SYME HALL

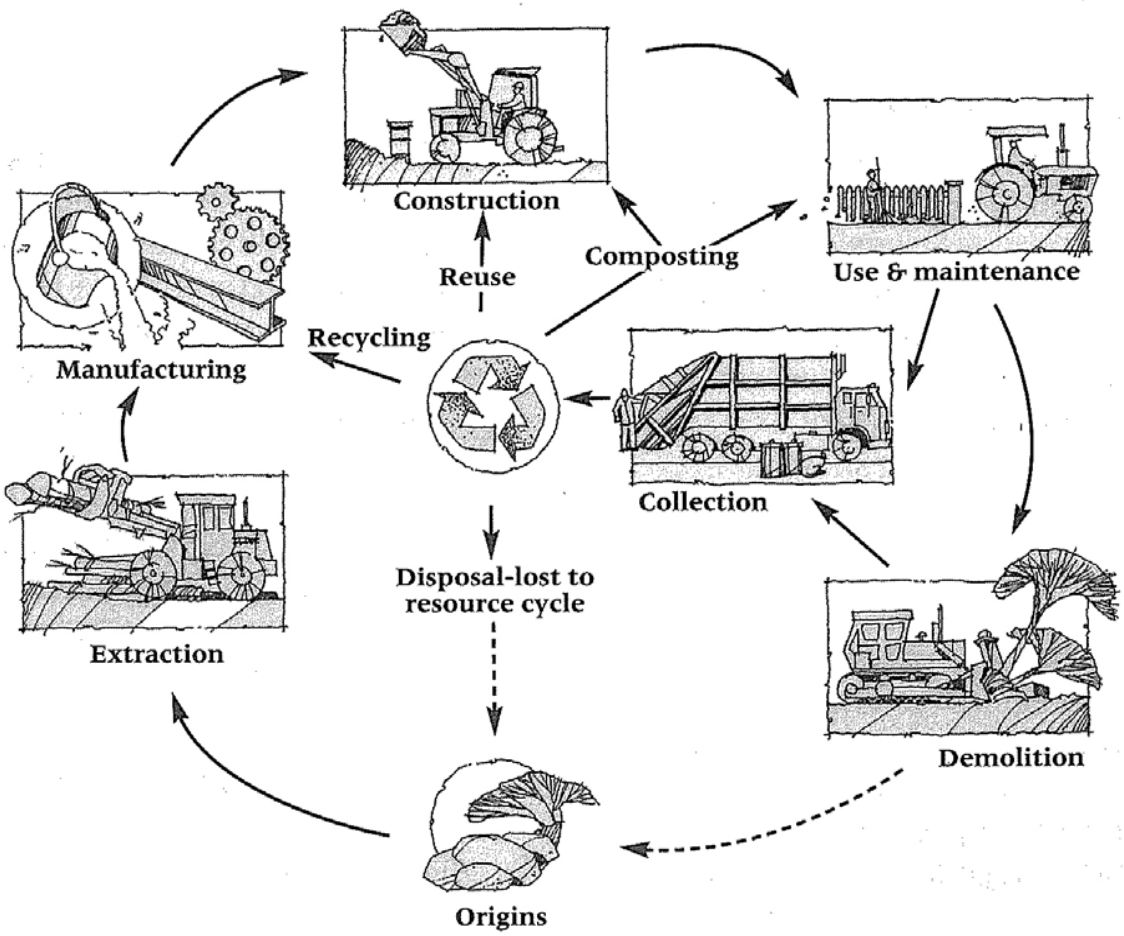
RAIN GARDEN

Low Impact Development Stormwater Workshop 2010

Low Impact Workshop

- Low Impact Stormwater Workshop
  - Timeline
    - May 24th– August 6th
  - Credit Hours
    - 6 Credit Studio Course
  - Enrollment
    - 18 students

Building Great Places Through Low Impact Development (LID)



Graphic Source:
Thompson & Sorvig, 2000

- Building Better Sites
  - Context Sensitive Design
    - Program / Users / Environment / Materiality / Maintenance
  - Integrated Design
    - Building / Site / Infrastructure
  - Living Systems Design
    - Soils / Hydrology / Flora / Fauna
  - Water Quality + Quantity
    - Capture / Convey / Release
  - Best Management Practices
    - Amended soils / Treatment chain / Bio-infiltration / Water-wise plants
  - Life-Cycle Assessment
    - Cost / Durability / Maintainability
  - Reuse + Repurpose
    - Water / Recycled Materials
  - Leading-edge Methods
    - Engagement / Design / Engineering / Materials / Fabrication / Installation

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A Troubled Site

SYME HALL DIAGNOSTICS

Lack of Vegetation (1)
Without vegetation, first floor residents do not have privacy from people who can easily approach their window

Overgrown Invasive Ivy (2)
Ivy has taken over the planting beds invading other shrubs and trees and growing out of control

Saturated Dark Corner (3)
Water does not travel away from the building leaving a damp, sometimes pooling area allowing mosquitos to breed

Unsightly Handrail (4)
Not needed for entrance as the slope is less than 4%

Condensate Eroding Mulch and Soil (5)
Constant dripping continues to flush mulch and soil onto the sidewalk

Wash-Out onto Sidewalk (6)
Stormwater washes mulch and water onto the sidewalk creating a slick surface for users and icing hazzard in freezing conditions

Rx

PATIENT Syme Hall
DATE Summer 2010
PHYSICIAN Landscape Architecture Studio

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- **Grade earth to move water away from building**
- **Capture stormwater runoff from roof and collect in cistern**
- **Channel water to infiltration areas to prevent water from sheeting onto sidewalks**
- **Provide structural support to soil by installing appropriate plants**
- **Clean water before returning it to the watertable**

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Stakeholders – Starting with the client

