

DESIGN ACTIVITIES WORKBOOK

Investigating Urban Ecosystems Teachers' Institute:
Urban Tree Education Project
Summer Workshop: June 27-July 1, 2016

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URBAN DESIGN & PLANNING

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DESIGN PROCESS OVERVIEW

MONDAY // 06.27
11:00 A - 12:00 P

The **DESIGN PROCESS** is

“the organization of the external physical environment to accommodate human behavior. It deals with the qualities and locations of structures, land, activities, and living things. It creates a pattern of those elements in space and time, which would be subject to continuous future management and change. The technical output - the grading plans, utility layouts, survey locations, planting plans, sketches, diagrams, and specifications are simply a conventional way of specifying this complex organization.”

Lynch & Hack, 1984

THE PROCESS

The list below gives a brief overview of the components of a typical Design Process. For the purposes of this week's workshop, we will be focusing on the first (4) steps.



1. PROGRAM - Define the objectives of the project. Consider the intended users, functions, & outcomes.



2. SITE INVENTORY - Document the existing conditions. Consider entrance locations, pathways, adjacent buildings, current uses, overhead or in-ground utilities, views out from the site, views into the site, sounds, drainage patterns, site circulation patterns, pedestrian zones, vehicular zones, etc.



3. SITE ANALYSIS - Analyze the Site Inventory to determine meaning. How do the site inventory items influence the design?



4. CONCEPTUAL DESIGN - Develop concepts to meet the program objectives. Take into consideration the Site Inventory and Analysis.



5. DESIGN DOCUMENTATION - Create design documents that dictate how the design will be built. Documents are usually developed in phases (Concept Design, Design Development, Construction Documentation) that show increasing levels of detail and specificity.



6. IMPLEMENTATION - Install the project. Respond to changes that result for unexpected field conditions.



7. POST-OCCUPANCY EVALUATION - Evaluate the project after installation. Are the program objectives being met? Are the plants, users, spaces, and materials performing as planned? What might explain unexpected results? How does this inform the design process for similar projects?

FRANCIS SCOTT KEY ES / MS: UNDERSTANDING THE PROCESS

As you follow along with the presentation, fill in the blanks below to identify different components of the design process for FSK.



1. PROGRAM :

Slide #: _____

Overall Program:



2. SITE INVENTORY :

Slide #: _____

Key Existing Conditions:

FRANCIS SCOTT KEY ES / MS: UNDERSTANDING THE PROCESS



3. SITE ANALYSIS :

Slide #: _____

Key Design Influences:



4. CONCEPTUAL DESIGN :

Slide #: _____

FSK Design Concept:

ECOLOGICAL ISSUES

The following table provides a list of common ecological issues encountered in urban site design. After choosing a site for your design challenge, work with your group to discuss some of the issues that you may want to address on your site.

ISSUE	SYMPTOMS	CAUSES
Lack of Vegetative Diversity	Limited animal and insect diversity, weaker ecosystems, disease and pests spread more rapidly, higher plant mortality rates	Overplanting of just a few types of plants
Loss of Animal Habitat	Declining ecosystem health, loss of natural predator species, increase of resilient rodent species,	Lack of native plants that support animal habitat, not enough diversity of plants in ecosystem
Pollinator Population Decline	Crops/flowers/plants/ not being pollinated, reduced crop yields	Important pollinator plants being destroyed or not planted, disruptions in insect life cycle that don't allow them to properly reproduce, overuse of insecticides that kill populations
Sediment Pollution in Waterways	Low oxygen levels in water, mortality among aquatic life, brown/murky water	Excessive run off in tributaries due to increased impervious surfaces, lack of vegetation to stabilize the soil, and erosion
Chemical Pollution of Waterways	Chemical imbalances in water, mortality among aquatic life, algal blooms, toxic water	Excessive runoff containing fertilizers/chemicals from farms, landscapes, campuses, roads, parking lots, and all impervious surfaces

ECOLOGICAL ISSUES

Thought of an ecological issue not listed here? Add it to the table and let's discuss! Every site has its own unique components, so use the blank spaces below to inform us about yours.

ISSUE	SYMPTOMS	CAUSES
Heat Island Effect	Rising ambient temperatures, increased wind speeds, urban warming, mortality among plants/ animals/insects, increased energy consumption for cooling	Removal of shade trees and vegetation, increased paved surfaces, dark heat-absorbing materials
Climate Change	Extremes in weather patterns, severe storms, rising tides,	Increased impervious surfaces, ozone depletion, pollution, reduction of natural ecosystems that filter pollution
Nature Deficit Disorder	Societies detached from nature, "fear" of nature, lack of understanding for natural processes & environment, lost sense of stewardship for the earth, increased levels of stress/anxiety/blood pressure/conflict	People not engaged in nature, natural environments being removed from urban environments
Soil Erosion	Destabilized stream banks/ shorelines/infrastructure, increased sediment pollution, destruction of natural habitat	Increased impervious surfaces (parking lots, roads, sidewalks, building roofs), reduction of vegetation that stabilizes soils, channelized stormwater runoff
<hr/> <hr/>	<hr/> <hr/> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/>

INTRO TO SITE INVENTORY

TUESDAY//06.28

2:00 P - 3:45 P

The **SITE INVENTORY** is

“about reading and understanding a site through repeated visits and studies. The site contains both a residue and a promise; its surrounding context, its soil, climate, water, ecology, and history are unique and special. Thus inventory has less to do with the individual imagination than with careful research and analysis. It is like a probe into the successive histories of a place.”

