



Brookside
GARDENS



Brookside Gardens



Landscape Architecture

DEPARTMENT OF PLANT SCIENCE AND LANDSCAPE ARCHITECTURE

Thoughtful Interventions Brookside Gardens, Montgomery County, MD

LARC 641: 1st Year Graduate Studio | Spring 2018
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Acknowledgments

Brookside Gardens

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Executive Summary

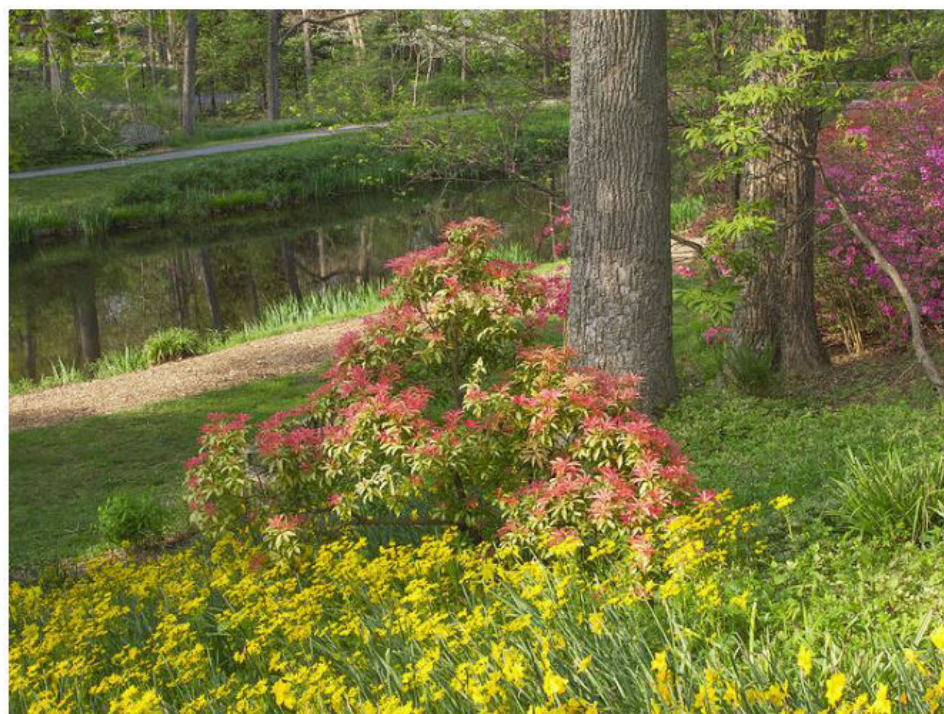


Figure 1

The Brookside Gardens project focuses on three major spaces; the Visitors Center Plaza and Lawn, the Azalea Garden, and the Camellia Garden. The project focuses on thoughtful interventions for these areas that provide ADA pathways, connections between gardens, stormwater solutions, gathering spaces, and plantings.



Figure 2

This project has been created by the students of the University of Maryland's Masters' of Landscape Architecture program under the direction of Dennis R. Nola, PLA, ASLA, in collaboration with the Partnership for Action Learning in Sustainability (PALS) program working in Montgomery County with the Director and staff of Brookside Gardens.

The design team suggests several recommendations for improvement to the gardens.

- Realign pathways to increase universal accessibility and reduce stormwater velocity
- Introduce stormwater best management practices (BMPs) to mitigate stormwater runoff
- Increase the definition of the Great Lawn to provide a grand open space
- Implement a meadow to reduce stormwater runoff and increase beauty and species diversity at the Visitors Center
- Introduce a plaza for gatherings and events adjacent to the Visitors Center
- Define gathering spaces within the Azalea Garden
- Develop a beautiful gate connecting the gardens to the Visitors Center
- Add an amphitheater to provide a performance space within the gardens





Site Analysis

Introduction

Brookside Gardens, a public display garden in Montgomery County Maryland, is an important destination within the Washington, D.C. metropolitan region.

The initial project phase focuses on analyzing the following:

- Regional Context
- Plant Hardiness Zone
- Stream Conditions in Montgomery County
- Surrounding Land Use
- Vehicular and Pedestrian Circulation Patterns
- Soil Conditions
- Wind and Sun Patterns
- Hydrology

Brookside Gardens in Montgomery County, Maryland (Figures 3 and 4) is a part of Wheaton Regional Park (Figures 5 and 6). Brookside Gardens is under the jurisdiction and support of the Maryland-National Capital Park and Planning Commission (M-NCPPC). This bi-county agency, authorized by the State of Maryland in 1927, acquires, develops, maintains and administers a regional system of parks within Montgomery County and Prince George's County. Although Brookside Gardens has its own operating budget and acts as an independent unit, for land use purposes Brookside is considered part of Wheaton Regional Park and must maintain Wheaton Regional Parks mandate of one-third developed to two-thirds undeveloped land use ratio and the current tree cover ratio.¹

Regional Context Map

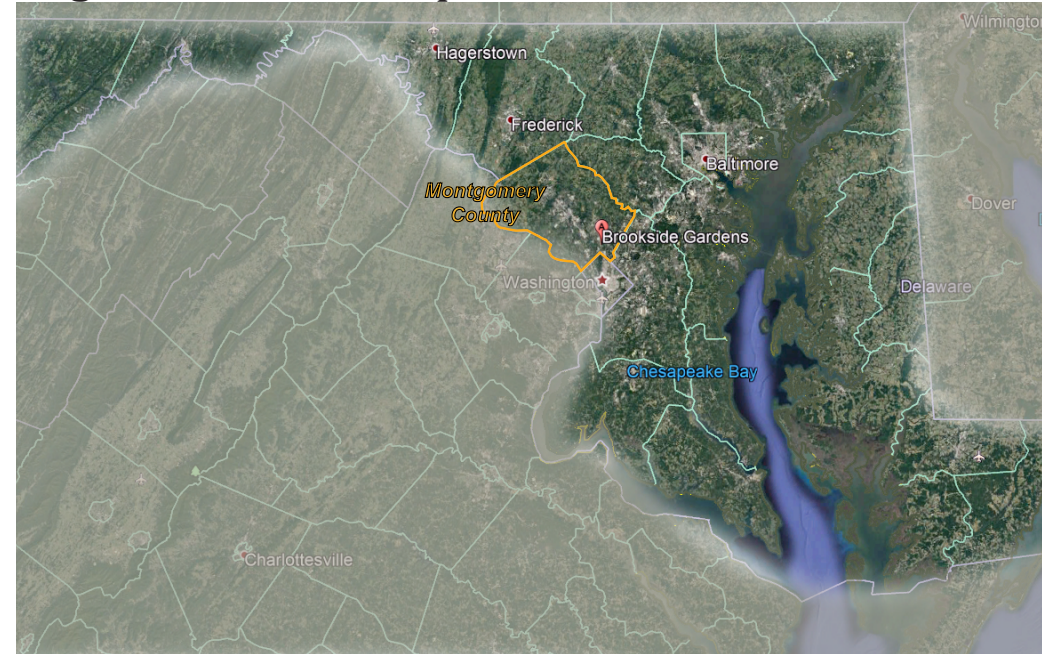


Figure 3

Montgomery County Map



Figure 4

Wheaton Regional Park Area Map

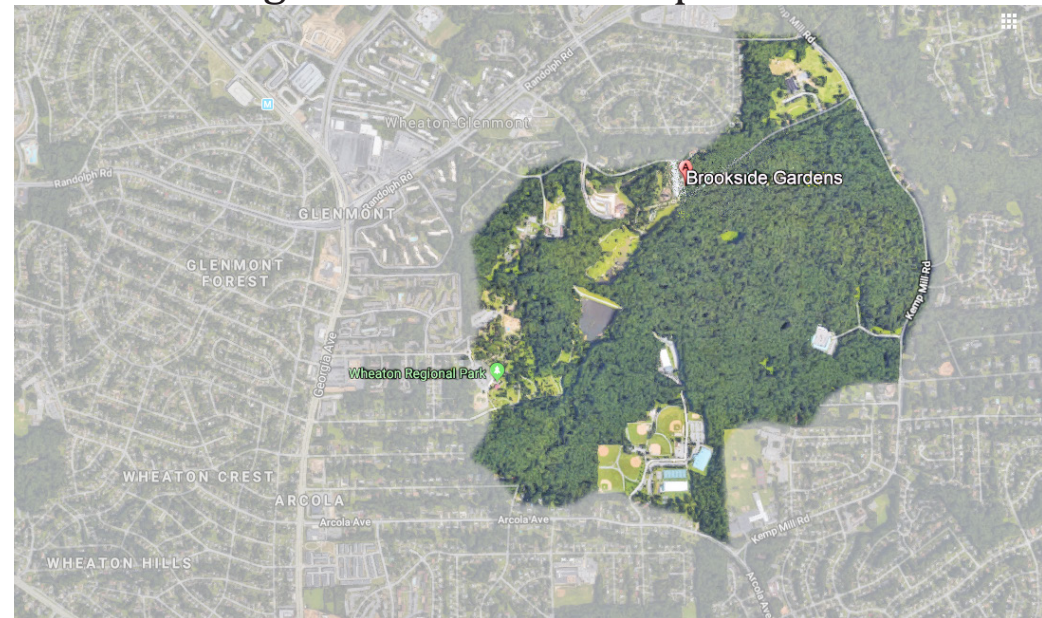


Figure 5

Brookside Gardens



Figure 6

Current Situation

Brookside Gardens is currently experiencing severe maintenance problems due to stormwater running rapidly through the gardens. Throughout the Azalea Garden and Camellia Garden there is a large amount of gullying, erosion, and overall disturbance. This rapid runoff is caused by insufficient and poorly placed pathways, steep slopes, and impervious surfaces that are a part of, and surround the gardens.

Brookside Gardens lacks meaningful spaces and pathways throughout the site. For example, there is no clear pathway from the Visitors Center across the lawn to the Azalea Garden, which leaves people unsure of the best route to use, and discourages exploration through the garden.

Images of Current Conditions



Figure 7



Site Analysis

Brookside Gardens is in hardiness zone 7a, according to the USDA hardiness zone maps (Figure 8). This means plantings should be able to withstand minimum temperatures of 0°F to 5°F.² The average minimum temperature of Rockville, MD, also in Montgomery County, was 44.3°F between 1971-2010, while the average maximum temperature was 65.6°F. The average annual total precipitation was 43.1 inches.³

The stream conditions for Brookside Gardens have been rated as fair by the Montgomery County Department of Environmental Protection, while streams adjacent to the site have been rated poor. Stream condition is related to stormwater runoff and erosion, which is why many of this report's design solutions pertain to improving stream conditions at Brookside Gardens (Figure 9).

