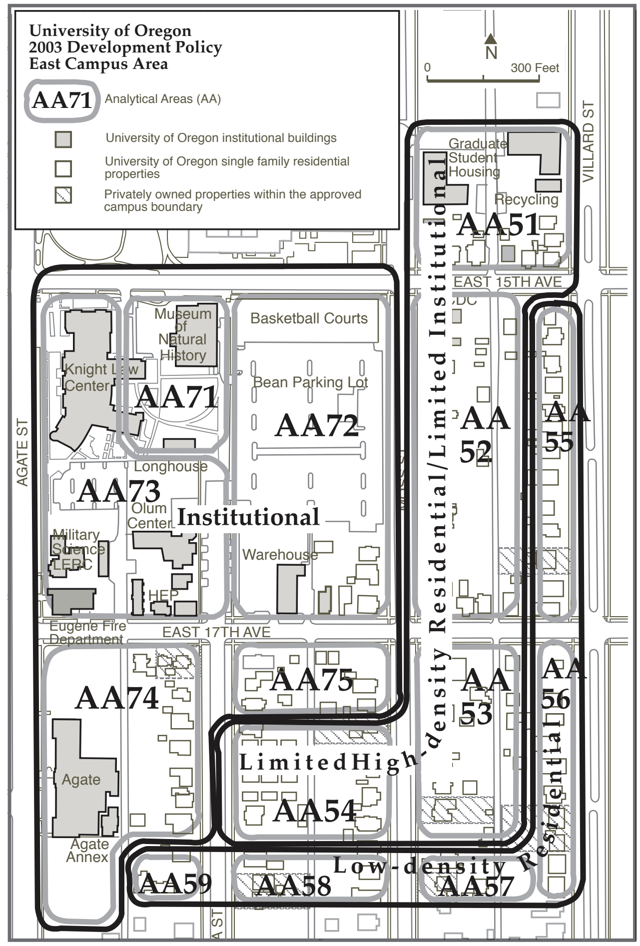
East Campus Pattern Language

The East Campus (1.12), even though it is separated apart and morphologically different from the main campus, still falls under the university planning process. This means that all the applicable Campus Plan policies and patterns apply, plus the specific East Campus policies and patterns (which provide further refinement for this specific area). These specific applicable policies are: Graceful edges, Campus-Like Character, Traffic, Parking, Maintenance, and Communication (UO ECDP 2003). Although East Campus is technically part of the university campus, the question arises: should the East Campus have its own pattern language that addresses stormwater, in attempt to create a new pattern that may be applicable campus wide?



1.12

2014 Aerial of East Campus
Google Earth



1.13

Sub-areas of East Campus
UO ECDP

East Campus Program

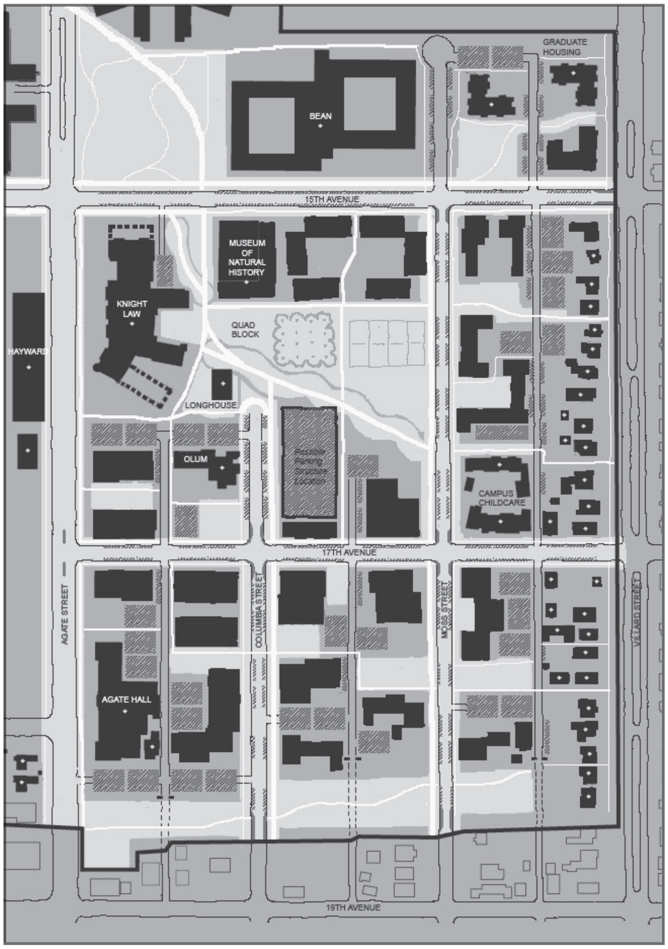
In 2003 a development policy was created for the East Campus area. The policy states that the East Campus area would be used mainly for future growth for student housing and institutional purposes (UO ECDP 2003). “Most recent estimates predict a need for approximately 500,000-600,000 additional gross square feet [of floorspace] over the next twenty years” (UO ECDP 2003). Since the East Campus can easily accommodate the needs of the university, the transition areas between neighborhood and campus needs particular attention. To refrain from creating abrupt edges, graceful transitions through tapering building heights, attractive and well-maintained landscapes and design features will enhance the harmony between the campus grounds and the neighborhood it is nested in (UO ECDP 2003).

The policy divides the East Campus up into three Sub-areas: Institutional, Limited High Density/Limited Institutional and Low Density Residential (UO ECDP 2003). These areas have specific policies and standards that need to be considered when developing (1.13).

East Campus Open Space Framework

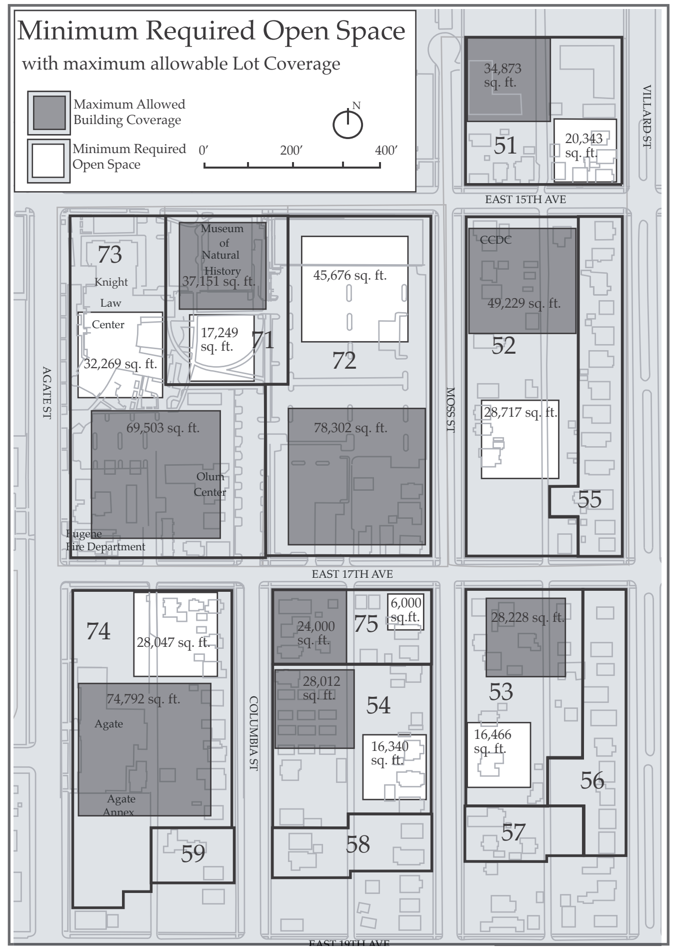
In 2004 Rowell Brokaw Architects developed an outline for an Open Space Framework (OSF) for East Campus for the UO planning process. The framework suggests design guidelines for future planning and designing for the East Campus area.

The Framework does not provide a fixed-image master plan for East Campus. Similar to the Campus



1.14

2004 Framework Diagram
UO East Campus Open Space Framework



1.15

2003 Minimum Required Open Space
UO Devlopment Policy for East Campus

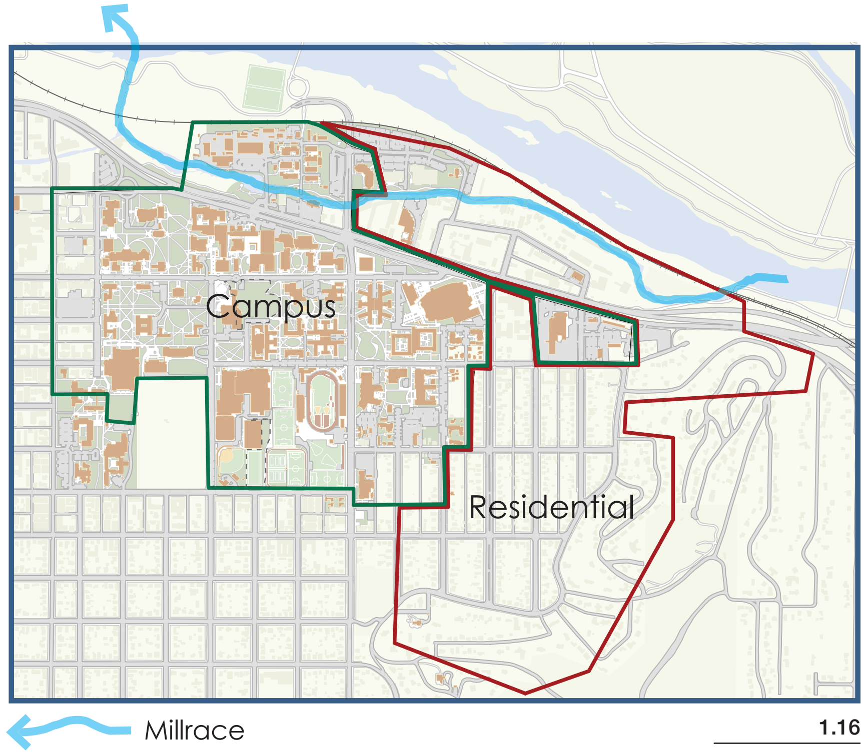
Plan, it presents options and directions of how to create an evolving organic model of design elements and policies that would be cohesive within the East Campus area. Based on outdoor spaces, the frameworks serves to protect and enhance open spaces and users' experience (UO ECOSF 2004) (1.14).

Although the framework is quite comprehensive in many ways, no detail is given on how to integrate and manage stormwater and pollution runoff from the area. The framework suggests that whenever possible designers are encouraged to introduce rainwater treatment to mitigate drainage problems (UO ECOSF 2004). 'Green Streets', which currently means streets that manage their own stormwater through green infrastructure, are highlighted as part of the framework. However, in the context of the framework, 'Green Streets' appear to mean traffic calming areas, pedestrian friendly 'green' walking paths, and lush plantings of trees, shrubs and the like (UO ECOSF 2004). There is no clear suggestion to incorporate bioswales etc. along the streets.

The framework states, "[i]n the East Campus area, as on the main campus, buildings are secondary to open space." This means that the future of the open space system is dependent on the placement of the buildings and how they can positively contribute to the open space framework (1.15). The OSF looks at a system of open spaces first before development, showing the importance of open space for the campus. The OSF also addresses pedestrian networks, building sites, streets and parking, but the plan neglects to address stormwater runoff, creating a missed opportunity, since open spaces usually overlap with stormwater facilities.

65%

of stormwater runoff goes to the millrace



1.16

Areas that drain to Millrace

E. Grape, UO Campus Operations

East Campus + the Millrace

“The majority of today’s campuses are not taking advantage of [storm] water resources that are available.” (Bruce 2012) With approximately 46” of rain during the months of October through May, the stormwater runoff at the UO is an untapped resource that is unaccounted for. Instead of directing and discarding stormwater into underground pipes, stormwater can be allowed to flow visibly and beautifully throughout the campus grounds. By revealing and using the water in the landscape allows rainwater to slowly filter back into the earth, recharge ground water, nourish plants, and provide opportunities for wildlife habitat and educational elements. The UO has the opportunity to use stormwater as a resource to unify and beatify their campus.

The existing stormwater runoff from the neighbourhood of the East Campus area is directed into lateral pipes and sent out to a main line under Agate Street. The polluted runoff from most storms is then transported less than a half mile away by pipe, where it is dumped into the Millrace and detained there for some time before emptying out largely untreated into the Willamette River.

Between the main UO Campus, East Campus and the Fairmount Neighbourhood there is approximately 365 acres of impervious surfaces (1.16). That calculates out to be over 456 million gallons of stormwater runoff a year. With 65% of that runoff going directly to the Millrace, the Millrace is accepting over 296 million gallons of polluted stormwater run off every year. (Appendix A).

Every year the UO pays nearly $400,000.00 in stormwater fees to the City of Eugene. The charges cover imperious fees and infrastructure costs to maintain and service stormwater pipes. On top of that hefty fee is another cost for pumping clean water from the Willamette River to keep the contaminated stormwater runoff in the Millrace moving along. To save money on pumping and reduce water pollution, water does not flow through the Millrace most of the time. However, due to public pressure and upkeep regimes to uphold a maintained appearance for the Millrace, the UO periodically pumps and floods the stagnant water in the Millrace. The cost for pumping is approximately $130,000 a year. The Millrace has turned into a conveyance system that accepts and transports polluted runoff. Needless to say, the UO is looking for a solution (Grape - personal communication 2016).

1.17

UBC Stormwater Terraces
PFS Landscape Architects

1.18

UBC Buchanan Courtyard
thefield.asla.org

PRECEDENT STUDIES

University of British Columbia

The University of British Columbia (UBC) sits on the western edge of a peninsula, just outside the bustling city of Vancouver. Nestled into the lush, forested 4,000 acres of University Endowment Lands, the oasis boasts a sea to sky experience of mountainous views and steep cliff overhangs to the ocean below.

Influenced by the Beaux-Arts, UBC's original campus plan (1914) created a traditional campus form with buildings constructed around a grand mall and other lesser axes. "The projects that followed tended to emerge one department or academic initiative at a time, each more concerned with parking and self contained convenience than some larger sense of place" (King 2015). This type of disjointed piecemeal development is the shape and form that many campuses are struggling to unify today.

Over the past ten years, UBC has changed gears and begun to blend their environmental concerns with design on campus. "In a sense, UBC has set out to brand itself… Other North American campuses were conceived with grand visions of buildings and grounds that never came to pass, and others now seek to emphasize green design as a selling point to potential students" (King 2015). To create and shape a unique campus identity, UBC is embracing one of their most abundant resources – stormwater runoff.

UBC is using stormwater design as a unifying pattern for creating a "campus water aesthetic" (Bruce 2012). Instead of traditionally managing stormwater underground through pipes, the campus is exposing the water through creative design interventions. "We need today a richer landscape aesthetic that integrates a deep understanding of the function of water, its relation to energy usage, and how it can be revealed as an essential part of local character" (Bruce 2012). By revealing and managing stormwater elements as a cohesive pattern throughout campus, UBC is proactively engaging in their sustainability mission to teach their students and the public about the importance of environmental systems.

As a precocious campus, UBC is thoughtfully committed to high quality design to responsibly manage their stormwater on the campus grounds. Their sustainability mission is obvious in the way they present moves in exposing large, visible stormwater features (Taddune - personal communication 2016). The largest feature by far is the Stormwater Terraces (1.17). "The terraces stand as an ambassador of sustainability along a key processional route into the heart of campus" (PFS 2016). Stormwater from nearby impervious surfaces is directed into terraces that descend down University Boulevard for 360 feet. Vegetation filters the stormwater along edges and provide interest and wildlife habitat. What was once a parking lot is now transformed into a popular gathering space for students to study, meet and socialize (PFS 2016).

Presently, there are at least five areas on the campus grounds that reveal stormwater in large, innovative, and beautiful ways and seem to be connected through planting materials, hardscape and exposed water. A flowing streambed (1.18), sizable rain gardens, a geometric water channel and a reflecting pool (1.19), the terraces as well as other non-treating water features, enhance the campus and provide continuity of a water aesthetic on the campus grounds.

UBC is setting a precedent for other university campuses by re-envisioning stormwater management. "Water defines the essence of UBC, and [stormwater design] is now also unifying its public realm, and in the process, helping build the strong sense of place essential to a major educational institution" (Taddune 2015). With these simple, yet complex gestures of stormwater management UBC begins to embody a sustainable campus ethic, making lasting impressions with their students and the public.

1.19

UBC Buchanan Courtyards
PFS Landscape Architects

St. Mary's College, CA

St. Mary's College in California has integrated both stormwater management and sustainable design guidelines into their Campus Master Plan (1.20).

To prevent stormwater pollution and protect local waterways, St. Mary's uses a variety of Low Impact Development (LID) design strategies to treat stormwater runoff on site. The Campus encourages LID designs to "be considered early on in the planning and site development process" so the facilities can be integrated for stormwater functionality and improve the appearance of the campus.

> "Sustainable stormwater management practices will preserve and enhance the unique resources, water quality and beneficial uses associated with the existing creeks and wetlands (wildlife habitat and riparian vegetation) while incorporating them as an environmentally sustainable feature of the campus" (St. Mary's 2015).

Although St. Mary's has a campus wide stormwater management plan, the campus takes a more technical approach and does not address how the stormwater facilities can be designed in patterns or common styles or combinations that add to the sense of place of the campus.

1.20

St. Mary's College, Moraga, California
Fuscoe Engineering

1.21

Lake Mendota, University of Wisconsin
Qualtrics Survey Hosting Service

1.22

Lake Mendota shore line
UW Madison

Figure 1.23

Flash flood at University of Louisville
weather.gov

Univeristy of Wisconsin, WI

"At the University of Wisconsin-Madison (UW), water has been a daily part of student life since the university was founded on Lake Mendota in 1848" (Bruce 2012).

Since the campus is located at the base of two watersheds, much of the runoff from the neighboring urban areas flows right through the UW campus and directly out into the University Bay, carrying with it all of its pollutants (1.21). The solution was to take a look at the whole watershed, and organize a stormwater management plan. The UW-Madison Campus Planning Committee "recommended that the University of Wisconsin-Madison commit to a policy that ensures that the amount of runoff from newly developed and redeveloped areas be no greater than the amount (of runoff) that occurred under native conditions" (Bruce 2012). Over the past 20 years integrative stormwater facilities became part of the development process for building projects on campus (Bruce 2012).

UW is a good example of how the environmental goals of one university has begun to transform the campus grounds. The campus now has several water management strategies, "including green roofs, bioswales, porous paving, and the use of native plants to absorb runoff" (Bruce 2012). The landscape forms of these strategies seem so far to be for technical treatment of stormwater, and not for creating an aesthetic water experience of the campus.

In the near future, there are plans to restore the wetlands that once graced certain edges of the Lake Mendota shoreline (1.22). Perhaps in doing this, the campus landscape will begin to reconnect to their regional landscape and establish a stronger sense of place in the eyes of the students.

University of Louisville, KY

Louisville, KY has a recent history of major flooding (1.23). In 2009 over 24" of rain fell in a period of three hours. Buildings on the University of Louisville (UL) campus were damaged, and classes evacuated. The campus suffered $20 million in damage. In 2012 another destructive flood struck, bringing similar consequences (Bruce 2012).

Since the University owned large areas of land that were in critical flooding areas, the institution entered into an agreement with the Metropolitan Sewer District to organize a plan for stormwater management for the whole campus. The campus was concerned that the recently planted prairie-style rain gardens and bioswales didn't blend into the campus's traditionally formal grounds (Bruce 2012). "Most agreed that the traditional rain garden approach would be out of character within the cultural landscape that defines the core campus" (Bruce 2012) (1.24).

The UL took this opportunity to make use of their best landscape resource to work with the stormwater: the sand geology that lay under the campus grounds. Without changing the aesthetics of the traditional campus grounds, large stormwater infrastructure was concealed under open spaces and parking lots and thus preserved the historic landscape (1.25). To help provide education about the infrastructure system, since most lay underground, a scattering of rain gardens and bioswales were mixed into different projects in the landscape (Bruce 2012).

The UL campus is an example of integrated stormwater management for technical purposes, rather than establishing new facilities that add aesthetic elements to a campus landscape.

1.24

Formal campus setting at UL
loiusville.edu

1.25

Advanced stormwater infiltration basins at UL
loiusville.edu

methods
chapter two

INTRODUCTION TO METHOD

The research method for this project is a 'design experiment' that will investigate different possibilities through a design-based approach (Deming and Swaffield 2011). The research is nested in subjectivism, where theoretical ideas are put into practice with design and implementation and tested against goal criteria. Through critical inquiry and creative intervention throughout a design process, "understanding emerges as research is underway" (Deming and Swaffield 2011). The research strategy is projective design, where a question is posed and the research attempts to solve it by hypothetically implementing a design and evaluating the results. The determination of the success of the design is measured by an evaluation technique that will test for compliance and effectiveness of the design against defined conceptual and qualitative criteria. The end result process may prove to be a transferable design process for use in other contexts, by other designers, to develop similar outcomes.

Research Question

If one strong Stormwater First Pattern is applied first to one or more East Campus blocks could one then still successfully satisfy all the other UO Campus Patterns?

Definitions

Stormwater First Pattern

A Stormwater First Pattern takes a holistic approach in designing for stormwater first, before other developments and their requirements are solved within that pattern. A stormwater system becomes the "bones" of all future development.

The Stormwater First Pattern looks at the logic of the site and designs with it, not against. Topography and the over land flows of water reveal opportunities where natural drainage occurs. These natural drainage patterns are highlighted to reveal locations of possible connections for large, visible stormwater facilities. The network areas for the Pattern are not areas left over after development, but seek to direct where and how development will occur. Stormwater is the a driving force behind the design, within which high-quality buildings are fitted to reduce flooding and water pollution.

UO Campus Patterns

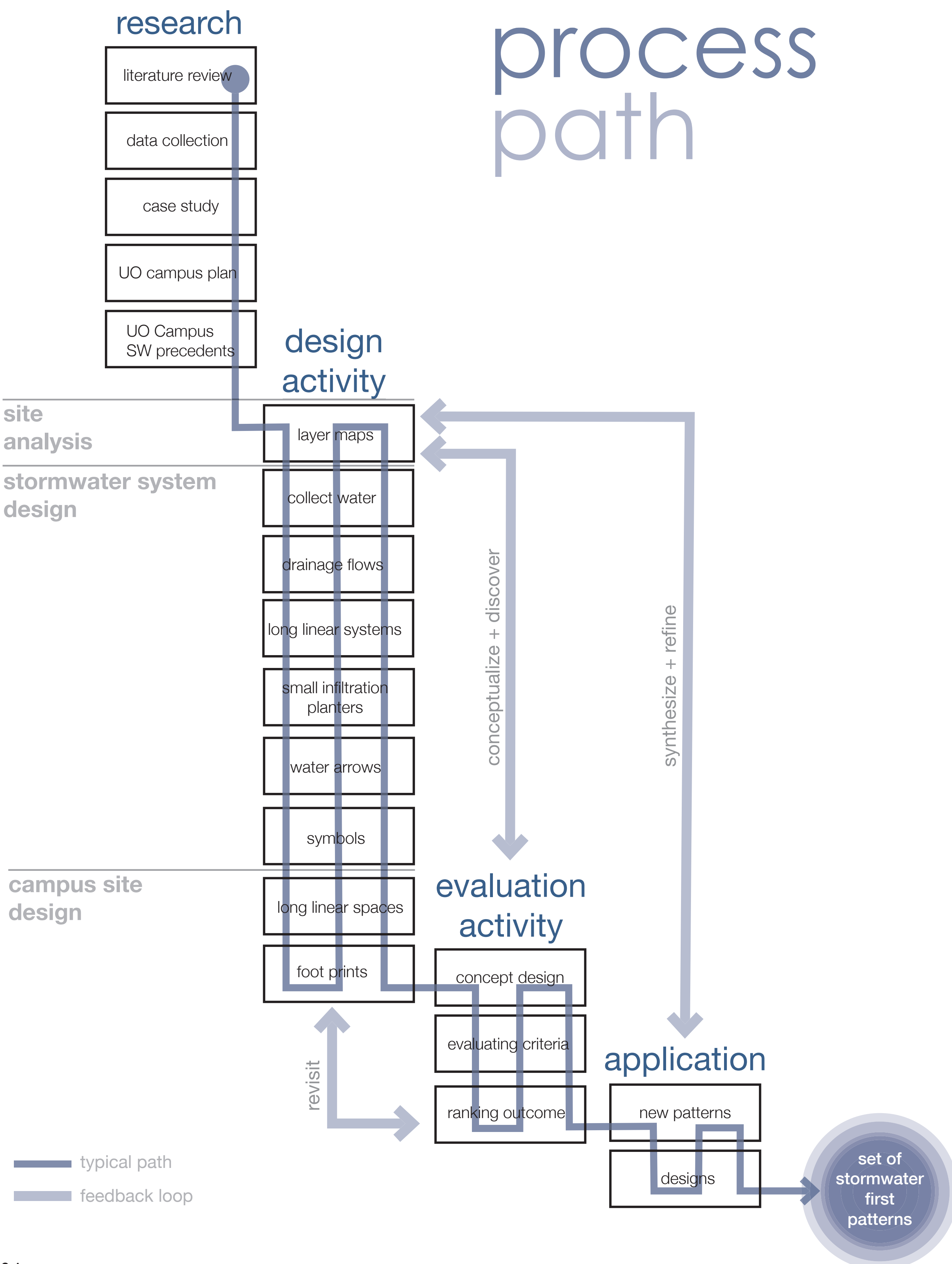
The Pattern Language design approach within the Oregon Experiment (see chapter 1) identifies a repeating problem within a context and strives to find a solution that can be replicated for similar issues in all corresponding situations and places.

The Pattern Language design approach for Stormwater First Patterns stems from the Pattern Language campus planning method at the UO, established by Christopher Alexander. It aims to be a systematic approach that can be applied to stormwater repeating problems in newly developed landscapes in need of a strong solution that fits well with other patterns. When applied to stormwater management, this campus design approach begins with stormwater runoff as the first problem and then campus planning programs. The East Campus is the context for this project. A generic solution is then explored through a Design Process that suggests patterns for evaluation in search of a strong solution.

Process Diagrams

The Process Diagrams give visual explanations of the method. **Diagram One** (2.1) is a design process flow chart. The series of boxes and arrows explain the back and forth nature of the Stormwater First Campus Design (SFCD). **Diagram Two** (2.2) Shows the whole process of how elements are connected from research to the final application. Thickness of lines represent important steps and thought process. The darker the colour, the more important the value of that one element was in contributing to the process. **Diagram Three** (2.3) Shows the whole process broken down into parts to visually understand the connected nature of the process.

process path



2.1

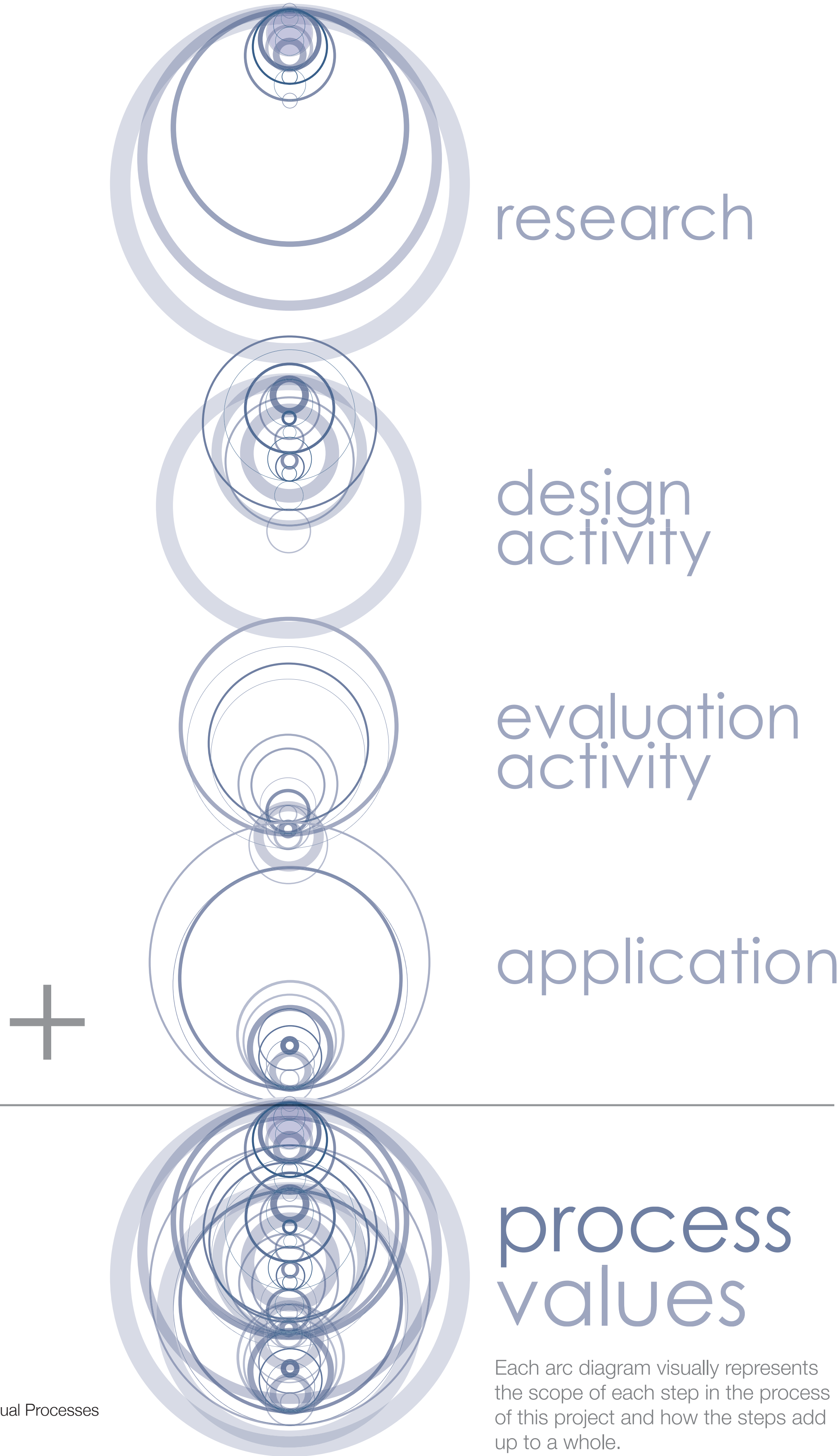
Box Process Diagram: Path

2.2

Arc Process Diagram: Values

Shows how elements are connected within the process

Thickness of line = important steps and thought process.
Darker colour = value of that one element in the process



Each arc diagram visually represents the scope of each step in the process of this project and how the steps add up to a whole.

2.3

Arc Process Diagram: Individual Processes

GENERAL METHOD DESCRIPTION(GM)

The core purpose of this general method is to purpose new stormwater pattern descriptions and perform design explorations and evaluations in concert with the existing patterns to discover how the proposed stormwater patterns can be rewritten so that designs they will tend to produce will more likely succeed in realizing all the patterns well. The method is a bit like a self-referential process of evolution toward discovering the "best" way to write the proposed new stormwater patterns. The evaluation of sketch designs within the method is meant to serve this pattern writing process, not to discover actual designs to build.

Below is a general outline for the description of the research method. The six steps can be applicable to any campus setting in which solutions for stormwater management can be applied. More detailed methods will follow. The steps are:

1. Background Research
2. Three Pattern Themes
3. Development Concept for Themes
4. Testing
5. Evaluating
6. Application

Background Research (GM)

Precedents

The designer(s) will narrow down the precedent study research by locating campuses with similar climates and comparable rainfall patterns to the study area. Campuses are defined for this project as both colleges and other land uses with similar patterns of buildings, paths, lawns and parking lots. Examine strategies for campuses that have built or implemented integrative stormwater management plans for all or most of their grounds. Consider the outcome of these precedent studies; was each to manage all the over land flow of stormwater runoff, or just a portion of it? Was it for flood or pollution control, or both? Did the campus include stormwater flows off streets and parking lots? Was the treated overflow runoff directed into a river or lake or into city pipes? Did the campus only obey their stormwater runoff codes/rules or did they surpassing the normal minimum required treatment of stormwater runoff and go above and beyond? Did the campus use stormwater runoff to help create a campus water aesthetic visually to i.e.: tie the grounds together?

Campus Plans

Locate local applicable campus documents for the study area. Look at the main Campus Plan, supporting documents, recent studies and goals of the campus for their campus grounds. If the campus has an existing stormwater management plan and facilities, be sure to understand and analyze existing facilities that work well, or not, on the campus and assess their design styles.

Current Stormwater Facilities

Locate existing stormwater facilities on the campus grounds in and around the planning area to get an idea of the extent of the facilities, their ages, technologies and styles. Research if the facilities are functioning well or not through observations and interviews with Campus Operations staff. Construction documents may help explain the bones of the facilities and can reveal information not necessarily seen on the surface.

Literature Review

Literature on the history of campus planning is important to understand layout, outdoor space and movement on the campus grounds. A Campus Plan and other related documents about the study area are significant to understand the goals, constraints and visions of the campus. Stormwater Management Plans or programs for other similar campuses can help provide ideas of how large areas of land can support stormwater runoff in a positive way.

Data Required

Acquire topographic maps of the study area for understanding and analyzing grading and drainage and a soil survey for areas with good/bad infiltration and permeability. Create a suitability map for wetlands on more disturbed soils derived from land use and land cover to understand historic development patterns on the site. Locate stormwater and infalls for runoff overflows, existing treatment and detention and any legal restrictions for development within the study area.

Pattern Themes (GM)

Through background research of the literature and the history of the study area, a few pattern themes are identified that may guide the formation of stormwater management first facilities and plans.

First a quick definition. A pattern is a goal and objective that can be integrated into all other patterns. They are sub-themes within an idea. Think of a pattern as a piece of a puzzle.

A Pattern Theme on the other hand is a pattern for the whole design. It is a big idea that all small patterns add up to or obey. Think of a pattern theme as a completed puzzle, that wouldn't exist without the little patterns or puzzle pieces.

For this project, pattern themes are broad concepts, intended to creatively manage stormwater runoff, with unique common values that can work together or individually to re-envision stormwater management. When looking at the campus as a whole with a pattern theme in mind, the designer can discover a broader stormwater plan beyond the study area that would be feasible and merge well with speculative project patterns and overall goals of campus planning.

Development Concept Design for Themes (GM)

To be properly understood, the study area can best be large enough to apply the pattern themes in a range of different situations. A list of Design Considerations must be generated to reflect major goals and constraints from the Campus Plan to guide design concept development. Other supporting documents as well as the hydrology and geography of the area should also guide design. This list will be consulted throughout the testing phase.

Testing (GM)

Analysis maps are layered on top of each other to uncover areas of natural drainage flows and more suitable areas for stormwater and building development. These working maps can help find suitable places for infiltration planters near potential development. For example, long linear spaces can link together smaller infiltration planters to form discrete or visible continuous infiltration conveyance systems.