Girof, 1999

SITE INVENTORY

Below is a list of commonly used site inventory questions. Take a few minutes to get familiarized with each one & think about how you might answer them relative to your own Design Challenge site.

GATEWAYS - where are the main entry points to the site?

SUN - which part of the site receives the greatest sun exposure?

SHADE - which part of the site receives the least sun exposure?

PRIMARY CIRCULATION - where is people's main route in/out of the site?

SECONDARY CIRCULATION - where are the secondary routes in/out of the site?

TERTIARY CIRCULATION - where are the tertiary routes (if any) in/out of the site?

FOCAL POINT - what area/object on site draws the most attention?

VIEWS - where are the most prominent views (if any) in/out of the site?

HIGH POINT - where is the highest relative elevation on the site?

LOW POINT - where is the lowest relative elevation on the site?

UTILITIES - where are existing utilities on site (i.e. light posts, manholes, etc.)?

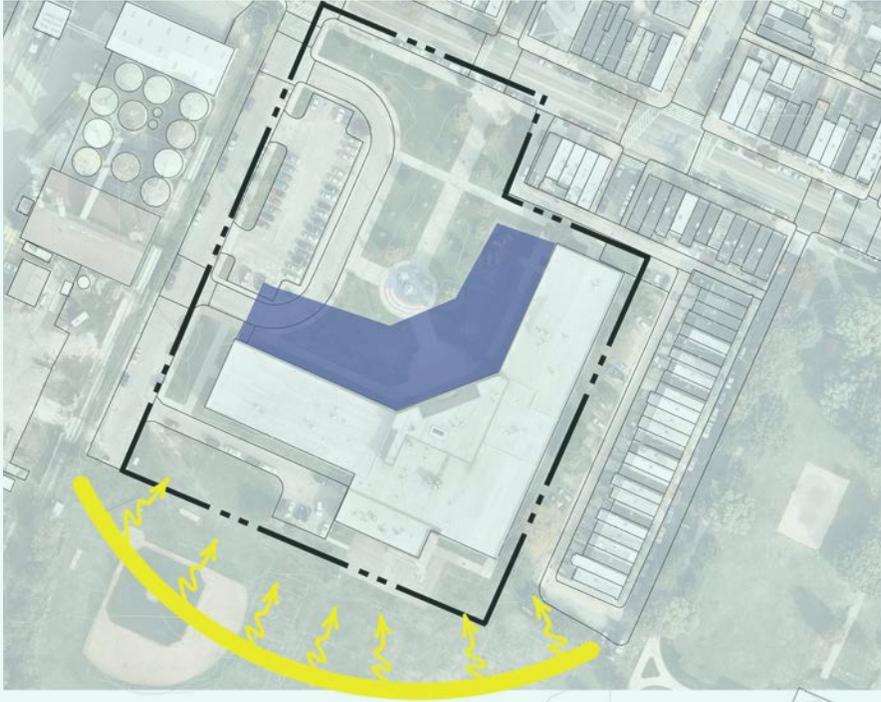
EXISTING VEGETATION - where are the existing plants on the site?

ACTIVE SPACE - which part of the site is most used for activities & gatherings?

PASSIVE SPACE - which part of the site is most used as a pass-through?

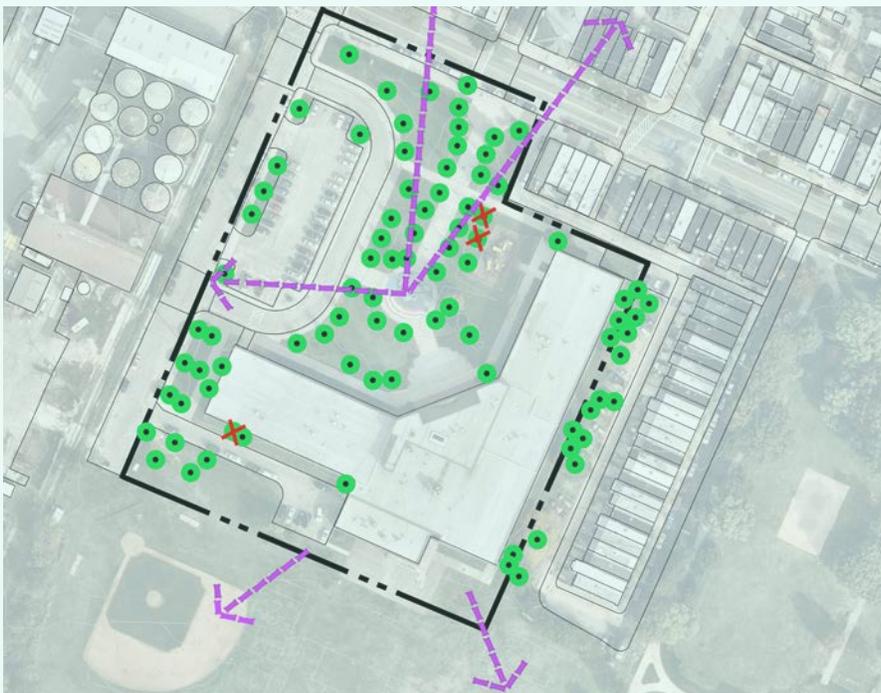
SITE INVENTORY PRECEDENTS

Below are some examples of Site Inventory diagrams for FSK. Notice how different layers of information can be consolidated to form a comprehensive representation of the site's existing conditions.