A large portion of the land surrounding Brookside Gardens is considered either medium or high density residential land. Also present is a significant amount of institutional and commercial land. All of these land use types have substantial amounts of impervious surface, which leads to increased runoff in the surrounding area (Figure 10).

Brookside Gardens is not easily reached by the surrounding community, especially by those who don't have access to cars. There are public transportation options available, but they're not accessible to all visitors. For example, the Glenmont Metro station is a 1.33-mile walk from Brookside Gardens, but this walk includes paths that are steep and inaccessible, and at times non-existent. There are several bus stops near Brookside Gardens, the closest 0.5-miles away, but paths along Glenallan Avenue and throughout the Park are also often inaccessible (Figure 11).

Plant Hardiness Zone

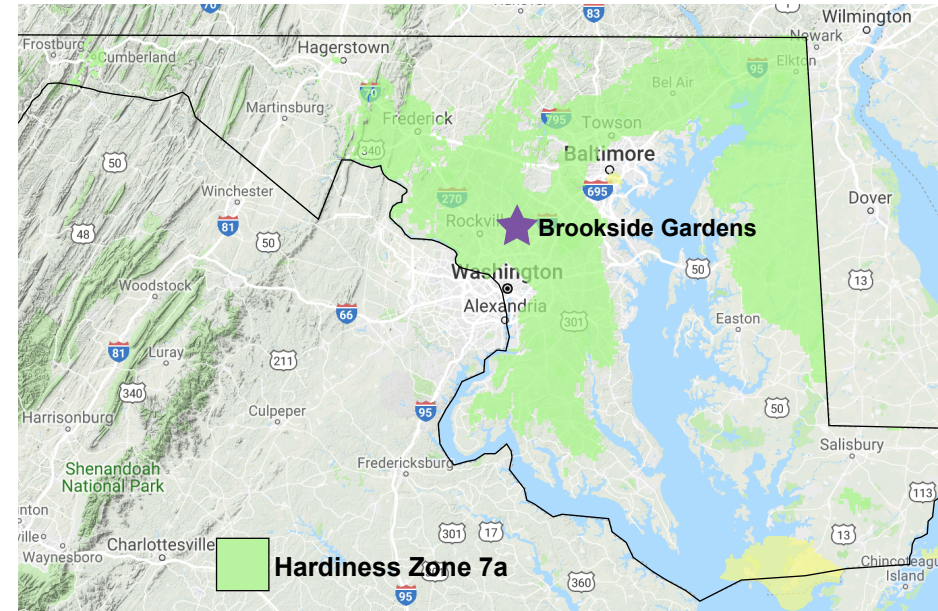


Figure 8

Stream Conditions in Montgomery County

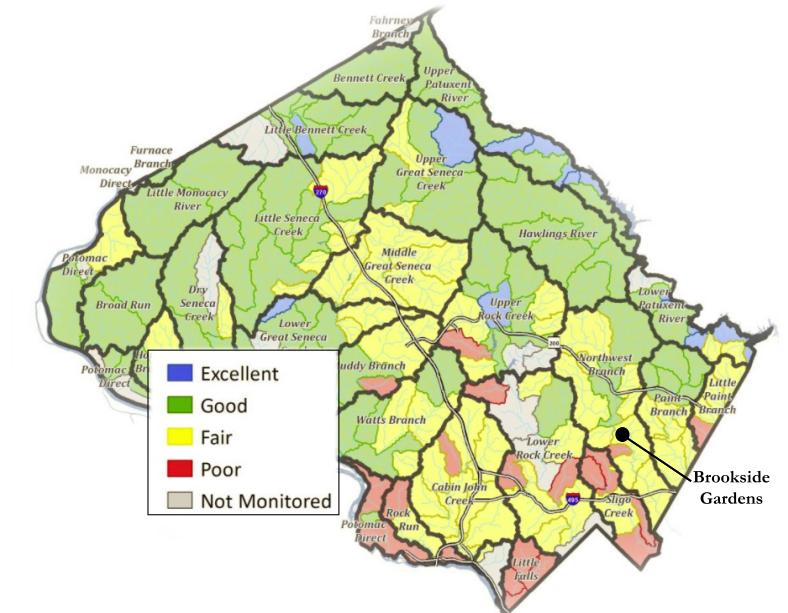


Figure 9

Surrounding Land Use

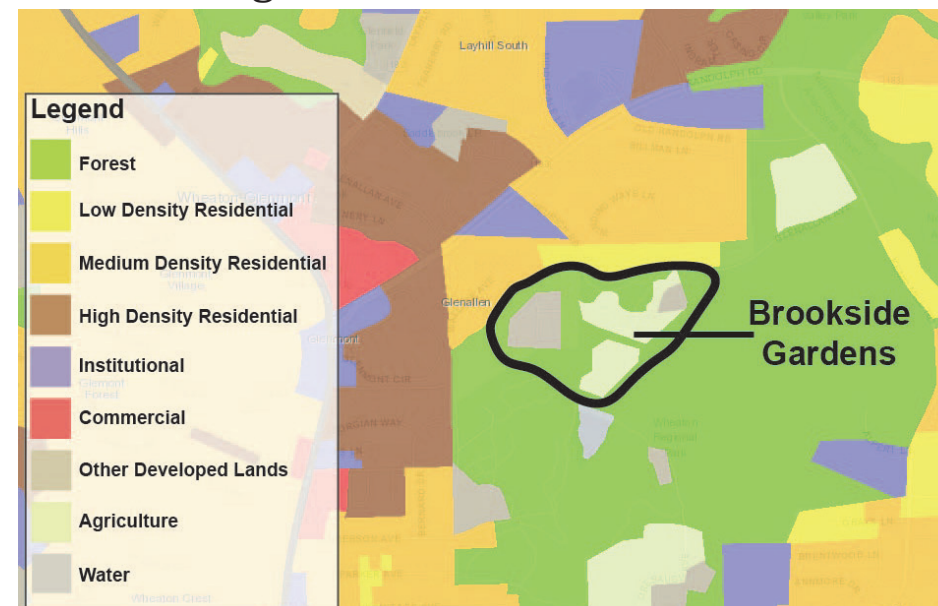


Figure 10

Vehicular and Pedestrian Circulation Patterns

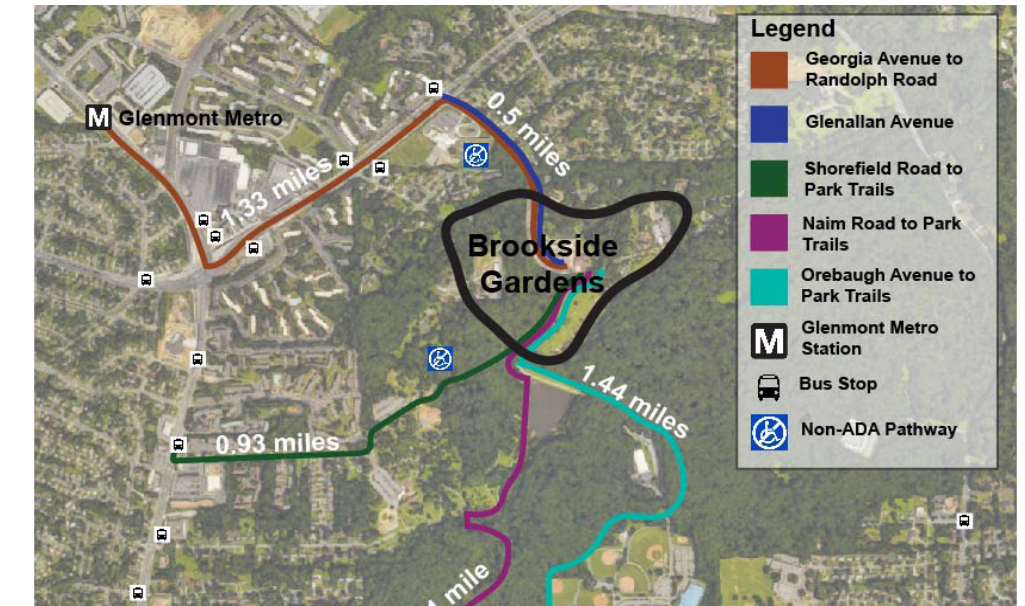


Figure 11

This Brookside Gardens project focuses on three spaces within the gardens: the Lawn and Visitors Center Plaza, the Azalea Garden, and the Camellia Garden (Figure 12).

There are several soil types present in the Brookside Garden area with slopes ranging from 0-15% percent, depending on location (Figure 13). Walkways with a slope greater than five percent are not ADA accessible without handrails, and so the proposed design includes pathway realignments that create ADA compliance.

The site's solar orientation is such that the sun shines most brightly toward the upper part of the Azalea Garden. Also, the Lawn and Visitors Center Plaza will be in shade most of the day. The prevailing harsh winter winds come from the northwest and cooling summer breezes come mostly from the southwest (Figure 14). These factors were considered when choosing plantings and in siting additional amenities.

Brookside Gardens drains to the Glenallan Tributary, which in turn drains to the Northwest branch of the Anacostia River, which then flows into the Potomac River. Brookside Gardens is part of the Northwest branch watershed, which is a sub-watershed of the Anacostia River. Figure 15 shows the direction of drainage on the site.