Concept drawings for each pattern theme are created for each block or sub-area while adhering to the list of Design Considerations. These concept drawings are then tested through Evaluation Criteria.

Evaluation

A set of Evaluation Criteria with operational definitions is compiled to measure goals that best encapsulate the vision that the university has for the study area and its context. If there is no pattern language that guides development on the campus, then designers must meet with stakeholders, campus planners, students and/or consultants to come up with a working list of goals or patterns that can be used to evaluate concept designs. The aim is to meet goals and best fit the scheme into the campus grounds and functions.

After the designs have been evaluated against the Evaluation Criteria and ranked from low to high using the operational definitions, a final score for each design emerges. The scores are then graphically represented in spider diagrams, to visually understand the strengths and weaknesses of each design outcome as a whole.

The whole design then undergoes a Design Critique. The critique addresses the essence of the design and the form and consequences of the applied pattern, recommendations for improving specific patterns that scored 'low' on the evaluation Criteria, and possible patterns that could be carried over for a new campus pattern language for stormwater.

Application (GM)

From the knowledge gained from this design research, a set of Stormwater First patterns are discovered to direct and manage stormwater runoff on the campus grounds.

The set of Stormwater First patterns is then applied to a final design(s). These designs show how the new patterns could work in relation to the selected set of campus patterns, within the context of the larger campus.

Each of the designs are then reviewed in a Final Design Discussion to inform how the new Stormwater First patterns are implemented and function in the design to meet the needs of the campus.

METHOD APPLIED TO EAST CAMPUS(EC)

This method will be applied to a case study, on the University of Oregon's East Campus Area (see chapter 1). The detailed method is tailored to this particular site, explaining the exact steps in an actual process.

BACKGROUND RESEARCH (EC)

Precedents

The University of British Columbia (UBC) was the main precedent for the project. UBC's Stormwater Management Plan and their intentions of creating large, visible and beautiful stormwater facilities on their campus grounds was an inspiration for the stormwater first designs and strategies behind this project.

UO Plans

Background research of four UO Campus Planning documents were considered. The main UO Campus Plan (UO CP) provides the policies and patterns for the whole university and what portions would likely be applicable specifically to the East Campus area. The East Campus Development Policy (UO ECDP) was a supplement to the UO CP and consulted as a guide to understand the programmatic needs of the Sub-areas in East Campus and what policies and patterns were required for development. The East Campus Open Space Framework (UO ECOSF) was used to understand the hierarchy of open space and designated open space verses buildings and parking areas to maintain a balanced framework for development. Related goals from the speculative Framework Vision Plan (FVP) were considered that were applicable to the East Campus site.

Current Stormwater Facilities

All existing stormwater facilities on the UO Campus grounds where verified and documented. Supporting construction documents and planting plans were collected and investigated to understand how the facilities were constructed and designed to function. Interviews with Campus Operation Employees revealed necessary maintenance and functionality of the facilities.

Literature Review

Documents from the University of Oregon's Campus Planning office were pertinent, since an area of the campus grounds would be the location for this project. Literature regarding the history of North American Campus Planning revealed intentions as to why campuses have been laid out in specific landscape patterns. University of British Columbia (UBC) was both a precedent study as well as a source for technical and process information regarding their Integrated Stormwater Management Plan (ISWMP) and facilities. Other universities were also studied to understand how stormwater management strategies have been integrated into their campus planning and physical campus grounds. Integrative Water Resource Management (IWRM) was studied to learn how campuses have sough to integrate stormwater into campus design.

Data required

There were several different types of data required for this project (Appendix B). **Topographic maps** with contour values revealed the grade change of the project area and where the stormwater runoff is currently directed. A **soil survey map** showed three types of soil on the site, revealing possibilities and limitations for infiltration and permeability. A **suitability map** was generated from historic maps and aerial photos that revealed development footprints on the site for over 100 years. It showed where the least disturbed soil may be that could be more conducive and cost effective to construct stormwater facilities. **Stormwater mains** showed existing conditions of how the stormwater on the East Campus is currently being managed, and where possible locations from the overflow from newly integrated stormwater treatment facilities can be directed if need be. **Sub-area** information specific to each block within the project area informed city zoning, prohibited uses, height limitations, density ratios, primary patterns, open space and parking requirements.

Three Pattern Themes (EC)

From the background research of the literature as well as the physical history of the UO and the adjoining East Campus grounds, there are several ideas that contribute in postulating Three Patterns that may be appropriate for stormwater management design in the project site.

Continuous Infiltration Channels

Long linear spaces are often featured on campus grounds, due to the common use of quadrangles with long linear axes. Spaces like these are then replicated in different sizes throughout UO Campus, creating open expansive spaces to small intimate places. Quadrangles and long axes set the stage for opportunities for continuous infiltration channels of stormwater systems.

Individual Infiltration Planters

Mandatory regulations direct stormwater management on the UO Campus. The current facilities are usually located adjacent to buildings or parking lots and accept runoff from rooftops and impervious areas. Although these systems function in similar ways to manage stormwater, they differ by design, are separated by location and have no cohesive elements other than function. Each of these individual infiltration planters has the potential to feed into larger infiltration basins. (For this project, Infiltration Planters are defined as rain gardens, stormwater planters, and stormwater pits).

Mimic Fluvial System

East Campus is in the Fairmount Hills watershed. Historically the rainfall runoff from the hills created an ephemeral stream that naturally flowed over four blocks of East Campus. Some time after 1910 the stream was redirected into pipes and sent out to the Millrace. The act of piping away the stream for convenience is a pattern seen in most urban environments that have to deal with unpredictable overland flows of water. By redesigning the area for stormwater management, opportunities arise to mimic the fluvial system that historically flowed over the area.

From this knowledge three design goals are postulated to drive formulation of three pattern themes described below, that are compatible with the patterns of proposed building types by the designer:

Architectural Stormwater Conveyance:
Continuous infiltration channels/alleys (2.4)

Infiltration Basin Emphasis:
Transport water between basins, along conveyance systems (2.5)

Stream System Emphasis:
Mimics fluvial system before development (2.6)

Development Concept Design For Themes (EC)

Four of the six blocks of East Campus were chosen as a test site for designing with the three patterns themes. Since two of the blocks were already developed, the other four blocks had the most potential for areas of expansion for future development. However, after examining those four blocks, only two of those blocks were suitable to move forward with for this project. A major factor in designing this area of campus redevelopment was to meet the UO Planning goals and constraints of the East Campus area. A list of **UO Design Considerations** (2.7) was compiled that expressed the programmatic requirements from the UO CP, UO ECDP, and UO ECOSF. This list was consulted throughout the design and evaluation process. At the end of the process, if the consideration was addressed, an ‘X’ was placed in the column next to it. Individual comments were noted for each consideration to show if they met the requirements or not.

Three Pattern Themes: Architectural Stormwater Conveyance

insite-studio.com

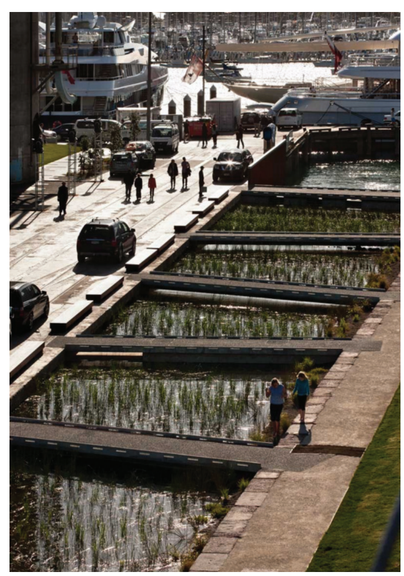
pfs.bc.ca

pinterest.com

pinterest.com

pfs.bc.ca

pfs.bc.ca



landscapearchitecturemagazine.org

2.4

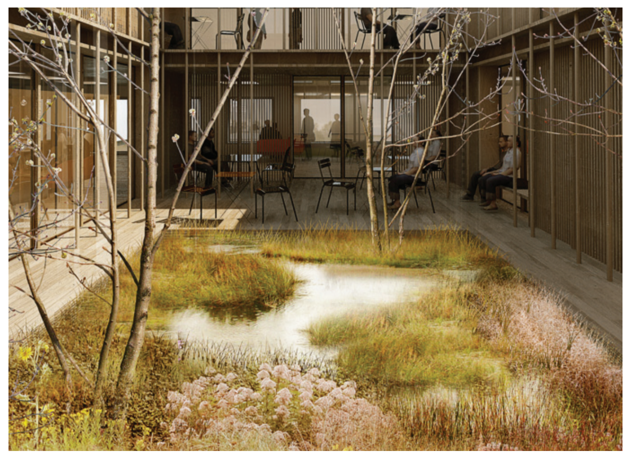
Architectual Stormwater Conveyance Examples

Three Pattern Themes: Infiltration Basin Emphasis

news.uwlax.edu

capecodgreenguide.wordpress.com

planning.ubc.ca



archdaily.com

cargocollective.com

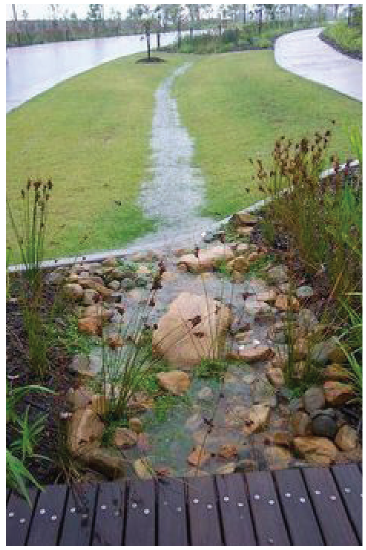
ecowatch.com

2.5

Infiltration Basin Emphasis Examples

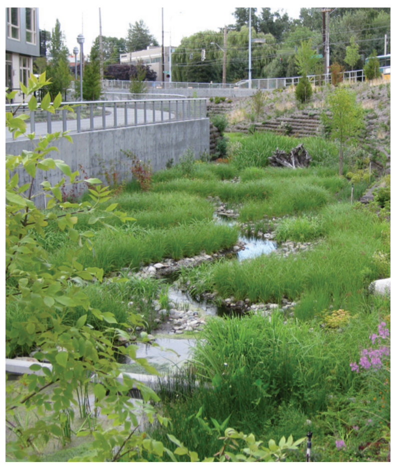
Three Pattern Themes: Stream System Emphasis

landezine.com



monash.edu.au

raedeke.com



greenplanethetics.com

ndagallery.cooperhewitt.org

landarchs.com

ramboll.co.uk

2.6

Stream System Emphasis Examples

		UO DESIGN CONSIDERATIONS	Comments
SUB AREA A EAST CAMPUS DEV. PLAN		Institutional	
		Building Height - 4 Storeis	
		Building Coverage 127,000 sq. ft.	
		Open Space Requirement 34,000 sf ft	
SUB AREA B EAST CAMPUS DEV. PLAN		High Denisty Res. + Institutional	
		Building Heights - 3 Stories	
		Building Coverage 107,000 sq. ft.	
		Building size max 50,000 gsf.	
		Open Space Requirement 62,000 sq. ft.	
		Parking Lots (max 100 spaces)	
		No General Parking in areas 53+54	
		No Structured Parking	
SUB AREA C EAST CAMPUS DEV. PLAN		Low Denisty Residential	
		Building Heights - 1.5-2 Stories	
		Building Coverage (no amount given)	
		Open Space Requirement (no amounts)	
		Parking Lots (only for house)	
		Preserve areas' single-family charater	
EAST CAMPUS DRAINAGE		Topographic map	
		Suitability Map	
		Natural Water Flows	
		Drainage Areas	
EAST CAMPUS OPEN SPACE FRAMEWORK		Native Plantings	
		Follow Flow of Topography	
		Open Space Network	
		Pedestrian Network	
		Building Placement	
		Parking	
		Minumum required Open Space per area	

2.7

UO Design Considerations (example)

Testing (EC)

Steps for Developing Alternative Design Concepts for Themes

1. A **CAD map** of the area was made which contained existing **UO building footprints, stormwater mains, soils, and topographic lines** with elevation values as well as the course of the historic creek. This map was printed and overlaid with trace.
2. The **suitability map** of historic land cover's greenest areas were highlighted on the trace.
3. **Natural drainage flows** of overland stormwater were revealed from the topographic map and were traced with arrows showing major runoff directions.
4. Areas that would likely be suitable for **collecting water** were defined with circles.
5. Another piece of trace was overlaid and long linear spaces for stormwater facility development were sketched over the natural drainage flows, revealing areas that could be better potential sites for discrete or visible **stormwater facilities**.
6. The spaces between the stormwater facility development and the edges of the blocks were defined as **areas for development**.
7. **Proposed buildings, parking lot footprints, plazas and paths** were roughly sketched into the defined areas for development. These sketches served as a starting point for developing and testing the three pattern themes.
8. **Refined sketches** were drawn for each block, defining clearly all the elements of the design.
9. **Three alternative designs concepts** were created for each of the two blocks (total of six designs), based on the three pattern themes: Architectural Stormwater Conveyance, Infiltration Basin Emphasis, and the Stream System Emphasis System.
10. For the **Architectural Stormwater Conveyance**, small infiltration basins were placed along pathways, adjacent to buildings and plazas and would accept stormwater runoff conveyed by underground pipe. Larger basins were then placed in open areas along wider pathways to accept overflow from smaller basins, and continue the treatment of stormwater.
11. For the **Infiltration Basin Emphasis**, small infiltration basins were placed at the base of buildings and near plazas to accept stormwater runoff. Larger basins were then placed in activity nodes that could accept overflow from smaller basins and continue treatment of the stormwater.
12. For the **Stream System Emphasis**, all stormwater runoff from buildings and plazas was directed through conveyance pipes out to the designed stream and through a series of settling ponds.
13. Stormwater from **parking lots was contained and treated separately** in each situation, due to toxic contaminants. The polluted water never mixed with cleaner water from building, plazas and paths.
14. Once the layout was completed with buildings, parking lots, plazas, paths and stormwater facilities, **arrows were drawn to show water movement**.
15. **Solid lines with arrows were drawn** to show the conveyance systems of water flows off of developments to smaller stormwater facilities.
16. **Dashed lines with arrows were drawn** to show stormwater overflows from smaller basins to larger basins.
17. **Colourful icons** were drawn on maps to show the area of were conceptual elements may be located.
18. The designs were then evaluated against the **Evaluation Criteria**.

Evaluation (EC)

Once the alternative design concepts were drawn for each block, individual designs were evaluated against a set of Evaluation Criteria (2.8) and ranked from low to high using the operational definitions. The Criteria were a selected group of adopted UO Pattern Language Standards currently used in formulating and approving campus developments at the UO as well as stormwater issues added for this study that are appropriate to the design concept.

All of the alternative design concepts naturally included the following UO Campus Patterns: Designated Open Space, Open University, Sustainable Development, Small Parking Lots, Tapered Density, Graceful Edges, and the whole project addressed Water Quality (from both the UO CP and the UO Oregon Sustainable Development Plan).

After the designs were evaluated and ranked a final score was shown. The various criteria scores for each design was then graphically represented together in spider diagrams, to visually understand the strengths and weaknesses of each design outcome as a whole.

After the Ranking Outcomes were presented, a more thorough evaluation of each Alternative Sketch Designs was done in the Design Critique section. The critique covered the essence of the design and the form and consequences of the applied pattern, recommendations for improving specific patterns that scored 'low' on the evaluation Criteria, and promising patterns that could be carried over for a new pattern language for stormwater.

Application (GD)

From the knowledge gained from this design research, the best set of Stormwater First patterns were selected, rewritten and proposed for addition to the UO's East Campus area to manage and design for stormwater runoff.

The set of Stormwater First Patterns were then applied to each of the two East Campus blocks by making final designs to show how the new patterns could work in relation to the selected set of campus programs, within the context of the greater campus. These designs resembled the Alternative Sketch Designs in that they were marked with symbols to show design moves. Each of the two designs were then reviewed in a Final Design Discussion which informed how the new Stormwater First patterns were implemented and functioned in the design.

	EVALUATION CRITERIA	Low	Med.	High	Comments
DERIVED FROM SELECTED UO PATTERN LANGUAGE STANDARDS	Access to Water (UO CP)				
	Accessible Green (UO CP)				
	Family of Entrances (UO CP)				
	Main Gateways (UO ECDP)				
	Open Space Framework (UO CP)				
	Paths + Goals (UO CP)				
	Pedestrian Paths (UO ECDP)				
	Positive Outdoor Space (UO CP)				
	Promenade (UO CP)				
	Public Outdoor Room (UO CP)				
	Quiet Backs (UO CP)				
	Shielded Parking + Service (UO CP)				
	Sitting Walls (UO CP)				
	Small Public Squares (UO CP)				
	South Facing Outdoors (UO CP)				
	Tree Places (UO CP)				
STORM WATER ISSUES	Stormwater Education Places				
	Stormwater Safety				

2.8

Evaluation Criteria (example)

results
chapter three

Sketches

Evaluation Criteria

Six Alternative Designs with Evaluations

Ranking Outcomes

Final Design Critique

SKETCHES

Generic designs of exploratory practice sketches aimed at understanding how pattern themes can play out were drawn out for each of the four blocks (Appendix C). This assisted in the understanding of the site and which three pattern themes would work best on some or all of the blocks. In the end, Blocks 2 and 3 could more readily support the three pattern themes in interesting and contrasting ways.

The stormwater first logic behind designing two of the East Campus blocks began by looking at the topography of the site and seeing the grade change. The East Campus area is relatively flat with a minimal grade change of just over 2 percent. Through the topographic maps, the natural drainage of overland stormwater runoff was revealed to show where stormwater once flowed and collected.

For each of the two blocks, after the exploratory practice sketches, one conceptual development drawing was sketched for each of the three pattern themes (Architectural Conveyance Stormwater Systems, Infiltration Basin Emphasis and Stream System Emphasis) for a total of six drawings.

The UO Design Considerations were considered when it came to imposing programmatic design constraints of each UO Planning Sub-area within each block. The Design Considerations indicated where specific structures would likely be developed, their heights, square footage, where parking should or should not occur and open space requirements. Depending on the thematic approach, reasonable building footprints, driven by the movement of stormwater runoff over the block, were then outlined in the sketch, showing where building development was more likely.

		UO DESIGN CONSIDERATIONS	Comments
SUB AREA A EAST CAMPUS DEV. PLAN	×	Institutional	Widths and length of buildings were considered for institutional sized buildings
	×	Building Height - 4 Storeis	Designs were in plan view, but the shade from the height of the building played a role
	×	Building Coverage 127,000 sq. ft.	Building coverage in this area was well under 20,000 sq. ft.
	×	Open Space Requirement 34,000 sf ft	Open space was strongly considered, Greenway in Sub Area A was preserved
SUB AREA B EAST CAMPUS DEV. PLAN	×	High Denisty Res. + Institutional	Dorms and institutional buildings shared similar sizes, but both were considered
	×	Building Heights - 3 Stories	Designs were in plan view, but the shade from the height of the building played a role
	×	Building Coverage 107,000 sq. ft.	Building coverage in this area, for both A + B Sub Areas were approx. < 55,000 sq. ft.
	×	Building size max 50,000 gsf.	All building footprints in the designs stayed under the 50,000gsf max size
	×	Open Space Requirement 62,000 sq. ft.	Open space was strongly considered in the concept development designs
	×	Parking Lots (max 100 spaces)	No parking lots were created no greater than 20 spots per lot
	×	No General Parking in areas 53+54	Parking lots were incorporated into these blocks but not specified as general
	×	No Structured Parking	No structure parking was designed on any of the blocks
SUB AREA C EAST CAMPUS DEV. PLAN	×	Low Denisty Residential	Row housings was designed along edges to blend in with the neighborhood
	×	Building Heights - 1.5-2 Stories	Building heights were obeyed for the row housing
	×	Building Coverage (no amount given)	The designs balanced out buildings and open space near neighborhood edge
	×	Open Space Requirement (no amounts)	Preserving opens space was strongly considered and kept Greenway as a buffer
	×	Parking Lots (only for house)	Parking only for homes, except for Architectural design, alley was moved
	×	Preserve areas' single-family charater	Row houses were 50'x25', blended in with the types of homes on the adjacent block
EAST CAMPUS DRAINAGE	×	Topographic map	This map was pertinent to the design since it revealed the elevation changes of the site
		Suitability Map	Although the suitability maps were created, they were minimally used
	×	Natural Water Flows	Natural flows of stormwater were mapped on trace paper as part of the testing phase
	×	Drainage Areas	Drainage and collection areas were mapped on trace paper as part of the testing phase
EAST CAMPUS OPEN SPACE FRAMEWORK		Native Plantings	Too fine of a detail to mention in document
	×	Follow Flow of Topography	Definitely considered for flow of water across site and placement of buildings
	×	Open Space Network	Positive outdoor space, trees and buildings working together, neighborhood character
	×	Pedestrian Network	Paths and goals, path widths, path transitions
	×	Building Placement	Buildings on streets, buildings on open spaces
	×	Parking	Small parking lots, alley parking
		Minumum required Open Space per area	Mentioned in Sub Area Open Space, Greenway preserved as continuous network

× Considered in design process

EVALUATION CRITERIA

Each of the six alternative sketch designs was evaluated against a group of selected UO Pattern Language derived Evaluation Criteria and other Stormwater-Specific Topics. The UO Evaluation Criteria consisted of direct quotes from two University of Oregon's planning documents: the current UO Campus Plan (UO CP) and the UO East Campus Development Policy (UO ECDP). Bold text denotes operational evaluation criteria developed for this project.

UO Pattern Language Standards

Access to Water (UO CP)

People have a fundamental yearning for bodies of water. Hearing it, being near it, and touching it are things people like to do.
THEREFORE: When possible create water features that allow campus users to listen to and touch water. These could be as simple as standing pools or as dramatic as water falling from a high spot.

Low – Water is ephemeral and only visible after occasional large storm.
Medium – Water is intermittent, often visible during the rainy season (Oct-May) and is stored in view so it lingers.
High – Water is visible year round (stormwater from rooftops, plazas and paths with grey water recirculation from inside of buildings).

Accessible Green (UO CP)

When people work extremely close to large open green areas, they visit them and use them often; but even a fairly short distance will discourage them.
THEREFORE: Provide a green outdoor space, for passive or active use, that is at least 50,000 square feet in area and at least 100 feet across in the narrowest direction, within 600 feet of every on-campus building.

Low – Greens are not accessible and do not meet the area requirements listed above.
Medium – Greens are accessible, but not easily navigable, and meet the area requirements above (50,000sq. ft. in area can be an accumulation of green spaces from different areas on one block).
High – Greens are easily accessible with designated leader paths, and meet all of the area requirements above (50,000sq. ft. in area can be an accumulation of green spaces from different areas on one block).

Family of Entrances (UO CP)

When people enter a complex of buildings, they may experience confusion unless the whole collection of entries is laid out so they can see the entrance to the place they are going.
THEREFORE: Lay out the entrances to form a family. This means: 1. They form a group, are visible together, and each is visible from all the others. 2. They are all clearly recognizable as entrances.

Low – Buildings do not form groups and entrances do not relate to each other.
Medium – Buildings are in groups, but not all entrances relate to each other.
High – Buildings are in groups and entrances relate to each other.

Main Gateways (UO CP and UO ECDP)

Any part of an area—large or small—that is to be identified by its users as a precinct of some kind will be reinforced or made more distinct and more vivid if the paths crossing its boundary are marked by gateways.
THEREFORE: Mark every campus boundary that has important meaning with great welcoming gateways where the major entering paths cross the boundary.
Low – No opportunities for a main gateway.
Medium – A gateway is visible, but not clearly and easily markable as such.
High – Natural space for a main gateway.

Open-space Framework (UO CP)

The University of Oregon campus is organized as a system of quadrangles, malls, pathways, and other open spaces and their landscapes. This organizational framework not only functions well, but also serves as a physical representation of the university's heritage.
THEREFORE: Build in ways that improve the existing open-space framework and extend it as possible.

Low – System of open spaces is incoherent because they are oddly shaped, visually and formally disconnected, small in relation to building masses and do not form clear outdoor rooms.
Medium – System of open spaces connects among open areas (on the block), but not to the larger open space framework (greenway).
High – System of open spaces connects to most areas (on the block), to the larger open space framework (greenway) and has some of the qualities described above for "low' assessment.

Paths and Goals (UO CP)

The layout of paths will seem right and comfortable only when it is compatible with walking (and walking is far more subtle than one might imagine).
THEREFORE: To lay out paths, first place goals at natural points of interest. Then connect the goals to one another to form the paths. The paths may be straight or gently curving between goals; their paving should swell around the goal.

Low – Paths meander, but do not connect to goals directly.
Medium – Paths connect to some goals, but not to all.
High – Paths are clear and connect to major goals.

Pedestrian Pathways (UO ECDP)

Pedestrian travel is an essential component of the campus experience and should be encouraged. Pedestrian activity creates an environment that encourages interaction and discourages automobile use.

THEREFORE: Promote walking by creating a system of pathways that connect to other campus pathways and to the street grid and creates alternatives to walking alongside or bicycling within streets. This pathway system will be considered part of the designated open spaces of the East Campus Area

Low – System of pathways do not clearly connect to street grid or to greenway.
Medium – System of pathways connects to street grid, but not to greenway.
High – System of pathways connects to street grid, and to greenway.

Positive Outdoor Space (UO CP)

(Additions italicized below are for this project only)

In general, outdoor spaces that are merely "left over" between buildings *and simply planted will not be used nor will they contribute to the identity and meaningfulness of the campus that validates it in the memories of students and visitors.*

THEREFORE: *Seek to* place buildings so that they embrace the outdoor spaces they form. Design the landscape so that some sides of the outdoor space are defined by buildings and some sides by arcades, trees, or low walls. Be sure to leave entrances to the outdoor "room" at several points so people can pass freely through the space and travel to other connecting outdoor spaces. *Leftover spaces that may still be formed by buildings and hardscapes should be made more meaningful by placing sculptures within them, converting them to outdoor rooms, creating exciting planting designs within them, or making them yards or courtyards that are strongly visible from inside adjacent buildings so that they are effectively brought into those buildings.*

Low - Stormwater facilities detract from positive outdoor spaces by poorly delimiting places, or forming barriers to entry for spaces, so they feel unused/empty or have no meaning and present no reason to linger or enjoy.
Medium - All leftover spaces that do not meet the criteria defined here as low or high.
High - Stormwater facilities contribute in creating or centering spaces that feel owned with a purpose or meaning, are outdoor rooms, are frequently used and/or have a sense that the area is an extension of the surrounding buildings (integrated along or near pathways, near art installations, maintained vegetation, seating, trees and shade).

Promenade (UO CP)

Each subculture needs a center for its public life, a place where people can go to see others and to be seen.

THEREFORE: Encourage the formation of promenades through the heart of the campus, linking main activity nodes and placed centrally so that each point in the campus is within ten minutes' walk of a promenade.

Low – Activity nodes are not linked due to lack of clear promenades.
Medium – Some activity nodes are linked by promenades.
High – All activity nodes are linked with promenades along stormwater systems.

Public Outdoor Room (UO CP)

Only a very few spots exist along the streets of modern towns and neighbourhoods where people can hang out comfortably for hours at a time.
THEREFORE: On the campus, make a piece of the common land into an outdoor room—a partly enclosed place, without walls, but with some roof, columns, places to sit, and perhaps with a trellis. Place it beside an important path and within view of many buildings. The Heart of Campus kiosk is an example of a Public Outdoor Room.

Low – No stormwater facilities are close enough to contribute to the atmosphere of an outdoor room.
Medium – Areas of social activity (outdoor rooms) are connected to main paths, but interrupt stormwater facilities from being connected, or vice versa.
High – A Node of social activity (outdoor room), publically engages users with stormwater facilities through views, sounds, and sights.

Quiet Backs (UO CP)

Anyone who has to work in noise or in offices with people all around needs to be able to pause and refresh with quiet in a more natural situation.
THEREFORE: Give buildings in the busy parts of campus a quiet "back" behind them and away from the noise. Along this quiet back build a walk that is far enough from the building so that it gets full sunlight but is protected from noise by walls and distance and buildings. Make certain that the path is not a natural shortcut for busy foot traffic, and connect it to other walks to form a long ribbon of quiet alleyways that converge on open spaces.

Low – Back of building(s) opens to high-use area or no quiet backs on block.
Medium – Back of building(s) in some sun, with some noise, close to other buildings.
High – Quiet Back often in full sun, accessible to the building (only) and is made 'more quiet' by the presence of water.

Shielded Parking and Service Areas (UO CP)

Parking lots full of cars are inhuman and dead spaces—no one wants to see them or walk by them. Loading docks and service areas also are cluttered and unkempt spaces containing unattractive garbage-filled dumpsters.
THEREFORE: Put all parking lots and service areas behind some kind of screening wall, so that the cars and dumpsters cannot be seen in passing; at the same time take into account the security of the users of these facilities. The surrounding wall may be a building, a low landscape wall, earth berm, or hedge.

Low – No parking areas screened with walls or vegetation.

Medium – Only some areas are screened with walls or vegetation.
High – All parking screened with walls or vegetation.

Sitting Wall (UO CP)

In many places low walls are needed to accommodate different landscape levels. Often these are along walkways or at the edges of open areas, which also make great places to sit and rest, think, or watch the world go by.

THEREFORE: Make landscape walls about 17-19 inches high and
12-14 inches wide to accommodate sitting. Do this especially alongside areas of activities to give people a place to sit and watch or to carry on a conversation begun with a chance meeting. Look for sunny places. Design these walls to discourage skateboarding along their tops.

Low – Activity nodes have low potential for sitting walls due to space constraints.
Medium – Activity nodes have potential places for sitting walls along paths and focal areas.
High – All activity nodes have high potential for ample sitting walls and some may enjoy views of water features.

Small Public Squares (UO CP)

A campus needs public squares; they are the largest, most public rooms on the campus. But when they are too large, they look and feel deserted.

THEREFORE: Make a public square much smaller than first imagined, usually no more than 45 to 60 feet across, never more than 70 feet across. This applies only to its width in the short direction. Its length can certainly be longer.

Low – No areas meet the size requirements for a public square.
Medium – One area meets the size requirements as a public square.
High – At least one or more areas meet the size requirements as a public square and is south facing.

South Facing Outdoors (UO CP)

People use open space if it is sunny, and they don't use it if it isn't.

THEREFORE: Place buildings so that the open space intended for use is on the south side of the buildings. Avoid putting open space in the shadow of buildings. And never let a deep strip of shade separate a sunny area from the building it serves.

Low – No outdoor plazas are south facing.
Medium – One or more outdoor plazas are south facing.
High – All outdoor plazas are south facing.

Tree Places (UO CP)

When trees are planted or pruned without regard for the special places they create, they are as good as dead for the people who need them.

THEREFORE: Plant trees according to their nature, to form enclosures, avenues, squares, groves; plant single-spreading trees toward the middle of open spaces. Shape the nearby buildings in response to trees, so that the trees themselves and the trees and buildings together form places people can use. (See the Campus Tree Plan.)

Low – Trees placement does not respond to buildings, trees are in awkward areas and/or are too far away to create a user-friendly place (shade, sitting, relaxing).
Medium – Trees placement responds to buildings, hides unwanted sights (parking/service area) and provides some interaction for people.
High – Tree placement responds to buildings, form places people use (squares, groves allees) and some of the trees may be planted around areas with water features to increase the spaces interest and usability (relaxing and shade).

Stormwater Issues

The below criteria *(italicized)* was created for this project, and does not come from either the UO Campus Plan or UO East Campus Development Policy.

Stormwater Education Places

Any stormwater facility can have educational components. However, if the location of the facility is not desirable, or if cues for learning are not there, the opportunity for education will be largely lost. THEREFORE: Design stormwater facilities to capture the eye with strong, interesting water features in busy areas of high pedestrian use. Provide opportunities to create a refuge and cues to learn by providing shade, shelter, sitting walls and benches to rest and stay and learn for a while.

Low – Stormwater facilities are in low-use areas, not near main paths, focused solely on function, boring and un-engaging.
Medium – Stormwater facilities are in high use areas, but are concealed and not visible to gain educational benefits due to lack of knowledge that the facilities are even there.
High – Stormwater facilities are in high use area that provide a strong, focal water feature, and serve as a refuge with seating and resting areas.

Stormwater Safety

The primary treatment for polluted stormwater runoff from roads and parking lots is typically managed out of sight and not easily touched or walked in by people and children.
THEREFORE: Minimize or avoid deep pits for stormwater management that can be potential fall-in hazards, especially at night. Maximize shallow, vegetated wetlands for safety of children. If budget allows choose primary treatment to be done in bio sequestration systems that reduce pollution in inaccessible ways.

Low – Deep stormwater pits are near walking paths and are not covered.
Med – Deep stormwater pits are not located near high use areas and use of wetlands or shallow infiltration basins are predominant.
High – No use of stormwater pits. Only shallow infiltration basins, wetlands, or bio sequestration systems are used.

SIX ALTERNATIVE DESIGNS WITH EVALUATIONS

Below is the legend for the following six alternative sketch designs for two blocks of East Campus. The elements in the legend were needed to evaluate all of the criteria mentioned above. After the designs were sketched out, symbols were placed on the sketches with the intention that specific activities or features would succeed in that area.

For example: The Screening Wall symbol (under Shielded Parking and Service Areas in the Evaluation Criteria) was placed in the designs where parking lots and service area had the potential to be hidden from human site. Conceptually these screening walls were conceived as planting buffers, small walls and/or with tree canopies to buffer sites and sounds.

Another example: The Activity Nodes symbol was placed in the designs in areas that would support locations for groups to gather. These areas often included places for sitting, viewing, featured stormwater educational opportunities and were potential destination places where people would sit and linger.

Organization of the Six Alternative Design Pages

SKETCHES

An Alternative Sketch Design and context map is displayed on the left side of the page.

EVALUATION CRITERIA

On the top right side are the corresponding Evaluation Criteria results with notations. **The important detailed notations in the comments section of the Evaluation Criteria is specific to each sketch design, and goes into detail about how well/or not each pattern operated in the design.**

SPIDER DIAGRAMS

On the bottom right is a Spider Diagram that depicts the results of the Evaluation Criteria scores graphically, showing dark as strength and white as a weakness.