SUN & SHADE

Diagramming areas with the most & least sun exposure on site can help identify design opportunities such as: where to plant trees, where there might be need for more shade, and where to plan, or avoid, outdoor gathering areas.



VIEWS & EXISTING VEGETATION

Noting prominent views & existing vegetation is helpful in deciding where to plant (or avoid planting) new trees. For this particular project, it was pertinent to keep certain site lines clear for the safety of students at the drop-off area, so this diagram helped identify which trees to keep, which ones to remove, & where to add new trees.

SITE INVENTORY PRECEDENTS

Keep in mind that Site Inventory diagrams come in many different formats, with varying levels of information. What you see here are examples of a basic, graphic diagram techniques.



SITE DRAINAGE

Making note of how water flows (or doesn't) throughout the site is of utmost importance when it comes to addressing many ecological issues. It not only helps with planting layouts, but will also reveal where there might be need for stormwater management.

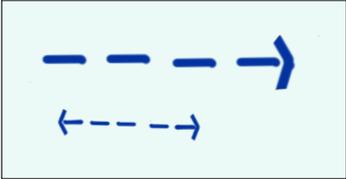
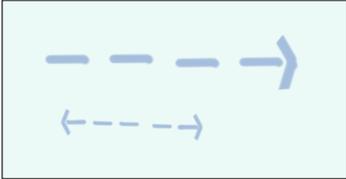
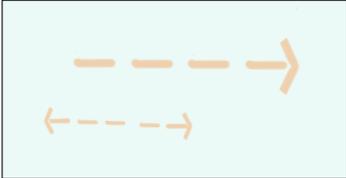
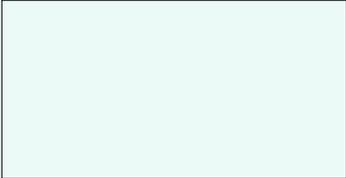
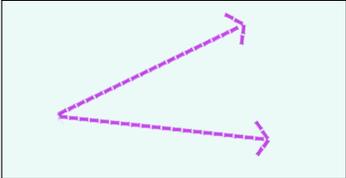
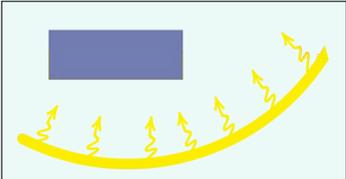
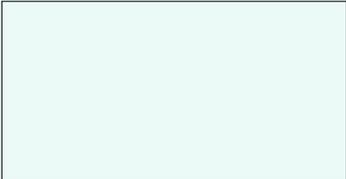


COMPOSITE SITE INVENTORY

A combined diagram of all the components of a site inventory provides a comprehensive glance at the overall site. With the most prominent areas of opportunity & constraint clearly identified, the site inventory sets forth the foundation for further analysis, & ultimately the site design.

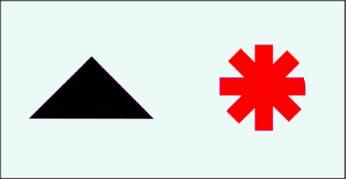
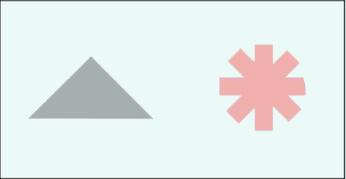
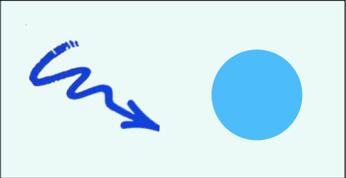
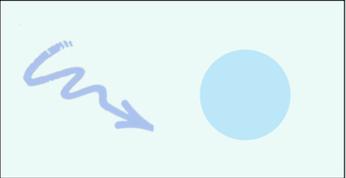
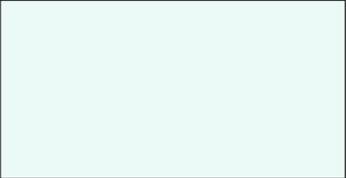
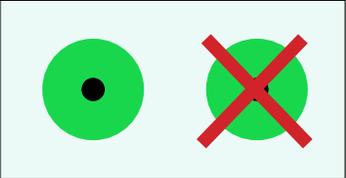
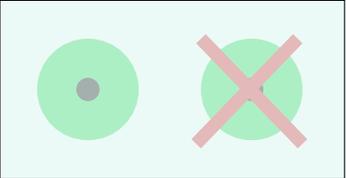
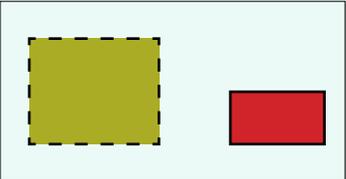
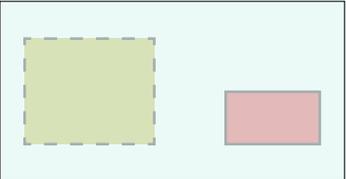
DESIGN ACTIVITY 1: YOUR SITE INVENTORY

Use the space below to quickly practice drawing Site Inventory elements.

	DEFINE	PRACTICE	DRAW
VEHICULAR CIRCULATION	<p>Primary</p>  <p>Secondary</p>		
PEDESTRIAN CIRCULATION	<p>Primary</p>  <p>Secondary</p>		
VIEWS			
SUN & SHADE EXPOSURE	<p>Shade</p>  <p>Sun</p>		

DESIGN ACTIVITY 1: YOUR SITE INVENTORY

Then use the material provided to create a Site Inventory diagram(s) for your site, on a separate sheet.