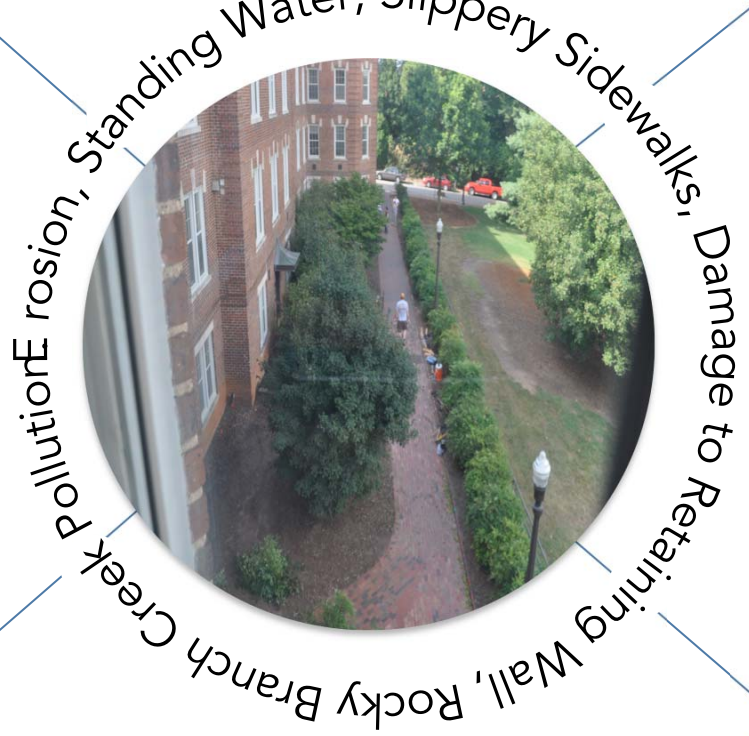
Needs and interests

University Housing

- Durability
- Safety
- Represent the University

University Landscape Architect

- Be unique to surrounding outdoor spaces
- Fit in with the overall campus aesthetic



University Engineer

- Integrity of structures
- Keeping water away from historic building

Grounds and Maintenance

- Relatively low maintenance
- Maintain access to building

Gaining an understanding of the client's **values** from the very 1st day

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Sustainability Integrated With Client Needs

Illustrative Plan

- Safety, Health + Welfare
- Beautification
- Usability

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Team Development

- *Site Grading + Layout*
- *Detail Development*
- *Procurement + Logistics*
- *Planting*
- *Signage + Marketing*

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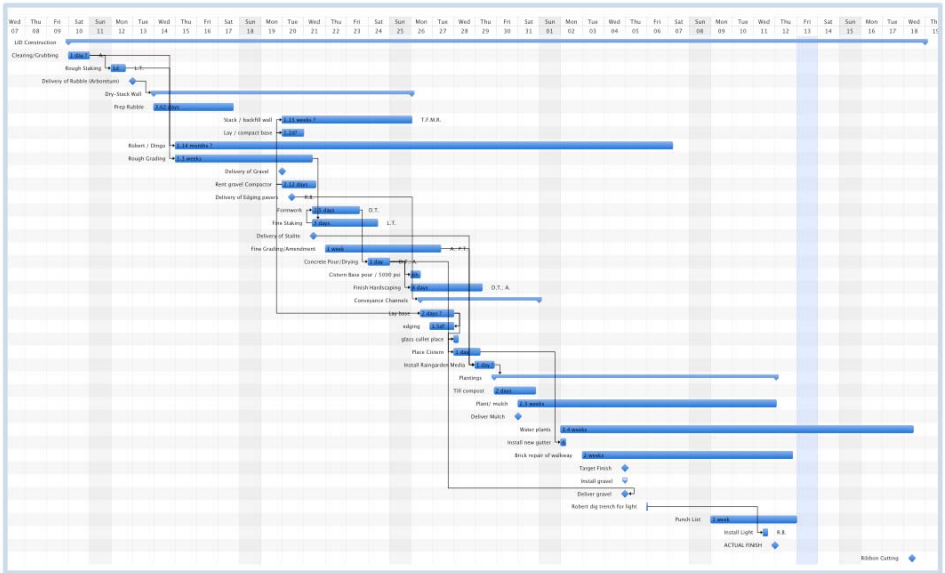
Materials + Logistics

FINAL DESIGN -
LID STUDIO SUMMER 2010
Estimates of Probable Cost

TAX ID# 400021

HARDSCAPES	DESCRIPTION	QUANTITY	UNIT	PRICE per UNIT	TOTAL ESTIMATE	SUPPLIER		PURCHASED BY	TOTAL PAID
Conveyance channels									
71 LF x 1.5'W x 2" thick compacted	Crushed Agg.- ABC approx 1.7 CY per ton	1	CY	$30.00	$30.00	Triangle Landscape Supply	delivery? 5 yd min.. may include all the		
Total for project	Glass Agg.	4	ton = .5 CY	$200.00	$800.00	Strategic Materials	channels		
	Concrete pavers	150	LF	$0.00	$0.00	NCSU			
					$0.00				
for concrete separators	80# bag of concrete	0	1 80# bag	$5.00	$0.00	Lowes	1 day		
Manhole cover									
	Concrete 300psi Fly Ash 20%	1.3	CY	$125.00	$162.50	Thomas Concrete: 5yd + free delivery ($100 for less)	1 day	Matt E. 7-22, full order	$415.50
	Concrete Delivery	1		$100.00	$100.00				
	Bender Board	5	boards	$60.00	$300.00		14-Jul	Nate	$185.40
	Wood- Form		fee	$0.00	$0.00				
	Tie wire	1	roll = 300'	$3.80	$3.80	Guaranteed Supply	19-Jul	NATE - Guarantered Supply Run	$137.75
	stakes	100	EA	$0.35	$35.00	Guaranteed Supply		Andy hardware run	$54.00
	#3 rebar	4	EA = 20'	$3.95	$15.80	Guaranteed Supply			
50 SF X 4" BASE	ABC Crushed Agg.	1	CY	$12.50	$12.50	Wake Stone		Matt 7-20	
	2x4's	1			$4.00	Lowes			
	Nails	1	5 lb box	$10.00	$10.00	Guaranteed Supply			
	Screws	1	box	$10.00	$10.00	Guaranteed Supply			
	Caulk - Silicone outdoor	2	tubes	$7.00	$14.00	Lowes			
31 SF x 4"	Glass Agg.	0	ton	$200.00	$0.00		4 CY		
Retaining Wall									
90 LF x 2' T	Concrete Rubble	425	LF	$0.00	$0.00	City of Raleigh			
					$0.00				
90 LF x 2.5' w x 6" d compacted	Crushed Ag. -Base ABC- 1.7 CY p ton	2.75	CY	$12.50	$34.38	Wake Stone	delivery?		
65 LF x 2'	Filter Fabric - commercial landscape fabric	65	SY	$0.65	$42.25	Atlantic soil & mulch		Matt 7-20	$42.50
	Stone Fines	1	YD	$30.00	$30.00	Atlantic soil & mulch		Matt 7-20	$30.00