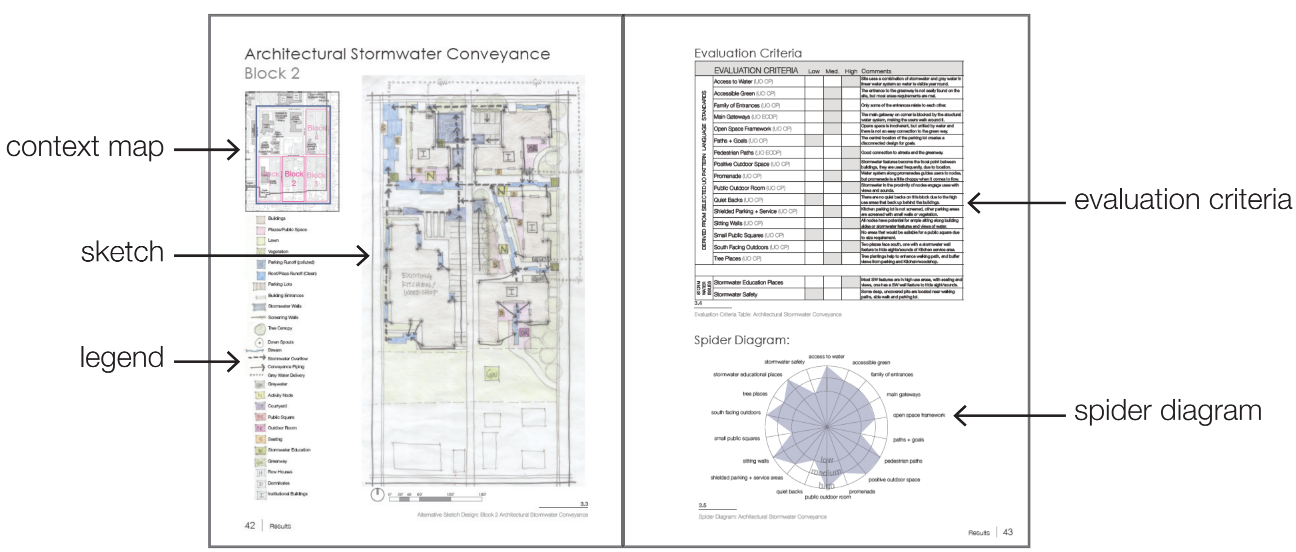
RANKING OUTCOMES

The next pages that follow show the process of tallying up the scores for the Ranking Outcomes for all of the six alternative designs.

FINAL DESIGN CRITIQUE

After the Ranking Outcomes are presented, they are followed by a more thorough evaluation of each the Alternative Sketch Designs to discover if there is a final pattern proposal for the UO to adopt in East Campus.

Example of Organization



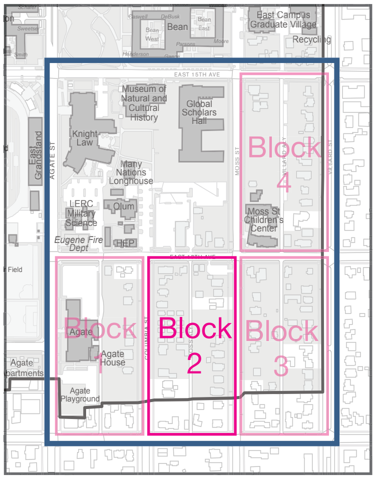
Six Alternative Sketch Designs Legend

3.2

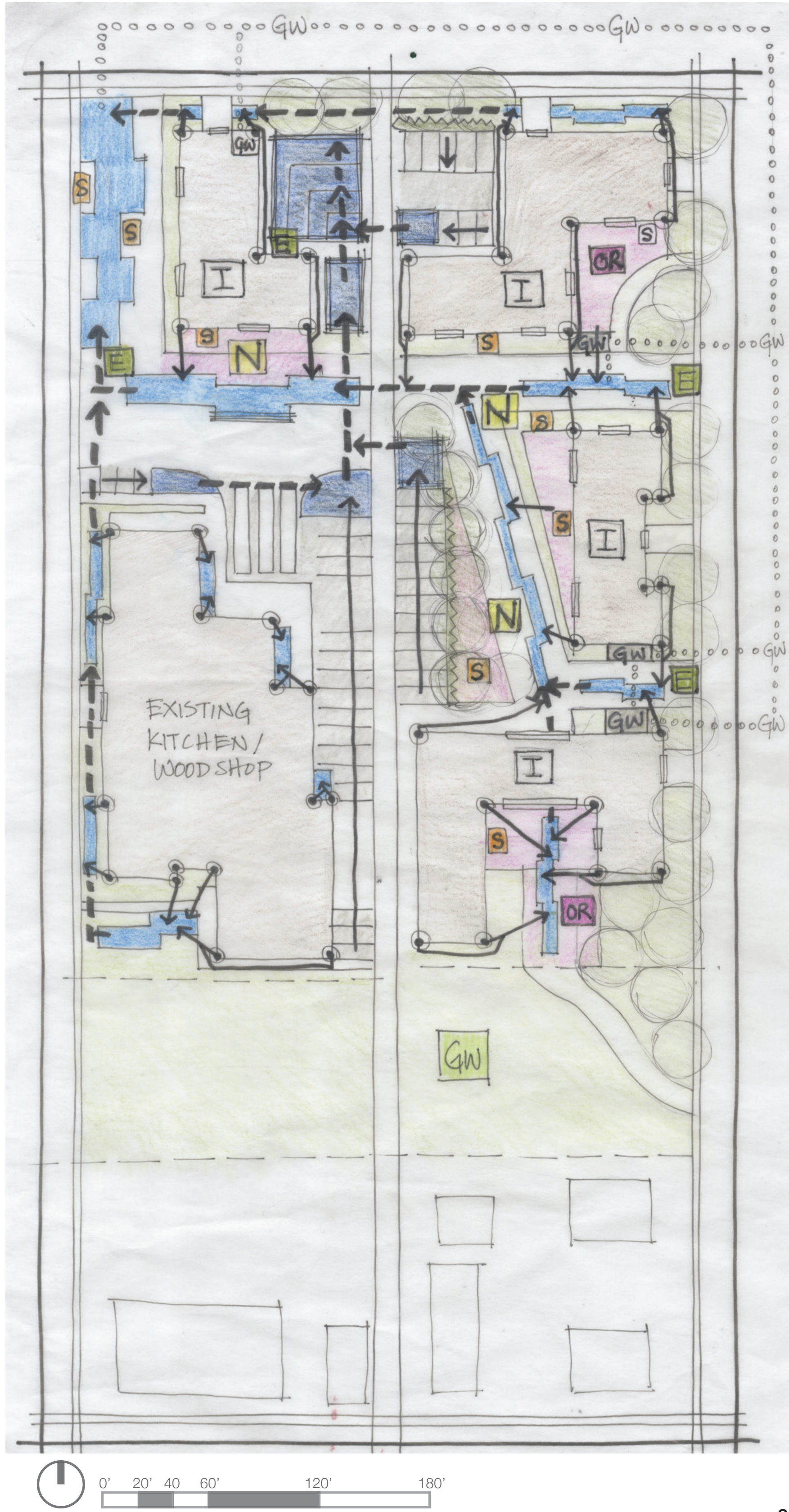
Six Alternative Sketch Design Legend

Architectural Stormwater Conveyance

Block 2



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings



3.3

Alternative Sketch Design: Block 2 Architectural Stormwater Conveyance

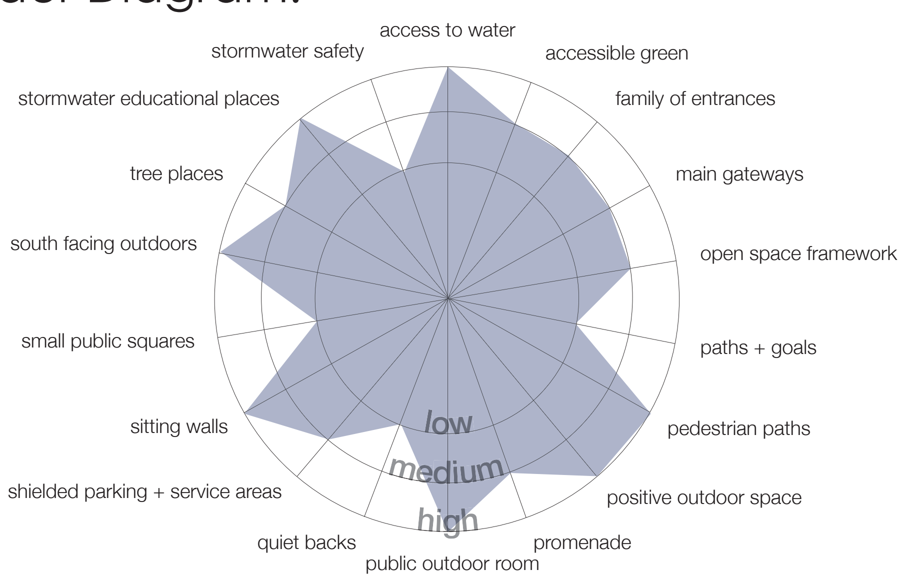
Evaluation Criteria

	EVALUATION CRITERIA	Low	Med.	High	Comments
DERIVED FROM SELECTED UO PATTERN LANGUAGE STANDARDS	Access to Water (UO CP)			■	Site uses a combination of stormwater and grey water in linear water system so water is visible year round.
	Accessible Green (UO CP)		■		The entrance to the greenway is not easily found on the site, but most areas requirements are met.
	Family of Entrances (UO CP)		■		Only some of the entrances relate to each other.
	Main Gateways (UO ECDP)		■		The main gateway on corner is blocked by the structural water system, making the users walk around it.
	Open Space Framework (UO CP)		■		Opens space is incoherent, but unified by water and there is not an easy connection to the green way.
	Paths + Goals (UO CP)	■			The central location of the parking lot creates a disconnected design for goals.
	Pedestrian Paths (UO ECDP)			■	Good connection to streets and the greenway.
	Positive Outdoor Space (UO CP)			■	Stormwater features become the focal point between buildings, they are used frequently, due to location.
	Promenade (UO CP)		■		Water system along promenades guides users to nodes, but promenade is a little choppy when it comes to flow.
	Public Outdoor Room (UO CP)			■	Stormwater in the proximity of nodes engage uses with views and sounds.
	Quiet Backs (UO CP)	■			There are no quiet backs on this block due to the high use areas that back up behind the buildings.
	Shielded Parking + Service (UO CP)		■		Kitchen parking lot is not screened, other parking areas are screened with small walls or vegetation.
	Sitting Walls (UO CP)			■	All nodes have potential for ample sitting along building sides or stormwater features and views of water.
	Small Public Squares (UO CP)	■			No areas that would be suitable for a public square due to size requirement.
	South Facing Outdoors (UO CP)			■	Two plazas face south, one with a stormwater wall feature to hide sights/sounds of Kitchen service area.
	Tree Places (UO CP)		■		Tree plantings help to enhance walking path, and buffer views from parking and Kitchen/woodshop.
STORM WATER ISSUES	Stormwater Education Places			■	Most SW features are in high use areas, with seating and views, one has a SW wall feature to hide sight/sounds.
	Stormwater Safety	■			Some deep, uncovered pits are located near walking paths, side walk and parking lot.

3.4

Evaluation Criteria: Blcok 2 Architectural Stormwater Conveyance

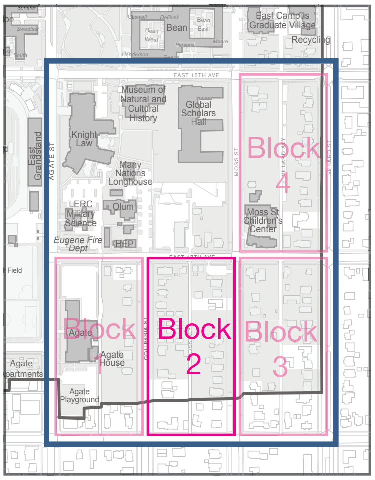
Spider Diagram:



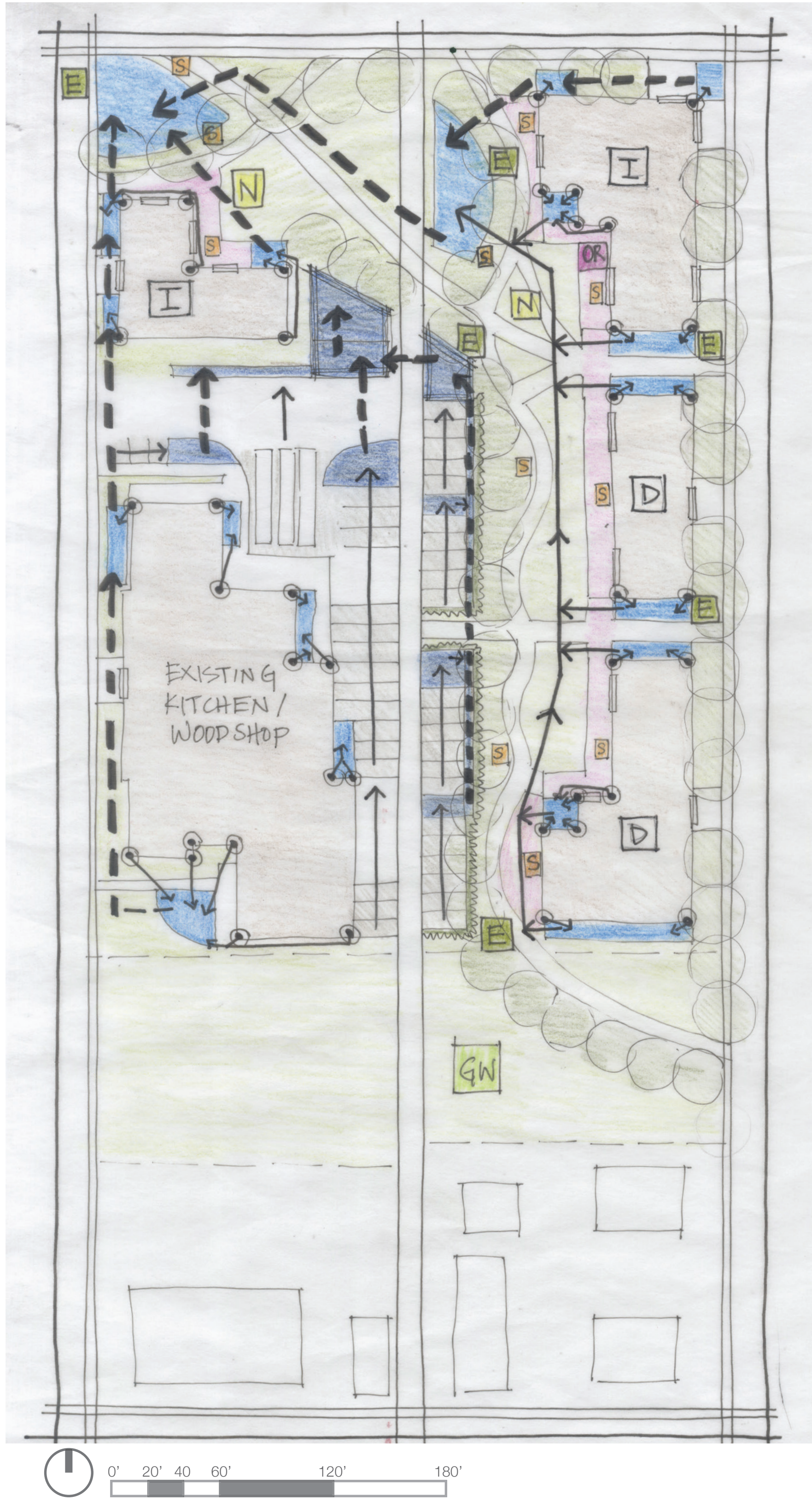
3.5

Spider Diagram: Block 2 Architectural Stormwater Conveyance

Infiltration Basin Emphasis
Block 2



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings



3.6

Alternative Sketch Design: Block 2 Infiltration Basin Emphasis

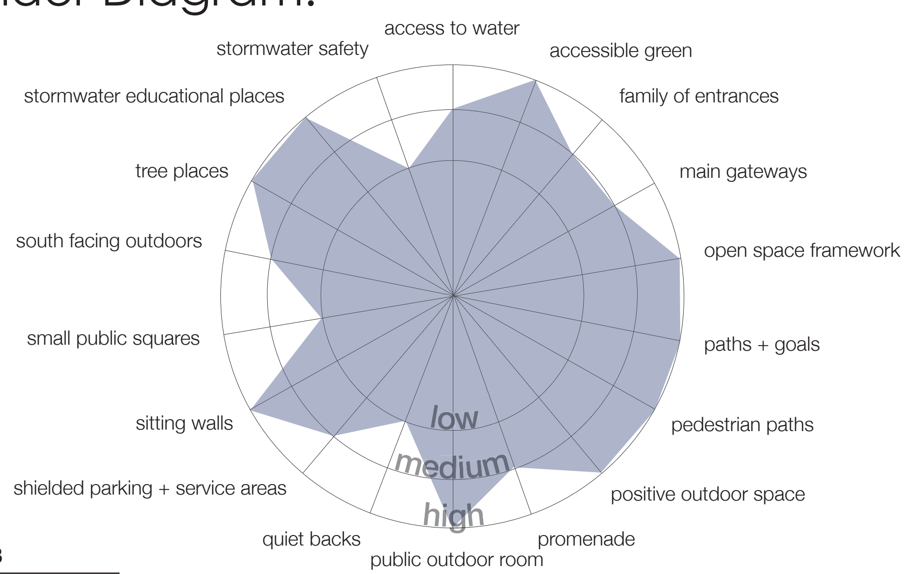
Evaluation Criteria

	EVALUATION CRITERIA	Low	Med.	High	Comments
DERIVED FROM SELECTED UO PATTERN LANGUAGE STANDARDS	Access to Water (UO CP)		X		Larger infiltration basins will regularly be filled with water in wet seasons.
	Accessible Green (UO CP)			X	The main path directs users across site to the greenway and the site meets all of the area requirements.
	Family of Entrances (UO CP)		X		Buildings are in linear-groups, but few of the entrances relate to each other.
	Main Gateways (UO ECDP)		X		The main gateway on corner is blocked by a water retention 'pond' so users have to walk around.
	Open Space Framework (UO CP)			X	The open space connects all areas along the path to the greenway.
	Paths + Goals (UO CP)			X	Paths make visibly clear connections to goals.
	Pedestrian Paths (UO ECDP)			X	Good connection to streets and greenway, which then has potential to connect over towards main campus.
	Positive Outdoor Space (UO CP)			X	Stormwater adds to the outdoor experience at nodes, potential for resting area with seating, trees, and art.
	Promenade (UO CP)		X		Clearly marked promenade are strengthened by trees, but are not along beautiful, visible stormwater systems.
	Public Outdoor Room (UO CP)			X	Stormwater in the proximity of nodes engage users with views and sounds and places to rest.
	Quiet Backs (UO CP)	X			Back of buildings are in high use areas with parking lots, and are not quiet.
	Shielded Parking + Service (UO CP)		X		Kitchen/Woodshop parking lot is not screened, other proposed parking areas are screened with vegetation.
	Sitting Walls (UO CP)			X	Potential areas for sitting walls around activity nodes are ample and some have views of water features.
	Small Public Squares (UO CP)	X			No areas that would be suitable for a public square due to size requirements.
	South Facing Outdoors (UO CP)		X		There is only one small south facing plaza, the rest of the plazas mostly face southwest.
	Tree Places (UO CP)			X	Tree plantings help enhance walking path, buffer views from parking/service for Kitchen and provide interest.
STORM WATER ISSUES	Stormwater Education Places			X	The larger infiltration basins provide focal points in the landscape, and have places to sit, rest and learn.
	Stormwater Safety	X			One deep, uncovered and ugly stormwater pit is located near a walking path.

3.7

Evaluation Criteria Table: Block 2 Infiltration Basin Emphasis

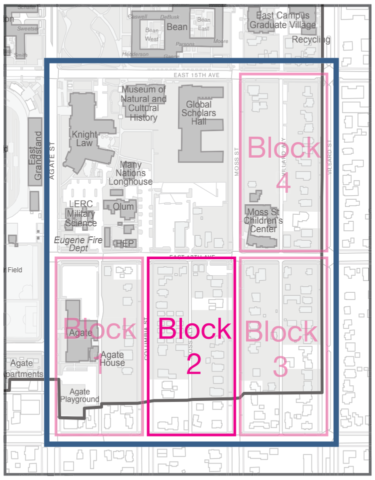
Spider Diagram:

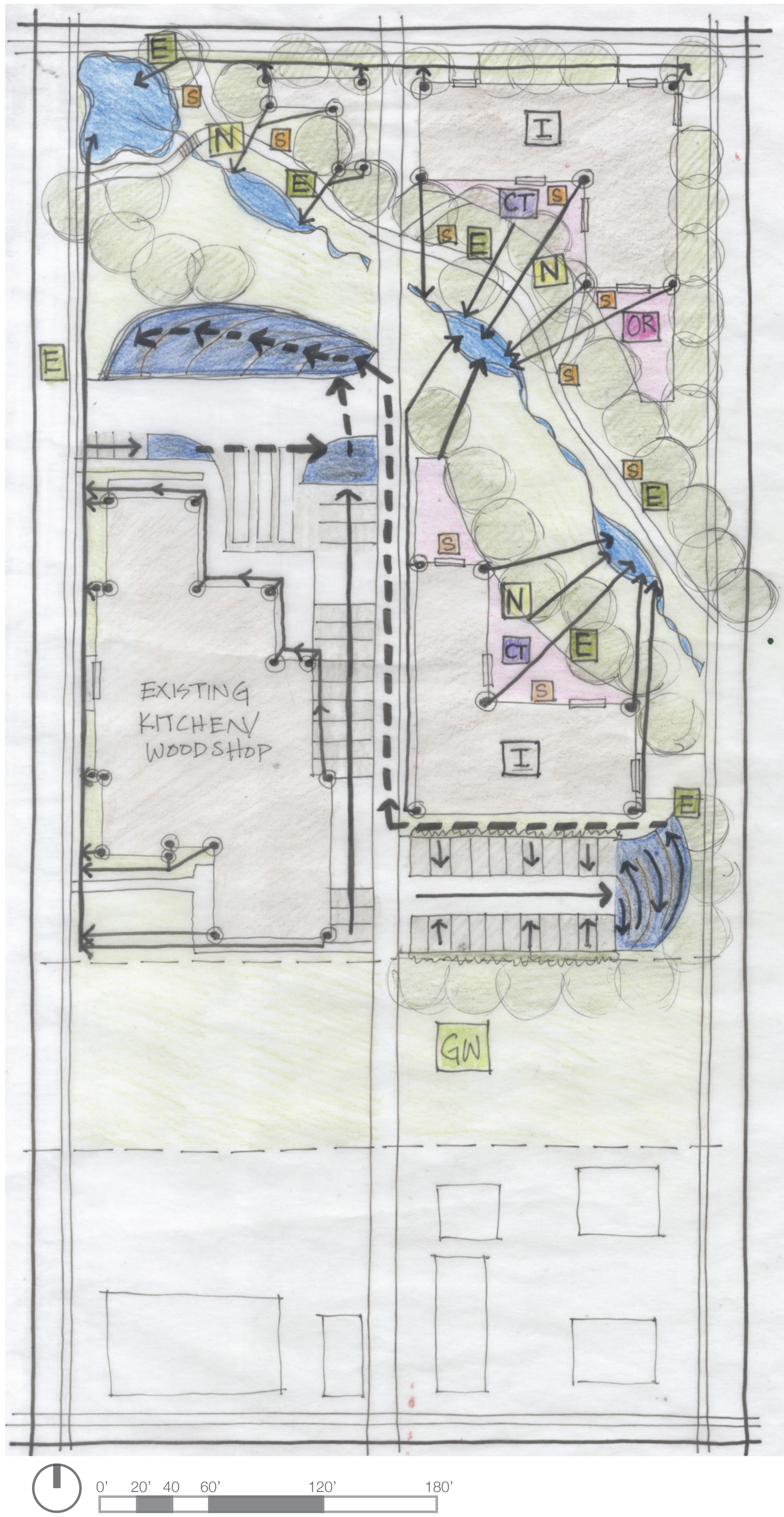


3.8

Spider Diagram: Block 2 Infiltration Basin Emphasis

Stream System Emphasis
Block 2





3.9

Alternative Sketch Design: Block 2 Stream System Emphasis

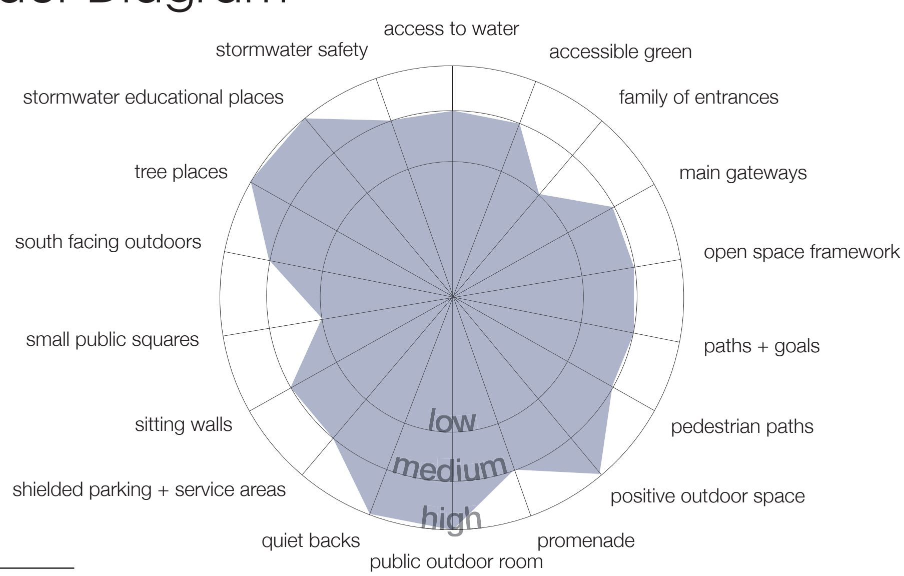
Evaluation Criteria

	EVALUATION CRITERIA	Low	Med.	High	Comments
DERIVED FROM SELECTED UO PATTERN LANGUAGE STANDARDS	Access to Water (UO CP)		■		Water is visible intermittently and tree shade helps keep stream area wet during rainy season into dry season.
	Accessible Green (UO CP)		■		Greenway accessible from street or alley only - not within block and surpasses area requirements.
	Family of Entrances (UO CP)	■			Buildings are separated by stream and too far to relate to each other due to visibility from tree canopy.
	Main Gateways (UO ECDP)		■		The main gateway on corner is separated into two paths with an stormwater 'pond' blocking the entrance.
	Open Space Framework (UO CP)		■		The stream buffer is ample as an open space corridor (too much space?), barely room to fit in buildings.
	Paths + Goals (UO CP)		■		Paths are only on one side of stream, making it challenging to connect to the other building.
	Pedestrian Paths (UO ECDP)		■		Only one strong and beautiful path that really connects to street grid, but not directly to greenway.
	Positive Outdoor Space (UO CP)			■	Outdoor space is very enjoyable and serene due to the plaza seating in the trees and the views of the wetlands.
	Promenade (UO CP)		■		Strong promenade only on one side of the stream, and only links up to two of the activity nodes.
	Public Outdoor Room (UO CP)			■	The outdoor room is enclosed by a wall and trees with a view and sounds of the wetland/stream.
	Quiet Backs (UO CP)			■	Quiet backs have shade and sun, seating, views of water and one of them is totally isolated from main path.
	Shielded Parking + Service (UO CP)		■		The Kitchen/Woodshop is not shielded, but the small lot near the greenway is screened with vegetation.
	Sitting Walls (UO CP)		■		Most of the activity nodes have potential areas for good sitting walls near buildings or along stream system.
	Small Public Squares (UO CP)	■			No areas that would be suitable for a public square due to access and the crowded nature of trees.
	South Facing Outdoors (UO CP)		■		One south facing plaza has summer shade from deciduous trees and winter sun exposure.
	Tree Places (UO CP)			■	Tree plantings nest around buildings, create a sense of being in the outdoors and are near water features.
STORM WATER ISSUES	Stormwater Education Places			■	Main stormwater educational opportunities are woven along the stream-path with sitting and resting areas.
	Stormwater Safety		■		Parking runoff is managed in a large infiltration basin, away from walking areas, other is in shallow wetlands.

3.10

Evaluation Criteria Table: Block 2 Stream System Emphasis

Spider Diagram

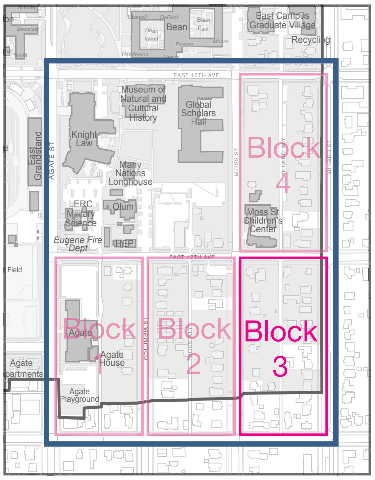


3.11

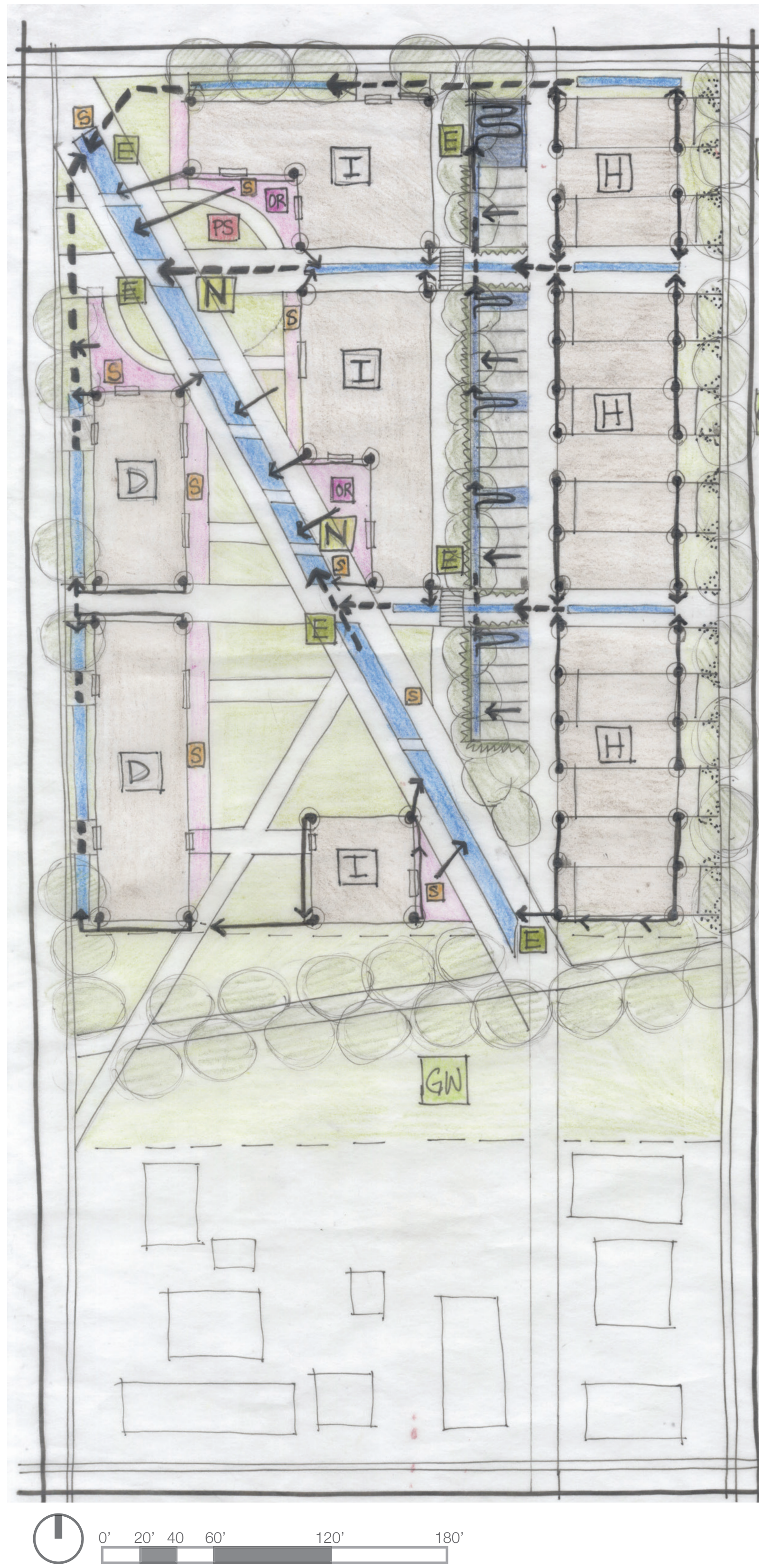
Spider Diaram: Block 2 Stream System Emphasis

Architectual Stormwater Conveyance

Block 3



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings



3.12

Alternative Sketch Design: Block 3 Architectural Stormwater Conveyance

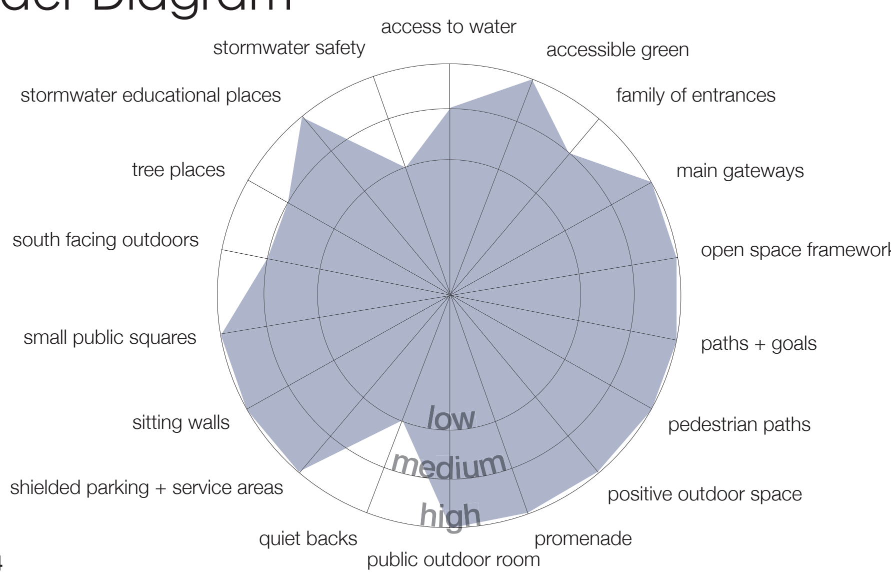
Evaluation Criteria

	EVALUATION CRITERIA	Low	Med.	High	Comments
DERIVED FROM SELECTED UO PATTERN LANGUAGE STANDARDS	Access to Water (UO CP)		■		Water is visible for longer periods during rainy season, since it is collected and stored in basins.
	Accessible Green (UO CP)			■	Greenway, very accessible, direct paths, lead physically and visually to destination, meets area requirements.
	Family of Entrances (UO CP)		■		Most but not all entrances of buildings relate to each other.
	Main Gateways (UO ECDP)			■	The main gateway on corner is clearly marked and open as an entrance.
	Open Space Framework (UO CP)			■	Open space is cohesive and connects the main path to greenway as well as shares open space to lawn + views.
	Paths + Goals (UO CP)			■	All paths and goals connect clearly along long linear pathway.
	Pedestrian Paths (UO ECDP)			■	Good connection to streets and greenway, which then has potential to connects over towards main campus.
	Positive Outdoor Space (UO CP)			■	The long linear SW system creates a focus + becomes a user-friendly extension of buildings and plaza spaces.
	Promenade (UO CP)			■	All nodes are linked by main promenade along stormwater systems.
	Public Outdoor Room (UO CP)			■	Stormwater engages with outdoor rooms providing a backdrop/focal point with vegetation and sounds.
	Quiet Backs (UO CP)	■			Back of buildings are in high use area, and are not quiet.
	Shielded Parking + Service (UO CP)			■	Parking lots are screened with vegetation on the campus side, alleys facing each other are not vegetated.
	Sitting Walls (UO CP)			■	All activity nodes have the potential for ample seating with views of water features.
	Small Public Squares (UO CP)			■	One area meets the size requirements of a Public Square, is south facing and has water features nearby.
	South Facing Outdoors (UO CP)		■		Two plazas are south facing, both have views of stormwater features
	Tree Places (UO CP)		■		Tree plantings hide parking areas, and can provide some interaction for users along greenway.
STORM WATER ISSUES	Stormwater Education Places			■	The long linear SW system is a highly visible area, with seating along the whole system.
	Stormwater Safety	■			One deep, uncovered stormwater pit is located beside the street sidewalk, and one near back of building path.