	DEFINE	PRACTICE	DRAW
FOCAL POINTS & GATEWAYS	<p>Gateways</p>  <p>Focal Points</p>		
DRAINAGE	<p>Direction of Flow</p>  <p>Standing Water</p>		
VEGETATION	<p>Existing</p>  <p>To Be Removed</p>		
IMPERVIOUS SURFACES & UTILITIES	<p>Impervious Surfaces</p>  <p>Utilities</p>		

INTRO TO SITE ANALYSIS

THURSDAY // 06.30
9:00 A - 10:00 A

The **SITE ANALYSIS** is

“this task of synthesis, of articulating all the factors into a design form, which distinguishes a designer from an engineer or a technician. Up to this point, imagination and taste had not entered into the process of designing. The skill of organizing the functional with the touch of aesthetic (proportion, sensitivity, drama, and all the other attributes associated with “beauty”) is the particular quality of a designer.”

Sasaki, 1950

ECOLOGICAL INTERVENTIONS

Below is a list of commonly used ecological interventions in urban site design. As you read through them, think about how you might use some of these tools to address the issues you've identified for your design challenge.

DESIGN TOOL	DESCRIPTION	BENEFITS
Micro Bioretention Area	A medium sized planted area that contains highly permeable soil, allowing stormwater to quickly percolate. Meant to capture rainwater runoff from buildings, roads, sidewalks, parking lots, & other impervious surfaces. Is planted with trees, shrubs, and perennials.	Slows stormwater, allows for groundwater recharge, reduces downstream pollution, increase habitat
Permeable Paving	A paving system that allows for water to percolate into the soil or aggregate below. This can be gravel, permeable asphalt, permeable concrete, recycled materials with a binder, etc.	Captures storm water, reduces runoff, allows for groundwater recharge
Parking Lot Planting Islands	Areas in a parking lot that are designated for trees and plantings. Usually about the size of a typical parking space and can be used in conjunction with micro bioretention facilities and/or curb cuts	Creates shade in parking lots, reduces heat island effect, increased vegetation, captures storm water
Slope Stabilization Plantings	Trees, shrubs, grasses, and groundcovers planted on steep slopes to stabilize the soil and to reduce erosion. Plants with fibrous root systems or naturalizing/spreading characteristics are typically desired.	Reduce erosion by securing soil susceptible to destruction in rain events. Also captures/slows stormwater and provides habitat value.

Continued on next page.

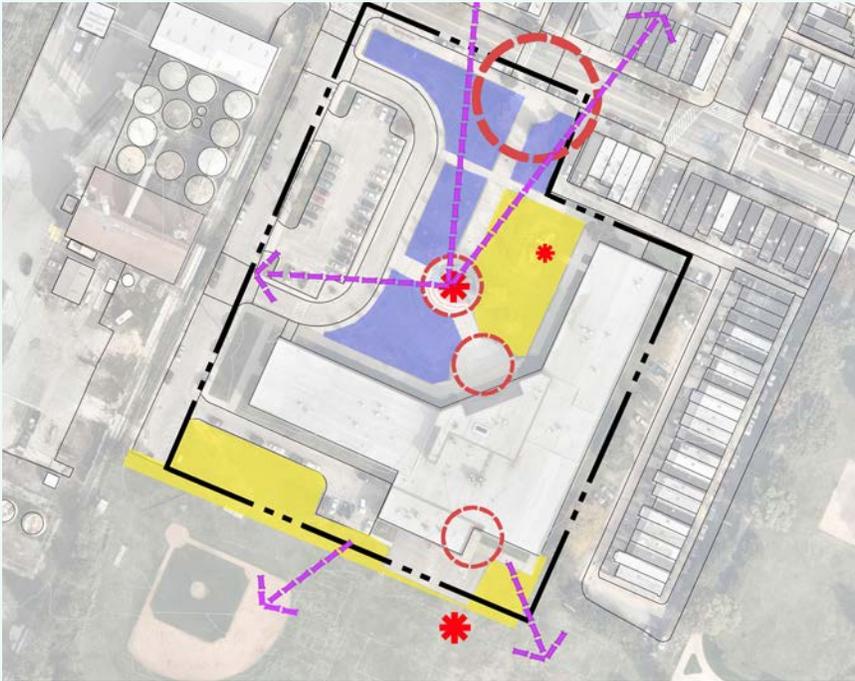
ECOLOGICAL INTERVENTIONS

DESIGN TOOL	DESCRIPTION	BENEFITS
Native Plantings	Planting areas that contain a mix of native trees, shrubs, perennials, grasses, and groundcovers.	Increased bio-diversity that results in healthier plant communities; Inc. habitat, & reduced need for mechanical/chemical interventions (mowing, trimming, fertilizing, etc).
Tree Grove	A large area of trees that provides shade to a usable space beneath the canopies	Reduces ambient temperatures, increases water uptake by roots, & carbon dioxide filtration by leaves.
Rain Garden	A medium sized planting area that contains trees, shrubs, and perennials that captures storm water in a depressed location and hold it until it can percolate naturally into the ground. Typically more ornamental than a bioretention area.	Reduces stormwater run off, creates habitat for insects, pollinators, birds, and other animals, increase groundwater recharge. Filters stormwater.
Curb Cuts	Gaps in a curb that allows stormwater to leave the gutter and flow into planted areas. Usually used in conjunction with micro-bioretention areas or rain gardens.	Captures stormwater before it enters the storm drain system and travels to the bay, reduces runoff and pollution.