Project Budget:

- Source Materials
- Coordination of Purchasing and Delivery of Materials
- Projected Costs vs. Actual Costs

Project Timeline:

- Projecting Duration and Necessary Resources for Each Phase of the Project
- Coordinating Resources: People, Tools, Materials, Money
- Projecting Critical Path of Project
- Coordinating Purchase of Materials with Phases of Project Development

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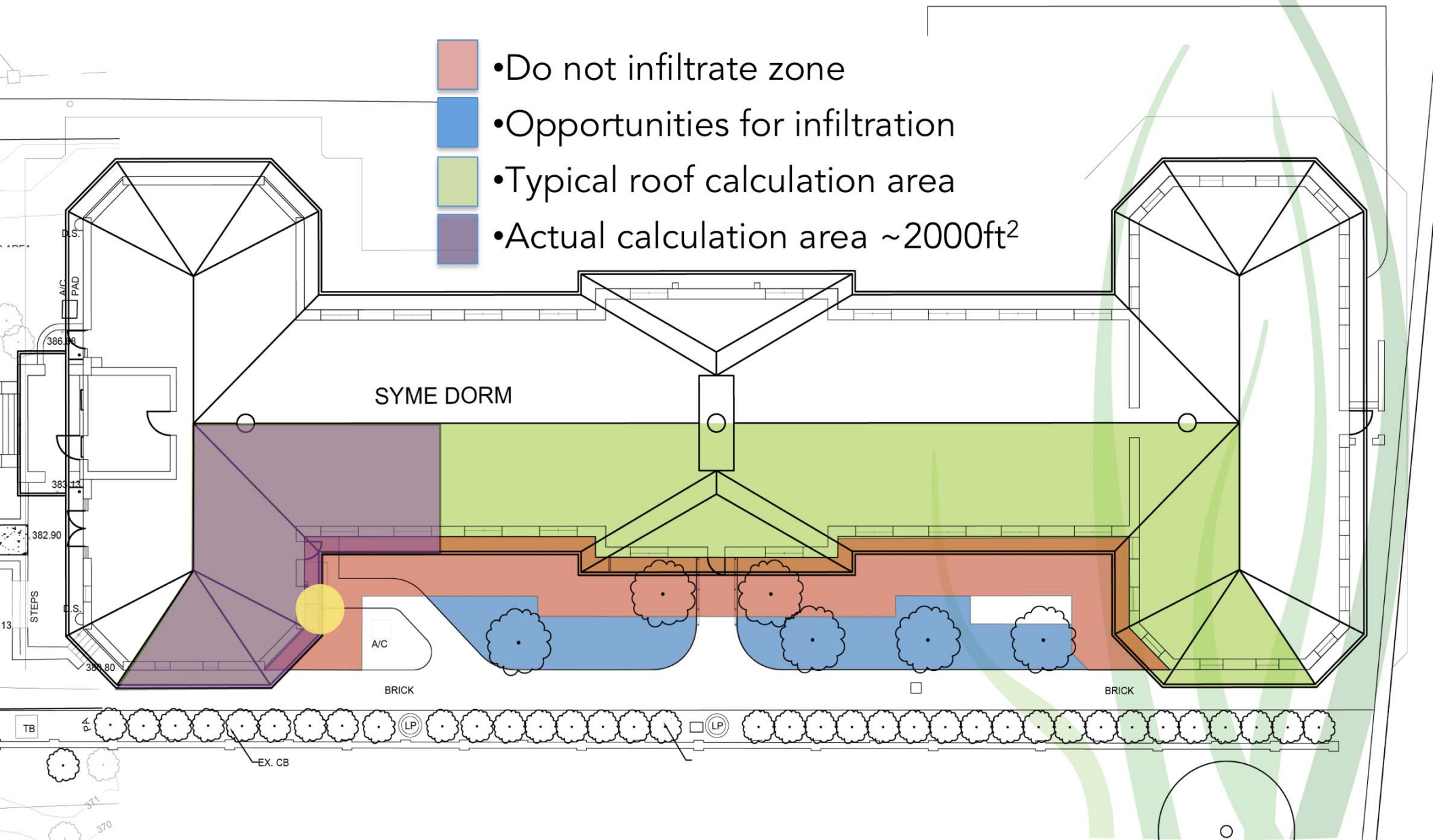
Infiltration Calculation

- Do not infiltrate zone
- Opportunities for infiltration
- Typical roof calculation area
- Actual calculation area ~2000ft^2



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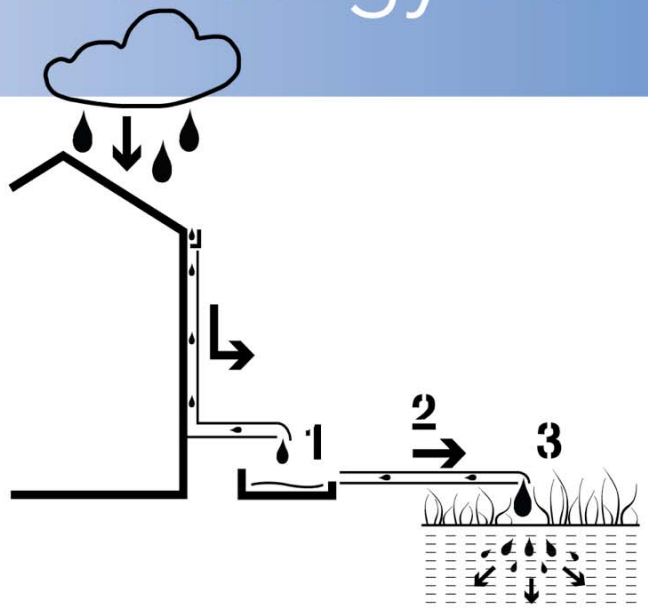
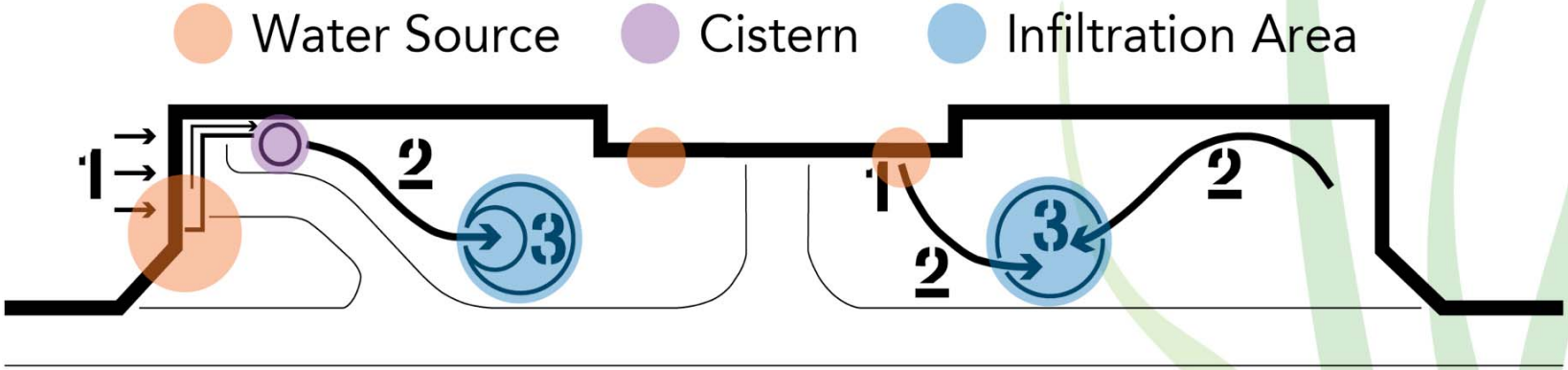
LID Strategy For Syme Hall