Project Site Map



Figure 12

Site Slope Map

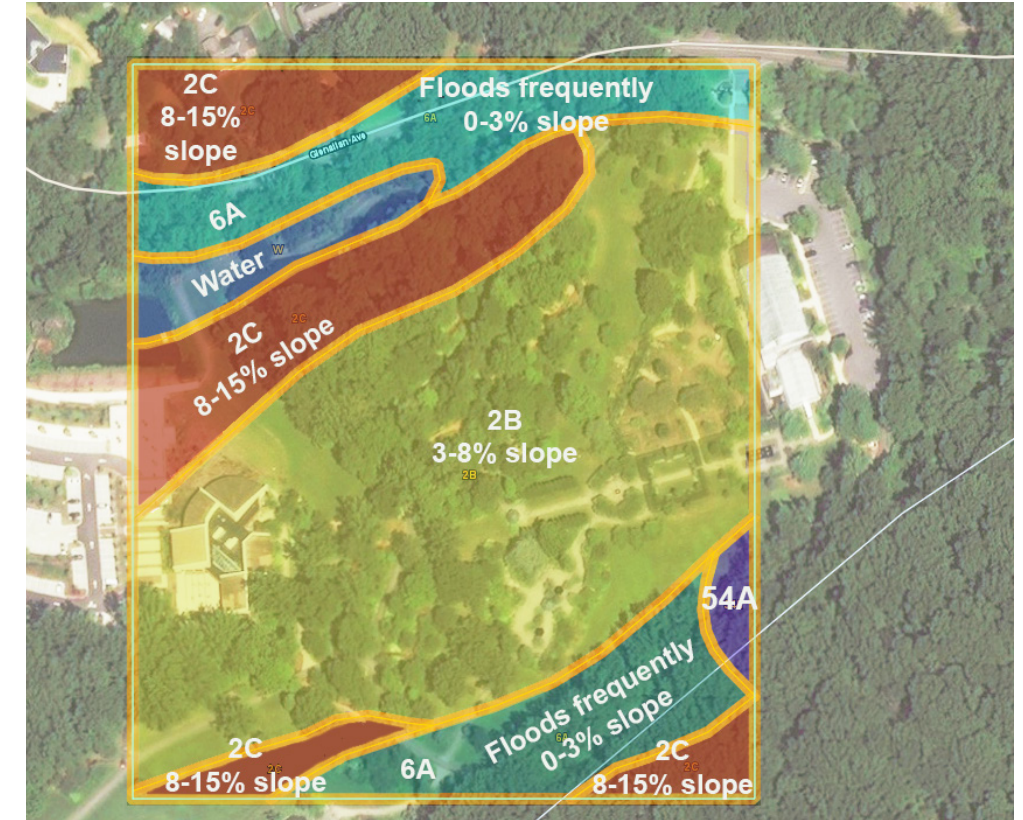


Figure 13

Wind and Sun Map

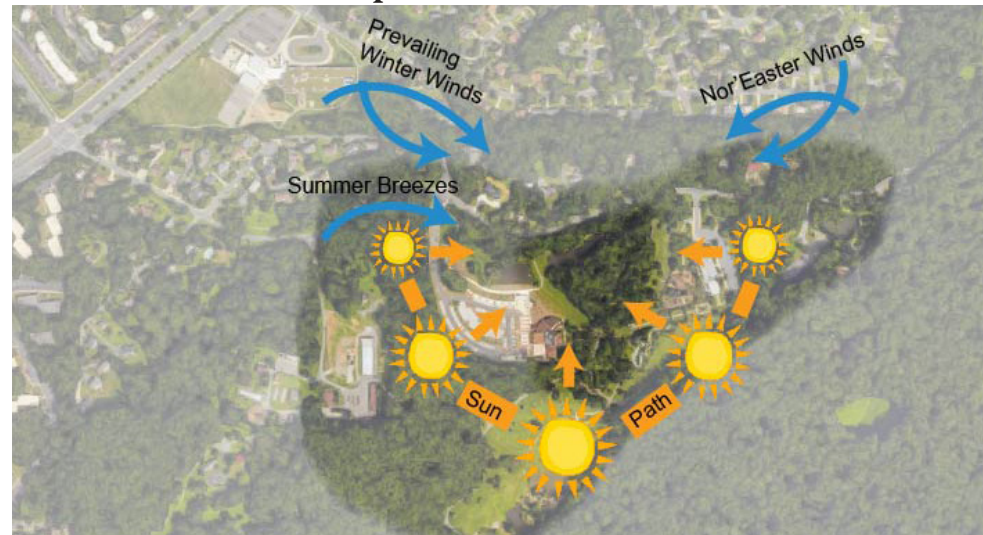


Figure 14

Hydrology Map



Figure 15

History of Brookside Gardens

Brookside Gardens is one of the most popular M-NCPPC destinations and a regional tourist attraction. The gardens began in 1959 when the M-NCPPC purchased land with the idea of maintaining open space in the rapidly developing Wheaton area. The area became Wheaton Regional Park, the first regional park in the M-NCPPC system. In 1960, The Commission purchased a former home and nursery from the Stadler family, which was adjacent to the original Wheaton Park parcel, and developed it into a botanical garden under the direction of landscape architect Hans E. Hanses. Hanses' vision was to create a space to display plants readily attainable in and suitable to the region, according to Montgomery County historical documents. The garden, surrounded by two small streams, was named Brookside Gardens and opened to the public on July 13, 1969.

From 1969 to 1971, Brookside Gardens consisted of the formal gardens, a wedding gazebo, the azalea walk and the conservatory complex. The Gardens were only 25 acres at the time, as compared to the current 54 acres. From 1972-1977, the Gardens expanded, adding the Gude Garden (dedicated by Congressman Gilbert Gude to his father and nurseryman, Adolph Gude), the Fragrance Garden, the Rose Garden, the Trial Garden (for testing annuals) and the Aquatic Garden. The azalea walk was expanded to add shade plants and allow viewing over the Aquatic Garden ponds.

In 1995, the Fragrance Garden was rebuilt and rededicated. The Viburnum and Camellia Gardens were also added. The first Butterfly Exhibit and the Garden of Lights opened in 1997.

From 1998 to 2004, Brookside Gardens changed dramatically. In 1998, the Visitors Center was built from the generous gift of Elizabeth Turner. Just outside of the Visitors Center, the Children's Garden was created. The Reflection Terrace was dedicated on October 1, 2004 to the victims of the 2002 sniper shootings in Montgomery County and is located on eastern bank of the Gude Garden.

The Brookside Gardens Master Plan was developed in 2004 by landscape architecture firm EDAW, and was approved in 2005 by the County Planning Board. The plan lays out a 15-phase development plan for the Gardens over the next 20 to 25 years (Montgomery County Parks. History, 2016). In 2016, a new, upgraded Visitor entrance and Parking Garden were built and renovations to the Gude Garden were completed. In 2018, a new production greenhouse will be completed.

Brookside Gardens continues to focus its efforts to develop via County Capital Improvement Plan funding and donor gifts, according to the Commission and the Garden's master plan.