DESIGN TOOL	DESCRIPTION	BENEFITS
Pollinator Garden	Mix of trees, shrubs, grasses and perennials that support pollinator species. Usually contain a large amount of flowering plants, but also needs plants that can host larvae and caterpillars.	Increases habitat for pollinator species which improves the larger ecosystem through pollinator health.
Learning Garden	Contains a mix of plant types and natural elements and seating opportunities.	Promote environmental education. Secondary benefits include habitat creation, carbon sequestration, storm water reduction, etc.
Garden Beds	Raised or ground-level planting beds in which annuals, herbs, or perennials can be grown.	Promote environmental education.
Green Roof	A roof system that contains drainage, soil, and plantings that mimic natural ecosystems. Green roofs can be planted with sedums on 4" of soil, or trees and shrubs with about 3' of soil. Depth and plantings typically depend on the structural capacity of the building.	Captures and slows stormwater runoff on buildings. Promotes habitat for insects, birds, and pollinators. Reduces ambient temperatures and reduced heating and cooling costs.
Building Foundation Plantings	Planting at the base of the building containing trees, shrubs, and perennials. Should be wide enough to allow plants to mature without heavy maintenance and accommodate shade trees. At least 8' wide. Can be combined with rain gardens or micro bioretention.	Reduced mowing area. Plants also provide shading for the building if on the south or west side of building. Captures storm water and reduces runoff and erosion. Increases habitat for animals/pollinators.

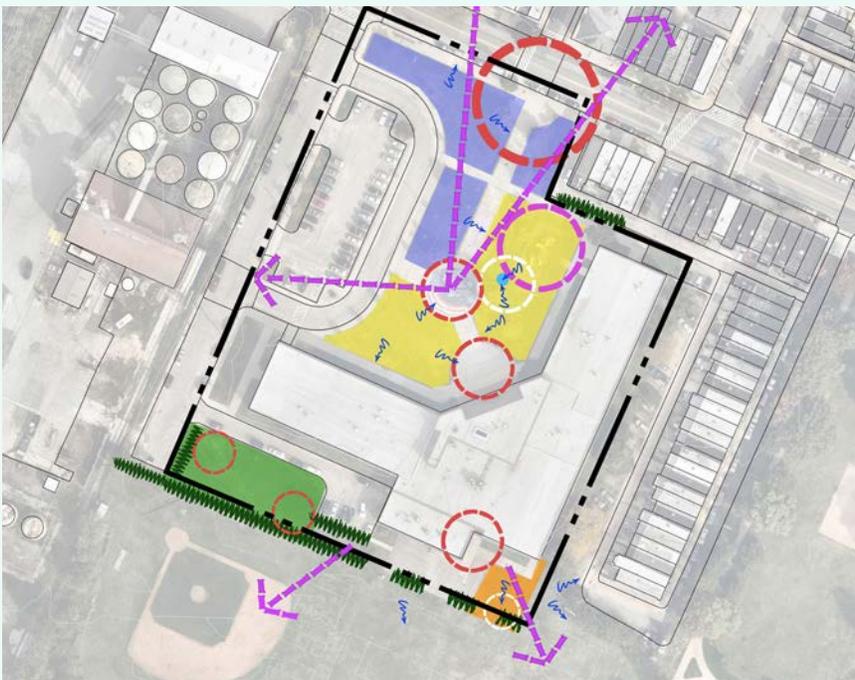
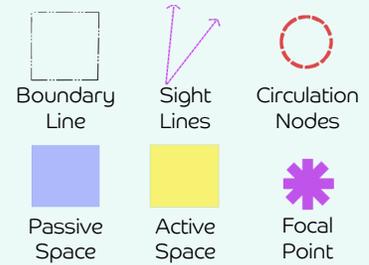
SITE ANALYSIS PRECEDENTS

The next two pages contain examples of Site Analysis diagrams for FSK. Based on the data we collected through our Site Inventory, we were able to come up with the appropriate ecological intervention, & used the diagrams below to analyze the most appropriate location for each.



ACTIVITY ZONES

Thinking about how a site is currently used and how you want to use a site in the future will help determine the most appropriate way to re-organize old spaces into new spaces.



ENVIRONMENTAL FACTORS

Layering environmental Site Inventory information with activity zone analysis will help inform where ecological design interventions will be most successful on your site.





SPATIAL LAYOUT

Analyzing and integrating the insight gained during the Program, Site Inventory and Site Analysis phases of the design process provides the foundation upon which to build a coherent design vision and spatial layout. Consider how your observations and intuitions about the site overlap and merge with the project's desired outcomes. Develop a spatial layout that fosters programmatic requirements and practically addresses ecological issues and constraints.

DESIGN ACTIVITY 2: YOUR SITE ANALYSIS

Use the info you've gathered through your site inventory, to come up with a list of potential ecological interventions (see pp. 19-21 for reference).

SITE INVENTORY

ECOLOGICAL INTERVENTION

DESIGN ACTIVITY 2: YOUR SITE ANALYSIS

Then use the material provided to create a Site Analysis diagram(s) for your site, on a separate sheet.

You may use this space for additional notes, to plan out your Site Analysis diagram, or just do it all on trace paper.