3.13

Evaluation Criteria Table: Block 3 Architectural Stormwater Conveyance

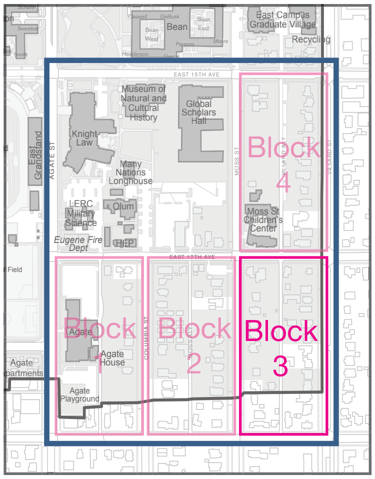
Spider Diagram



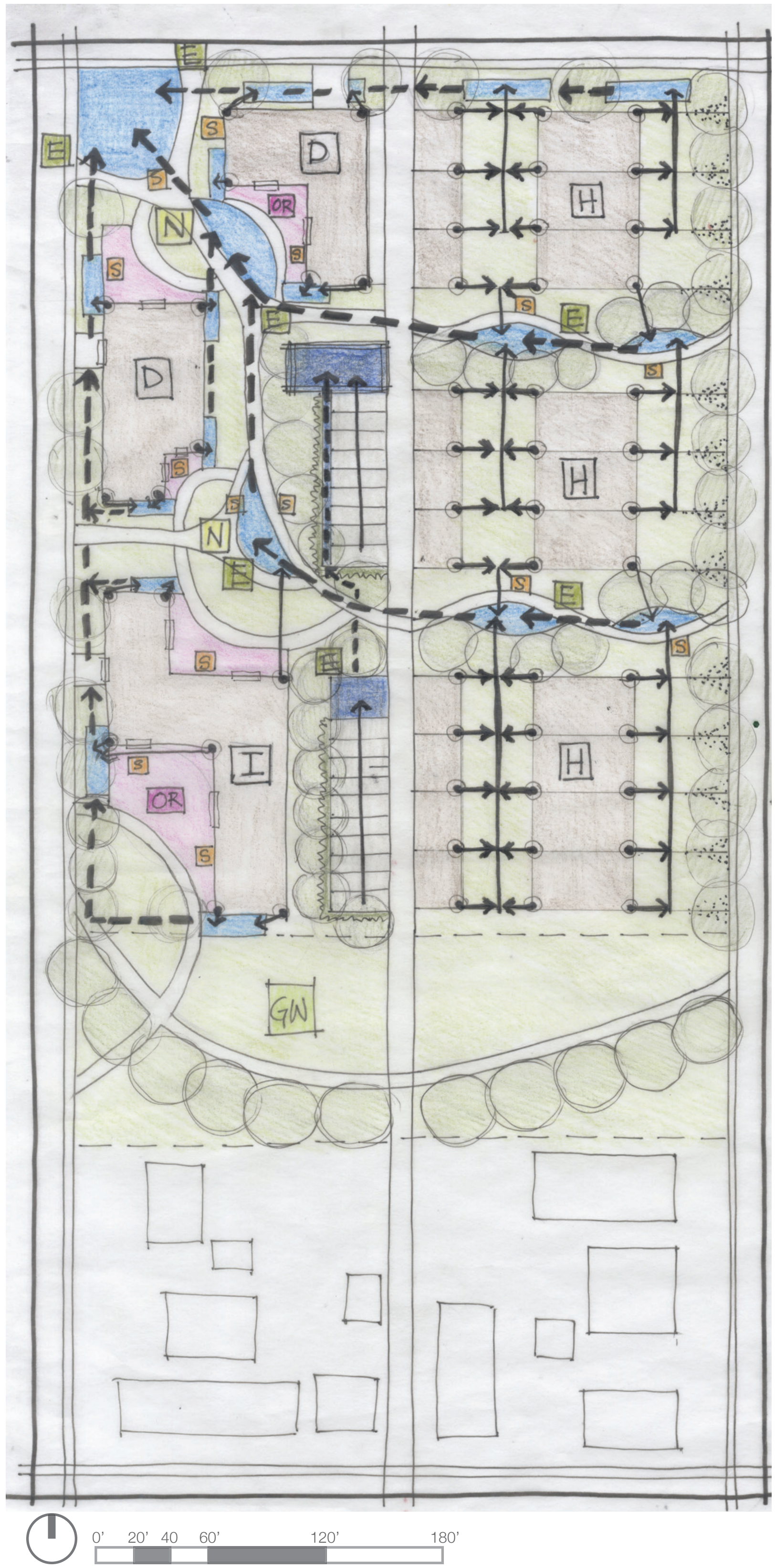
3.14

Spider Diagram: Block 3 Architectural Stormwater Conveyance

Infiltration Basin Emphasis
Block 3



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings



3.15

Alternative Sketch Design: Block 3 Infiltration Basin Emphasis

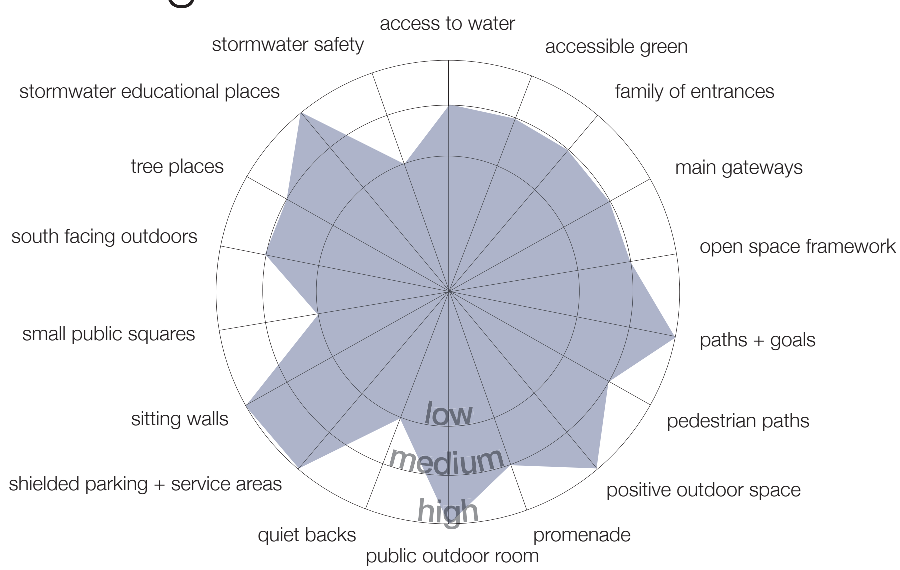
Evaluation Criteria

	EVALUATION CRITERIA	Low	Med.	High	Comments
DERIVED FROM SELECTED UO PATTERN LANGUAGE STANDARDS	Access to Water (UO CP)		X		Larger infiltration basins will regularly be filled with water in wet seasons.
	Accessible Green (UO CP)		X		Main access to the greenway is from the street or alleyway, site meets area requirements.
	Family of Entrances (UO CP)		X		Buildings grouped, but not all entrances relate to each other.
	Main Gateways (UO ECDP)		X		The natural main gateway on corner is blocked by a water retention 'pond', forcing users to walk around.
	Open Space Framework (UO CP)		X		The open space within the block is good, but doesn't connect easily with the greenway.
	Paths + Goals (UO CP)			X	Paths make connections to goals along gently curving pathways.
	Pedestrian Paths (UO ECDP)		X		All of the paths connect to the street, but not clearly to the greenway.
	Positive Outdoor Space (UO CP)			X	Stormwater 'ponds' contribute to activity nodes, create a sense of place, engage users and provide seating.
	Promenade (UO CP)		X		Promenade links major goals, but only go through part of block, doesn't link with greenway due to parking.
	Public Outdoor Room (UO CP)			X	Stormwater facilities are part of the outdoor rooms, they engage users with views and sounds,
	Quiet Backs (UO CP)	X			Back of buildings are in high use area, and are not quiet due to main paths and parking lots.
	Shielded Parking + Service (UO CP)			X	All parking lots are screened with vegetation and trees for buffering.
	Sitting Walls (UO CP)			X	Potential for ample sitting walls at activity nodes and surrounding buildings, with views of water.
	Small Public Squares (UO CP)	X			No areas that would be suitable for a public square, due to limited space.
	South Facing Outdoors (UO CP)		X		Three plazas are south facing with views of water features.
	Tree Places (UO CP)		X		Tree placement hides parking lots and guides users along the paths, woven with stormwater facilities.
STORM WATER ISSUES	Stormwater Education Places			X	The ponds are in high use areas, provide focal points in the landscape, and offer places to sit and rest.
	Stormwater Safety	X			One deep, uncovered stormwater pit is located near a walking path.

3.16

Evaluation Criteria Table: Block 3 Infiltration Basin Emphasis

Spider Diagram

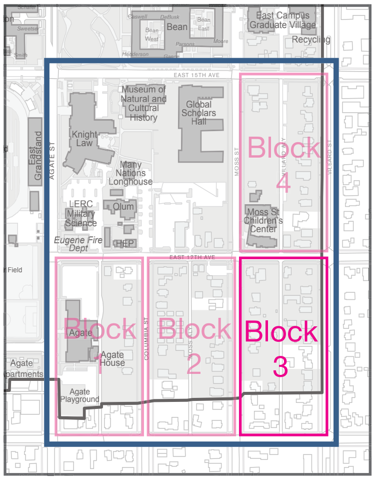


3.17

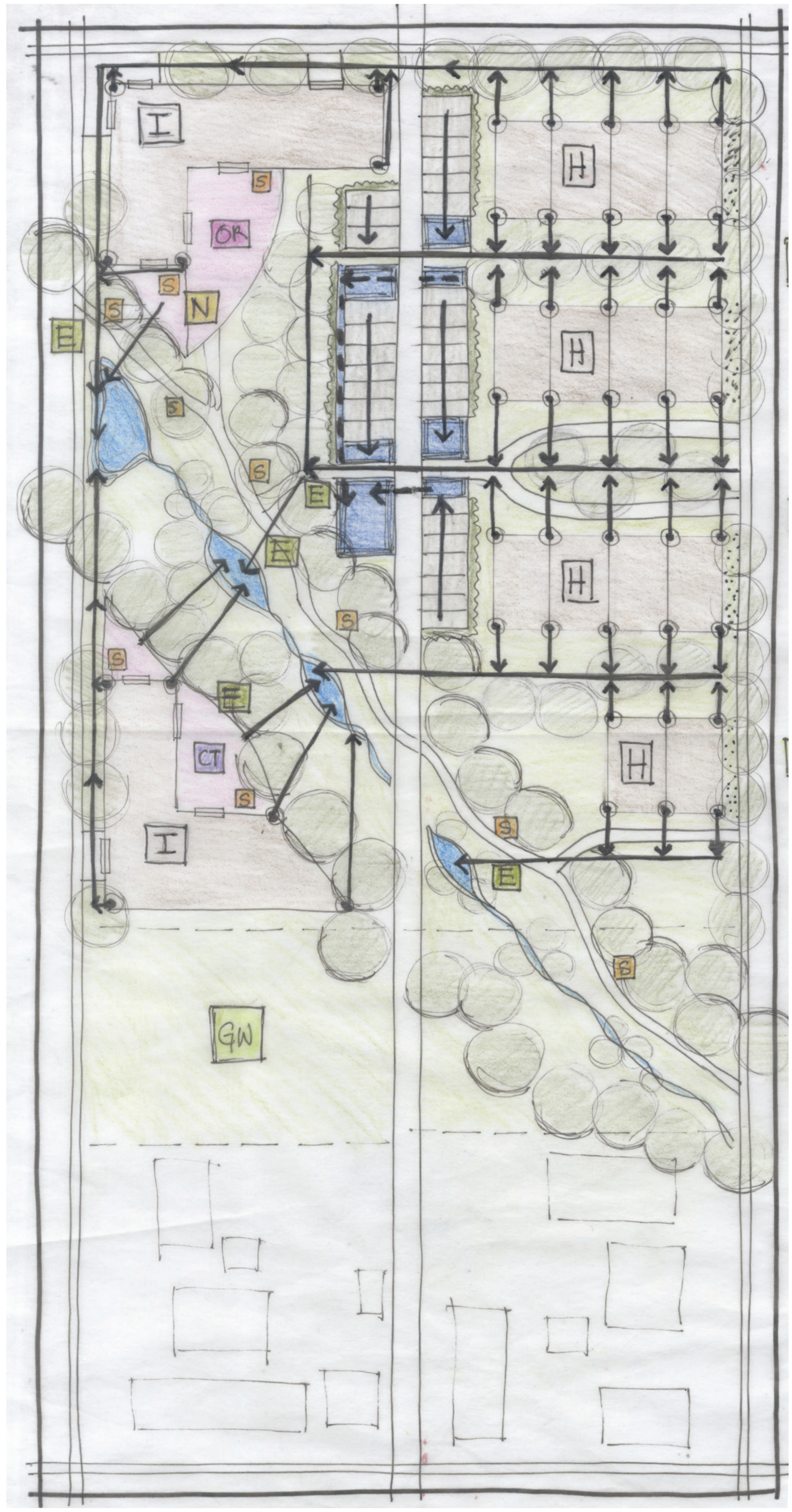
Spider Diagram: Block 3 Infiltration Basin Emphasis

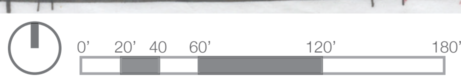
Stream System Emphasis

Block 3



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings





3.18

Alternative Sketch Design: Block 3 Stream System Emphasis

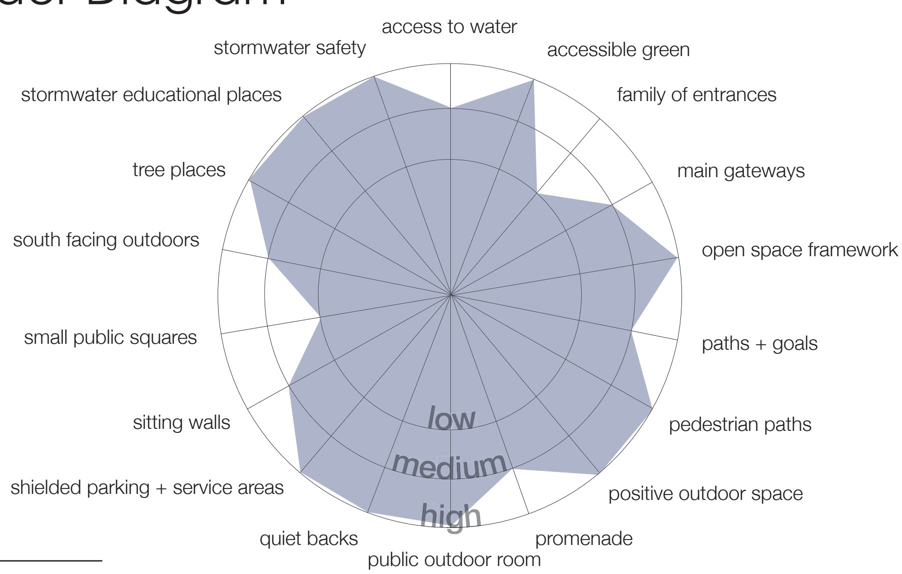
Evaluation Criteria

	EVALUATION CRITERIA	Low	Med.	High	Comments
DERIVED FROM SELECTED UO PATTERN LANGUAGE STANDARDS	Access to Water (UO CP)		■		Water is visible intermittently and tree shade helps keep stream area wet during rainy season into dry season.
	Accessible Green (UO CP)			■	Path along stream directs users to greenway, stream and greenway together exceed area requirements.
	Family of Entrances (UO CP)	■			The stream separates building entrances, so they are too far away to relate to each other.
	Main Gateways (UO ECDP)		■		Main gateway on corner is blocked by building and entrance to stream path is hidden on side of street.
	Open Space Framework (UO CP)			■	The Stream buffer and the greenway together provide possibly too much area for open space.
	Paths + Goals (UO CP)		■		The main path connects only to one building, may potentially be too hidden if not well marked.
	Pedestrian Paths (UO ECDP)			■	Only one strong and beautiful path that really connects through the block, doesn't connect to other building.
	Positive Outdoor Space (UO CP)			■	Outdoor rooms at the back of buildings are protected, and create a sense of ownership to those who use them
	Promenade (UO CP)		■		Strong promenade that connects to only node on block.
	Public Outdoor Room (UO CP)			■	The outdoor rooms visually engage with stormwater views and sounds.
	Quiet Backs (UO CP)			■	Quiet backs can be buffered with trees (with one better than the other due to views of parking lot).
	Shielded Parking + Service (UO CP)			■	Mostly shielded parking with trees and vegetation, except from the alley access.
	Sitting Walls (UO CP)		■		Good amount of potential sitting walls near buildings and along stream.
	Small Public Squares (UO CP)	■			No areas that would be suitable for a public square due to access and the crowded nature of trees.
	South Facing Outdoors (UO CP)		■		One south facing plaza has summer shade from deciduous trees and winter sun exposure.
	Tree Places (UO CP)			■	Trees create intimate places at back of buildings + along pathways, while hiding unwanted views of parking.
STORM WATER ISSUES	Stormwater Education Places			■	Wetland ponds are along main path, are engaging with views and potential ample seating at each focal area.
	Stormwater Safety			■	Shallow wetland areas along stream are removed from main path, but are in viewing distance.

3.19

Evaluation Criteria Table: Block 3 Stream System Emphasis

Spider Diagram



3.20

Spider Diagram: Block 3 Stream System Emphasis

RANKING OUTCOMES

The assessment criteria were defined and applied a low to high scoring system to filter the designs down to the preferred alternative that would suggest a best design approach for improving and adopting each of the three pattern themes. The scores were then tallied up and graphically presented towards identifying a promising design theme/approach.

This system for ranking kept the scoring equally weighted, since this is the default of campus planners at the UO.

Ranking Outcomes

Block	Design Alternative		Rating Points		Rating Counts		Total Score		Grand Total
BLOCK 2	Architectural Conveyance System	Low	1	X	4	=	4	+	39
		Medium	2		7		14		
		High	3		7		21		
	Infiltration Basins	Low	1	X	3	=	3	+	42
		Medium	2		6		12		
		High	3		9		27		
	Stream System	Low	1	X	2	=	2	+	39
		Medium	2		11		22		
		High	3		5		15		

Block	Design Alternative		Rating Points		Rating Counts		Score		Total
BLOCK 3	Architectural Conveyance System	Low	1	X	2	=	2	+	46
		Medium	2		4		8		
		High	3		12		36		
	Infiltration Basins	Low	1	X	3	=	3	+	39
		Medium	2		9		18		
		High	3		6		18		
	Stream System	Low	1	X	2	=	2	+	44
		Medium	2		6		12		
		High	3		10		30		

3.21

Ranking Outcome Table

DESIGN CRITIQUE
Architectural Stormwater Conveyance
Block 2

Essence of the Design: Form + Consequences of the Pattern

This whole design is highly influenced by the new kitchen/woodshop, which is poorly designed in relation to how it limits putting quality human spaces on the block for the future. The form of the design was driven by how elevation changes created water flows across specific areas within the block. The idea of the large conveyance systems was to accept high volumes of stormwater runoff during storm events without having the water go to the City pipes. The water would slowly be treated as it infiltrated into the ground, or would be prominently conveyed and treated in the next overflow basin. The larger conveyance systems take up a lot of space and tend to block natural pathways from buildings through plazas. Since the design had to work around the alley and the existing kitchen/service area, the conveyance system created a very choppy promenade that will require skillful design to be potentially beautiful. It poses a hindrance for circulation.

Making Improvements: Moving from Low to High

The water system unifies and articulates the spaces in the block, yet most of the large stormwater systems accentuate the disconnectedness of the design. The paths and goals get visually lost between sharp corners and the separation from the alley. Goals could be better connected if paths were more fluid with visual connections. Since the Sub-area requires a specific amount of square footage for building space, there are no opportunities for quiet backs, since all proposed building backs open up to corridors, high use areas and parking lots. There is no designated space for a small public square due to the limited remaining space and water systems that cut off access and movement around the plazas. A public square still may not work in this design, unless stormwater elements and/or building footprints are altered or reconfigured to open up a space. Also, since so much of the space is influenced by views of the kitchen/woodshop parking lot and service area the public square may not be suitable for this block. There are some stormwater safety issues with deep stormwater pits near walking paths that can become fall-in hazards to people late at night. The design of the deep pits could be changed to larger, shallow, visible, vegetated infiltration basins, long linear street trenches or underground vaults.

Carrying Over: Possible Pattern Proposal

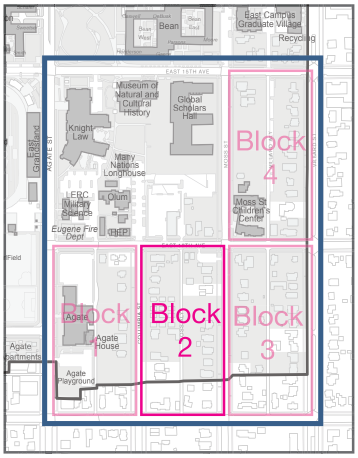
The grey water circulation in this design is unique among all the designs. By recirculating grey water from all proposed buildings on site, water can be visible throughout the year. The idea of using grey water circulation to produce year round visual water in the water system should be carried through to the proposed planning patterns. There are technical challenges in combining stormwater with grey water systems and water quality.

3.3 (repeated)

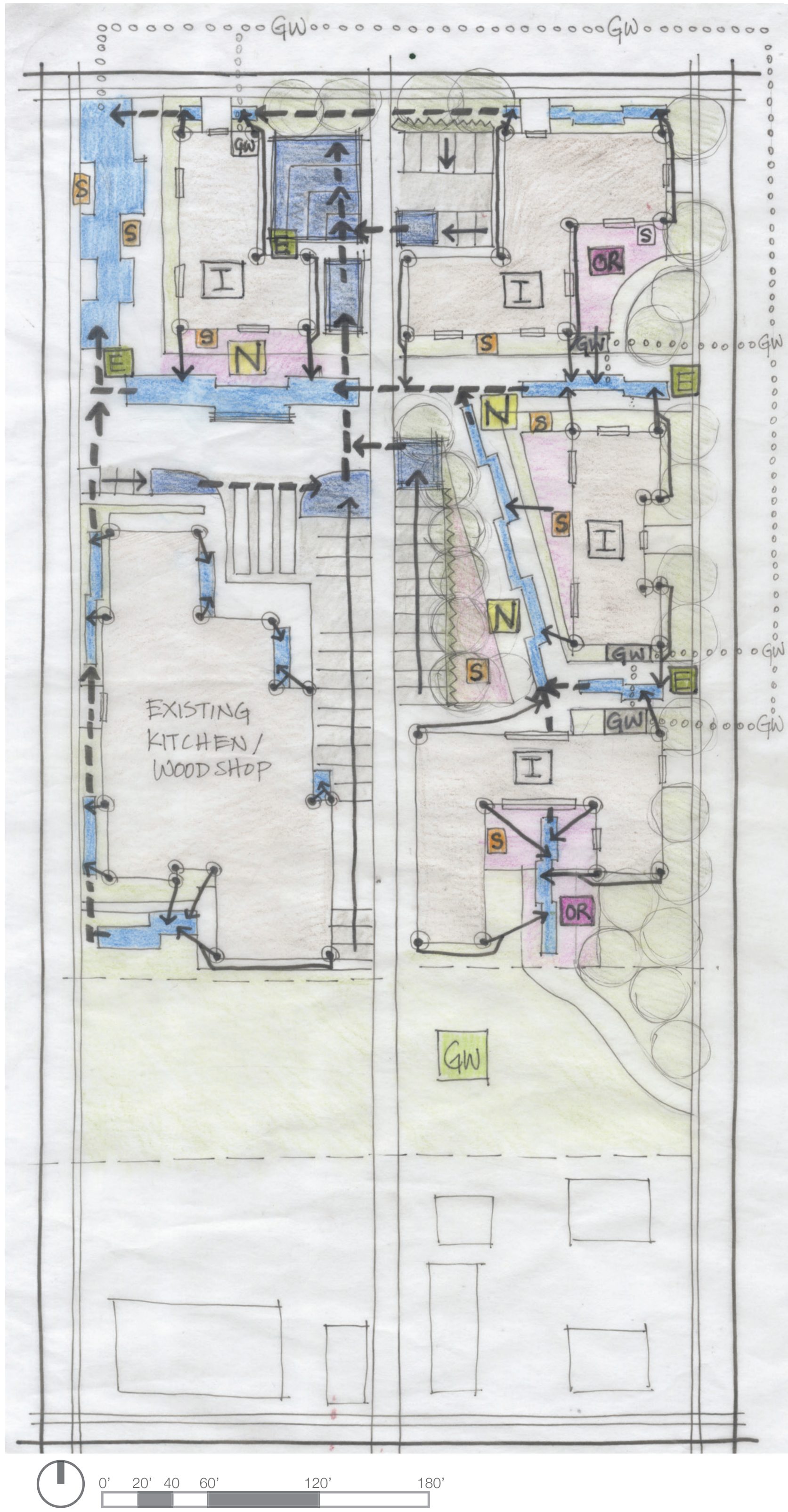
Alternative Sketch Design: Block 2 Architectural Stormwater Conveyance

Architectural Stormwater Conveyance

Block 2



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings



DESIGN CRITIQUE
Infiltration Basin Emphasis
Block 2

Essence of the Design: Form + Consequences of the Pattern

The core of the design was driven by stormwater flows. But due to the Kitchen location and its open, ugly service area and alleyway, this particular block was more challenging to design. The idea behind the patterns for the Infiltration Basin Emphasis was to catch water at the source of every building, plaza and pathway, treat it, and then have it overflow during heavy storms to another area for further treatment. Parking runoff is treated in its own separate infiltration basins and never mixes with cleaner water from rooftops, plazas and paths. There are many little vegetated infiltration basins all over the site, and two larger ones that accept overflow from smaller basins. Every little basin is next to a building and will need maintenance to ensure they are looking good and functioning to clean and infiltrate stormwater (eroded soil and sediment build up) near high use areas. These little basins are easy to appoint around a design that emphasizes other purposes so as to punctuate a stormwater first pattern. The larger basins take up a lot of room, as do the parking lot treatment areas, if they are out in the open.

Making Improvements: Moving from Low to High

The building backs in this conceptual design are adjacent to a high use path and are exposed visually to the service alley and parking lots, so there is no opportunity to create buildings with quiet backs on this block. There is space for a small public square, but it is unsuitable since it overlooks a road, has views of the service alley and is next to a deep stormwater pit. There are two areas that have stormwater safety issues on this block. These are two large stormwater pits are very close to the main walking paths and have potential to be ugly fall-in hazards. In this situation, changing the pits to underground vaults or other solutions could be feasible at higher cost. With this option there would still be treatment of the polluted stormwater, as well as opportunities to open up the space for more trees to buffer the Kitchen/Woodshop service area.

Carrying Over: Possible Pattern Proposal

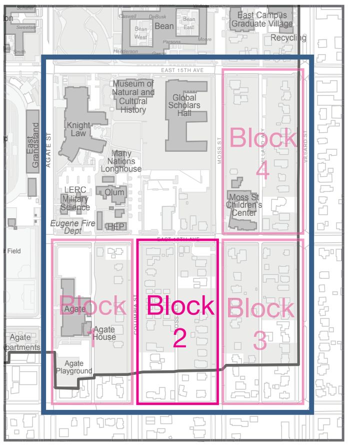
The design strongly connects buildings, paths and open spaces together. The public outdoor rooms engage users with stormwater at activity nodes visually and interactively with seating and paths.

3.6 (repeated)

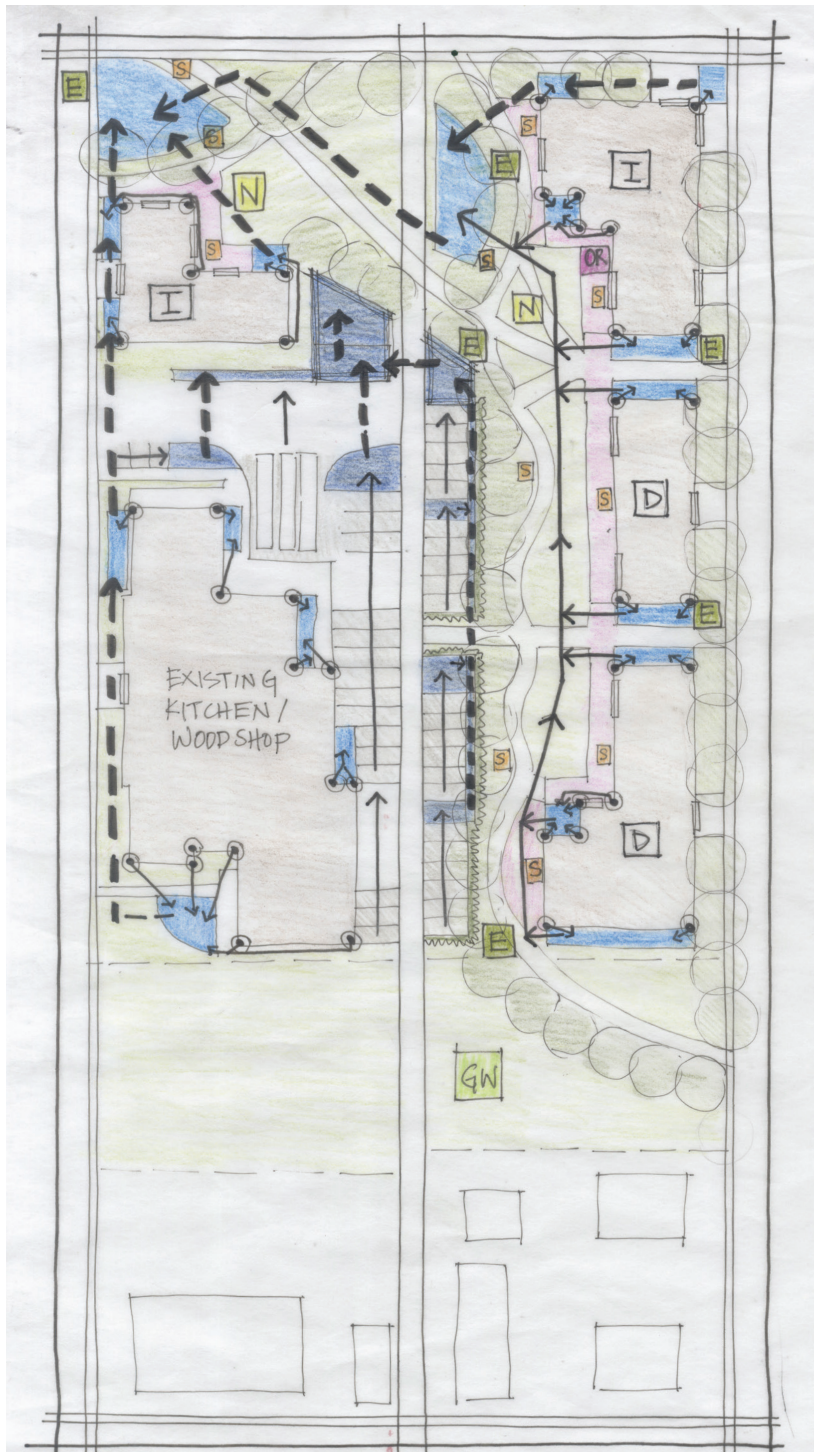
Alternative Sketch Design: Block 2 Infiltration Basin Emphasis

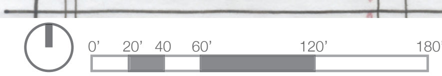
Infiltration Basin Emphasis

Block 2



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings





DESIGN CRITIQUE
Stream System Emphasis
Block 2

Essence of the Design: Form + Consequences of the Pattern

This design came from the idea of daylighting and recreating a historic stream form like that which once passed over this area of East Campus. The form of the design is based on a meandering stream form with intervening pools like miniaturized beaver dam ponds. Conveyed water collects in pools along the stream and a path meanders near by. The riparian tree canopy is dense and quiet, creating a space that could be similar to a setting in the woods. The pattern of this stream could present safety issues at night, or during the day due to the potentially heavily forested and planted area. The stream and riparian area take up a lot of room, and the rest of the block becomes cramped with buildings and parking lots, violating many of the campus patterns. Areas for social gathering seem to be minimal in this design, as it emphasizes a more tranquil setting.

Making Improvements: Moving from Low to High

Since the stream buffer could hide the entrances of the buildings behind lush tree plantings, it is more difficult for buildings to have a family of entrances. This cannot be solved unless the stream buffer is dramatically smaller and/or buildings are linked by paths and bridges. Due to the stream buffer size and density of trees through the stream landscape, there is no obvious room for a small public square unless an opening is created which could violate the tranquil naturalistic stream landscape. Backs of buildings are shady and intimate, and not a place for semi-large gatherings. If the stream buffer was a gesture and significantly smaller or irregular in width, a square could possibly be incorporated but it could also detract from the naturalness of the streamway design. The stream system may be the most natural and beautiful of all the designs but its 50-foot buffer, designed to accomodate a lush and healthy riparian zone, may be a fatal flaw in usable space and ability to incorporate the UO Pattern Language Standards.

Carrying Over: Possible Pattern Proposal

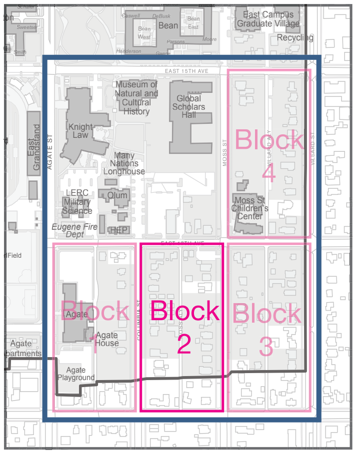
The stream system design presented a good example for quiet backs. Buildings backing up to the stream system, with a canopy of trees and only one pathway, made this a strong setting for quiet backs that could be 'brought into' the working spaces in the buildings.