Brookside Gardens Timeline

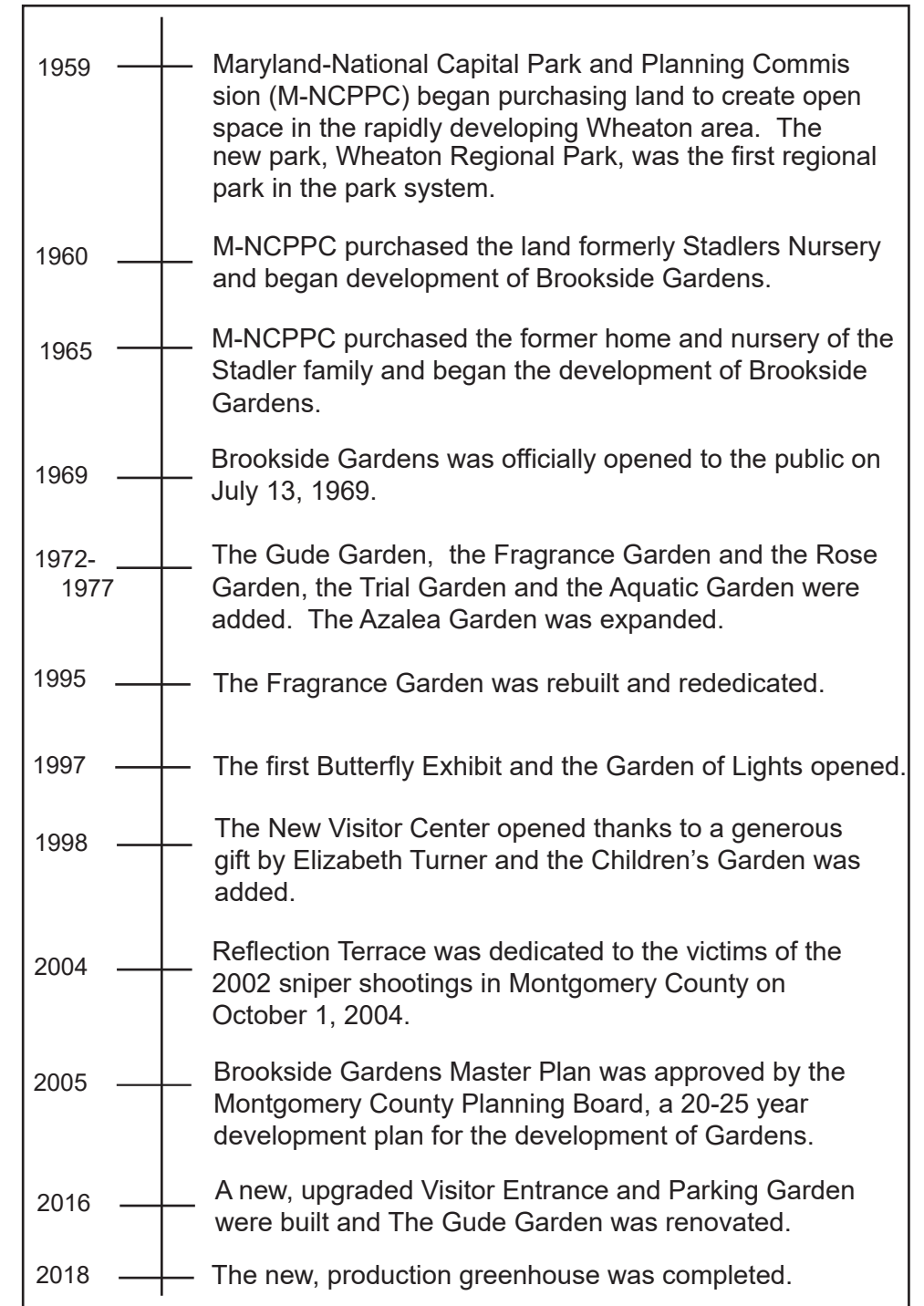


Figure 16





Design

Concept Design Process

Lawn and Visitors Plaza

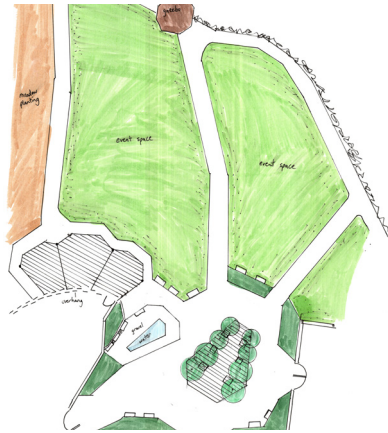


Figure 17

Azalea Garden

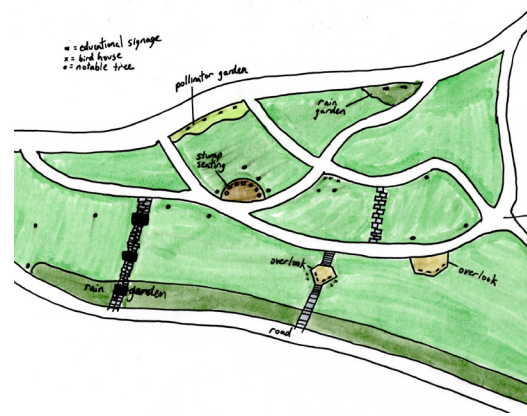


Figure 18

Camellia Garden

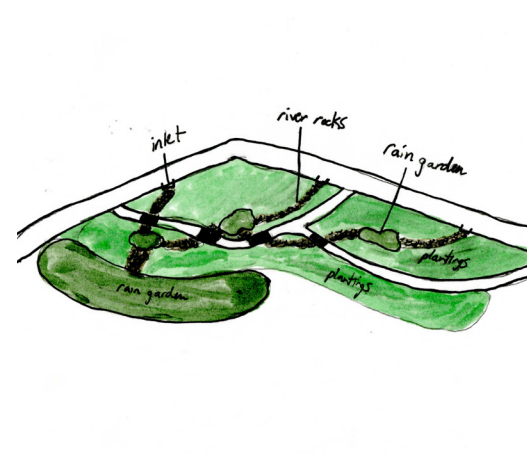
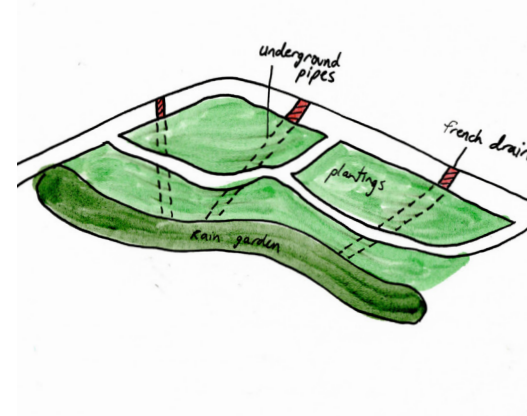
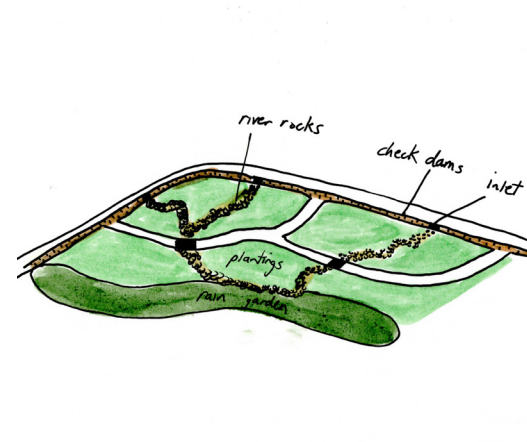


Figure 19

Each student developed several design ideas for the Lawn and Visitors Plaza, the Azalea Garden, and the Camellia Garden.

After synthesizing their design solutions for each space, an interim presentation was shared with Brookside Gardens staff. During this presentation, both the staff and students discussed the positives and negatives of each design, and came up with a modified program to be implemented in the final designs. These figures show the concepts that were presented to the staff of Brookside Gardens during this interim review.

Design Description

The design of Brookside Gardens focuses on bringing accessible and meaningful spaces to the gardens, while simultaneously providing stormwater solutions that will add beauty and usability to the site.

This design intervention focuses on three distinct areas of Brookside Gardens: the Lawn and Plaza near the Visitors Center, the Azalea Garden, and the Camellia Garden.

The design for the lawn and plaza includes a beautiful gate entrance to the Gardens and plaza, as well as plentiful seating options and a distinctive architectonic pergola. The lawn includes plentiful open spaces connected to the Azalea Garden with ADA accessible pathways and a beautiful meadow.

The design solution for the Azalea Garden includes a change in the path system to slow rainwater and increase infiltration, while also providing accessibility from the top of the garden to the ponds below.

It includes plentiful seating areas that can be used for breakout sessions at various symposiums often held at the Visitors Center, additional plantings to control erosion, and a bioswale to direct and infiltrate water runoff.

The design for the Camellia Garden includes a grove of trees that embrace an amphitheater suitable for performances. Alongside the amphitheater is an interconnected system of bioswales and raingardens designed to artfully capture, control, and distribute stormwater.