1. Collect 2. Convey 3. Filter



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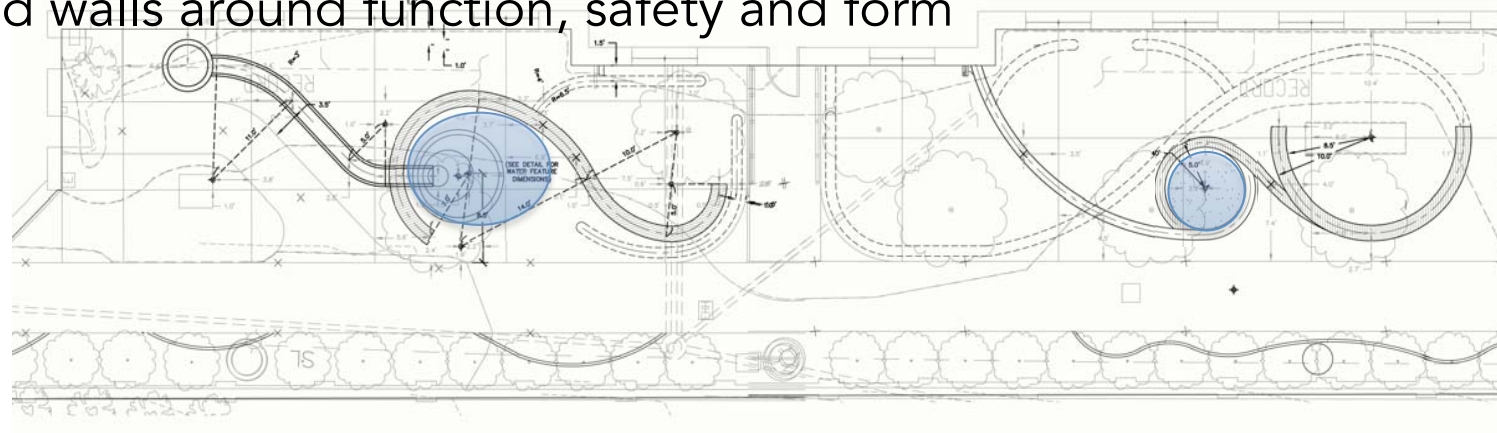
Grading + Layout

- Finding old Terracotta pipes forced changes
  - Sketching to maintain the bones of the original design
  - Understanding path and flow of water
  - Major structures included dry-stack walls and runnels

- Creating, referencing and measuring from historical documents
- Adapting to and discovering existing conditions
- Shaping rain gardens and walls around function, safety and form



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Grading + Layout

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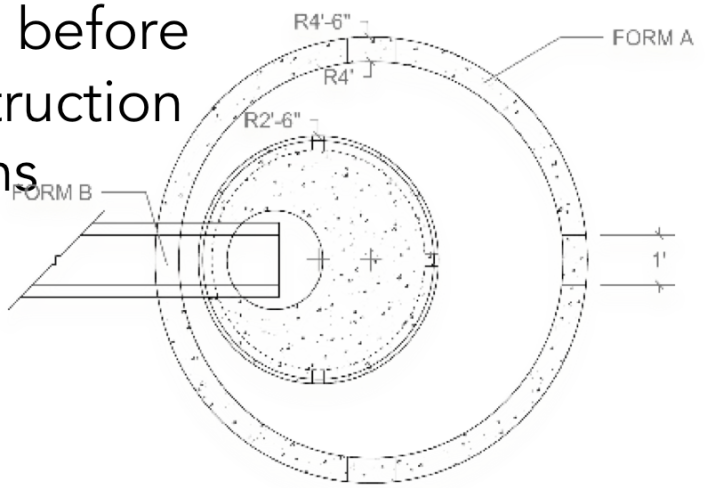
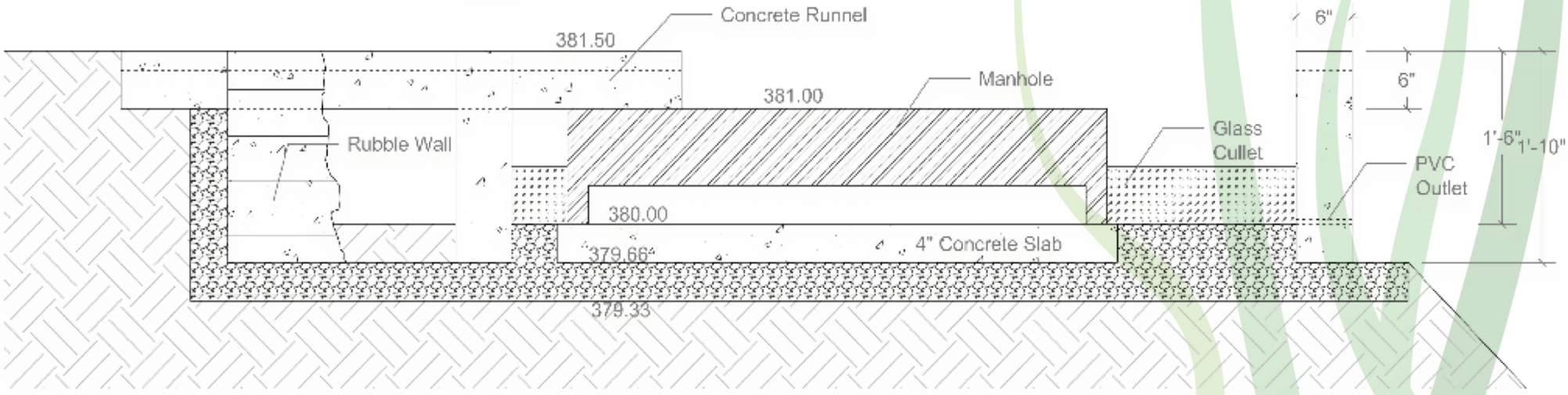
Grading + Layout