INTRO TO CONCEPTUAL DESIGN

THURSDAY // 06.30
1:00 P - 3:00 P

The **CONCEPTUAL DESIGN** effort is

“not restricted to genius, or separate from practicality, or sudden revelation. Fine places develop out of an intimate understanding of form possibility, which has been gained by constantly reframing the problem, by repeatedly searching for solutions. Revelations go by the inch and the foot, rarely by the mile. Particular methods, learned by experience, help the designer to make this journey of discovery.”

Lynch & Hack, 1984

FSK: CONCEPTUAL DESIGN

Below is the final site plan for the Anthem Arboretum at FSK. The design of the Arboretum is intended to create a rich, sensory environment that offers a range of educational and recreational opportunities including passive learning through botanical displays, active learning through nature play, scientific discovery through a living laboratory, and a formal teaching space for discussion.



FSK: CONCEPTUAL DESIGN

The Display area of the Anthem Arboretum provides a striking botanical collection of native Chesapeake species that offers students, teachers, parents, and community members passive learning and leisure opportunities.



The Discover area of the Anthem Arboretum is designed to highlight ecological cycles and connect directly with Next Generation Science Standards and the Baltimore Ecosystem Study's curricula. Compost stations, raised planters, a greenhouse, botanical collections, and the living laboratory Designed Experiment provide learning opportunities for different ages/grades.

FSK: CONCEPTUAL DESIGN

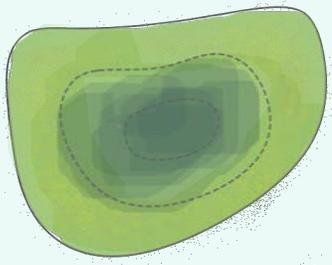
The Play area of the Anthem Arboretum offers younger students a natural, active, multi-sensory learning environment that is safe, educational, and stimulating.



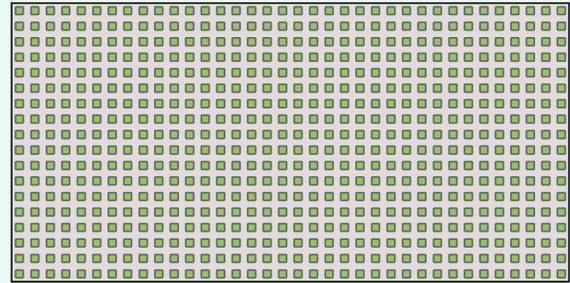
The Discuss area of the Anthem Arboretum provides a formal gathering space or outdoor instruction, as well as sitting areas for groups and individuals. The Native species that frame and contain the space extend the Discover area, while benches, an outdoor blackboard, and a little library enrich the learning environment.

SCALED OBJECTS

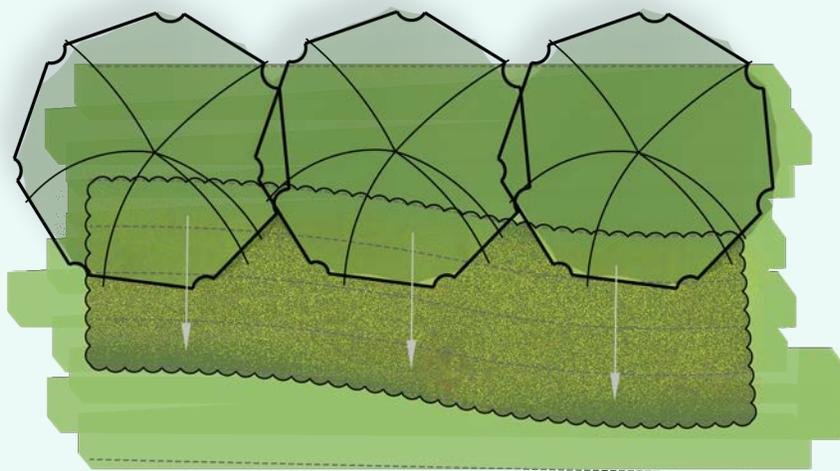
Use the examples below to get familiar with to-scale graphic representations of the Ecological Interventions listed on pp. 19-21. For each of these objects, assume that 1" on paper, equals 20' on site.



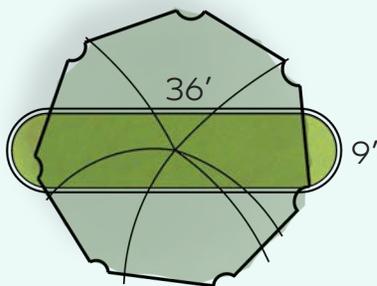
MICRO-BIORETENTION
700 SQ. FT.



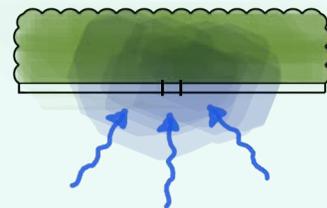
PERMEABLE PAVERS
1800 SQ. FT.