Inspirational Images



Figure 20. Bioswale



Figure 21. Decorative Trench Drain Cover



Figure 22. Meadow Planting



Figure 23. Bioswale



Figure 24. Series of Raingardens



Figure 25. Runnels and Walls

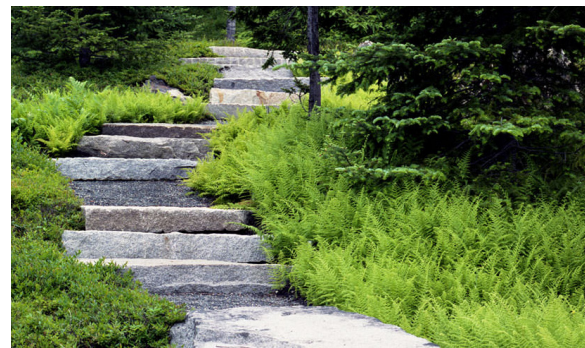


Figure 26. Stone Stairs



Figure 27. Wooded Amphitheater



Figure 28. Council Circle



Figure 29. Garden Gate



Site Plan

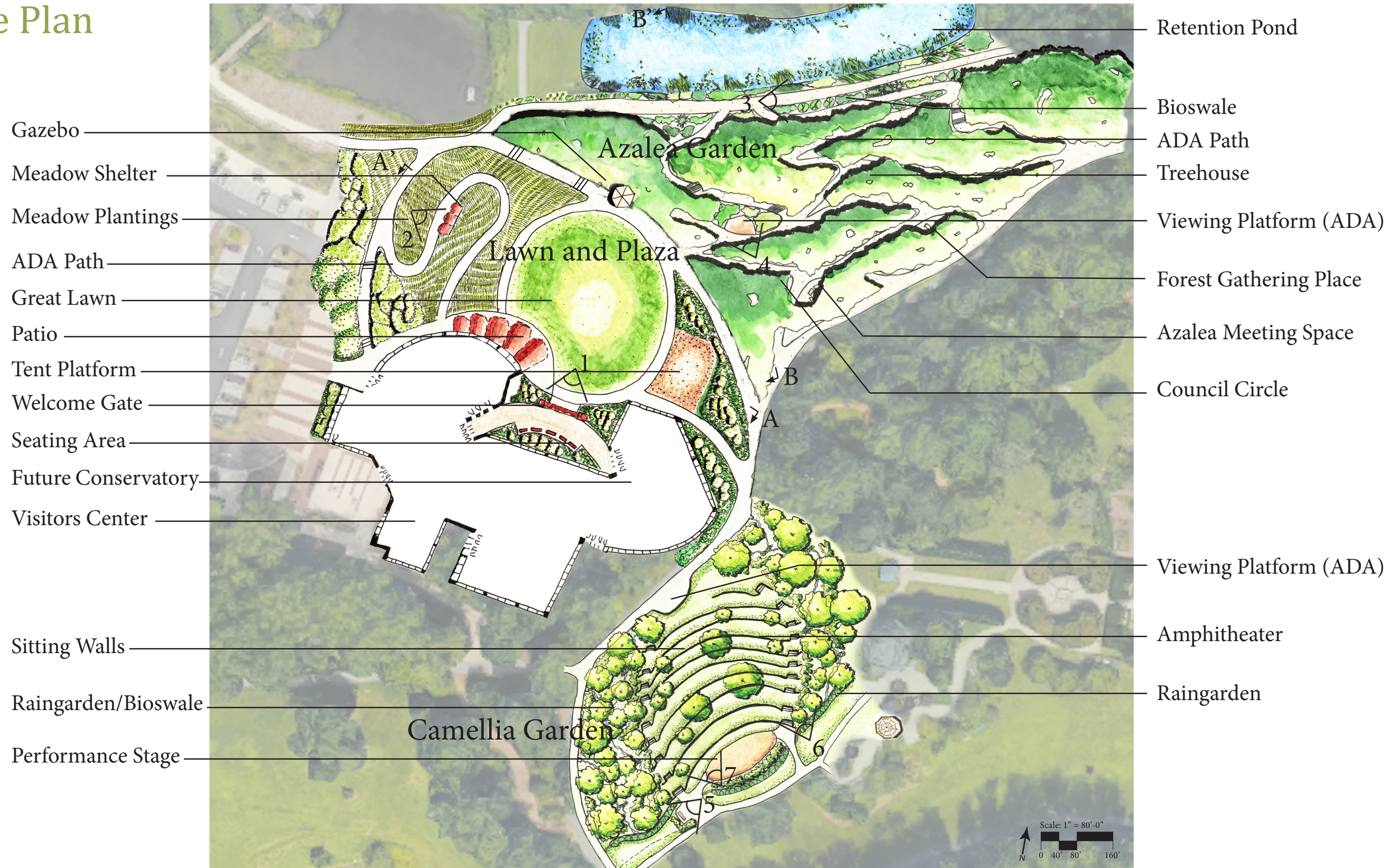


Figure 30



Visitors Center Plaza and Lawn Enlargement

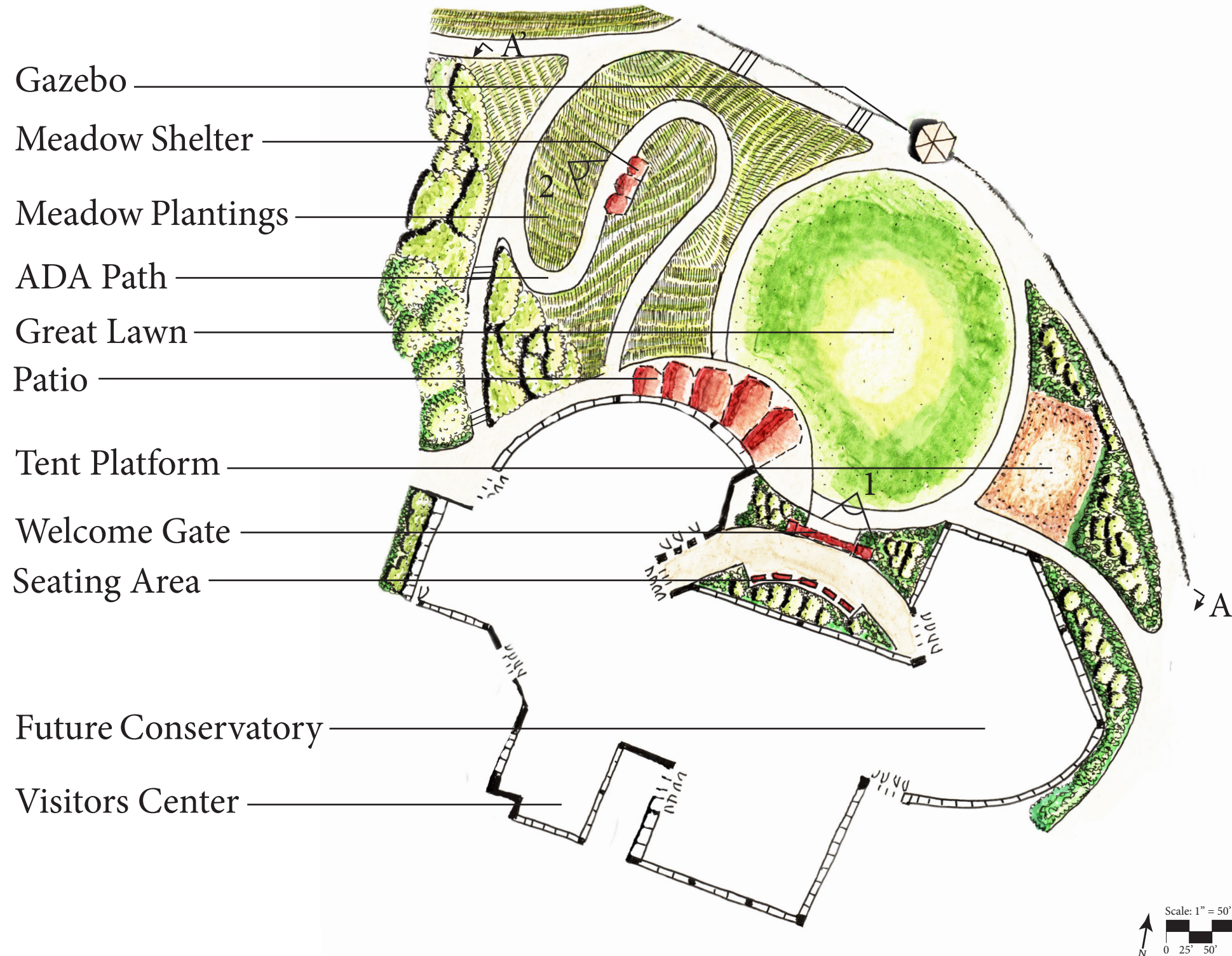


Figure 31

Functional Diagram

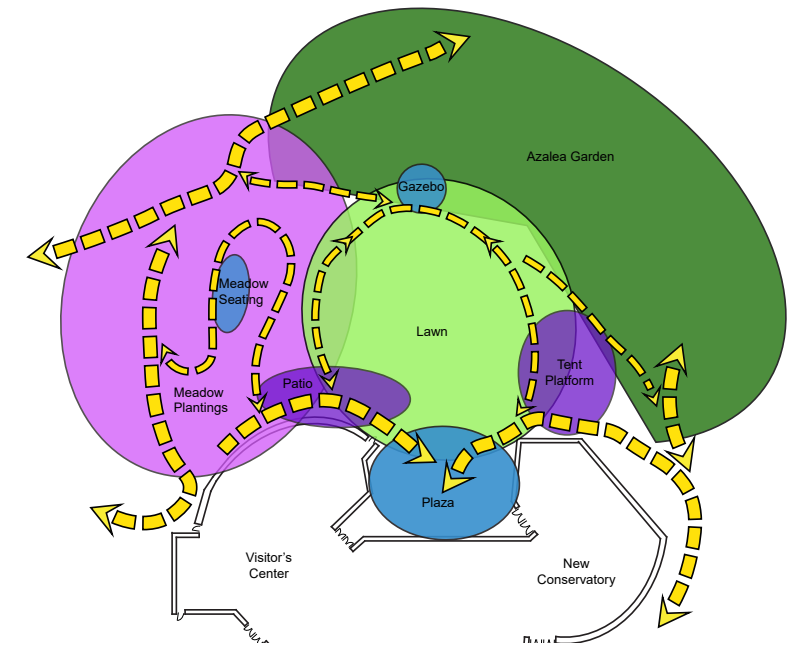


Figure 32

The functional diagram (Figure 32) explains the circulation of people throughout the lawn and plaza, shown by the yellow dashed arrows. Each bubble represents a different space within the study area. The building entries are shown, as well as the gathering places such as the meadow shelter and plaza.

The larger image shows an architectonic loggia over the Visitor's Center patio, which will provide shade and shelter during events. In addition, the room adjacent to the patio will have retractable glass panels to create an indoor-outdoor space when the weather is nice.

Visitors Center Plaza



Figure 33

Meadow Shelter

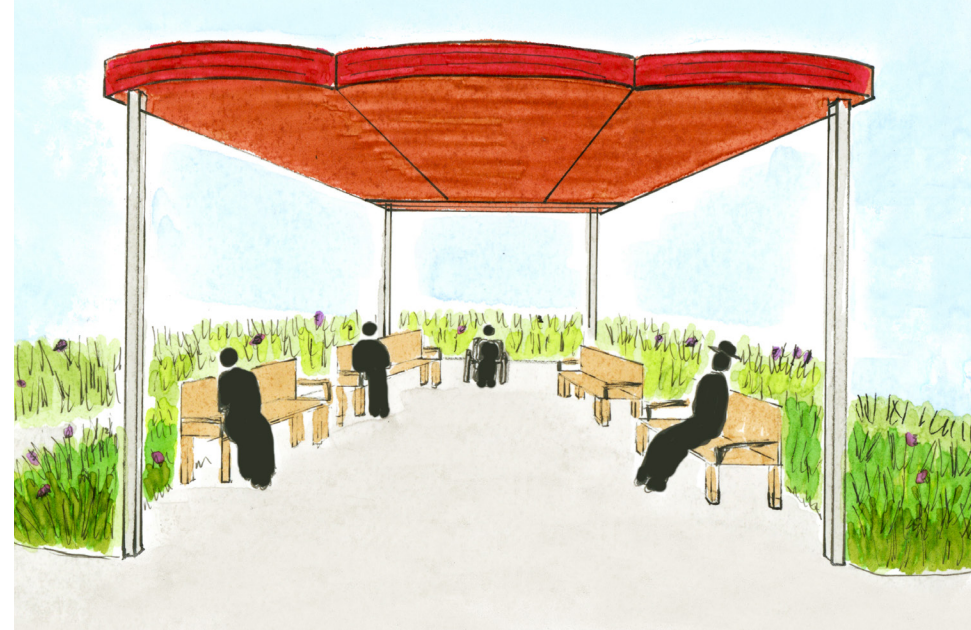


Figure 34

Grading/Lawn and Visitors Center

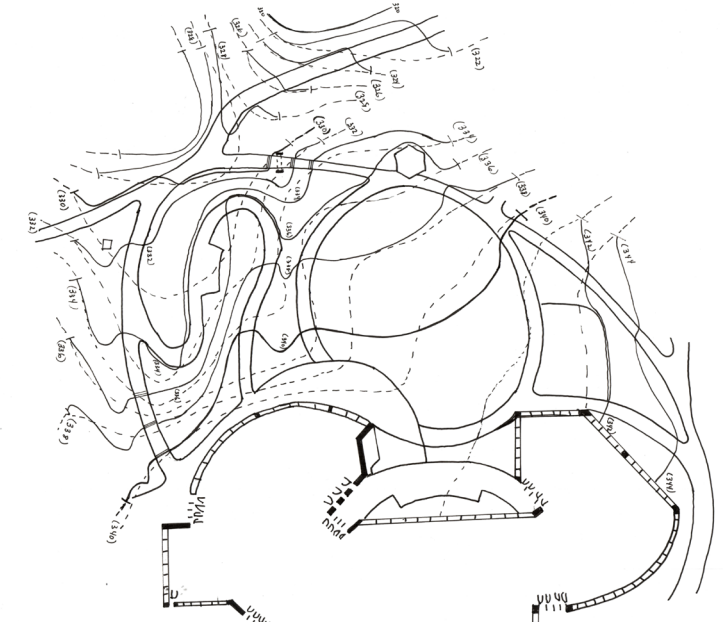


Figure 36

NTS

Conservatory, Visitors Center, Lawn and Meadow

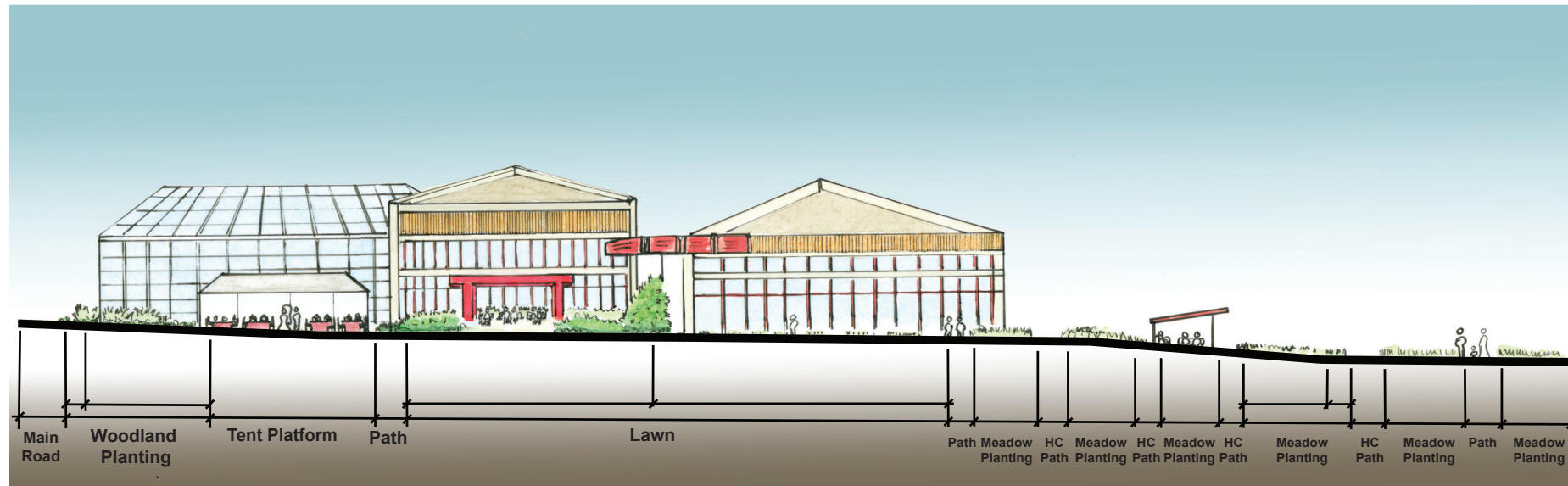


Figure 35

Scale: 1" = 40'-0"
0 20' 40' 80'

Figure 33 shows an iconic welcome gate that connects the plaza of the Visitors Center with the lawn and will provide a portal to the surrounding gardens. Its Chinese-inspired color and style brings definition and interest to the area.

Figure 34 shows the meadow shelter. This space mimics the architectonic design of the loggia at the Visitors Center patio. It is meant to be a restful and reflective area in the midst of a beautiful meadow.

Figure 35 is a section cut through the lawn and plaza, which begins near the tent platform and cuts through the lawn area down to the meadow. This delineates the path system as well as the proposed conservatory that will be incorporated into the space.

Figure 36 provides technical information regarding the shifting of landforms required to achieve the proposed design.