3.9 (repeated)

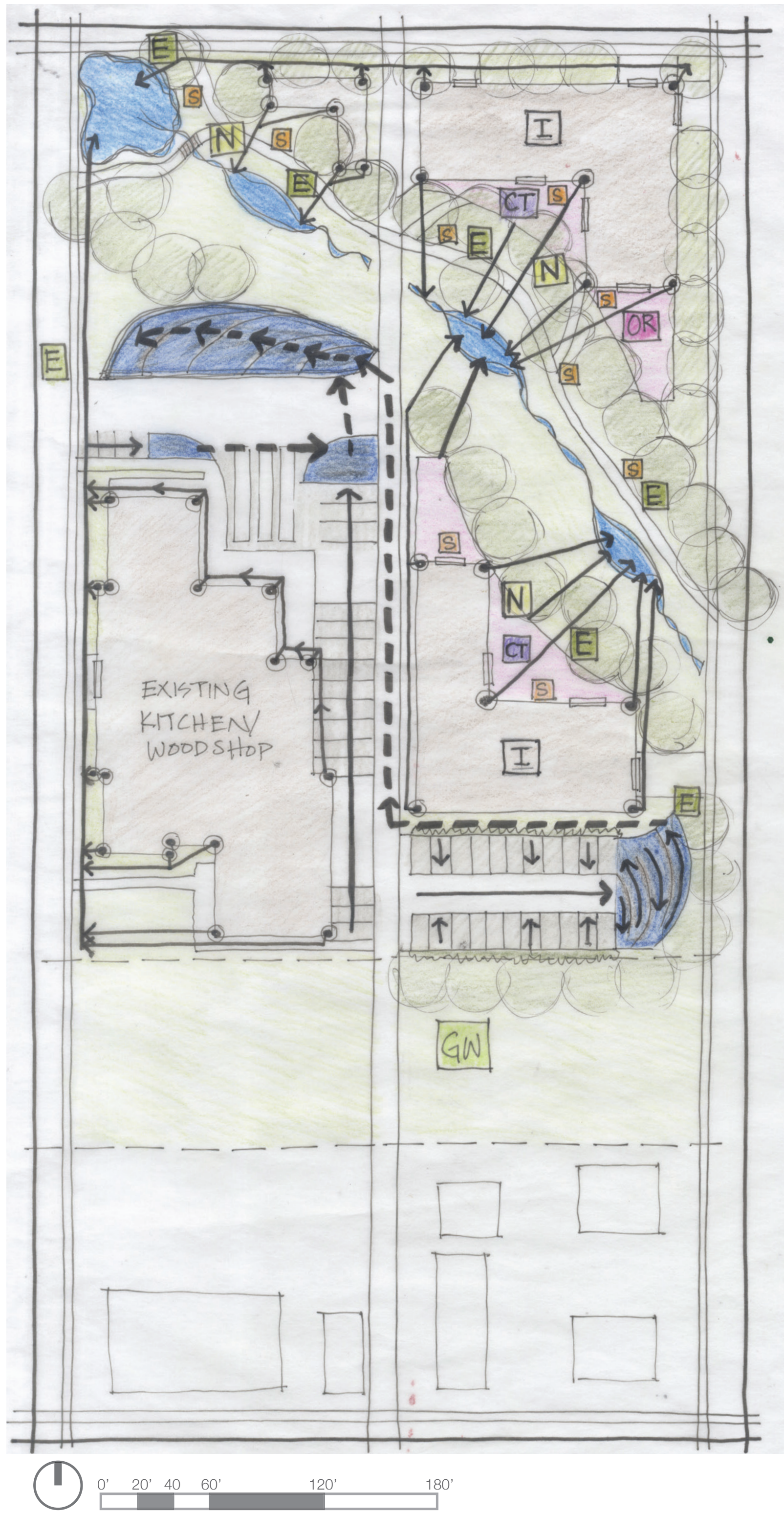
Alternative Sketch Design: Block 2 Stream System Emphasis

Stream System Emphasis

Block 2



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings



DESIGN CRITIQUE

Architectural Stormwater Conveyance

Block 3

Essence of the Design: Form + Consequences of the Pattern

This design moves the alley over to the east through the block and creates a long linear central pattern that conveys water in an architectural and orderly way. This strong form openly conveys to the users the necessity of stormwater management, and how it can be integrated into a campus setting in a beautiful way. The form is simple, making water and pedestrian connections easy. Plenty of path-bridges can be fit into areas of high use so crossing is not an issue. This architectural water corridor fits easily into long linear spaces (such as quads) that have suitable elevation changes. The linear water systems are long, and may cause issues with service access for buildings or often not enough gathering stormwater to flow through the whole way. Perhaps just some parts of the system need to be able to accept water in most storms, and other parts can have a similar shape, but a different use such as a vegetated planter, fountain or seating area. During big storms these non-stormwater elements in the channel would still transport runoff to the next basin, but would do so through underground conveyance pipes or visible stormwater runnels along the surface of the ground. Such a linear structure may create a barrier – if poorly designed. By moving the alley and pushing parking lots over, great outdoor space was discovered and enabled this wonderful architectural water corridor to be considered.

Making Improvements: Moving from Low to High

This design pattern is not a good example of a place with likely opportunities for quiet backs. The backs of all buildings are open and expansive, creating almost a public quad-like setting. There is an opportunity to plant trees along the backs of buildings, to reinforce the long linear paths, but this still wouldn't create strong quiet backs. There are several smaller stormwater pits, but one larger one that raises a concern for stormwater safety since it is near walking paths. All of these stormwater pits could be designed differently. Polluted water could be sunk and treated in a trench conveyance system along the parking lots edge, out of the way of human contact.

Carrying Over: Possible Pattern Proposal

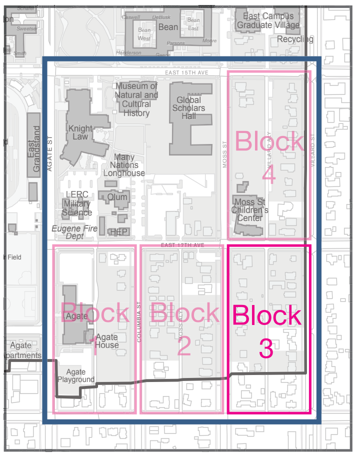
This design was the most promising, due to the number of 'high' scores it received. Since the original alleyway was situated directly in the middle of the block, this design strategically relocated the alleyway at a cost, 80 feet over to the east and opened up space to integrate a continuous, long linear stormwater system. Because of this deliberate move, the design demonstrations a strong emphasis of a promenade, positive outdoor space and the use of buildings and vegetation to shield parking lots and the alley.

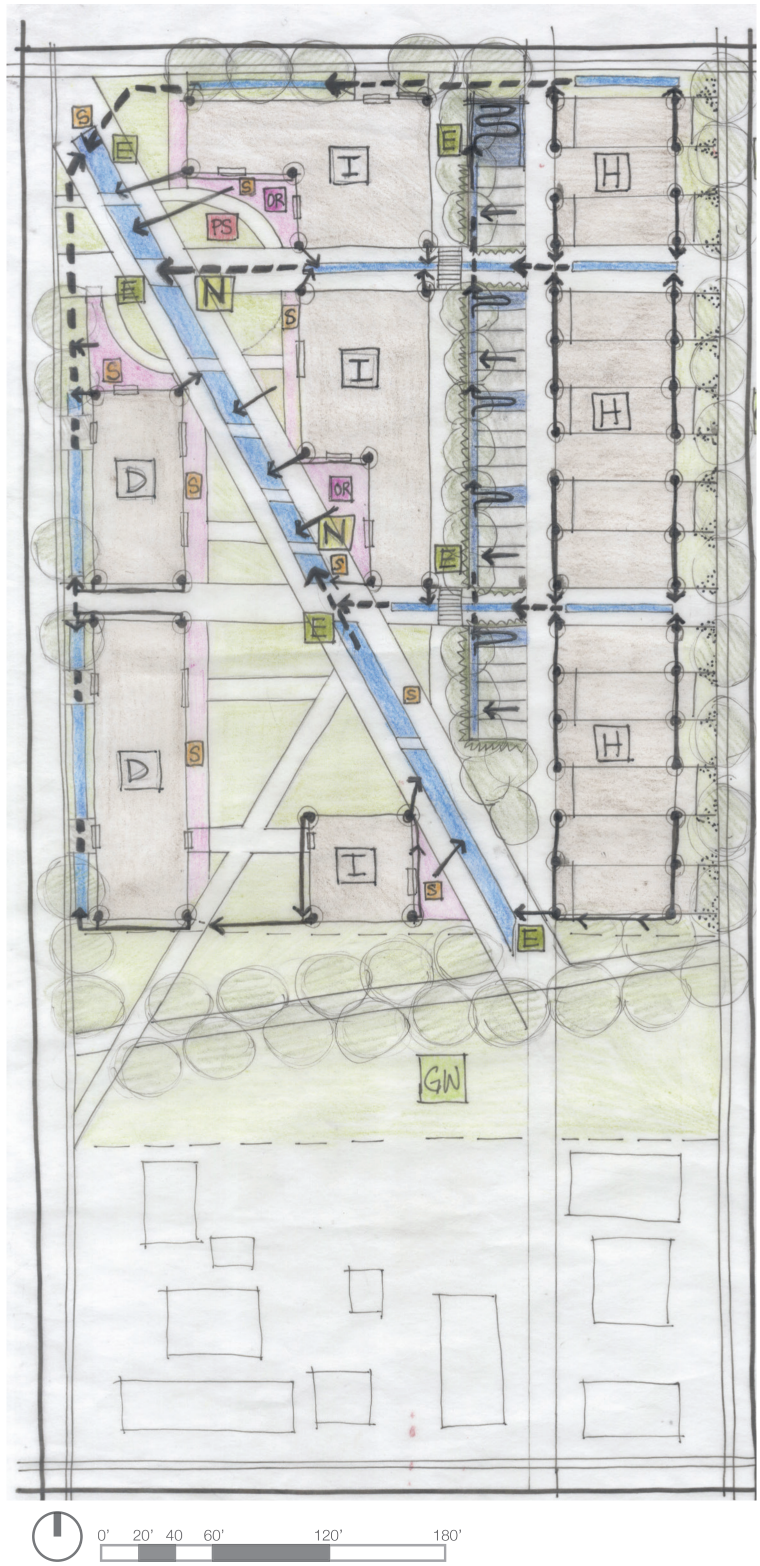
3.12 (repeated)

Alternative Sketch Design: Block 3 Architectural Stormwater Conveyance

Architectual Stormwater Conveyance

Block 3





DESIGN CRITIQUE
Infiltration Basin Emphasis
Block 3

Essence of the Design: Form + Consequences of the Pattern

The infiltration basins collect water, treat it, and the overflow feeds into larger basins for further treatment. Since this block dealt with row houses, all of the runoff from homes is transported by pipe to infiltration basins. The water treatment areas between houses create pocket parks and opportunities to connect the campus to this neighbourhood with pathways. The form of the infiltration basin pattern creatively weaves the basins in and around pathways, seemingly to guide circulation. Larger basins are placed at nodes or focal points in the landscape, beckoning attention. The larger basins would likely attract positive attention, and have the potential to be ugly if not well designed and maintained. Poor maintenance may cause problems aesthetically, since they are placed so centrally. The basins block entrances, which can cause confusion to the user as to how to enter the whole block or a building. The design lacks singular and strong open space to unify the experience of the whole block.

Making Improvements: Moving from Low to High

There are no opportunities for quiet backs, unless buildings are reconfigured and main paths are brought to the front of the buildings. But even so, the backs of buildings would look out onto parking lots, which may or may not prove to be noisy and distracting to the user. The central location of the infiltration basins divides up areas and poses a problem for places that would normally be suitable for a small public square. Removal or reconfiguration of one of the basins could create a space for a square, but then stormwater would not be a strong focus of the design. The deep uncovered parking lot stormwater pit is a problem for stormwater safety and aesthetics. It is directly on a walking path and is open to human interaction. This would be a good opportunity to for an underground vault or long linear trench system to reduce visibility and avoid human contact.

Carrying Over: Possible Pattern Proposal

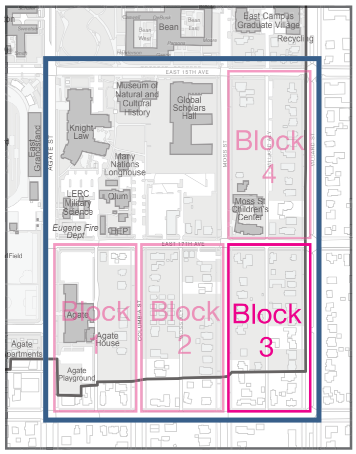
Stormwater scenery is beautifully woven throughout the design creating opportunities for stormwater education. Stormwater basins are in high use areas, provide focal points and could be strengthened with seating to sit, relax, learn and stay a while. An elegant tree placement on the greenway could offer a soft buffer between the neighbourhood and the campus grounds.

3.15 (repeated)

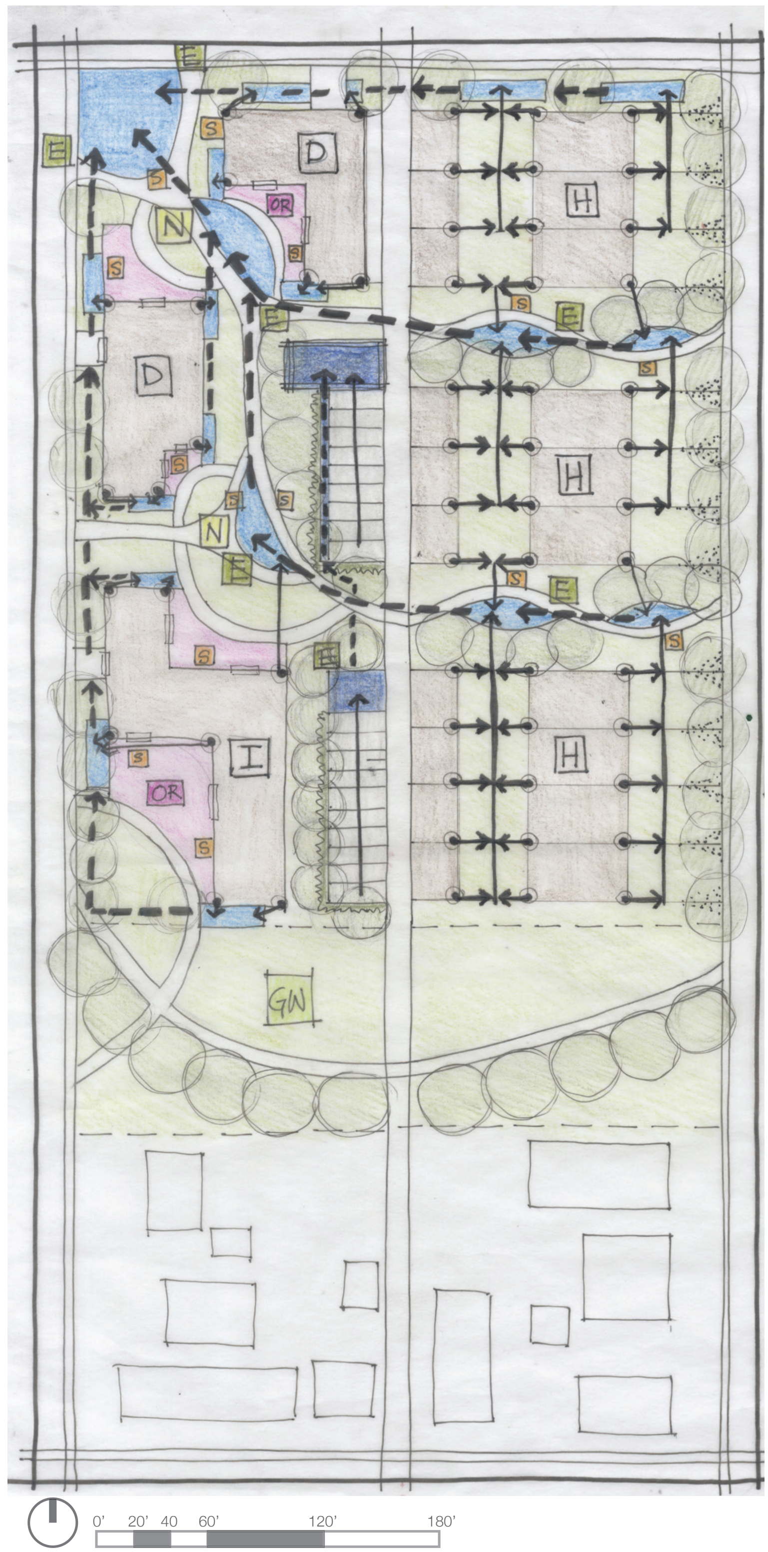
Alternative Sketch Design: Block 3 Infiltration Basin Emphasis

Infiltration Basin Emphasis

Block 3



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings



DESIGN CRITIQUE
Stream System Emphasis
Block 3

Essence of the Design: Form + Consequences of the Pattern

The design is based on physically remembering the historic stream that once flowed over this area of the block. The actual stream site was approximately in the same area as the proposed stream. The proposed stream flows over the site and accepts stormwater runoff into a series of little pools where it is transported and treated. The riparian buffer (50 feet on either side) is planted with lush trees and understory plantings, creating quiet places throughout. The stream areas block out views of parking, noises and long vista-views. Due to the secluded nature that this pattern presents, safety is a potential issue. The riparian buffer pushes buildings to the edges and limits their footprints and thus fewer buildings can be developed in the block. Making connections to destinations across the stream could be difficult and awkward, since designated crossings are limited and in areas that may be hidden to users. Parking lots are minimal due to lack of space and might not meet UO expectations.

Making Improvements: Moving from Low to High

Due to the visual obstruction of the stream's dense canopy of trees, entrances of buildings do not readily speak to each other, and thus do not easily create a family of entrances. If the buffer was narrower and if buildings made visual and physical links with viewsheds and paths, perhaps a connection could be made, but it would not be strong unless the stream corridor were reduced to a figural gesture. There is no space on the block for a small public square. The intimate nature of the small open spaces and the quiet backs are not suitable locations for a square.

Carrying Over: Possible Pattern Proposal

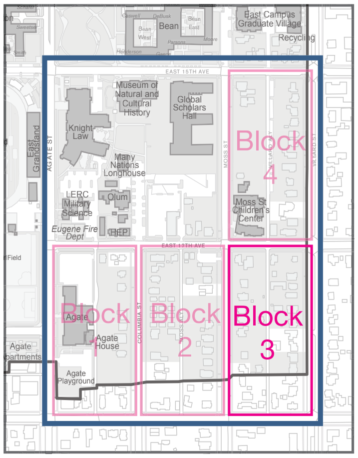
The stream system creates a natural open space framework that joins the greenway. The stream is buffered with lush trees and plantings, contrasting the urban neighbourhood and creating a lovely addition to the area and the edge of the block. Stormwater is largely out of reach but still visible to enjoy and learn from.

3.18 (repeated)

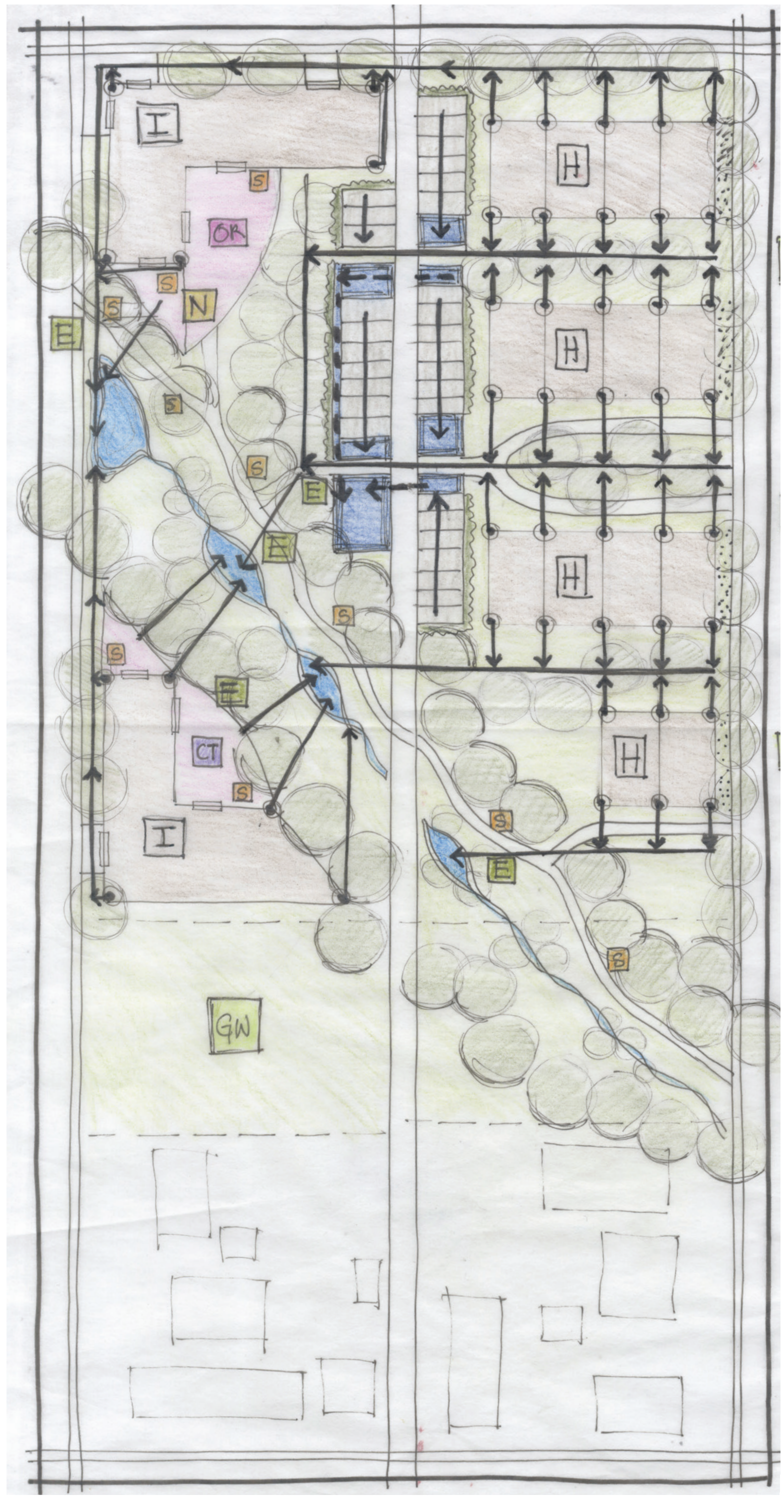
Alternative Sketch Design: Block 3 Stream System Emphasis

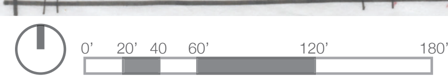
Stream System Emphasis

Block 3



- Buildings
- Plazas/Public Space
- Lawn
- Vegetation
- Parking Runoff (polluted)
- Roof/Plaza Runoff (Clean)
- Parking Lots
- Building Entrances
- Stormwater Walls
- Screening Walls
- Tree Canopy
- Down Spouts
- Stream
- Stormwater Overflow
- Conveyance Piping
- Grey Water Delivery
- GW Greywater
- N Activity Node
- CT Courtyard
- PS Public Square
- OR Outdoor Room
- S Seating
- E Stormwater Education
- GW Greenway
- H Row Houses
- D Dormitories
- I Institutional Buildings





application

chapter four

Stormwater First Patterns

Applying New Patterns

New Patterns Articulated

STORMWATER FIRST PATTERNS

Based on the knowledge gained from this research project, the best set of Stormwater First Patterns for the University of Oregon's East Campus are presented below. Even though they were written for the East Campus area, they have the potential to be universally used when applying a Stormwater First approach to campus design.

Alleys

Alleyways are useful for service vehicles, parking and utility access. The alleys divide up city blocks creating incoherent landscapes for a cohesive campus design.

THEREFORE: When opportunities arise to form a cohesive campus setting on a city block, move the alleyway or move utilities into a tunnel, to create flexibility so the block has the potential to offer a more unified setting for the campus grounds.

Infiltration Basins

Many stormwater facilities are typically one of a kind, disjointed from one another, and go unnoticed in the landscape.

THEREFORE: Punctuate a stormwater first pattern by designing smaller infiltration basins that are linked together in obvious ways, to define a larger system. Bring water to the systems in exciting ways so people can experience and potentially engage in the sights and sounds of the seasonal attraction.

Parking Lot Stormwater Treatment

Stormwater runoff from parking lots is contaminated in more toxic ways and should be designed and placed in a way that discourages human contact and access.

THEREFORE: Design stormwater treatment facilities for parking lot runoff away from areas that encourage public or social gatherings. Strategically place the facilities in locations between buildings and parking lots, where the areas are typically away from high use areas so there is less chance for people to come in contact with them. Consider removing the opportunities for interaction to the polluted stormwater by sinking the runoff into vaults under cover or in long linear systems with narrow infall channels along the edges of parking lots, and cover with grates.

Stormwater Education Places

Any stormwater facility can have educational components. However, if the location of the facility is not desirable, or if cues for learning are not there, the opportunity for education will be largely lost.

THEREFORE: Design stormwater facilities to capture the eye with strong, interesting water features in busy areas of high pedestrian use. Provide opportunities to create a refuge and cues to learn by providing shade, shelter, sitting walls and benches to rest and stay and learn for a while.

Stormwater Fit

The need to edit campus landscapes with stormwater first facilities can diminish the experience of historic and well-designed campus spaces.

THEREFORE: Design stormwater facilities in ways which improve water quality and reduce flooding, but that fit within the best patterns of historic campus character. Try to design stormwater facilities to respect and enhance the integrity of the quality features typically found on campus grounds, such as plantings, quadrangles, axes, malls, meandering paths, plazas and greens and select suitable planting palettes that reinforce the campus aesthetic.

Stormwater as a Focal Element

Often areas of high use and social focus have a central focal point that people tend to gather, hang out for some time and relax. These areas often have seating, some shade and are near a main pathway, but lack opportunities to engage with water.

THEREFORE: When designing to add stormwater elements to activity nodes, make them into a focal point, do so in creative ways to engage users with the sights and sounds of seasonal water. Place seating around the area to pull people in to sit and stay a while and become educated.

Stream Pattern

Over time, many visible streams and creeks have been redirected into city pipes to drain campus landscapes.

THEREFORE: Try to design a waterway to accept stormwater runoff in ways that remember former streams. If space allows, create a healthy-sized stream and riparian zone. Try to add naturalistic steam focus like pools meanders, and riffles with amenity elements. With less space, use smaller artistic gestures to represent the stream and evoke the qualities of the stream that once crossed the area.

Stormwater Safety

The primary treatment for polluted stormwater runoff from roads and parking lots is typically managed out of sight and not easily touched or walked in by people and children.

THEREFORE: Minimize or avoid deep pits for stormwater management that can be potential fall-in hazards, especially at night. Maximize shallow, vegetated wetlands for safety of children. If budget allows choose primary treatment to be done in bio sequestration systems that reduce pollution in inaccessible ways.

Year Round Water

Grey water from buildings is typically underutilized, and discarded even thought it has great potential to be an amenity and replenish water in the landscape during dry seasons.

THEREFORE: Build new buildings with grey water systems that deliver water outside to water treatment areas, living machines or planting beds. Let the water flow in whole landscape throughout the year and combine with seasonal water.

APPLYING NEW PATTERNS

Final Design Discussion Overview

The two designs that follow on the next pages show a final synthesis of the UO Design Considerations (4.1) as resolved through, the selected set of UO Pattern Language Standards and the new set of Stormwater First Patterns that emerged from this study and proposed for the UO (4.2).

The designs are labeled with the same legend as the six alternative designs in the previous chapter with symbols to explain how the elements are situated and work in the landscape.

Through this design investigation, an understanding became clear. The UO patterns are about many little design moves that add up to a quality campus, project by project. The proposed Stormwater First Patterns, when applied, are not huge design moves on their own, but are a potentially strong part of how the landscape can come together. They feed into the already established UO Pattern Language that structures the campus grounds.

4.1

UO Design Considerations for Final Application

4.2

Patterns Considered for Final Application

	UO DESIGN CONSIDERATIONS
SUB AREA A EAST CAMPUS DEV. PLAN	Institutional
	Building Height - 4 Storeis
	Building Coverage 127,000 sq. ft.
	Open Space Requirement 34,000 sf ft
SUB AREA B EAST CAMPUS DEV. PLAN	High Denisty Res. + Institutional
	Building Heights - 3 Stories
	Building Coverage 107,000 sq. ft.
	Building size max 50,000 gsf.
	Open Space Requirement 62,000 sq. ft.
	Parking Lots (max 100 spaces)
	No General Parking in areas 53+54
	No Structured Parking
SUB AREA C EAST CAMPUS DEV. PLAN	Low Denisty Residential
	Building Heights - 1.5-2 Stories
	Building Coverage (no amount given)
	Open Space Requirement (no amounts)
	Parking Lots (only for house)
	Preserve areas' single-family charater
EAST CAMPUS DRAINAGE	Topographic map
	Suitability Map
	Natural Water Flows
	Drainage Areas
EAST CAMPUS OPEN SPACE FRAMEWORK	Native Plantings
	Follow Flow of Topography
	Open Space Network
	Pedestrian Network
	Building Placement
	Parking
	Minumum required Open Space per area

	PATTERNS CONSIDERED
DERIVED FROM SELECTED UO PATTERN LANGUAGE STANDARDS	Access to Water (UO CP)
	Accessible Green (UO CP)
	Family of Entrances (UO CP)
	Main Gateways (UO ECDP)
	Open Space Framework (UO CP)
	Paths + Goals (UO CP)
	Pedestrian Paths (UO ECDP)
	Positive Outdoor Space (UO CP)
	Promenade (UO CP)
	Public Outdoor Room (UO CP)
	Quiet Backs (UO CP)
	Shielded Parking + Service (UO CP)
	Sitting Walls (UO CP)
	Small Public Squares (UO CP)
	South Facing Outdoors (UO CP)
	Tree Places (UO CP)
NEW STORMWATER FIRST PATTERNS	Alleys
	Infiltration Basins
	Parking Lot Stormwater Treatment
	Stormwater Education Places
	Stormwater Fit
	Stormwater as a Focal Point
	Stream Pattern
	Stormwater Safety
	Year Round Water

NEW PATTERNS ARTICULATED

Block 2

Final Design Discussion

This block is designated by the UO East Campus Sub-area plan as institutional and high density (dormitories). However, in this design only institutional buildings are chosen, since many views from the building backs are of the kitchen/wood shop and service area, which creates low-quality views not best for dormatories.

Block two (4.3) presents the opportunity to move the alleyway into an underground tunnel to create a more unified landscape that is similarly found on the main campus grounds. This strategic move opens up the landscape and inspires a space for a long, curvilinear shaped quadrangle. The quad is enhanced with stormwater facilities, appropriate planting compositions and shade trees to respect the essence of the historic character of the main campus.

The proposed streamway element remembers in miniature the historic stream that once flowed over the block, but in a more contemporary style (4.4) as it weaves through a geometric pattern of pathways and buildings. By incorporating infiltration basins (4.5) with dispersed artful rainwater designs, the facilities not only accept all of the seasonal runoff from the block, and the greywater from new buildings (excluding the parking lot water), but they also attract people to gather, sit, learn and stay a while at the activity nodes.

Stormwater educational places are flowing throughout the design, and respond to the university's ideas of an outdoor classroom. Wherever there is stormwater or greywater flowing, there is an opportunity to learn. Many of these areas are near activity nodes (4.6) with seating, some shade, space to gather and artful rainwater designs (4.7) to capture the senses.

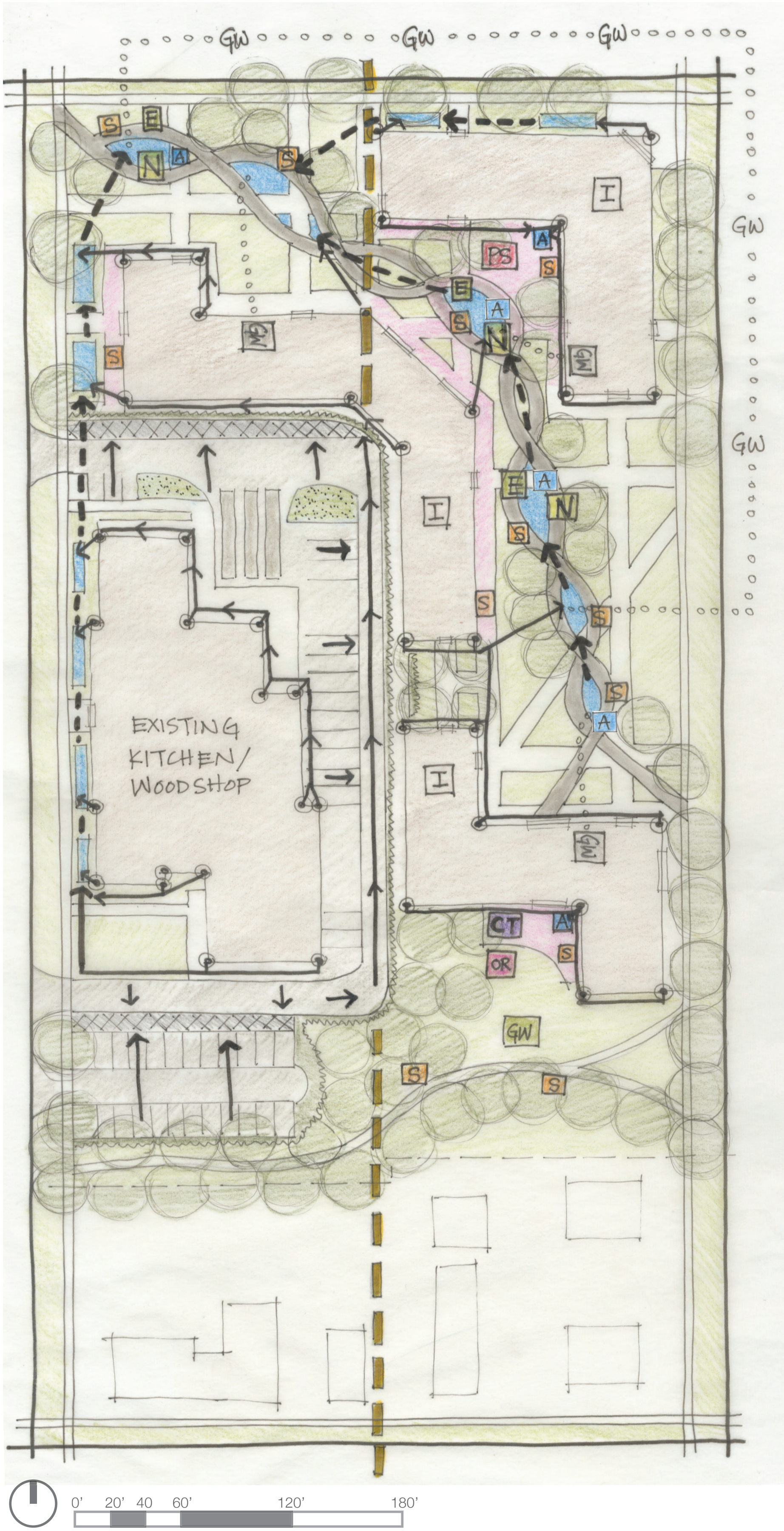
All of the stormwater runoff from the parking lots is treated in a long, linear underground vaults next to the kitchen's service roads. The placement of these vaults discourage human contact, since the water is located away from high use areas. Water is treated underground verses the traditional exposed stormwater treatment pits out in the open.