SLOPE STABILIZATION
PLANTING



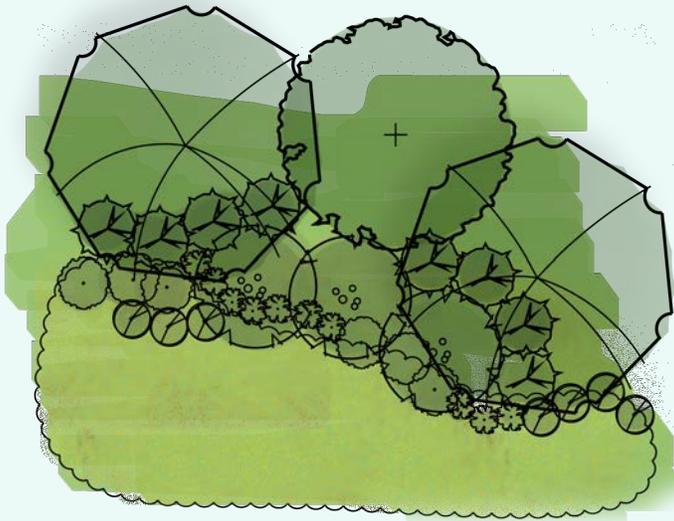
PARKING LOT ISLAND
9' X 36'



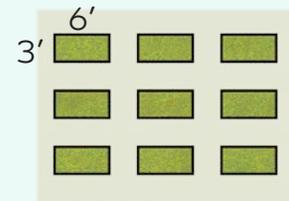
CURB CUT

SCALED OBJECTS

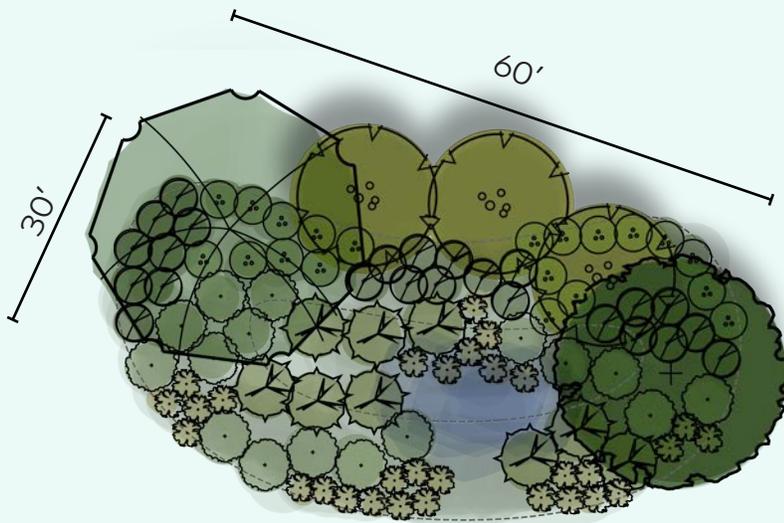
Take some time to practice tracing over each object, as you'll be using them later to lay out your design solution on your site.



NATIVE PLANTING
AREAS



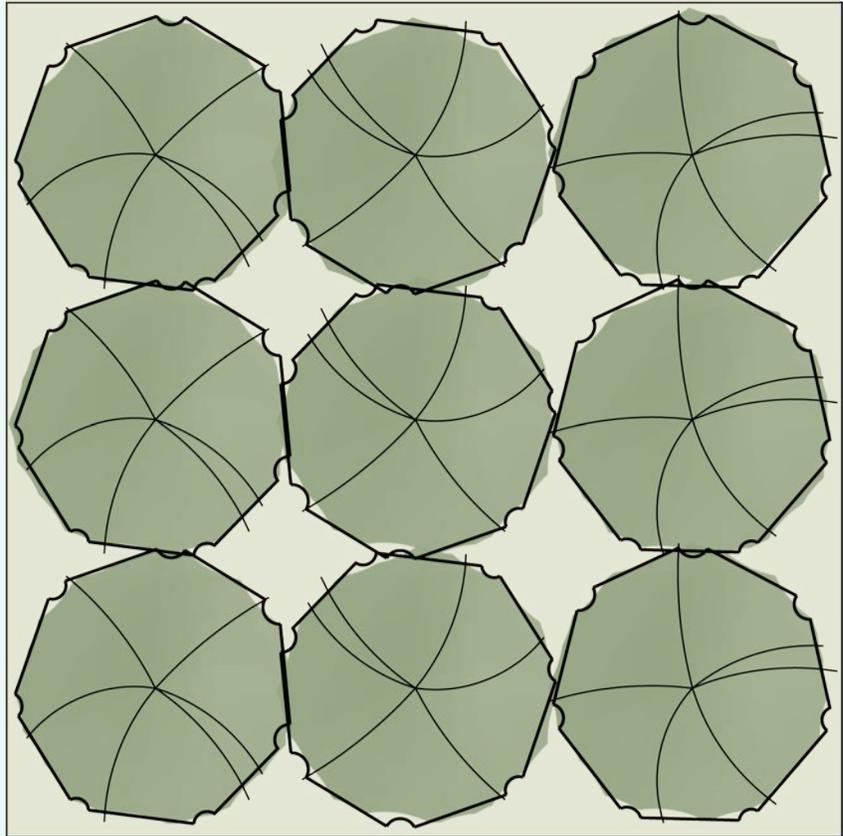
GARDEN BEDS
3' X 6' (PER BED)



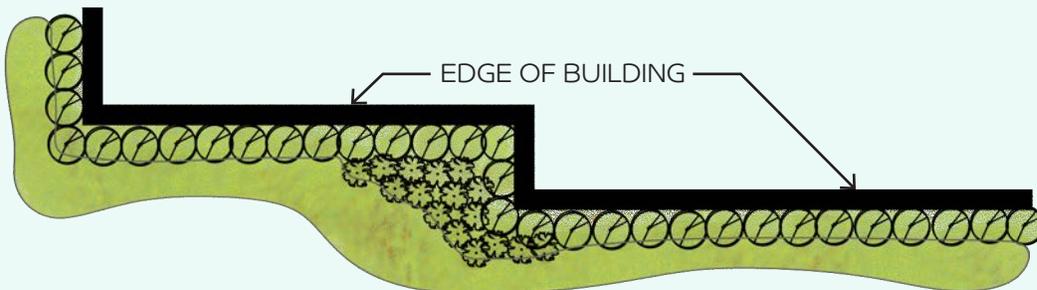
RAIN GARDEN
30' X 65'

SCALED OBJECTS

Use the examples below to get familiar with to-scale graphic representations of the Ecological Interventions listed on pp. 19-21. For each of these objects, assume that 1" on paper, equals 20' on site.