Azalea Garden Enlargement

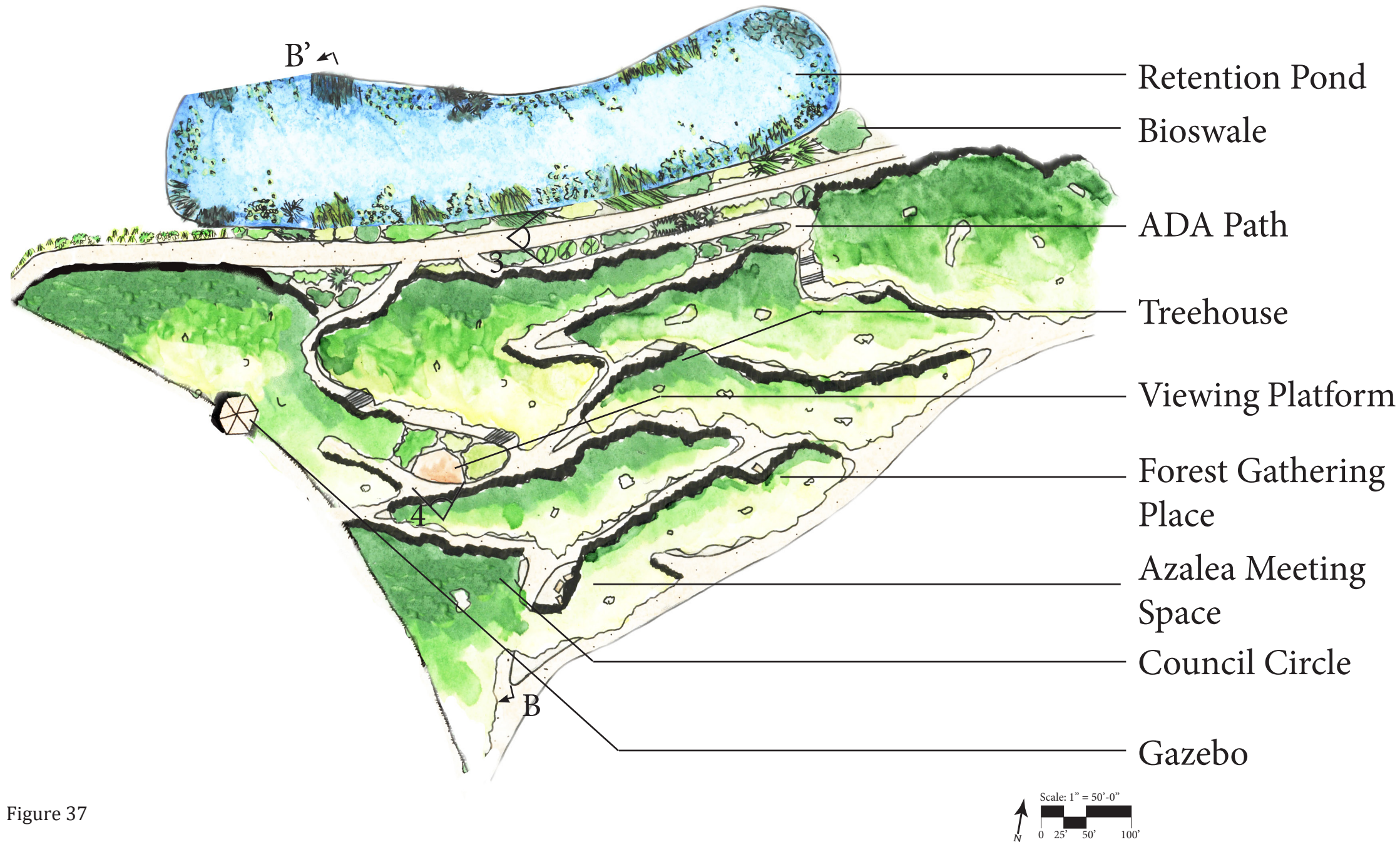


Figure 37

Functional Diagram

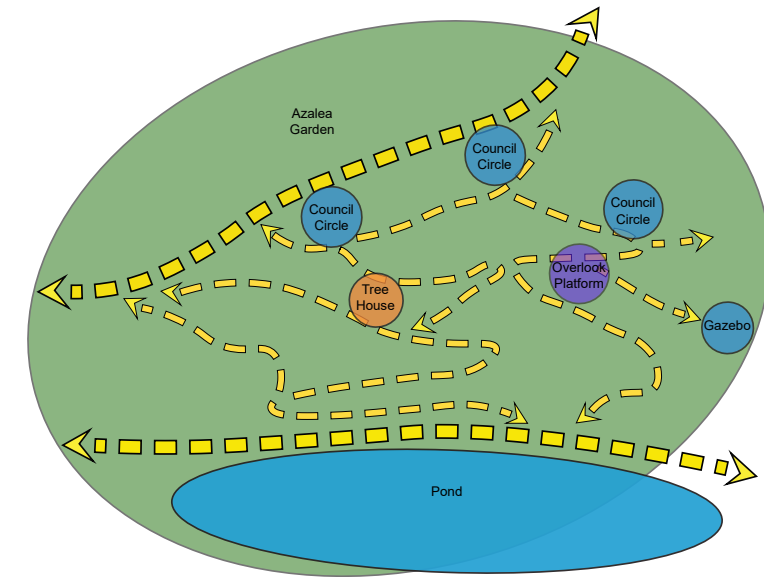


Figure 38

The Azalea Garden is re-envisioned a heavily planted area with several gathering spaces that can be used during corporate training breakout sessions. It includes ADA-compliant pathways throughout the garden to bring universal accessibility to most of the space. A bioswale runs alongside the uphill edge of the pathway closest to the pond to slow and prevent stormwater runoff from washing debris over the pathway and into the pond.

Pond Pathway



Figure 39

Viewing Platform



Figure 40

Grading/Azalea Garden

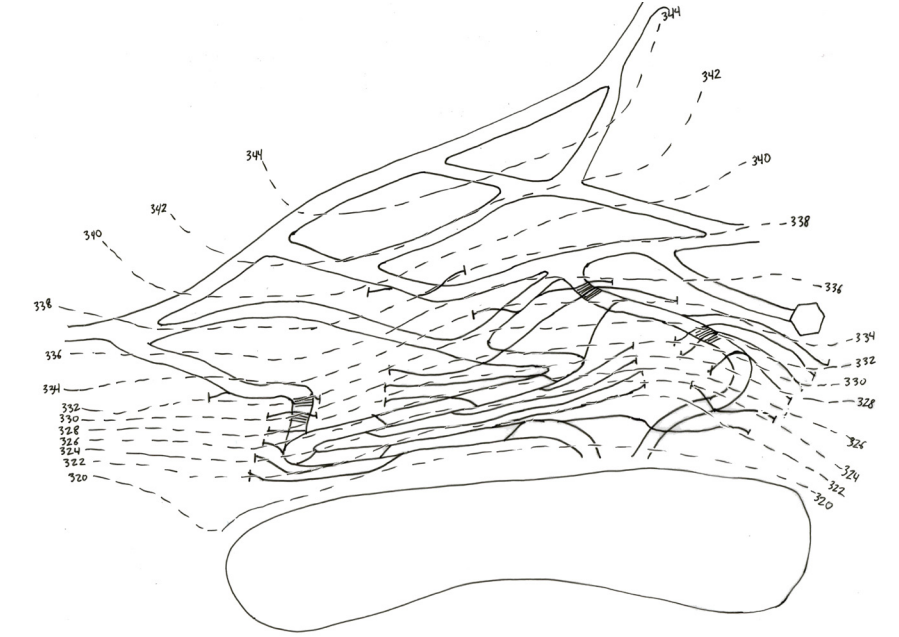


Figure 42

NTS

Pathways, Council Circle, Viewing Platform and Pond

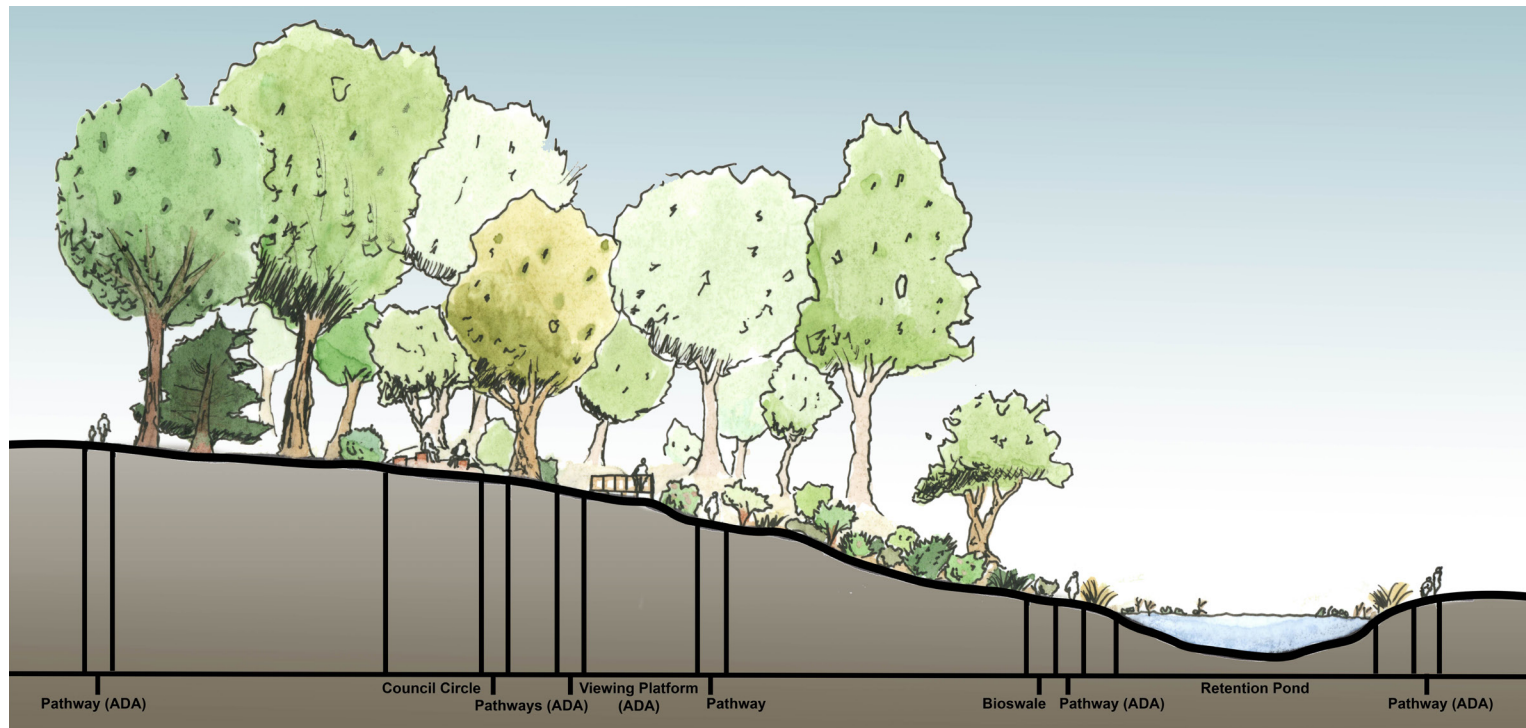


Figure 41

Scale: 1" = 40'-0"
0 20' 40' 80'

Figure 39 shows the ADA-compliant pathway along the pond, and a bioswale that will capture stormwater runoff and also provide beauty, interest, and additional wildlife habitat to the space.