Detail Design + Implementation

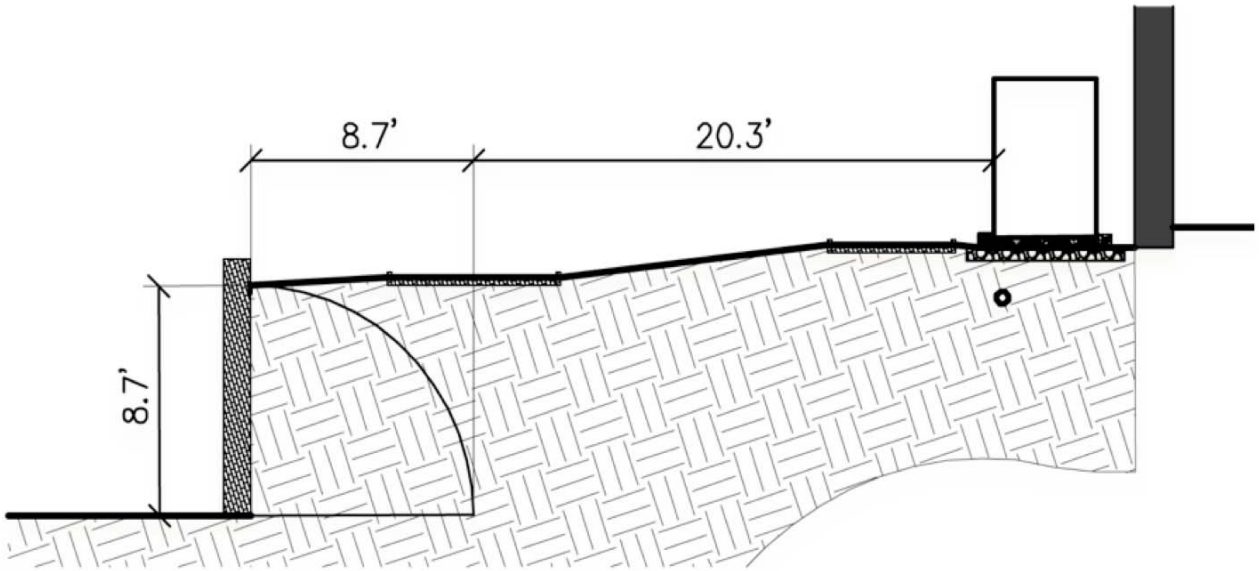
- Detailing and understanding CIP wall + infiltration basin before construction begins



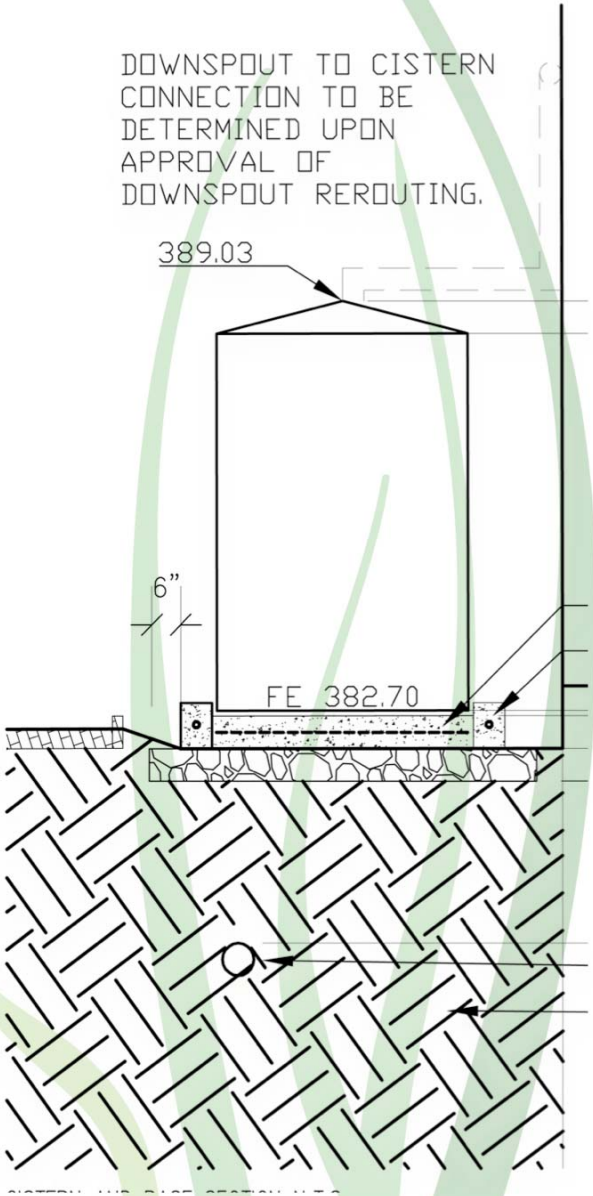


Detail Design + Implementation

- Choosing location of 500 gallon cistern based on sound engineering principles



WALL/CISTERN SECTION 1"=10'



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Detail Design + Implementation