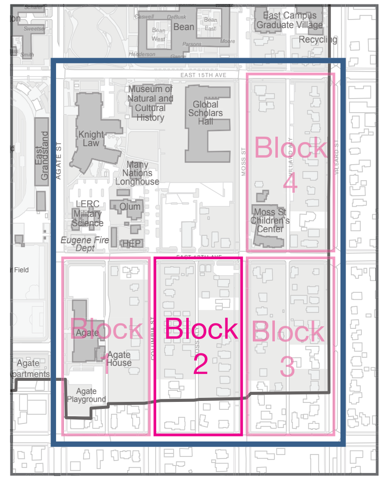
4.4
Gestures to remember the historic stream
ndagallery.cooperhewitt.org

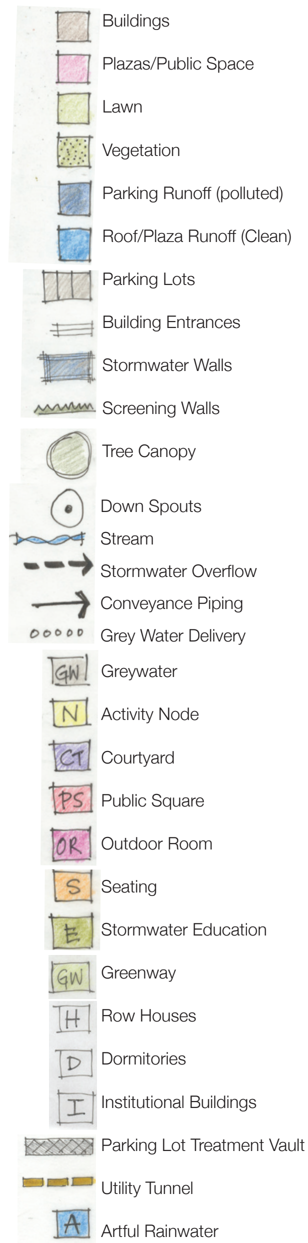
4.5
Infiltration basin
news.uwlax.edu

4.6
Activity nodes encourage people to sit and stay a while
myk-d.com

4.7
Engaging rainwater runnel
jmlwaterfeaturedesign.com







4.3

Block 2: New Patterns Articulated

NEW PATTERNS ARTICULATED

Block 3

Final Design Discussion

This block is designated by the UO East Campus Sub-area plan as institutional, high-density residential (dormitories) and low density residential (row houses). All three of these types are represented in this design in their perscribed areas.

The design for block three (4.8) takes advantage of moving the alleyway. However, the alley is not placed in a tunnel, but shifted over to the east, so the alley can still be used for residents' in the adjacent row houses as well as access for the parking lots off the alley. With the alley-move, more space is available on the block to form and preserve a foundation for a cohesive landscape for a semi-traditional quad setting, anchored with buildings on most sides and a strong promenade to link all parts together. The linear promenade passes along a corridor of water (4.9) and vegetated raingardens (4.10) terminating at the greenway, guiding the user to a possible destination point and a quiet place for taking refuge from the busy campus setting.

Throughout the design infiltration basins (large and small) are incorporated to accept most of the runoff from building rooftops, plazas, paths and lawns. Greywater from buildings also circulated so water would flow in the whole landscape year round. Parking lot water is collected and treated separately in underground vaults, which never drain into the infiltration basins. These vaults are located near parking lot spaces and covered with grates (4.11), to ensure no human contact. Over flow from the vaults is directed to the city's storm sewer pipes.

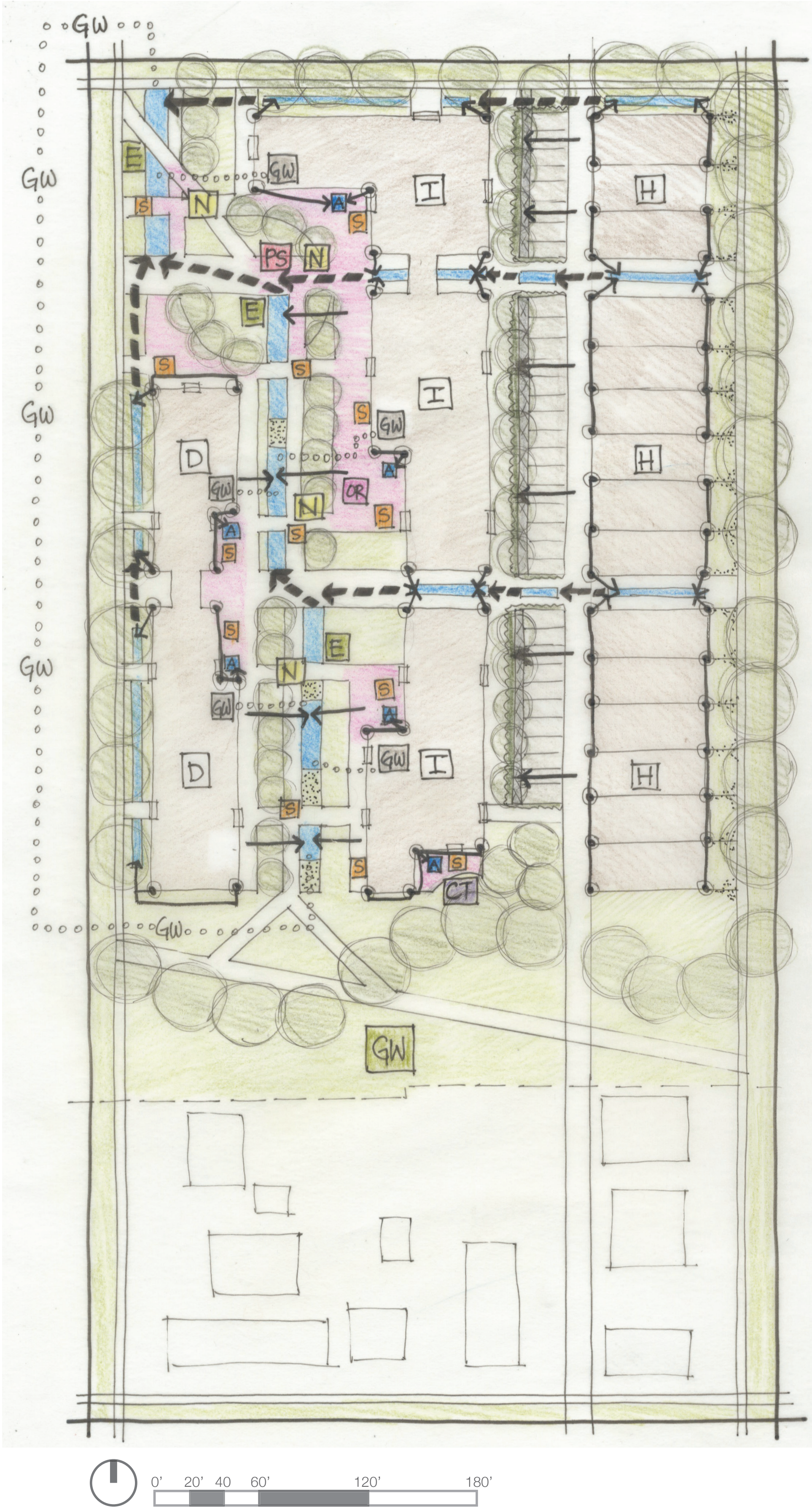
Interesting and strong artful rainwater features are placed in many areas from activity nodes to quieter contemplative spaces (4.12). These areas with rainwater focal elements provide shade, shelter and seating to encourage a place to sit and rest while offering opportunities for learning.

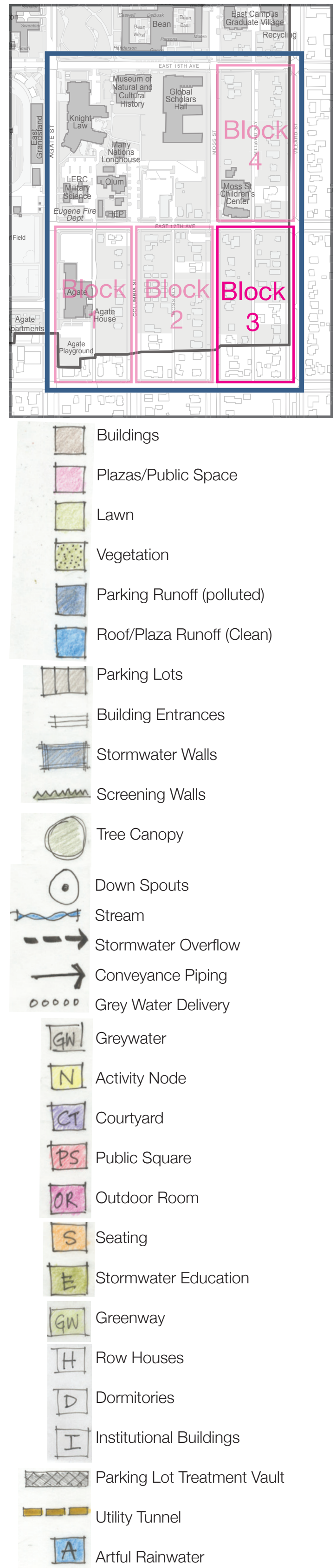
4.9
Long linear corridors of water
news.ubc.ca

4.10
Vegetated rain garden
planning.ubc.ca

4.11
Bar grating covers stormwater vaults in parking lot
mcnichols.com

4.12
Quiet area with rainwater feature
pinterest.com





4.8

Block 3: New Patterns Articulated

conclusion
chapter five

Discussion

Concluding Remarks

DISCUSSION

Motivation

The University of Oregon (UO) recognizes itself as aspiring to be a sustainable campus. The Pattern Language developed by Christopher Alexander, which influences and guides most design projects on campus is not formulated to address stormwater. This leaves developers and campus planners to decide the form of stormwater treatment, perhaps minimally complying with law, if any, even if it does not blend in with the rest of campus.

Purpose

The core purpose and intentionality of this research was successful in producing a set of nine Stormwater First Patterns for the University of Oregon's East Campus. These patterns will help to be a unifying element for stormwater design on the campus grounds, particularly on East Campus, and create opportunities for defining a campus water aesthetic. This process is tailored to work well with the existing set of UO patterns, however the method is specific to the East Campus' distinct form of city blocks. More research needs to be conducted on other campuses in other locations to see if the results give similar outcomes.

Why Patterns?

Why do other campuses not use a pattern language for campus development? Why does the use of a Master Plan, developed for unifying the campus, hinder the attempt to coordinate the campus as a whole? The pattern language is a solution to a disconnected campus grounds. But how can the campus make use of patterns if there are no instructions on how to create and apply them?

Creating a Pattern Language

This method helps the campus planner discover and create a pattern language for campus development. Although this method of design experiments, evaluations and diagrams may prove to be more costly than regular ad hoc campus development, the process has the potential to create better outcomes for campus planning by developing a pattern language to assist in unifying the campus grounds.

Process

Through this design process an understanding occurred that the only feasible way to develop new patterns is to go though the process of design experiments and evaluations to see if they work in relation to existing patterns. By writing new patterns, the designer anticipates the consequences and how they will play out in the design but can't be sure unless they are tested in conjunction with existing patterns or objectives through design experiments. Through this method, new patterns are tested for compatibility to see if they will satisfy all the other pattern requirements.

The history of disconnected campus development reminds us that it is very challenging to design campuses beautifully. Since Christopher Alexander is not here to write new patterns, this method for discovering and testing for writing patterns can be an alternate way to approach campus planning and development. The method allows designers to write their own Pattern Language and apply it to unify their campus. And if campus planners want to get serious about stormwater management, creating a set of Stormwater First patterns is attainable through this method.

CONCLUDING REMARKS

The outcome of this project reveals how a proposed set of Stormwater First Patterns could improve the quality and experience of stormwater runoff on the University of Oregon's East Campus, while still satisfying a selected set of existing campus design patterns.

One of the biggest problems of polluted stormwater runoff is from the streets. Due to time constraints, this issue was not addressed. With more time, this project would have focused on the streets to see how stormwater could have been managed in a stormwater first application.

The University of Oregon does not have a stormwater management plan for their whole campus. However, adopting and integrating a pattern language for stormwater could be the first step in creating a more unified way to design and better manage stormwater on the campus grounds.

Although these new patterns were written for the UO's East Campus area, they have the potential to be more universally used when applying a Stormwater First approach to the rest of the UO or other campus designs. The general method may also be broadly transferable to any campus and it's planners who are interested in creating a unified and attractive stormwater management plan.

bibliography

Bibliography

Alexander, Christopher. The Oregon Experiment. New York: Oxford UP, 1975. Print.

Bruce, Jeffery L., and Frank Edgerton Martin. “Blue Systems: Toward a Campus Water Aesthetic.” Society for College and University Planning41.1 (2012): 12-37. Questia. Web. 17 Jan. 2016.

Chapman, M. Perry. American Places: In Search of the Twenty-first Century Campus. Westport, CT: Praeger, 2006. Print.

Deming, M. Elen, and Simon R. Swaffield. Landscape Architecture Research: Inquiry, Strategy, Design. Hoboken, NJ: Wiley, 2011. Print.

Dennis, Michael. “PLANNING | MichaelDennisAssociates.” PLANNING | MichaelDennisAssociates. Web. 21 Jan. 2016.

Farrand, Beatrix Jones. Beatrix Jones Farrand: (1872-1959): 50 Years of American Landscape Architecture. Washington, DC: Dumbarton Oaks Research Libr. and Coll., 1982. Print.

Grape, Eric. “UO Stormwater Runoff.” Personal Interview. 2016

(ISWMP) “Integrated Storm Water Management Plan.” Integrated Storm Water Management Plan. Web. 17 Jan. 2016.

King, John. “Learning Curves.” Landscape Architecture Magazine 1 Sept. 2015: 113-35. Print.

PFS. University Boulevard Implementation. Vancouver, BC: PFS. Print.

Rottle, Nancy. 1.0 Landscape Preservation Guidelines and Description of Historic Resources. Eugene, Or. University of Oregon, 2008. Print.

St. Mary’s) “Design Guidelines and Standards: Chapter Four.” St. Mary’s College of California. 20 Nov. 2015. Web. 17 Jan. 2016.

Taddune, Nicole. “Point Grey: Stormwater Ambassador.” Rainy Day Campus. 1 Oct. 2013. Web. 17 Jan. 2015. <http://www.nxtbook.com/naylor/CSLQ/CSLQ0413/index.php?startid=35#/36>.

Taddune, Nicole. “UBC Stormwater Management.” Personal Interview. 5 Feb. 2016.

(UN) “Decade, Water for Life, 2015, UN-Water, United Nations, MDG, Water, Sanitation, Financing, Gender, IWRM, Human Right, Transboundary, Cities, Quality, Food Security.” UN News Center. UN. Web. 21 Jan. 2016.

(UO CP) University of Oregon Campus Plan. Second Edition 2011 ed. Eugene, OR: n.p., 2011. Print.

(UO ECDP) University of Oregon 2003 Development Policy for the East Campus Area. 2nd Edition ed. Eugene: [U of Oregon], 2003. 64. Print.

(UO ECOSF) East Campus Open Space Framework. Eugene, 2004. 61. Print.

(UO SDP) Sustainable Development Plan, University of Oregon. 2nd Edition ed. Eugene: U of Oregon, 2000. 9. Print.

(USGS) “Rainfall Calculator (English Units) How Much Water Falls during a Storm?” USGS Water Science School. Web. 23 Jan. 2016.

appendix

UO Millrace Stormwater Runoff

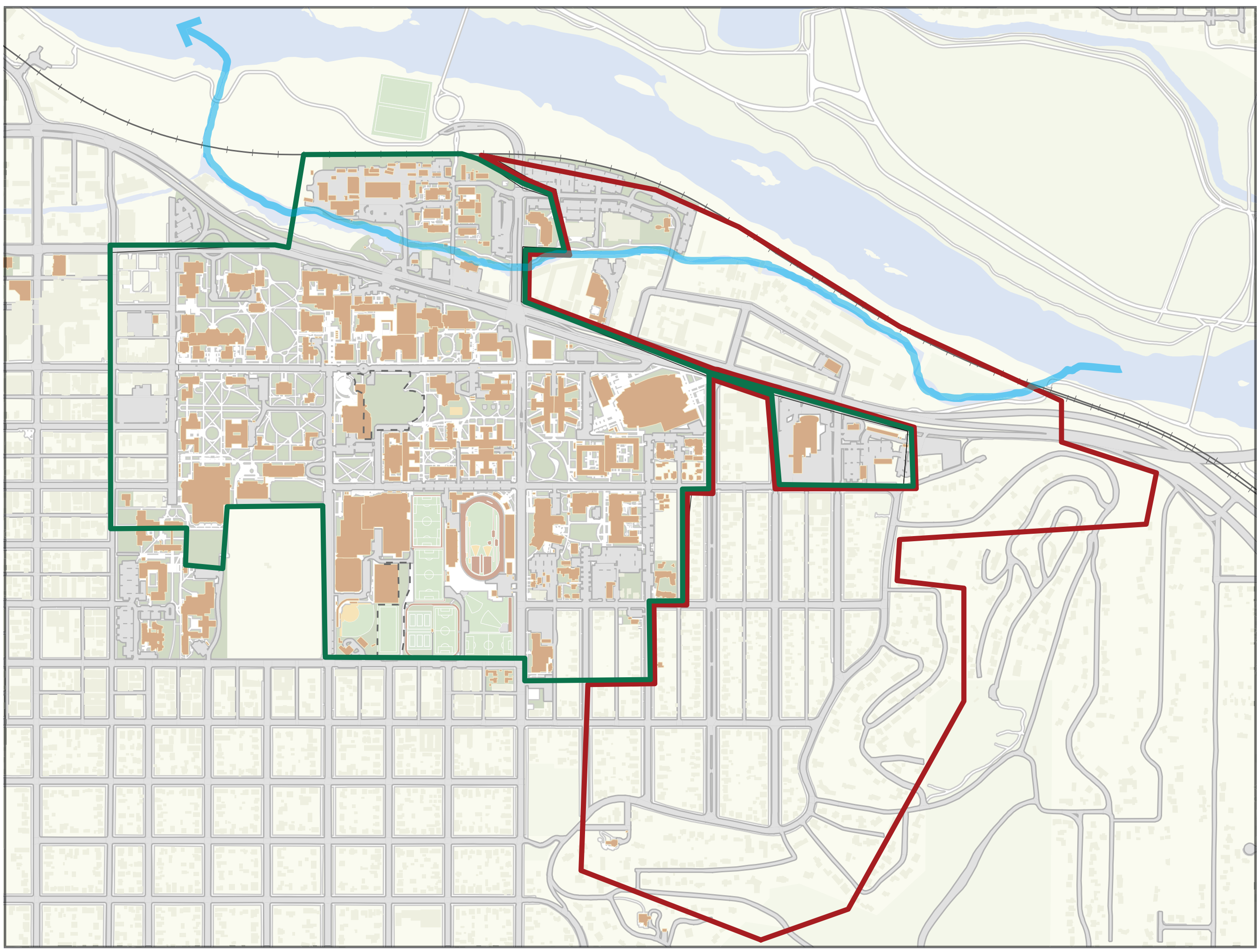
University of Oregon Maps + Required Data

Exploratory Practice Sketches

APPENDIX A
UO Millrace Stormwater Runoff

The existing stormwater runoff from the neighbourhood of the East Campus (A.1) area is directed into lateral pipes and sent out to a main line under Agate Street. The polluted runoff from most storms is then transported less than a half mile away by pipe, where it is dumped into the Millrace and detained there for some time before emptying out largely untreated into the Willamette River.

Catchment Basin for the UO Millrace
(Campus + Fairmount Neighbourhood area)



Campus Grounds

Residential

Millrace

A.1

Catchment Basin for UO MIllrace
E. Grape, Campus Operations

Stormwater Runoff Calculations

Impervious areas estimated:

Campus	Residential
6,415,909 square feet (147 acres)	3,101,165 square feet (218 acres)

Impervious amounts provided by E. Grape at UO Campus Operations 2015

1 acre x 1 inch of rainfall = 27,154 gallons (US)

Campus

147 acres x 27,154 gallons = 3,991,638 gallons

3,991,638 gallons x 46 inches (yearly rainfall in Eugene) =183,615,348 gallons

183,615,348 gallons x .65 (% going into Millrace) = **119,349,976 gallons**

Residential

218 acres x 27,154 gallons = 5,919,572 gallons

5,919,572 gallons x 46 inches (yearly rainfall in Eugene) = 272,300,312 gallons

272,300,312 gallons x .65 (% going to the Millrace) = **176,995,202 gallons**

\+ 119,349,976 gallons
176,995,202 gallons

296,345,178 gallons of untreated runoff per year into the Millrace and out to the Willamette River

= **45 Olympic sized swimming pools**

APPENDIX B
University of Oregon Maps + Required Data

Topographic Map - East Campus

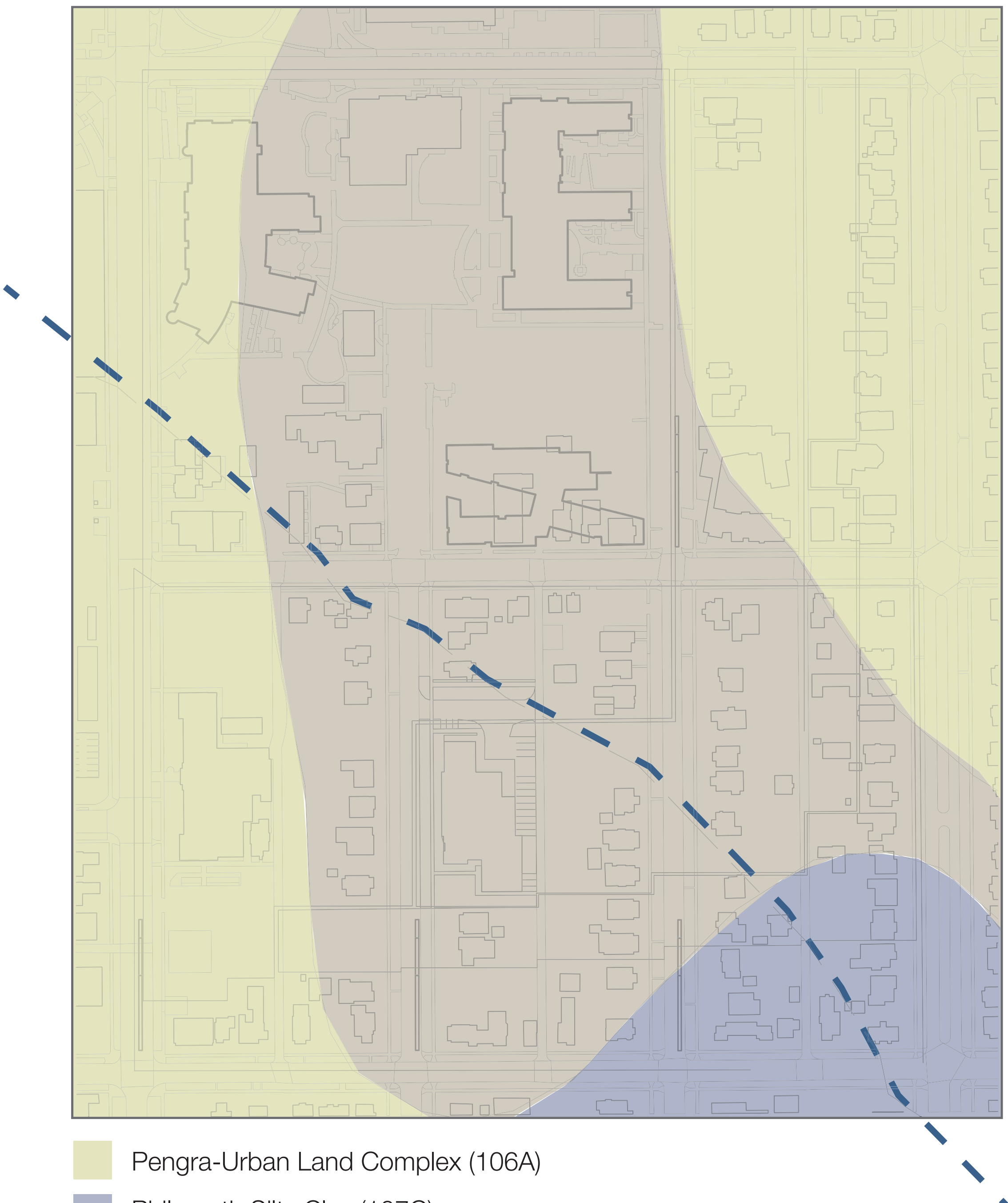
A **Topographic map** (A.2) with one-foot contour values revealed the grade change of the East Campus area and showed where the stormwater runoff is currently directed. This map was used as the base map for all of the Concept Design sketches.

A.2

Topographic Map + Soils Survey of East Campus
E. Grape, Campus Operations

Soils Map - East Campus

A **soil survey map** (A.2) showed three types of soil on the site, revealing possibilities and limitations for infiltration and permeability.



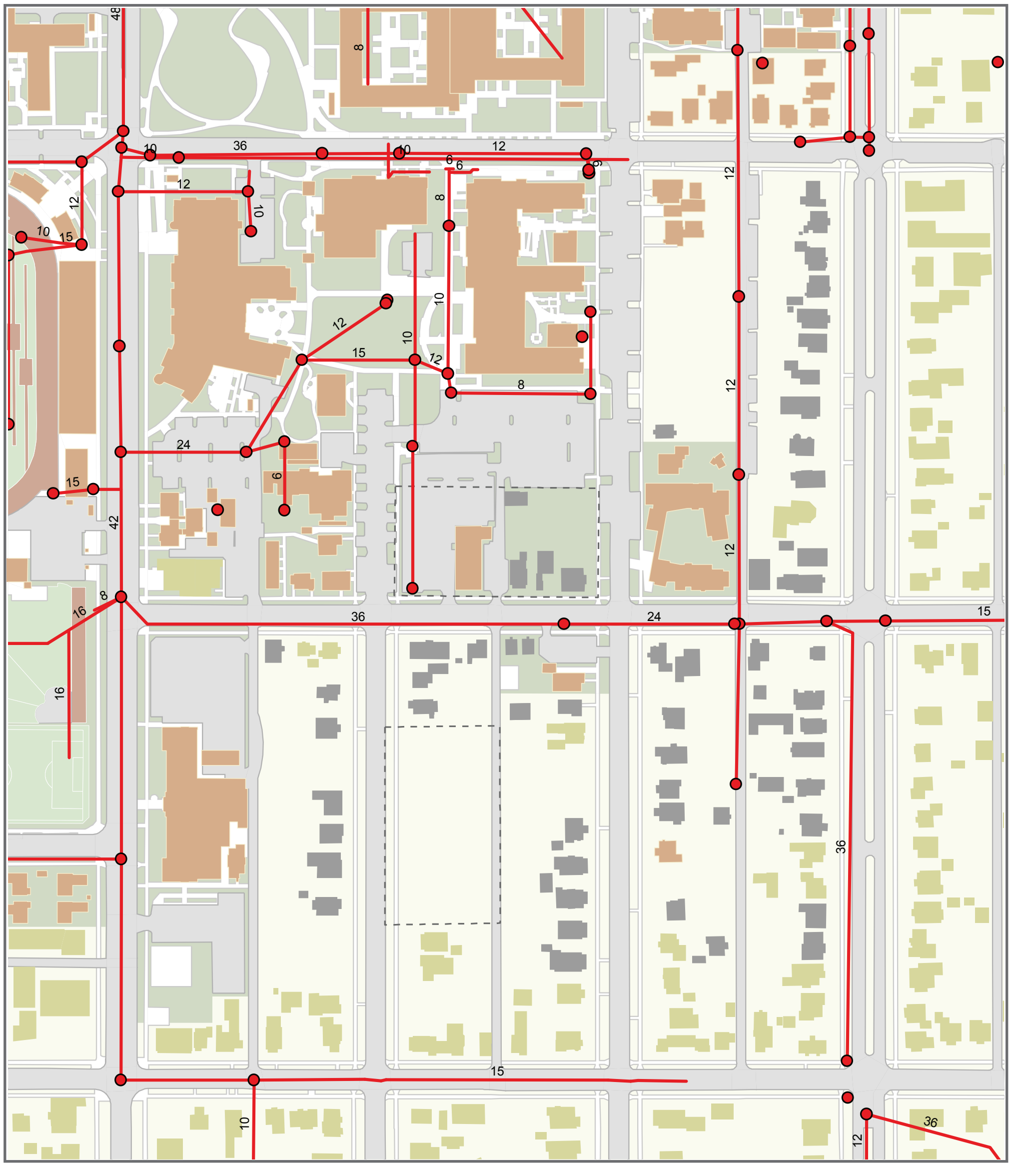
Pengra-Urban Land Complex (106A)

Philomath Silty Clay (107C)

Urban Land-Hazelair-Dixonville Complex (127C)w

Stormwater Mains + Buildings - East Campus

Stormwater mains (A.3) shows existing conditions of how the stormwater on the East Campus is currently being managed, and where possible locations from the overflow from newly integrated stormwater treatment facilities can be directed if need be.



36 Stormwater Mains + Size

Manholes

UO Owned Buildings (Institutional + Residential)

UO Owned Buildings

Non-UO Owned

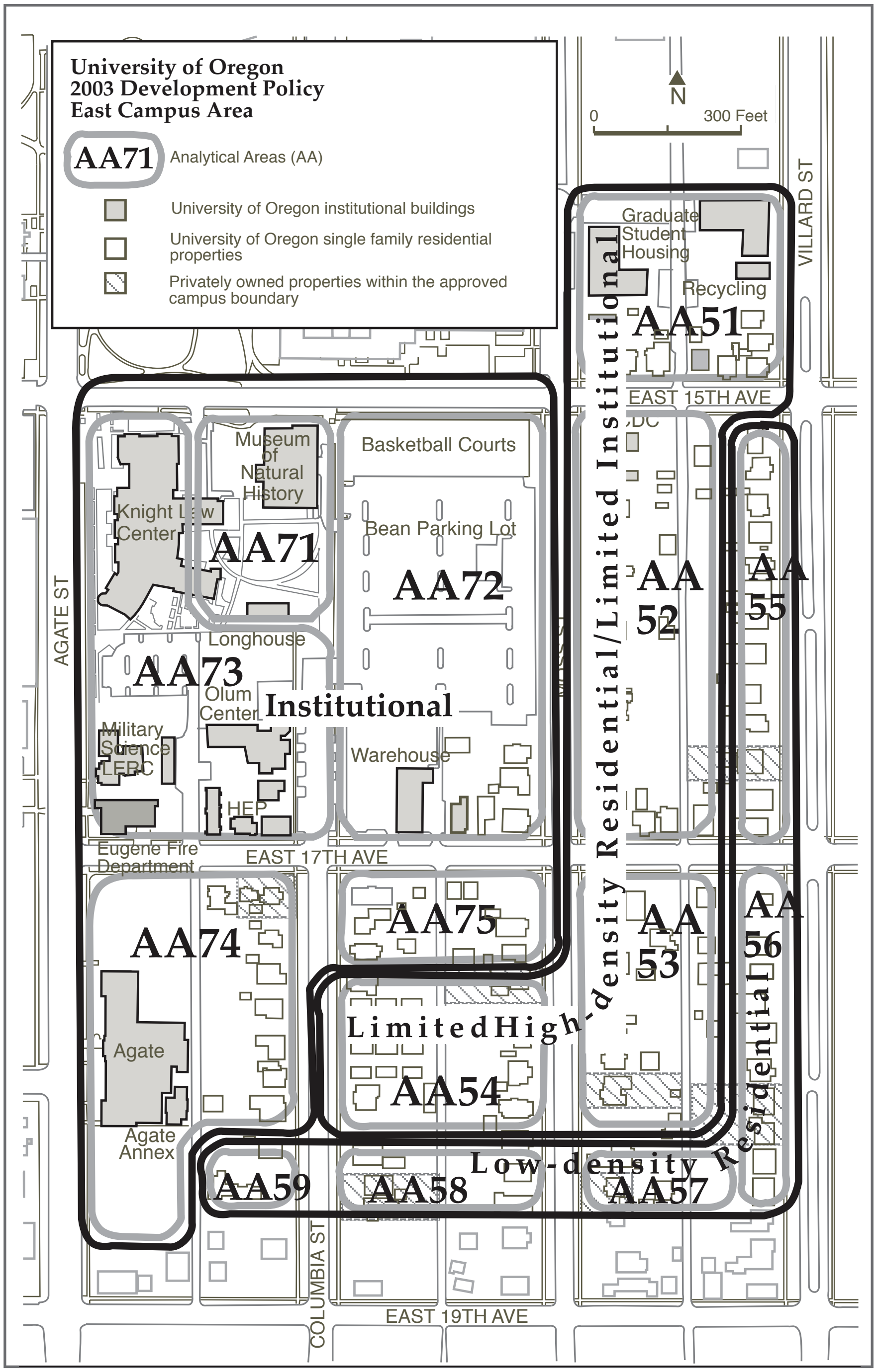
A.3

Stormwater Mains + Buildings

Campus Operations

Sub-area Map for East Campus

Sub-area (A.4) information specific to each block within the project area informed city zoning, prohibited uses, height limitations, density ratios, primary patterns, open space and parking requirements.