Figure 40 is a perspective from the Viewing Platform, which allows visitors to learn more about the garden via interpretive signage, as well as look out on the plantings and enjoy the view toward the pond.

Figure 41 is a section cut of the Azalea Garden that begins at the upper path and goes along the Council Circle and Viewing Platform, and down the slope to the pond. Pathways are shown, as well as plantings.

Figure 42 is a grading plan that shows how to adjust the landform to accommodate the proposed ADA-compliant pathways and the new breakout spaces.



Camellia Garden Enlargement

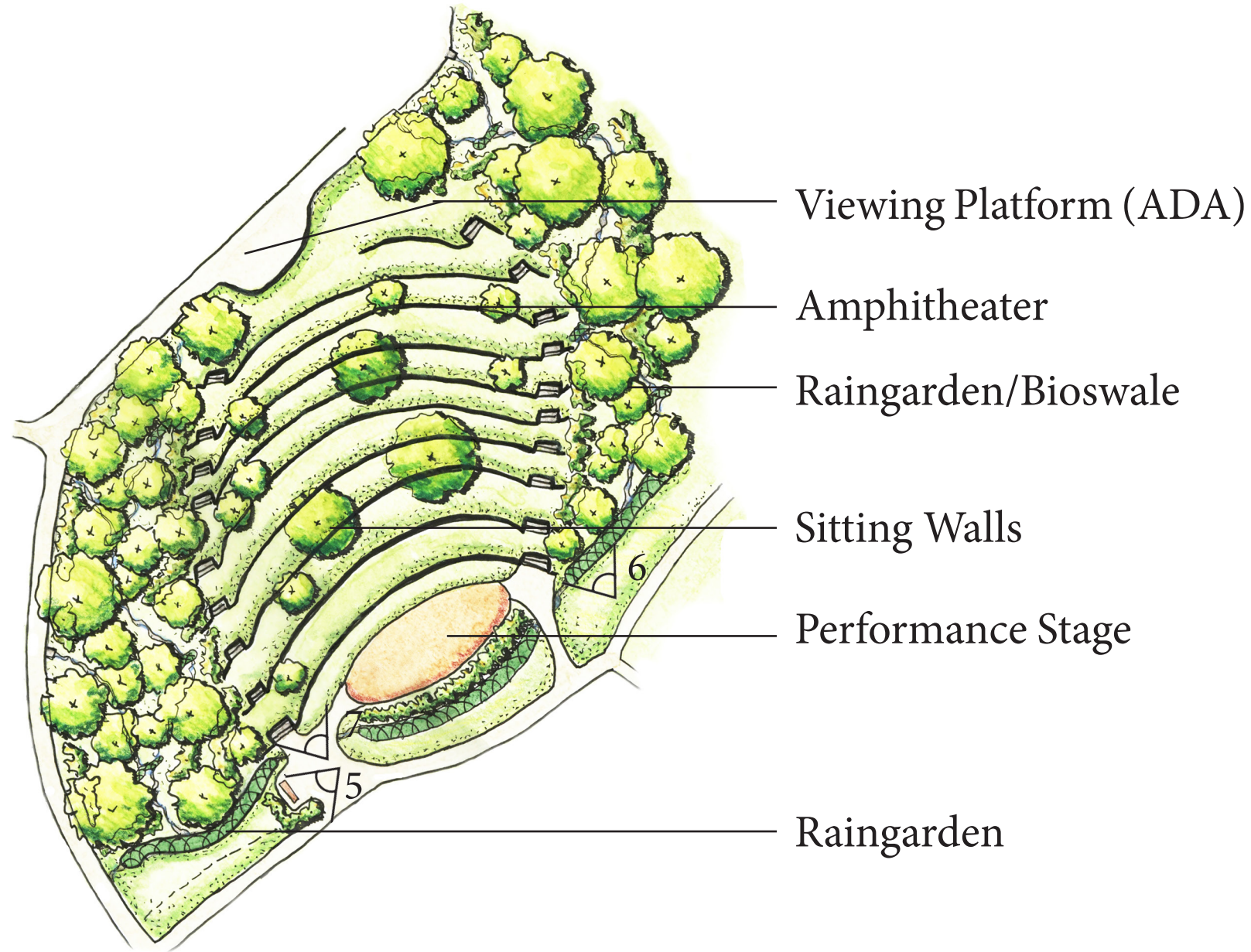
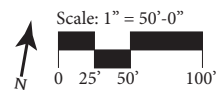


Figure 43



Functional Diagram

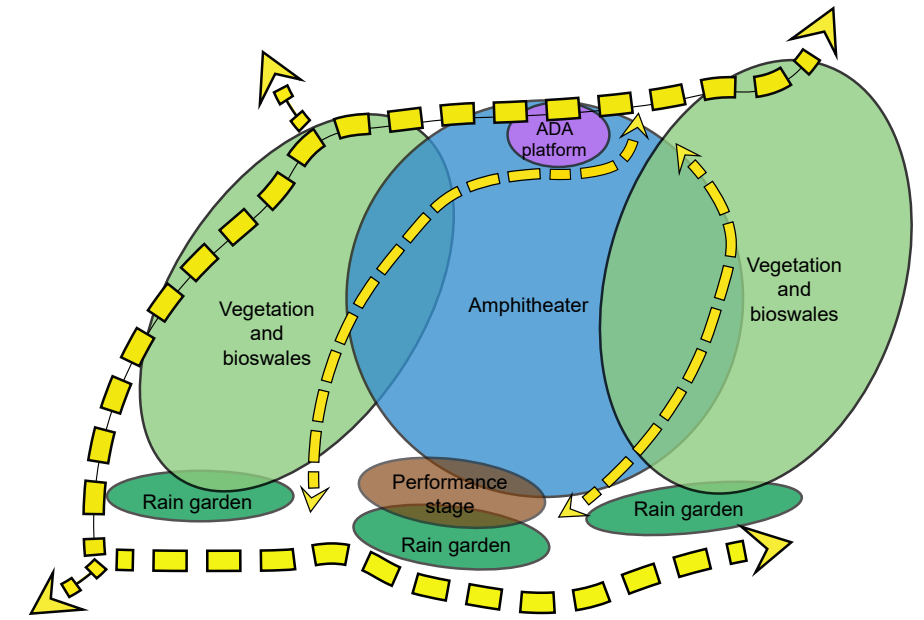


Figure 44

The Camellia Garden includes raingardens and bioswales below the highly vegetated area surrounding the amphitheater; they will sequester and absorb stormwater runoff. Proposed pedestrian circulation will run along the sides of the amphitheater and below the rain gardens. The Camellia Garden uses stone sitting walls as well as grassy areas on each level to provide a variety of seating options.

Raingarden



Figure 45

Amphitheater Walls



Figure 46

Grading/Camellia Garden

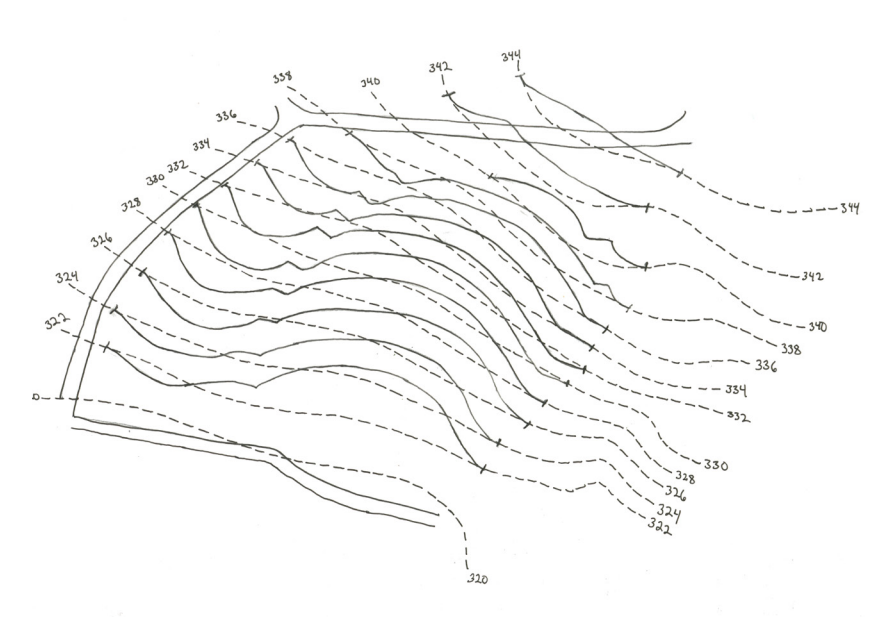


Figure 49

NTS

Amphitheater



Figure 47

Construction Detail



Figure 48

Figure 45 shows the rain garden at the amphitheater's base that provides drainage and sequestration of stormwater.

Figures 46 and 47 show what the amphitheater levels look like, with stone sitting walls as well as grassy areas between each level.

Figure 48 is a construction detail showing stormwater flow throughout the bioswale/rain garden system and infiltration into the ground water.

Figure 49 details the amphitheater's adjusted landform to accommodate the shaped sitting walls and levels.

Performance Metrics

The proposed permeable paving, raingardens and bioswales in the three sites add 13,032 square feet of area for water sequestration. This translates to 97,486 gallons of water sequestered. The three sites total 4.42 acres,⁴ which means the three site areas can sequester a 0.81" rain event,⁵ meaning about 55 percent of Maryland rain events can be fully sequestered by these interventions.⁶

This does not take into account the natural stormwater sequestration methods, such as vegetation and soil, which are abundant in the spaces.