- Learning many lessons from the concrete forming process

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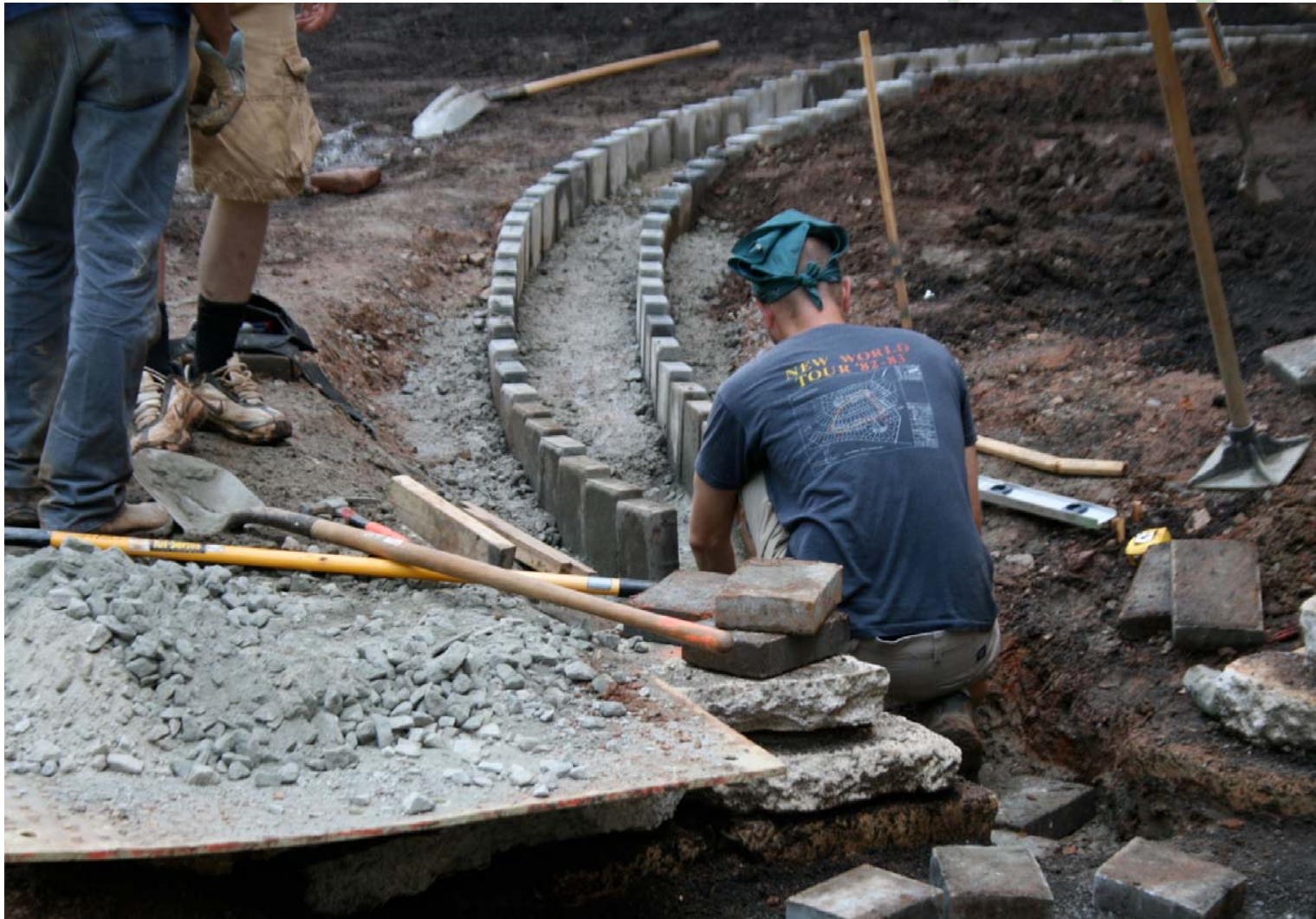
Detail Design + Implementation

- Building artful conveyance channels to incorporate A/C condensate into the infiltration zones



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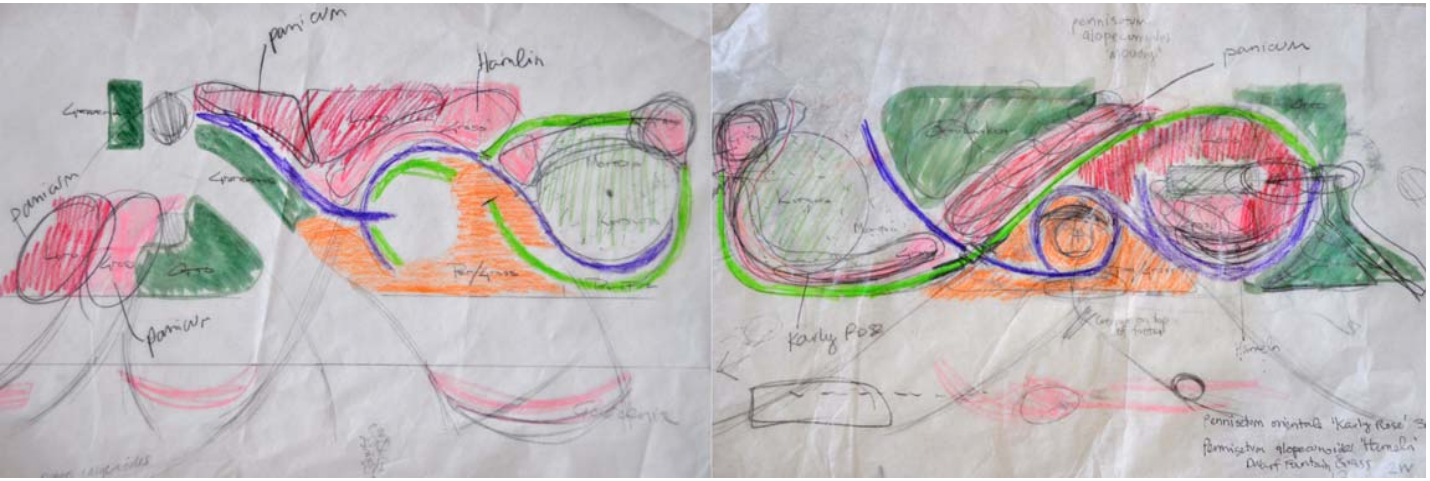
Plant Design + Selection



- Choosing plants by survivability, maintainability, availability
- Creating School-Year (August-May) Interest
- Planting to highlight the rain-fed water system

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Plant Design + Selection

- Approximately 1,100 plants total

Education + Experience: Signage

- Appropriate for the design
- Durable
- Educate
- Step away from the norm

MATERIAL TEXTURE
COLOR IMPACT MESSAGE
BRAND SHAPE
EDUCATION SIZE PLACEMENT

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Signage – Integral aspect of design

Education: Service Learning

- Student ASLA - supporting a hands-on classroom by volunteering

General Maintenance Guidelines

Task	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Care of Plants												
Monitoring/Post Storm Clean-up												
Pruning(shrubs if needed)												
Deadheading												
Cutting Back Perennials and Liriope												
Mulching												
Weeding												
Watering												
Leaf Removal												