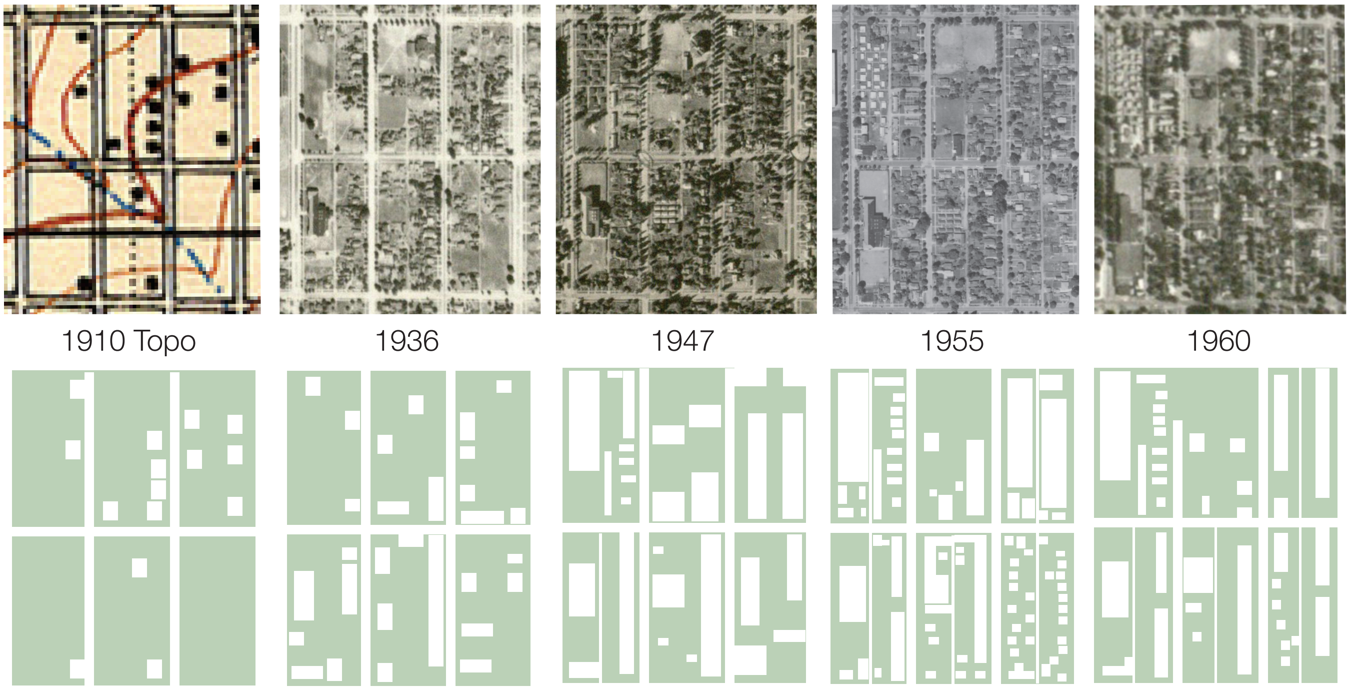


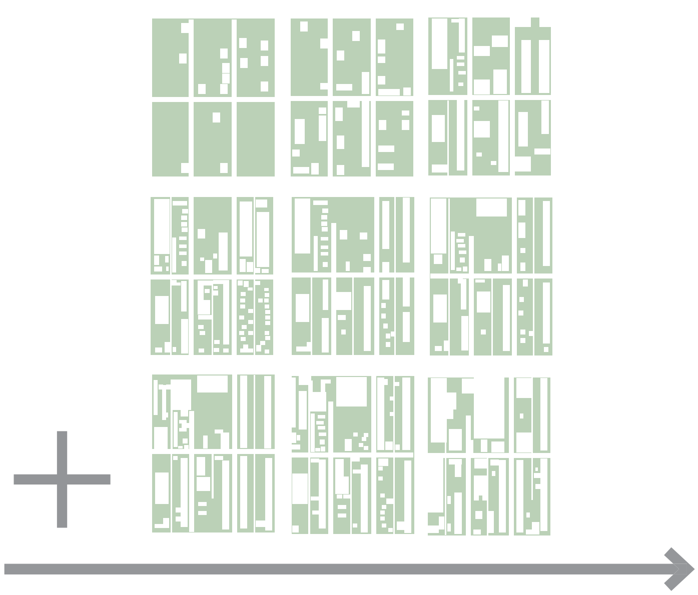
A.4

Sub-area Map for East Campus
2003 Devlopment Policy for the East Campus Area

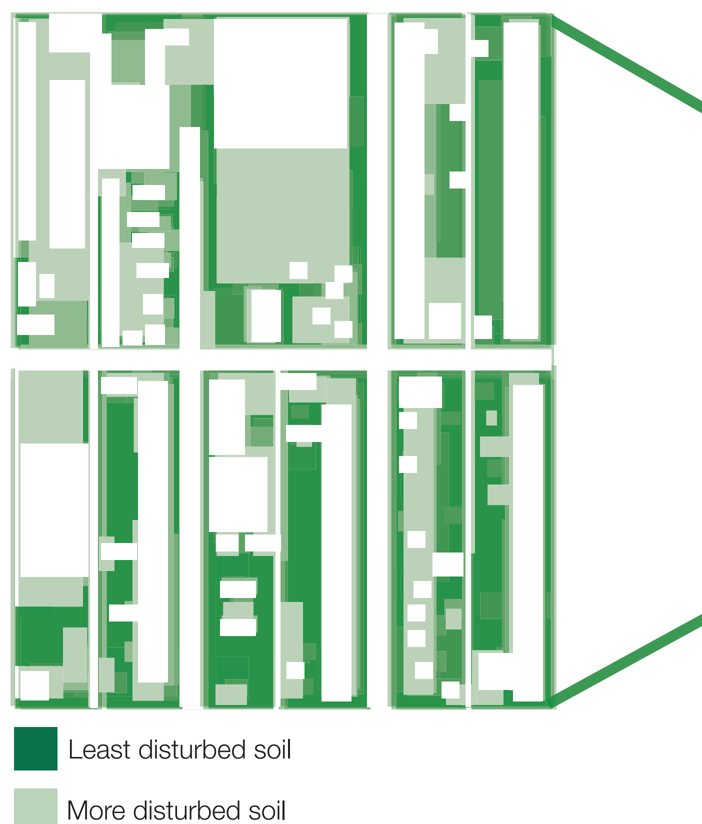
Suitability Map

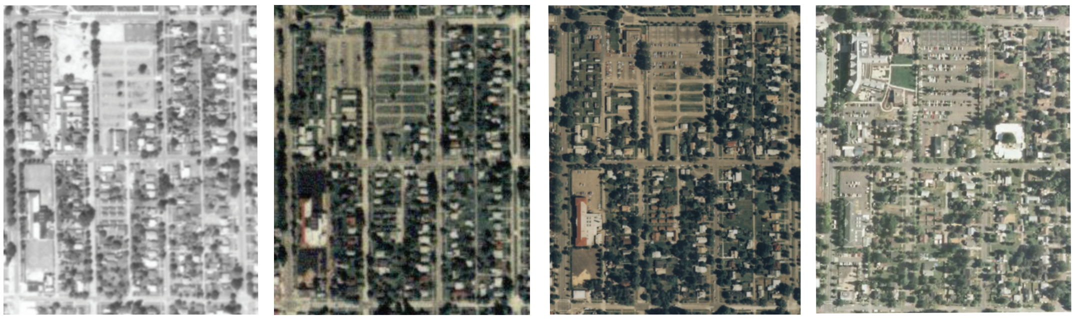
Using historic maps and aerial photos (A.5) a **suitability map** was generated that revealed development footprints on the site for nearly 100 years and showed where the least disturbed soil may be that could be more conducive and cost effective to construct stormwater facilities.



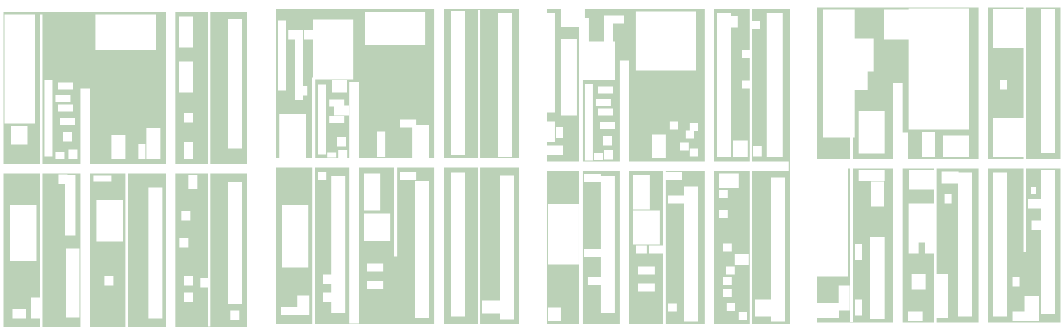


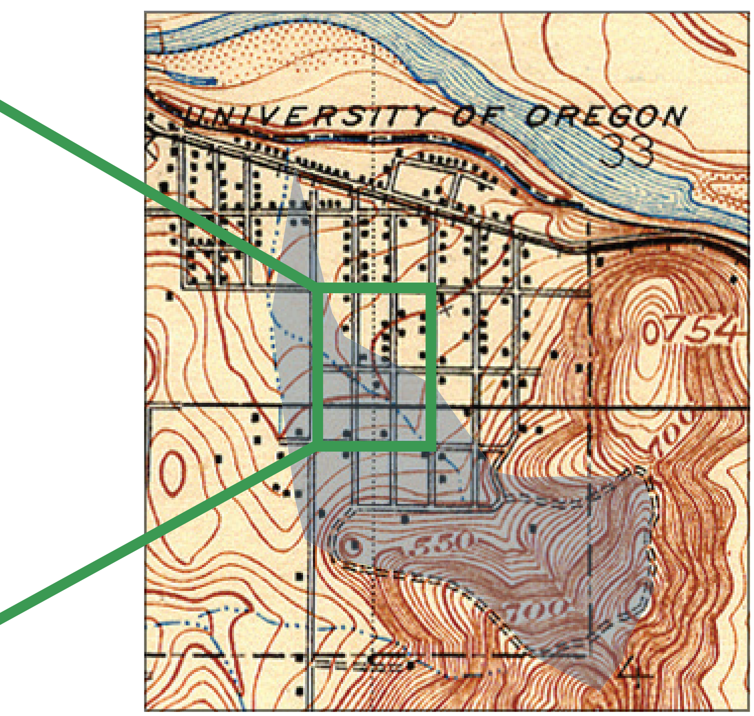
Land use and land cover 1910 - 2005. Nine layers were added together for the suitability map.





1968 1979 1990 2005





1910 Topographic map shows drainage area for a watershed that sheet flows down the hill and over the East Campus area to the Millrace.

A.5

Historic Topographic + Aerial Maps
Library.uoregon.edu

East Campus Overall Framework

The **East Campus Overall Framework** (A.6) provides guidelines and recommendations for developing the East Campus area so it aligns with the Main Campus goals and seeks to create a place that blends in well with the Fairmount Neighbourhood character.

The Framework diagram illustrates four main components of the East Campus:

OPEN SPACE NETWORK — **light gray**

PEDESTRIAN NETWORK — **white**

BUILDINGS — **black**

STREETS & PARKING — **line and hatch**

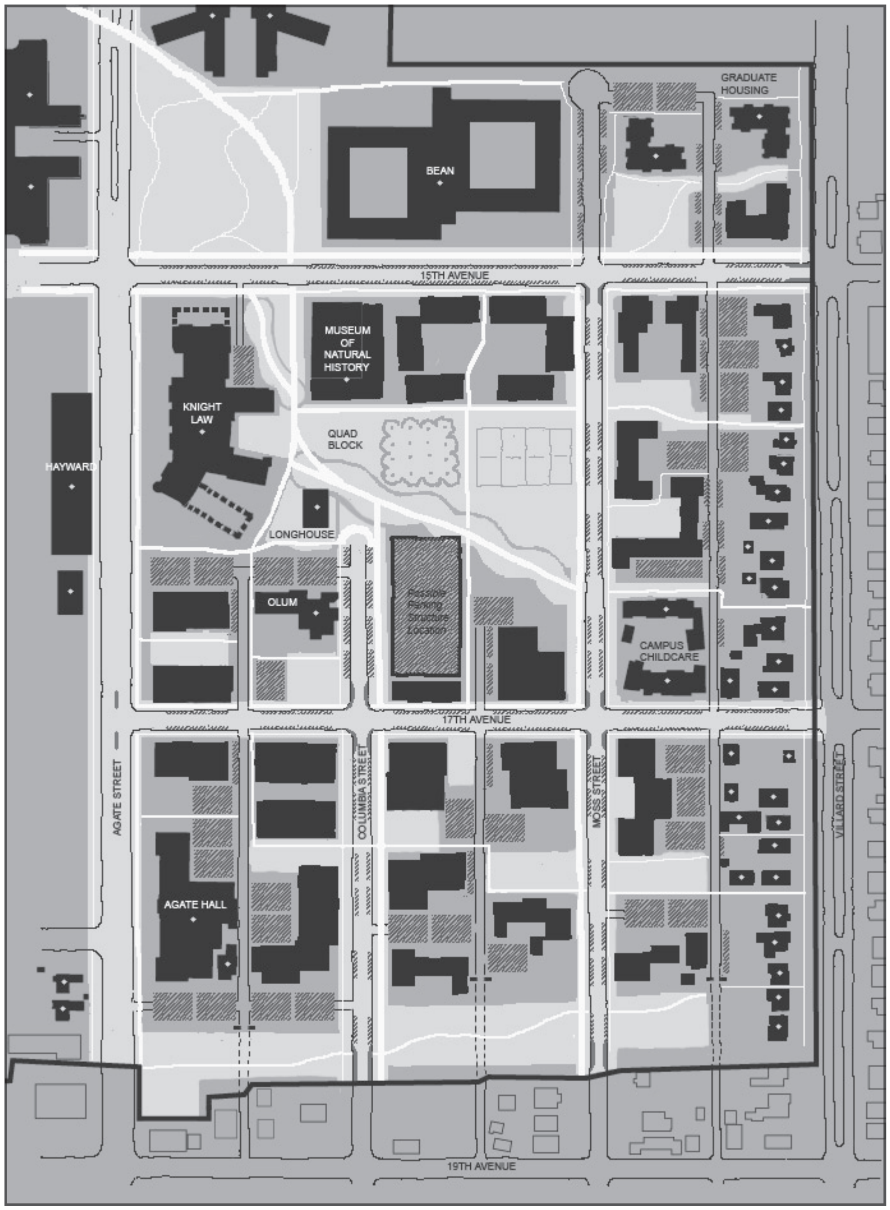
Undesignated space — **dark gray**

The diagram is not a master plan. It is a record of the results of several growth simulations. These simulations were used to help generate and test the principles described in the overall framework and guidelines sections of this document.

Including the streets as open space, the overall amount of open space indicated exceeds the minimum required by the East Campus Development Plan (ECDP). The amount of open space shown within the blocks roughly corresponds to minimum requirements.

Building coverage shown in black corresponds to maximum coverage allowed in each analytical area.

The parking shown meets general University parking requirements and the parking requirements of the built-out East Campus. Specific parking lot locations are not as critical as the overall strategy of using alleys for parking.

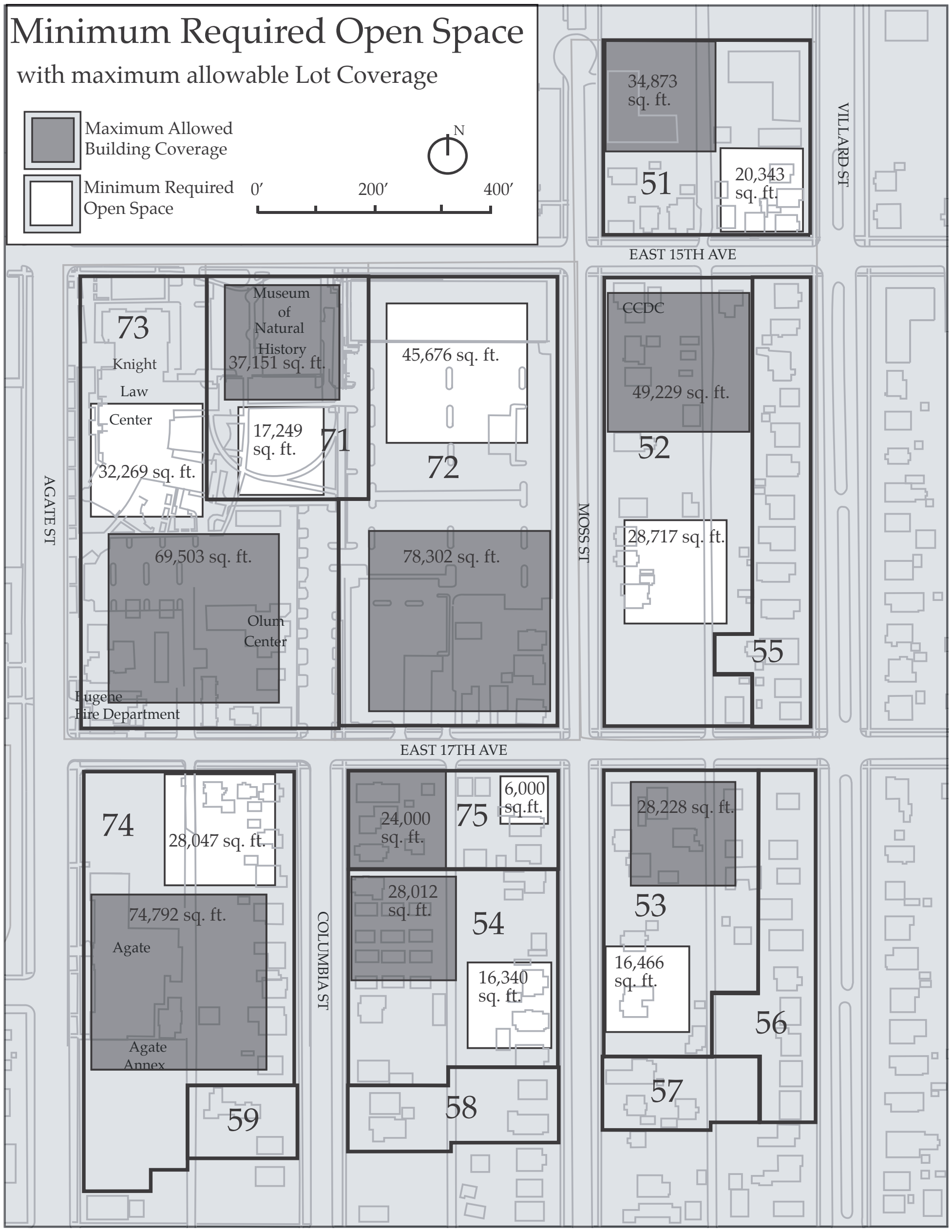


A.6

Open Space Framework
2004 East Campus Open Space Framework

Minimum Required Open Space for East Campus

The **Minimum Required Open Space** (A.7) Plan informs how much area is to be preserved for open space within each Sub-area of East Campus. Note that some blocks are divided up into Sub-area (see Sub-area map), and each have their own open space requirements. According to the East Campus Open Space Framework, streets are also considered open space.

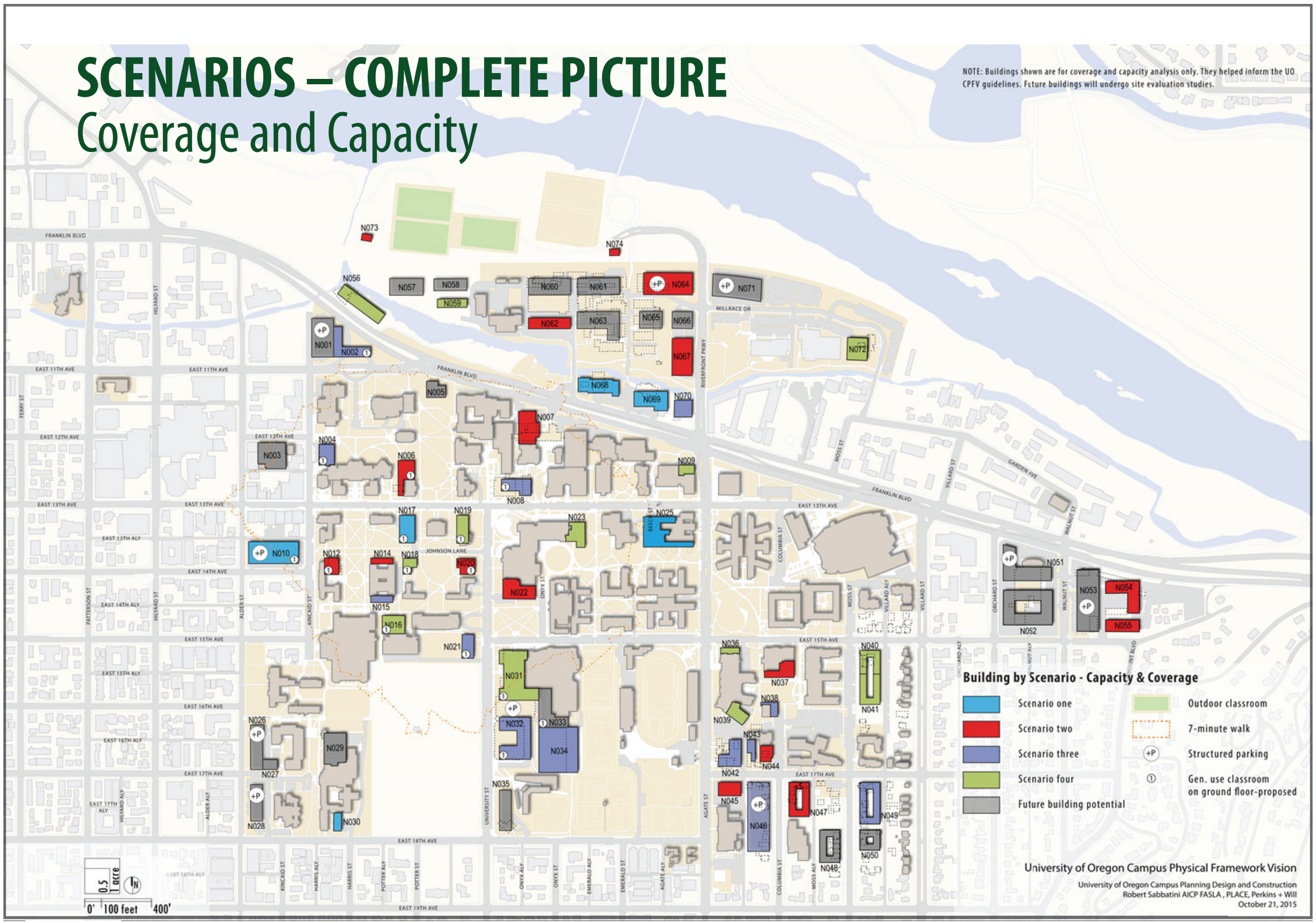


A.7

Minimum Required Open Space for East Campus
2004 East Campus Area Open Space Framework

Framework Vision Plan - Coverage and Capacity

The Framework Vision Plan (VFP) is a new advisory (2015/16) study to guide future expansion on the UO campus. Below is the VFP Complete Picture of Coverage and Capacity (A.8) for building scenarios on the UO Main Campus and East Campus.

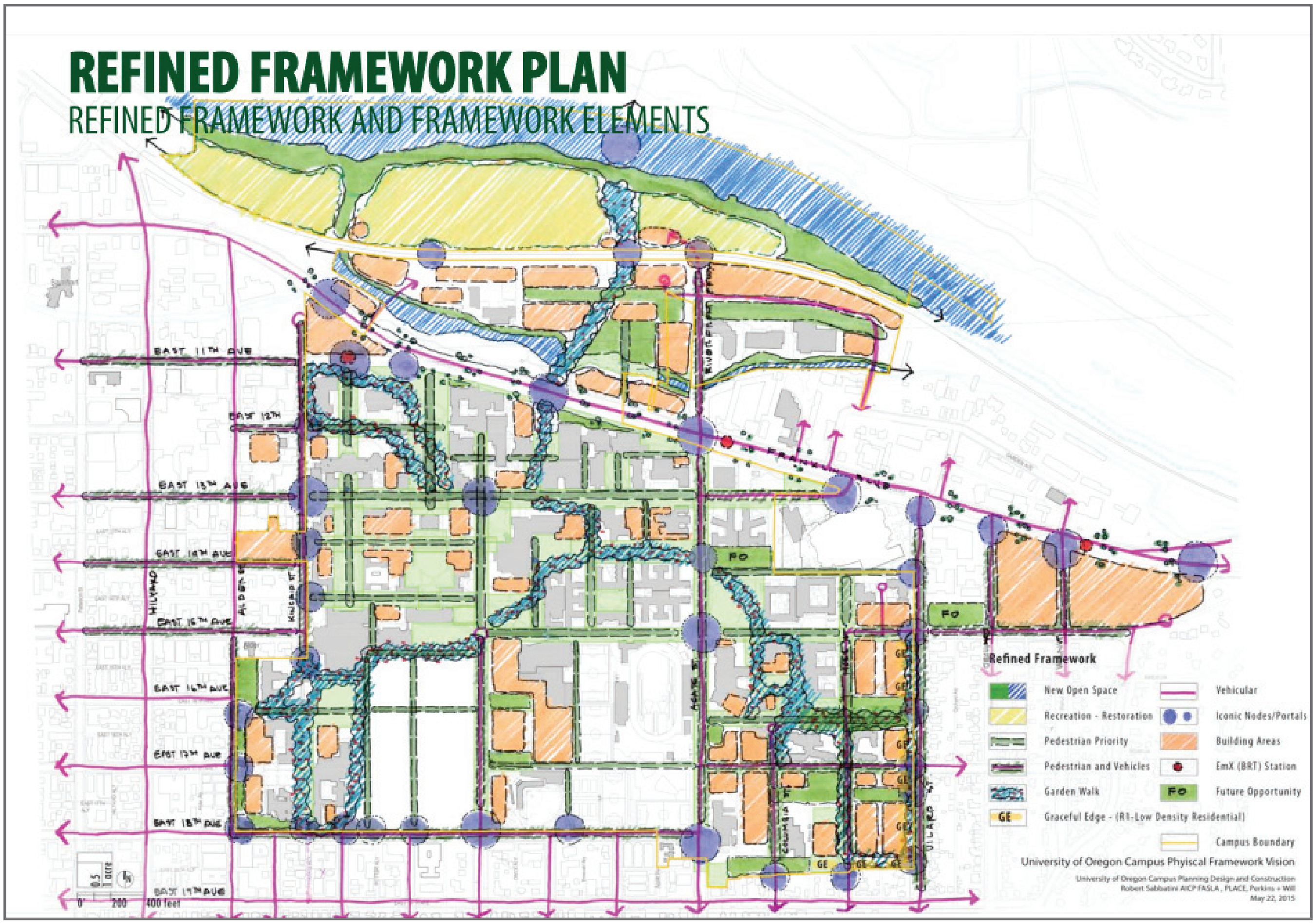


A.8

FVP's Complete Picture of Coverage and Capacity
2015 Framework Vision Plan

Framework Vision Plan - Refined Framework Plan

The Framework Vision Plan (VFP) is a new advisory (2015/16) study to guide future expansion on the UO campus. Below is the VFP Refined Framework showing all the elements of their design for Main Campus and East Campus (A.9).



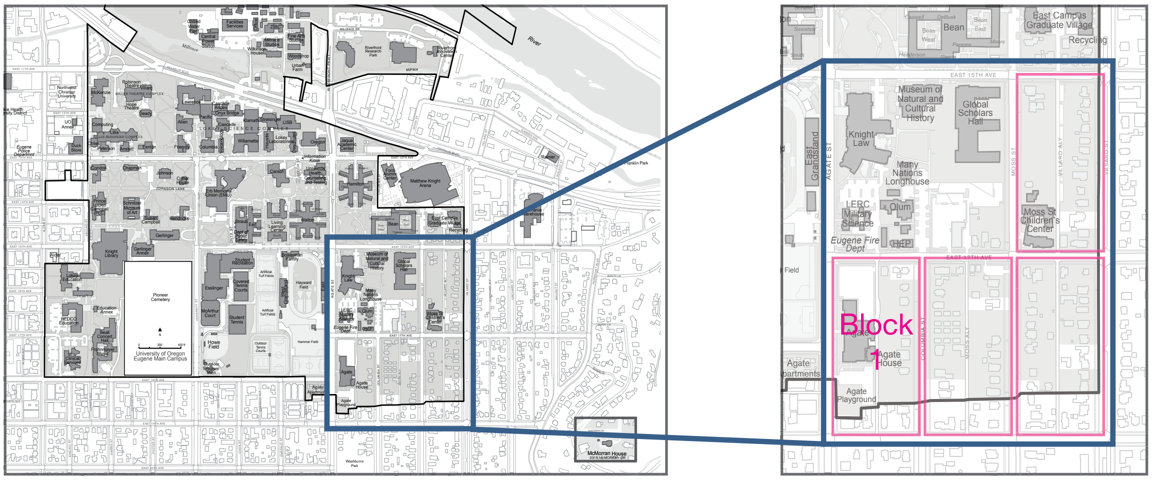
A.9

FVP's Refined Framework Plan
2015 Framework Vision Plan

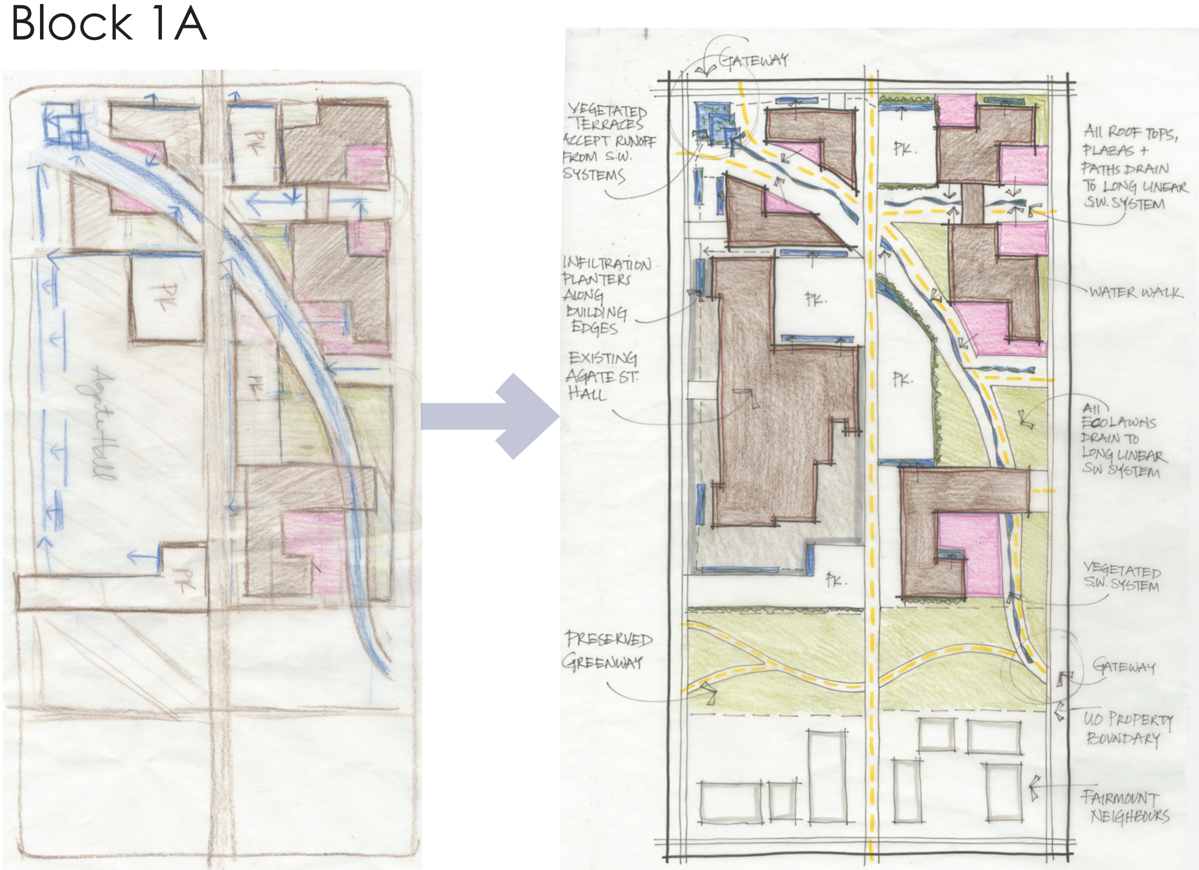
APPENDIX C
Exploratory Practice Sketches

Generic designs of exploratory practice sketches were drawn out for each of the four blocks. This assisted in the understanding of the site and which three pattern themes would work best on some or all of the blocks. In the end, only Blocks 2 and 3 could support the three pattern themes.