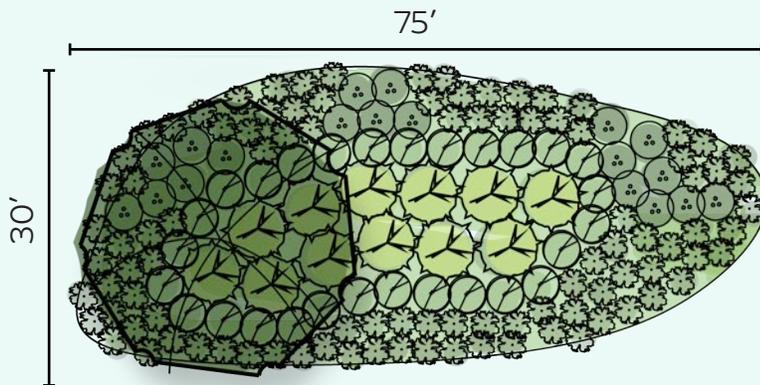
TREE GROVE
90' X 90'



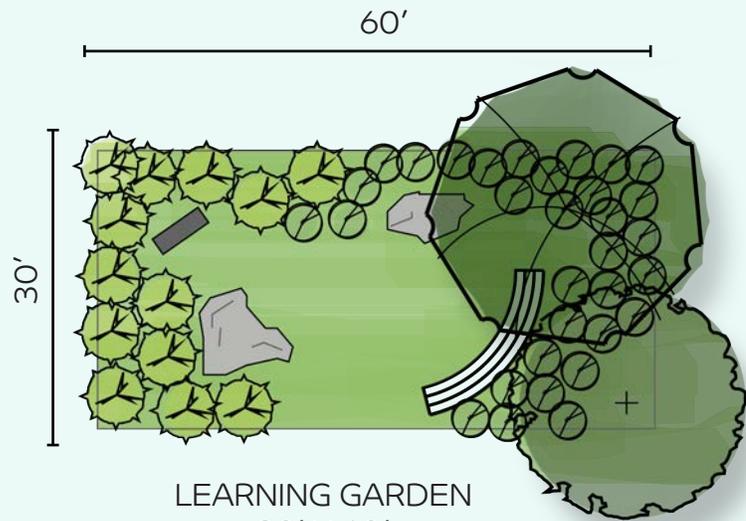
BUILDING FOUNDATION
PLANTINGS

SCALED OBJECTS

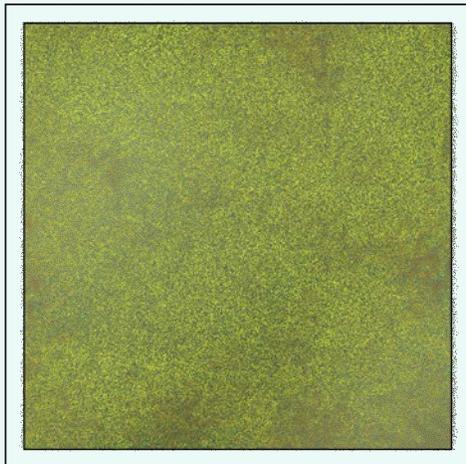
Take some time to practice tracing over each object, as you'll be using them later to lay out your design solution on your site.



POLLINATOR GARDEN
30' X 75'



LEARNING GARDEN
30' X 60'



ROOF GARDEN
50' X 50'

DESIGN ACTIVITY 3: DESIGN YOUR SITE!

Now it's time to take everything you've learned thus far and integrate them into a comprehensive solution to your original design challenge at your site.

You may use this space for additional notes, to plan out your Site Design, or just do it all on trace paper.

DESIGN ACTIVITY 3: DESIGN YOUR SITE!

Be sure to remain focused on coming up with a design solution that addresses the particular ecological issue(s) at your site. While creating a beautiful graphic representation is a major part of design, it is not the main objective for this week's workshop.

Use the space below to describe how you arrived at your design solution. Identify what you learned during each phase of the design process and how your learning informed your design. Think of it as design story-telling!

0. ECOLOGICAL ISSUE :

What was the ecological issue you tried to address?

1. PROGRAM :

What program requirements did you try and meet?

3. SITE INVENTORY :

What did you learn about the site?

4. SITE ANALYSIS

How did you integrate your issue(s), program, and site information ?

5. CONCEPTUAL DESIGN

What is the big idea behind your design (what is the climax of your story)?

Feel free to discuss your ideas with other groups, and don't hesitate to ask for help. Most importantly - think about how you might take the tools you've learned this week, and put them to use back in your classrooms, where you can inspire and empower your students to go outside & change the world. Happy designing!

MAHAN RYKIEL
LANDSCAPE ARCHITECTURE
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