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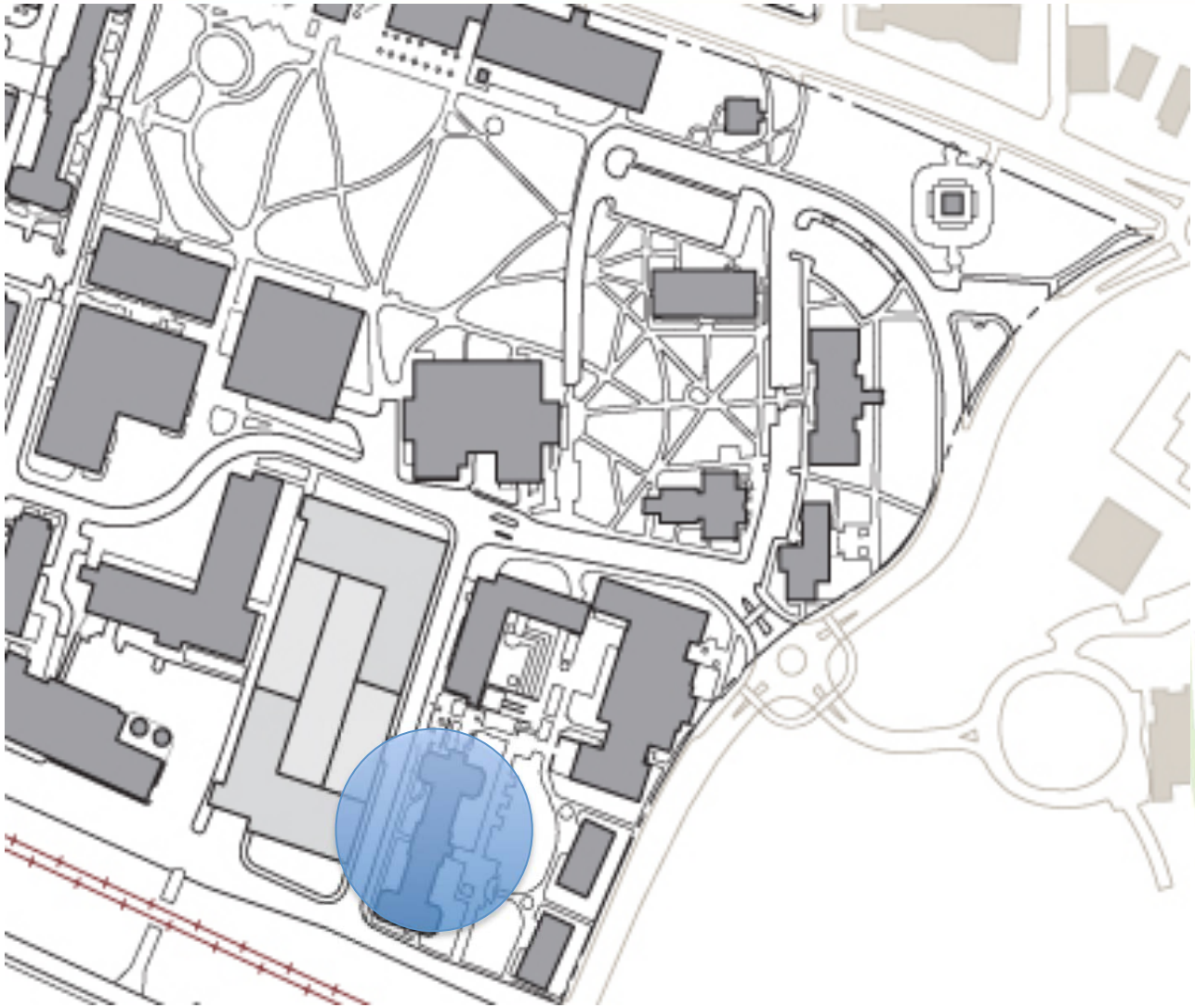
Local Influence



- Model for:
  - Campus as laboratory
  - Innovative learning
  - Future collaboration across disciplines
  - Research

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Far Reaching Effects

- Beyond Landscape Architecture
- Beyond Housing

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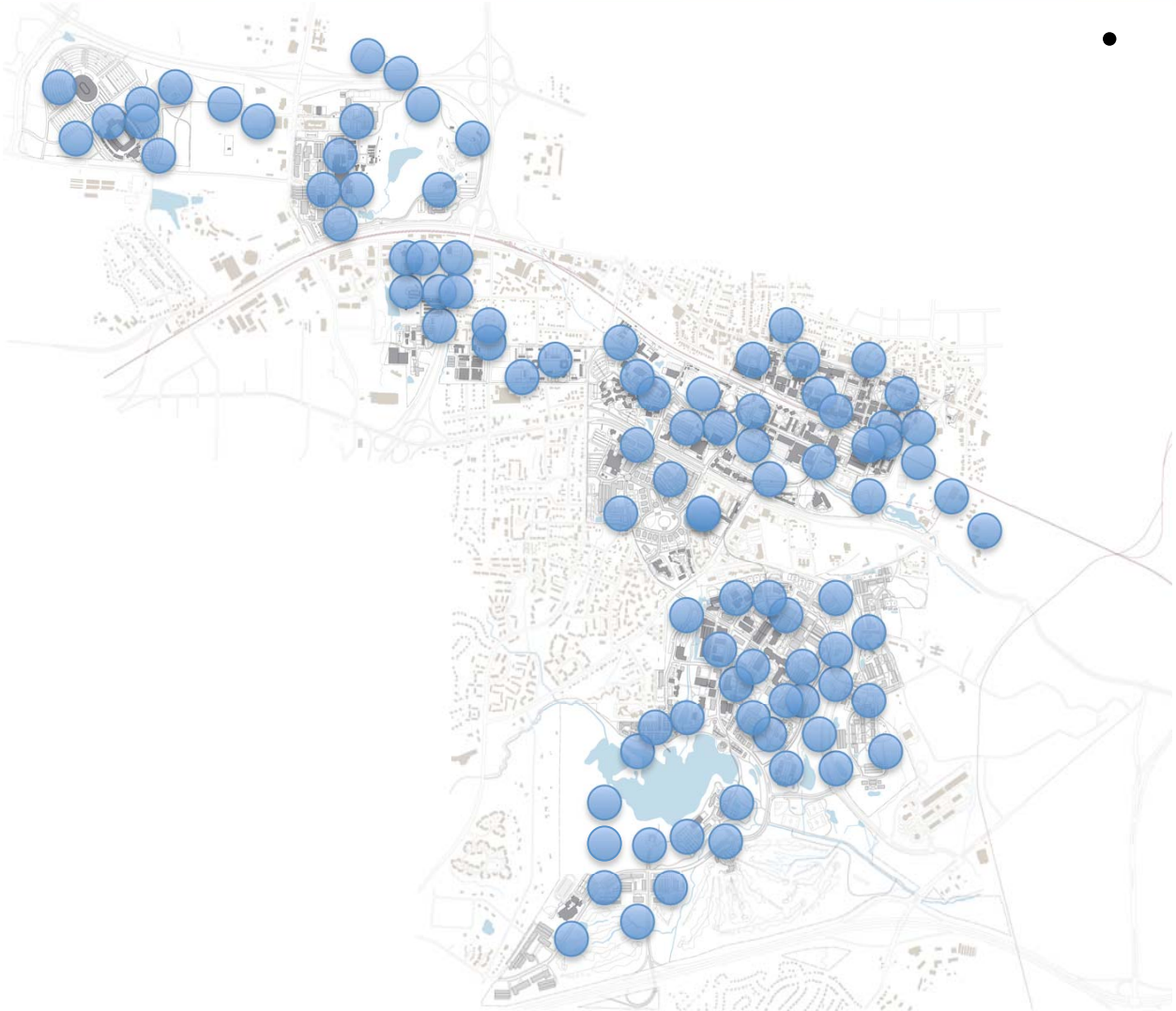
Influence an Entire Campus!