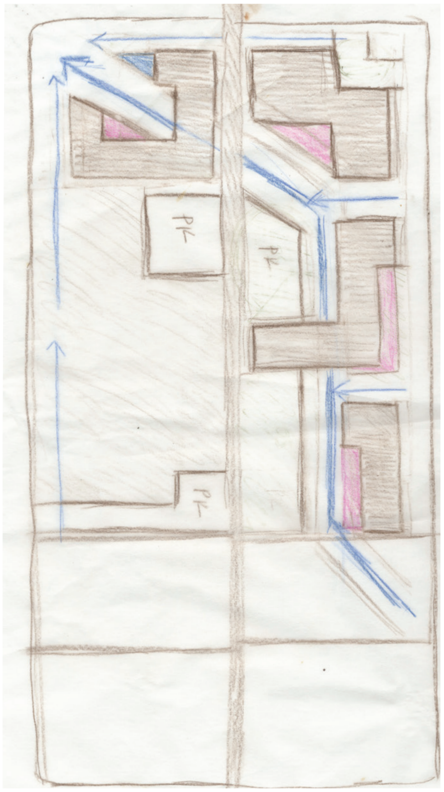
Exploratory Practice Sketches - Block 1

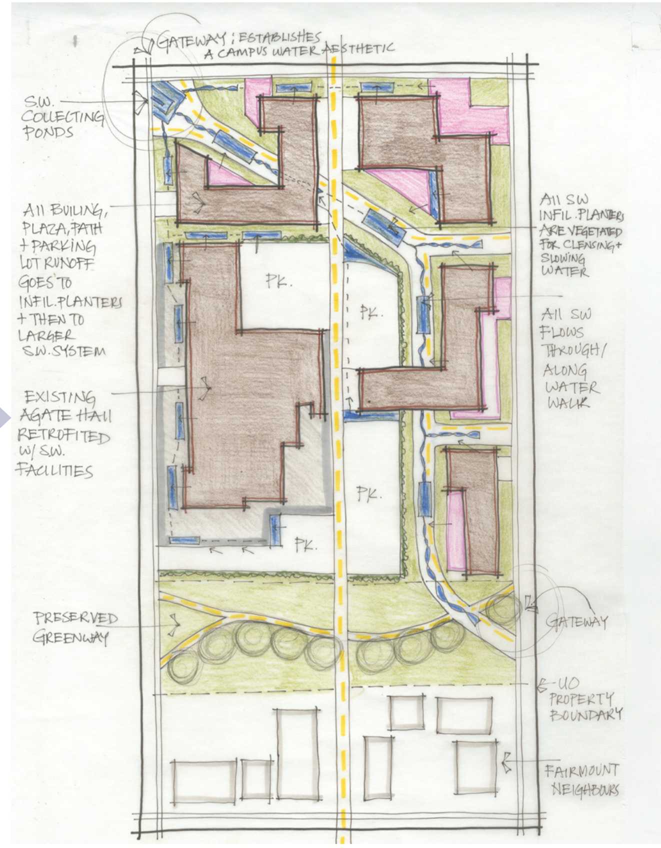


Block 1A

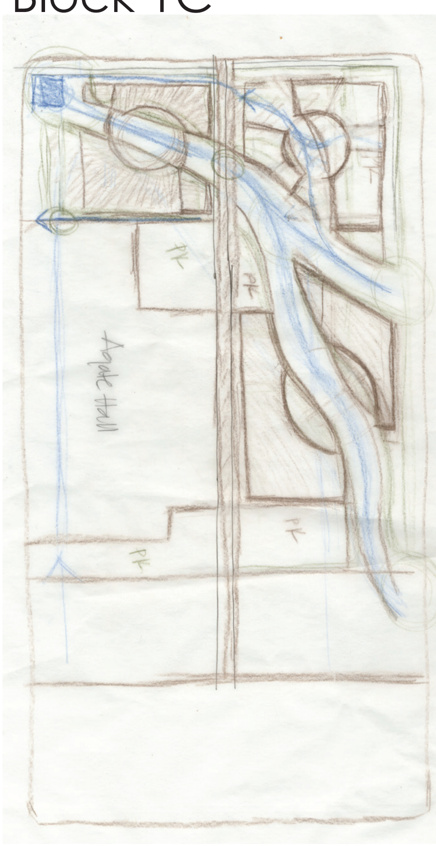


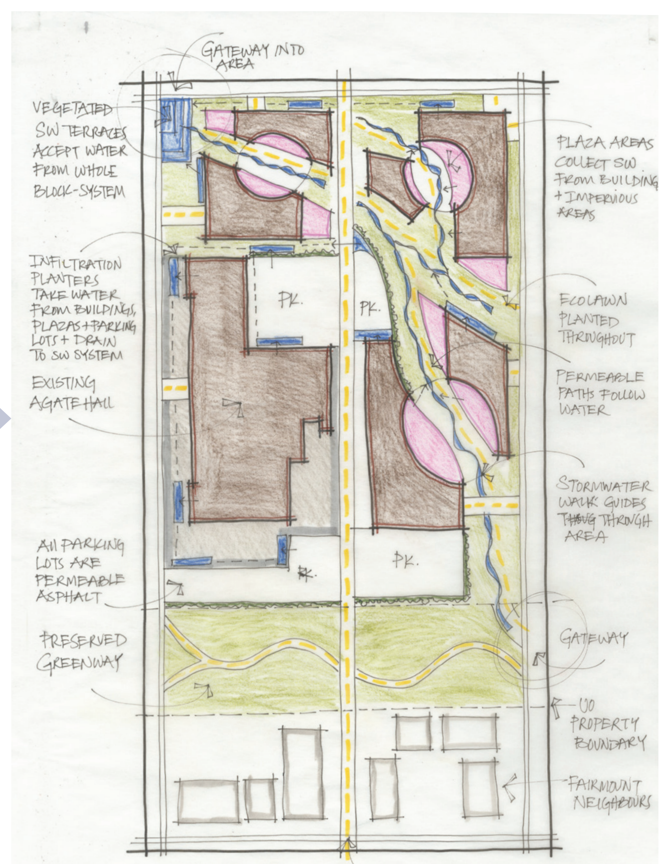
Block 1B





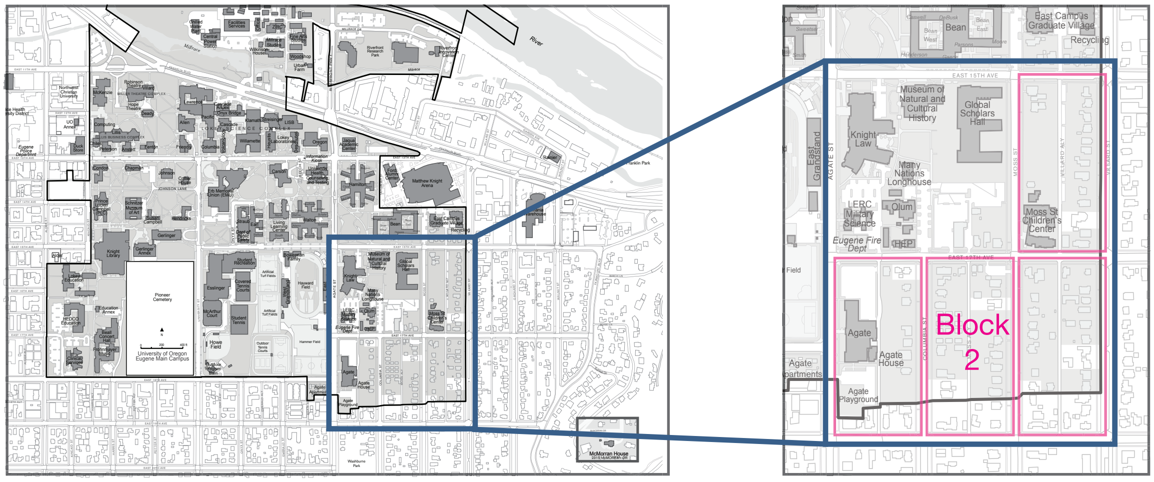
Block 1C





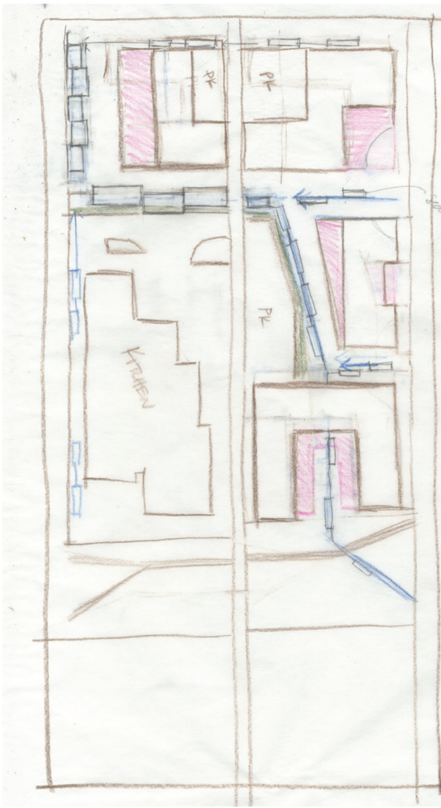
Exploratory Practice Sketches - Block 2

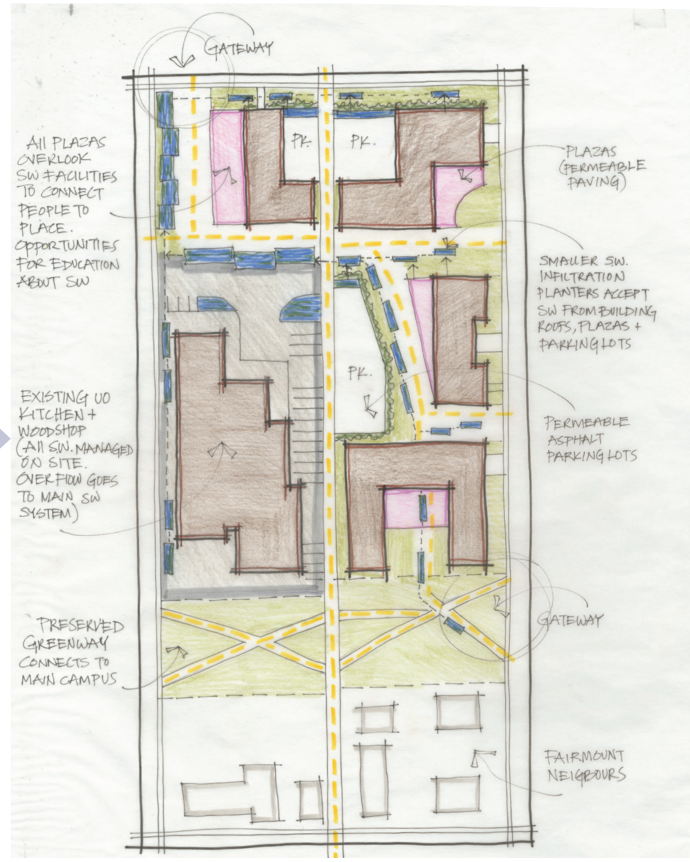
Generic designs of exploratory practice sketches were drawn out for each of the four blocks. This assisted in the understanding of the site and which three pattern themes would work best on some or all of the blocks. In the end, only Blocks 2 and 3 could support the three pattern themes.



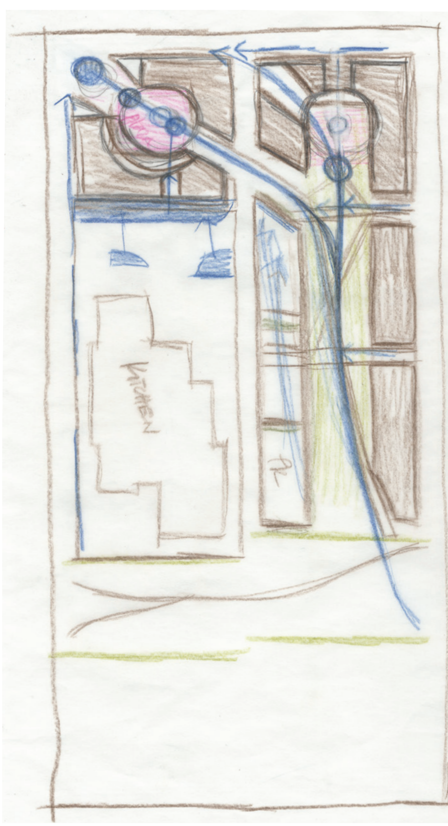
Block 2A

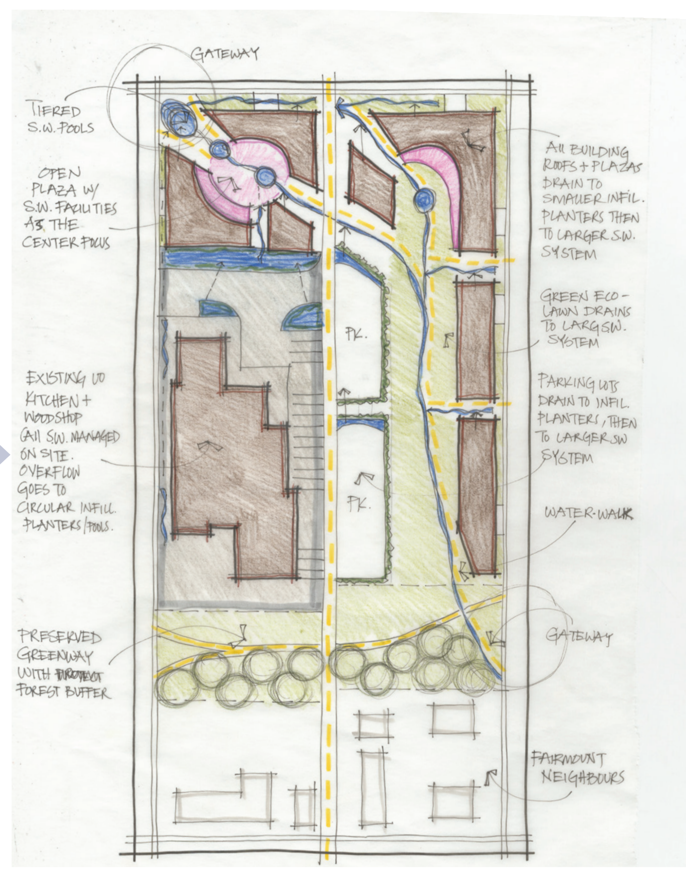
Block 2B





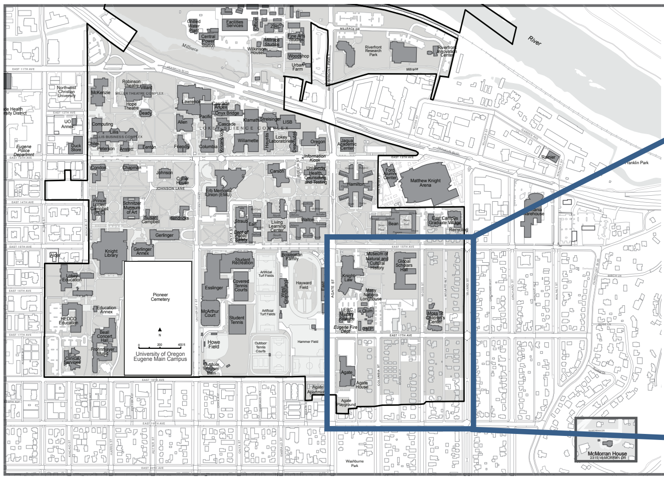
Block 2C

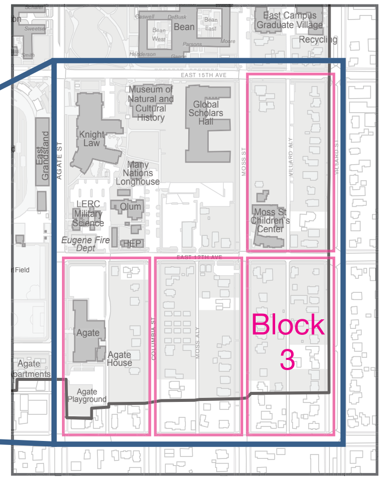




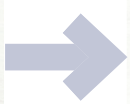
Exploratory Practice Sketches - Block 3

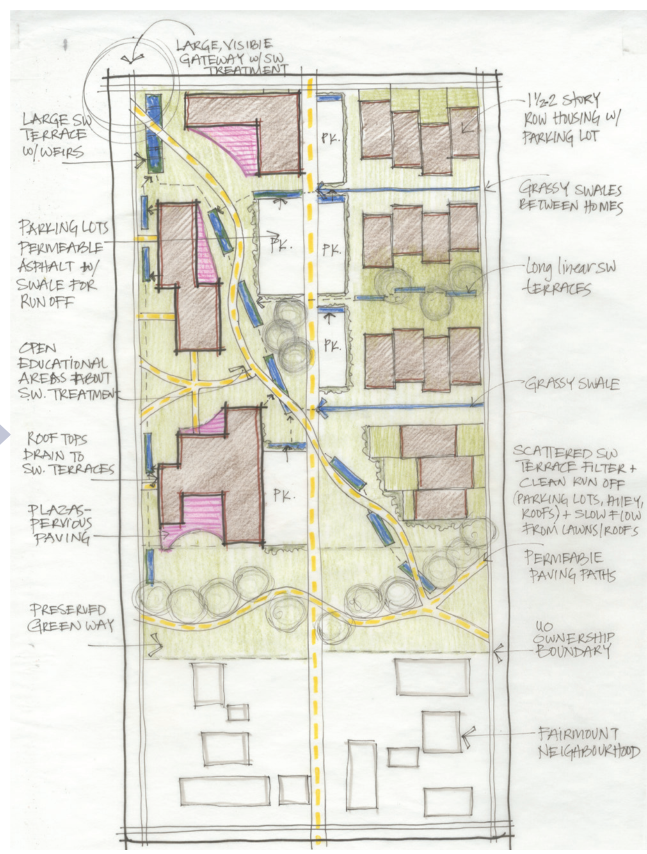
Generic designs of exploratory practice sketches were drawn out for each of the four blocks. This assisted in the understanding of the site and which three pattern themes would work best on some or all of the blocks. In the end, only Blocks 2 and 3 could support the three pattern themes.



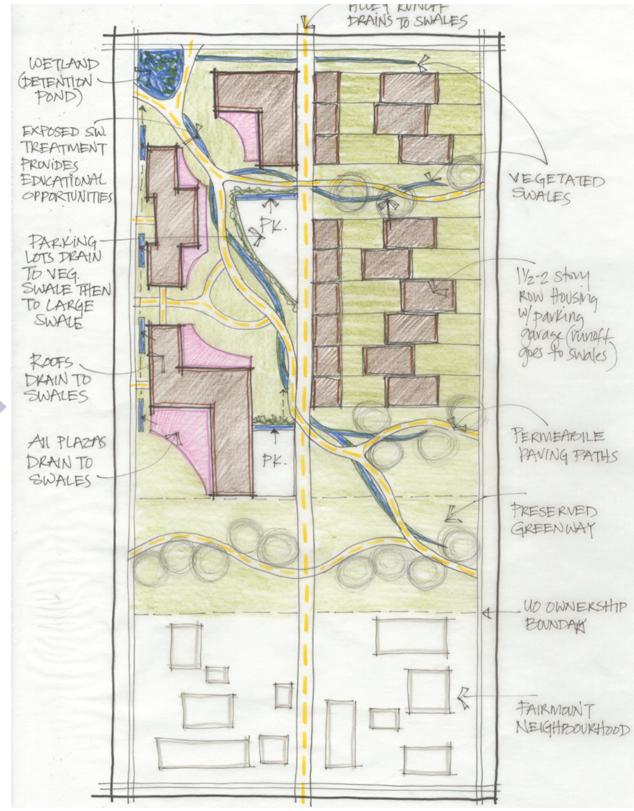


Block 3A

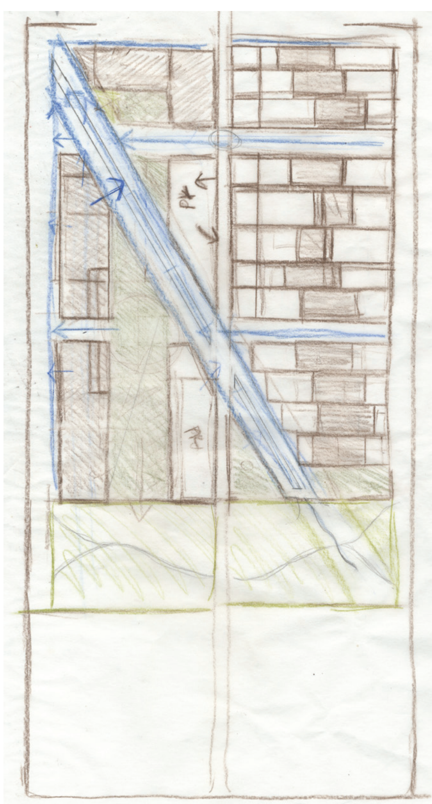


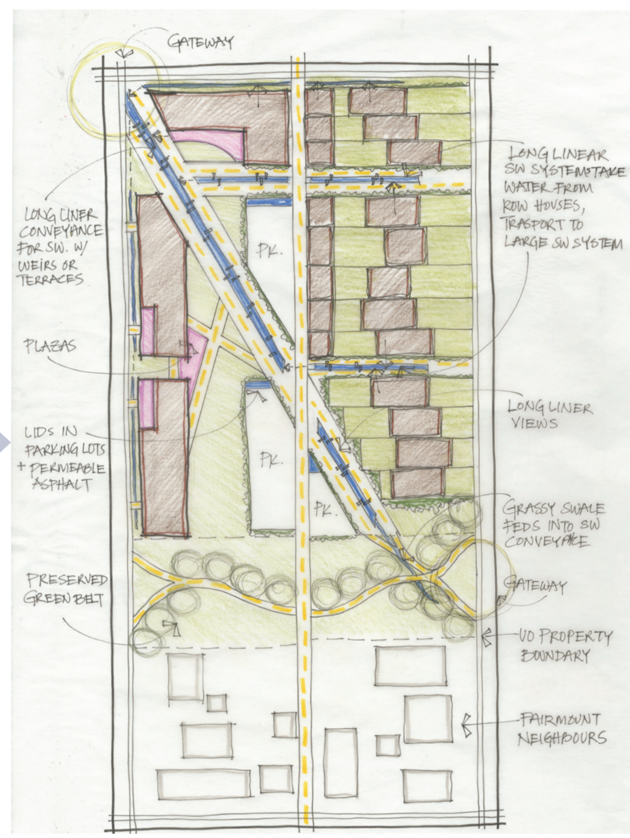


Block 3B



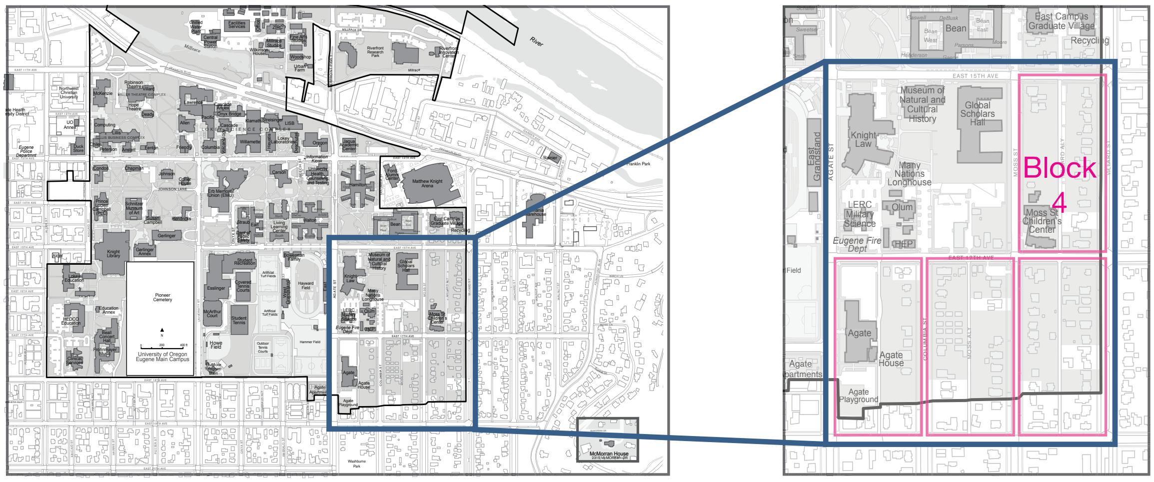
Block 3C



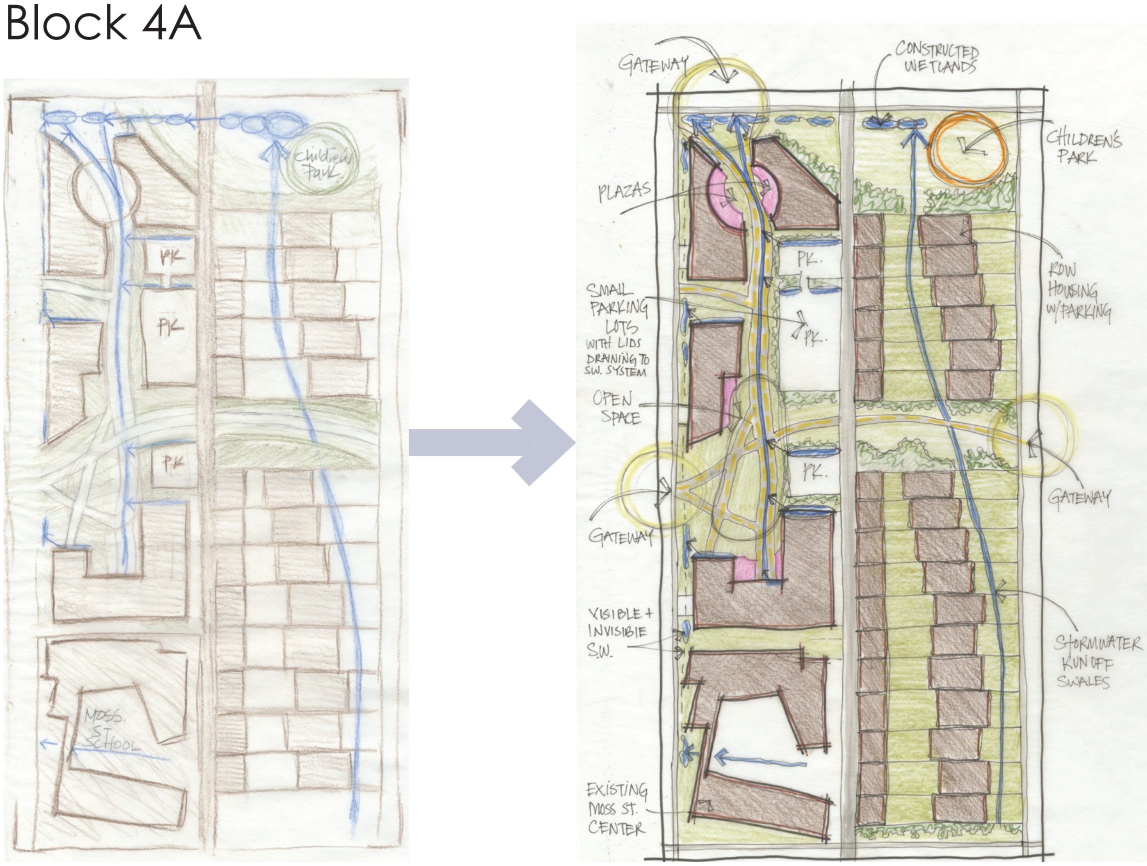


Exploratory Practice Sketches - Block 4

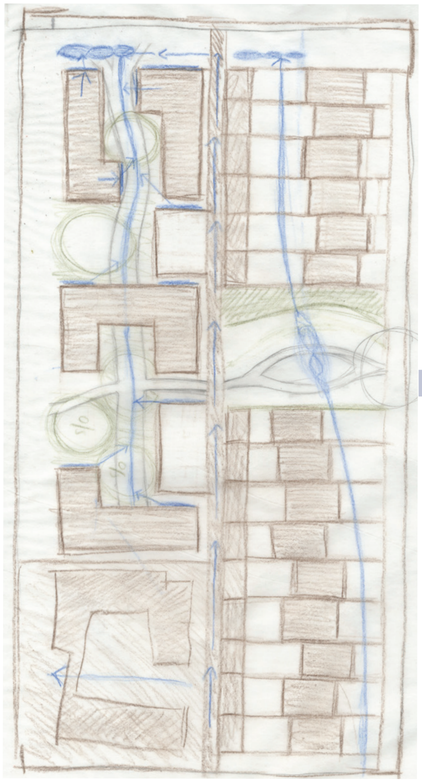
Generic designs of exploratory practice sketches were drawn out for each of the four blocks. This assisted in the understanding of the site and which three pattern themes would work best on some or all of the blocks. In the end, only Blocks 2 and 3 could support the three pattern themes.

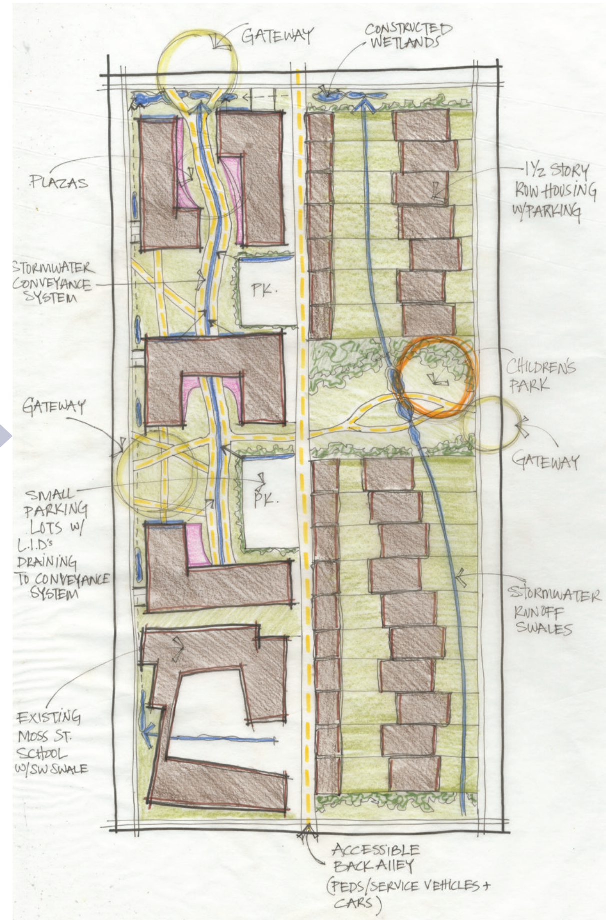


Block 4A

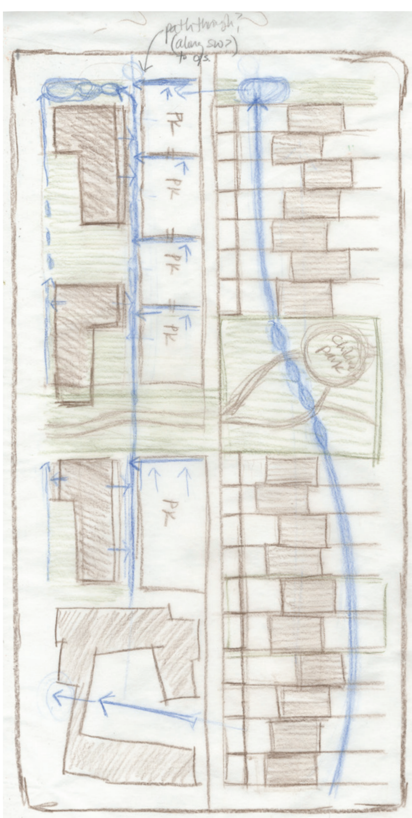


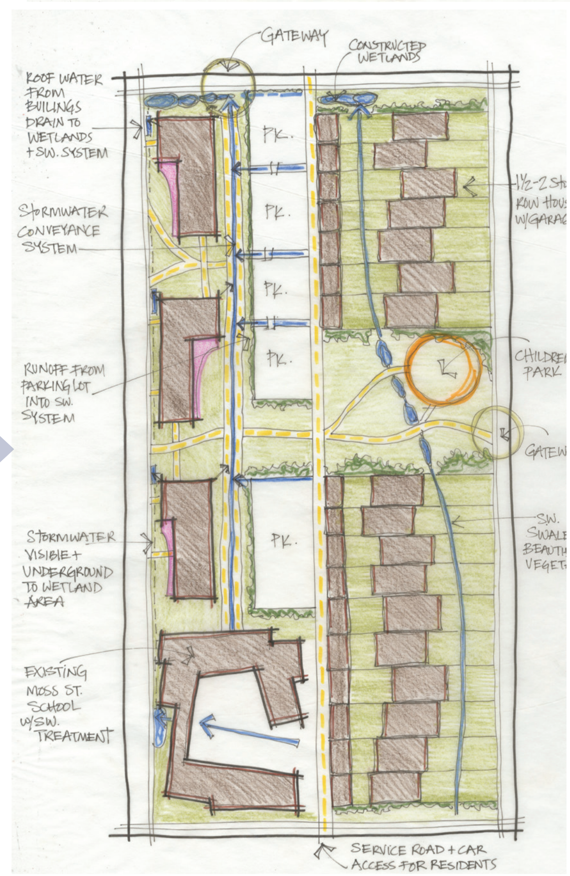
Block 4B

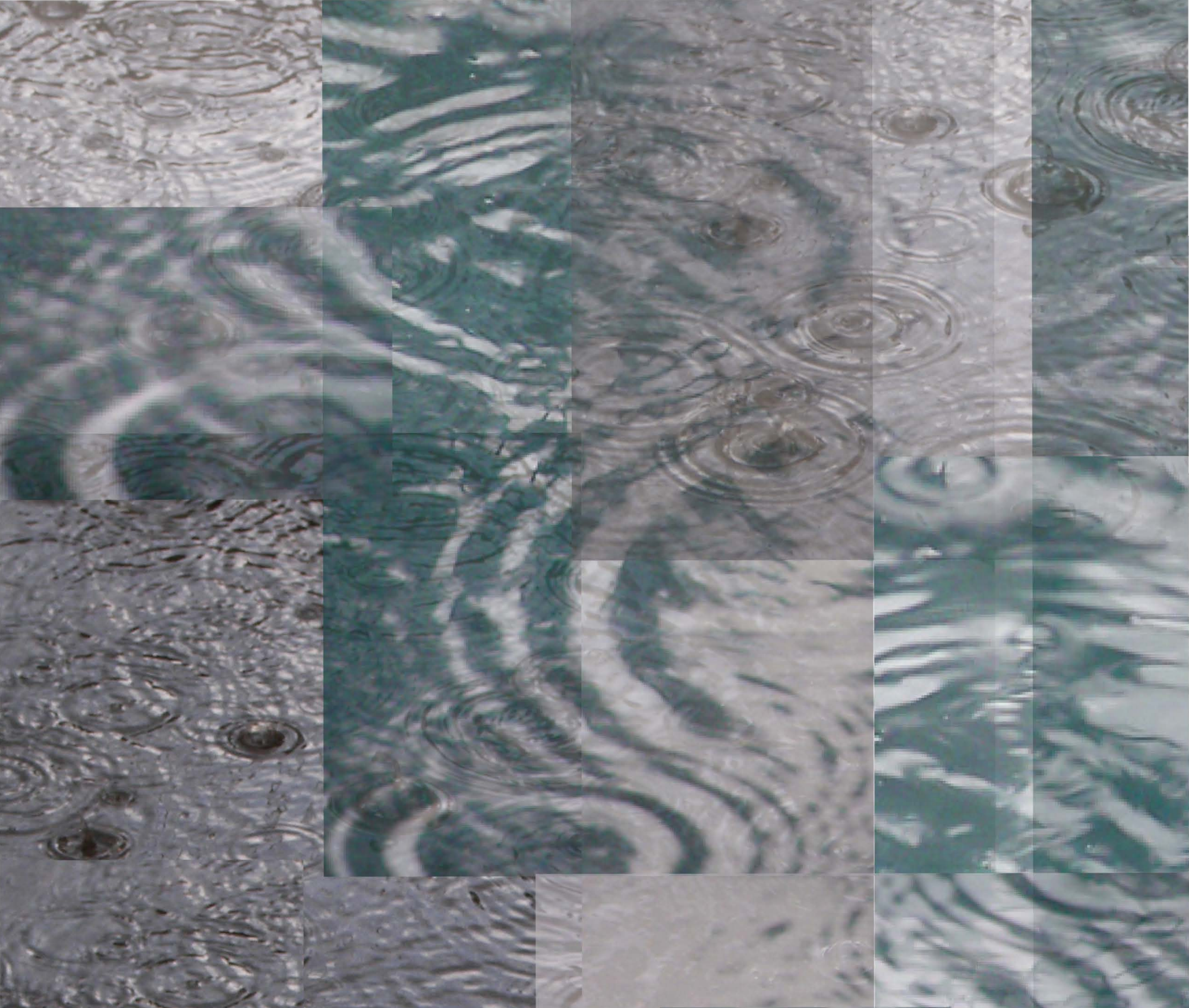




Block 4C







About the author...

Rebecca Shepard grew up in Vancouver BC, where she was an avid puddle jumper. Now she lives with her husband and their puddle-jumping daughter in Eugene, Oregon. Rebecca received her undergraduate + graduate degrees in Landscape Architecture at the University of Oregon in 2015 + 2016.

The essence of Rebecca's work is to engage humans with their environment, through weaving the outdoor experience with educational elements. Rebecca thrives at the challenge to reclaim habitats for fish and wildlife by working with plants and reimagining the beauty and functionality of stormwater management. By providing opportunities to observe and interact with nature, Rebecca's hope is to reconnect people with their landscape and thus create a more healthy and resilient relationship between people and their environment.