- Twelve Guiding Principles of the Physical Master Plan
  - Commitment to the Master Planning Process
  - Sustainability
  - Integration of Academic, Programmatic and Physical Planning
  - Human-Scaled Campus Neighborhoods and Paths
  - Design Harmony
  - Mixed-Use Activities
  - Visible Neighborhood Activities
  - Universal Design
  - Effective Movement for a Pedestrian-Oriented Campus
  - City Context
  - Campus Safety
  - Hallowed Places

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Measures of Success

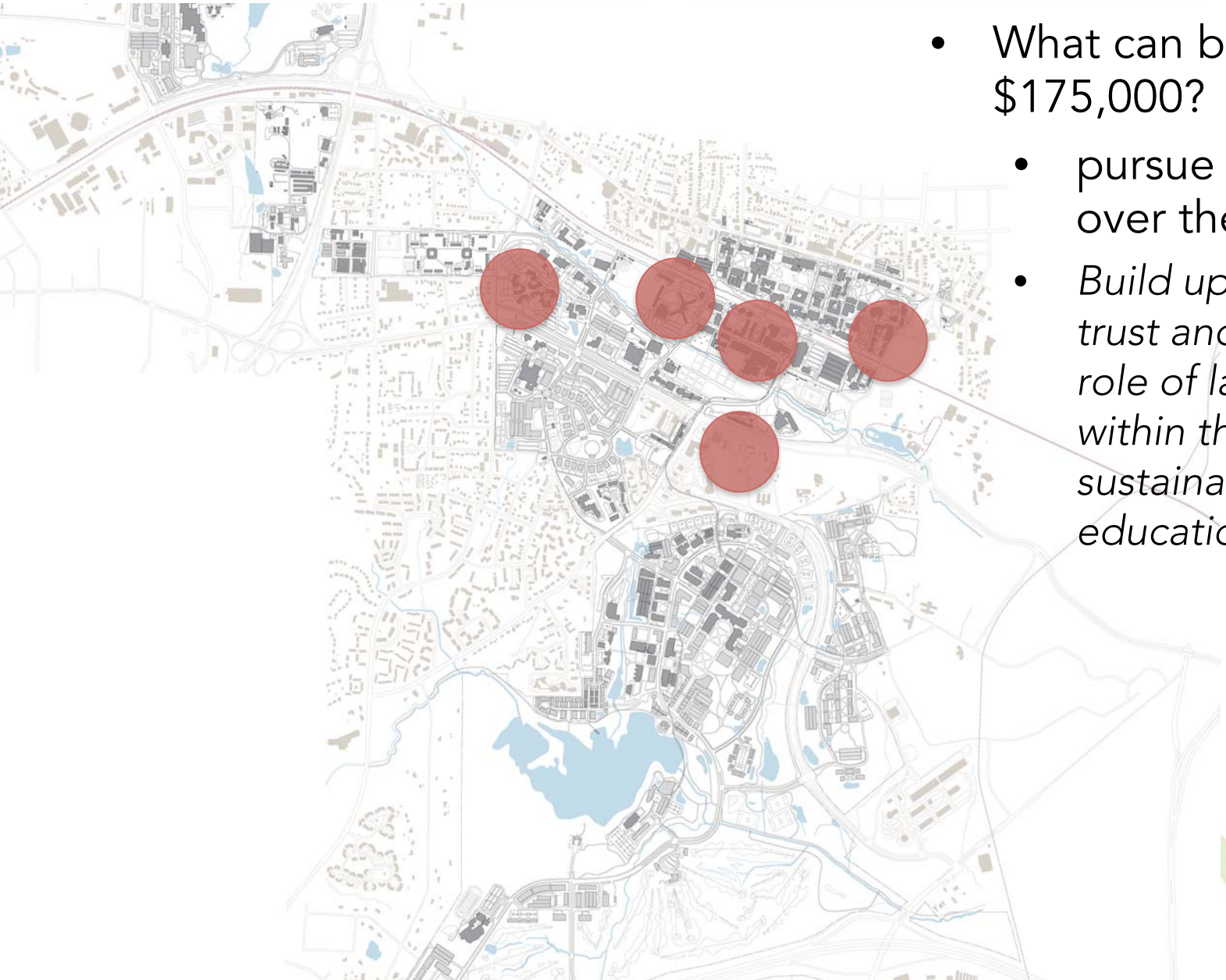
Proven Function

- garden has infiltrated every storm event since its completion

Client Satisfaction

- The client has guaranteed $175,000 to support 5 more years of service-based LID projects

Value Added – Next Steps



- What can be done with $175,000?
  - pursue 5 similar projects over the next 5 years
  - *Build upon a newly formed trust and enthusiasm for the role of landscape architecture within the realms of sustainability, environmental education, and placemaking*

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Celebrating Healthy Ecosystems