Conversion Factor

- 1 cu foot = 7.481 gallons
- 1" rain falling on one acre = 3,630 cu ft
- Total site area = 4.42 acres
- 1" rain falling on one acre = 27,154 g

Sequestered Water

- 97,489 gallons
- 22,056 gallons sequestered/acre
- 0.812 inches of water
- 55% of Maryland's stormwater events

Stormwater Interventions

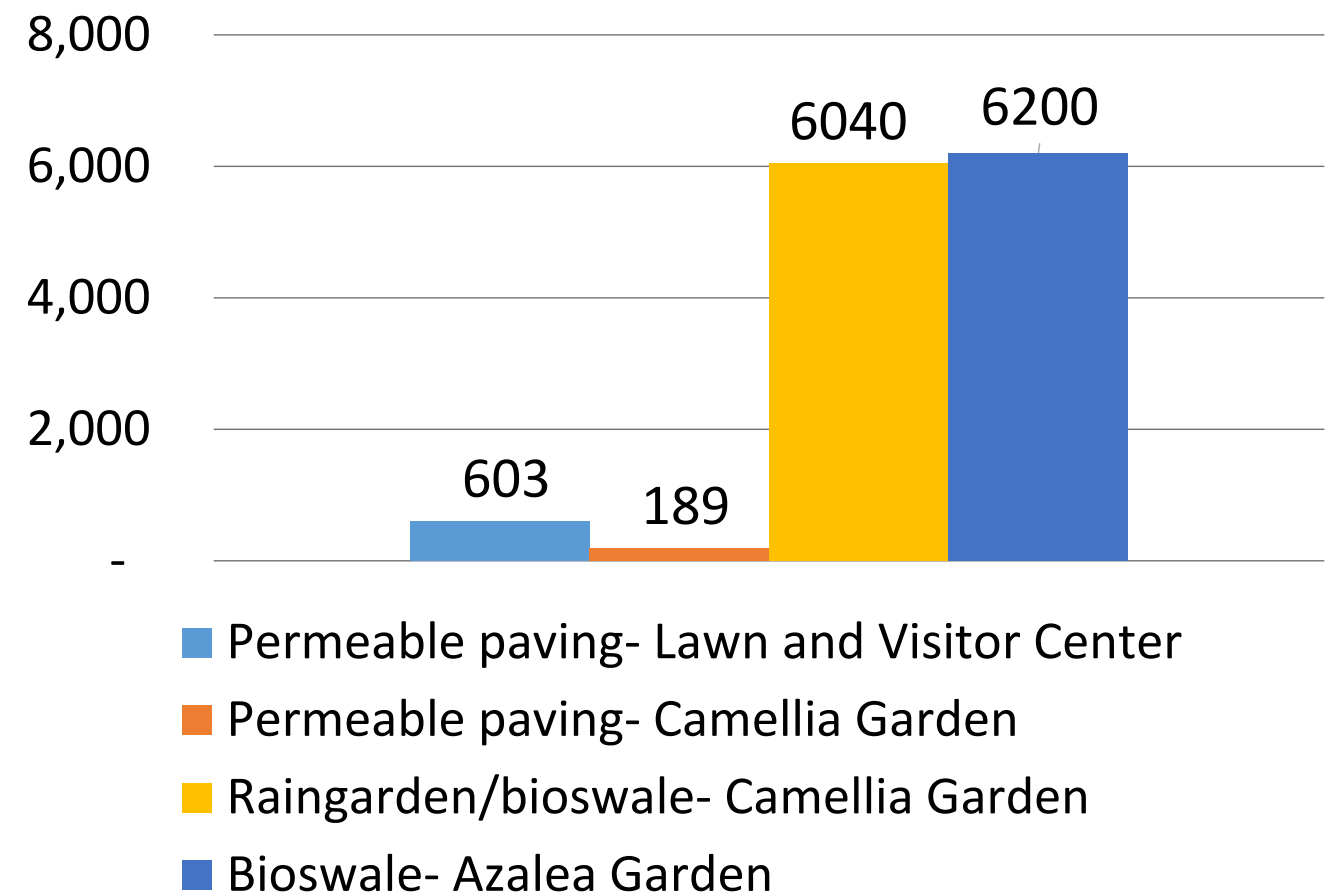


Figure 50

Adding ADA-compliant pathways was an important part of this design. In the lawn and Visitors Center plaza, 79 percent of the pathways are considered universally accessible, while only 21 percent are non-ADA-compliant. Between the lawn, tent platform, Visitor's Center patio, and the meadow shelter, there is room for approximately 1,100 people to gather.

In the Azalea Garden, 84 percent of pathways are considered universally accessible, while only 16 percent are non-ADA-compliant. The gathering spaces, viewing platform and treehouse can hold approximately 60 people.

The design of the Camellia Garden takes into account the steep slope, which is why the amphitheater is appropriate for the space. An ADA-compliant platform was placed at the top of the amphitheater to provide an unobstructed viewing of the stage. This accounts for the space's two percent universal accessibility. The sitting walls, lawn space and viewing platform of the amphitheater can hold 888 people.

Percentage of Universal Access by Garden

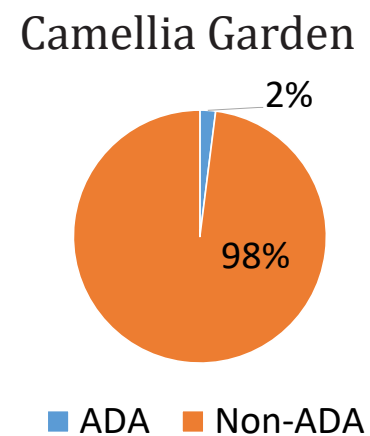
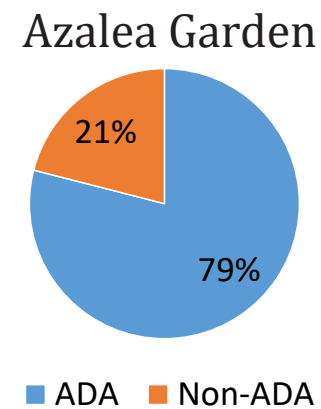
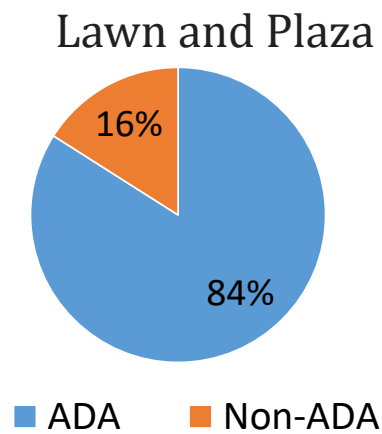
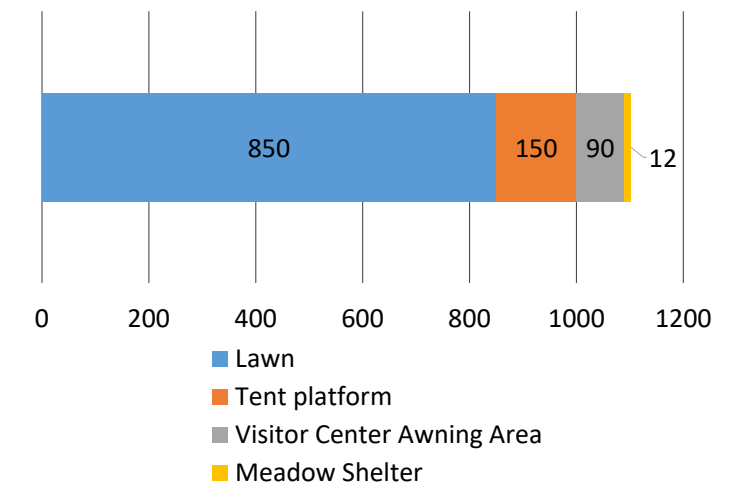


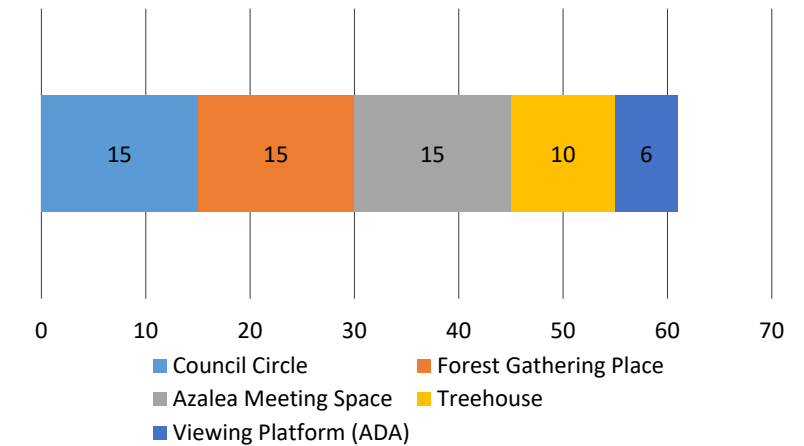
Figure 51

Outdoor Space Additions

Lawn and Plaza by Number of People



Azalea Garden by Number of People



Camellia Garden by Number of People

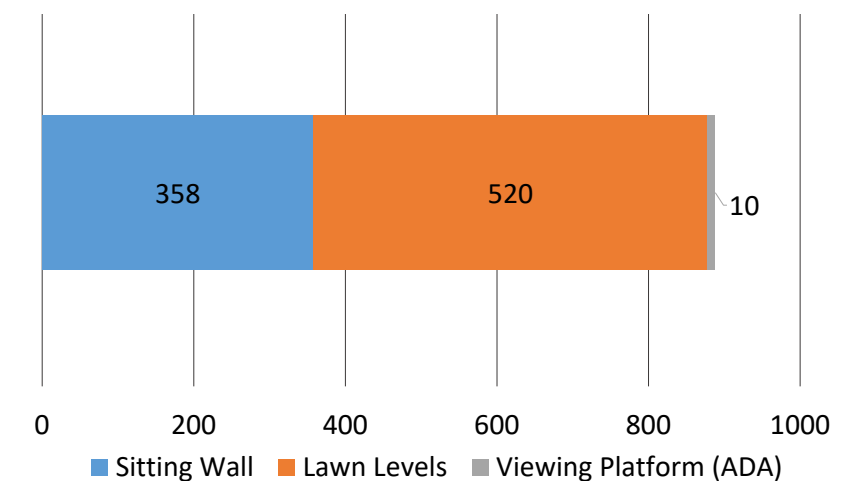


Figure 52

Citations

Cover Photo Credits

Upper left: Gude Garden in Fall:

<https://apps.montgomerycountymd.gov/BASISCAPITAL/Common/Project.aspx?ID=P078702>

Lower left: Gude Garden Path: Photo Brookside Gardens

Lower right: Fragrance Garden: <http://pittsburghowlscribe.blogspot.com/2013/03/brookside-gardens-year-round-beauty-in.html>

Upper right: Spring Tulips: Photo Brookside Gardens

Site Analysis and Design Pages Photos Credit: Sherry Russell

Figure 1. <http://chrisscroggins.com/featured/brookside-gardens-8-chris-scroggins.html>

Figure 2. Photo from <http://pittsburghowlscribe.blogspot.com/2013/03/brookside-gardens-year-round-beauty-in.html>

Figure 3. Based on USGS Web Soils Map. Created by Sherry Russell

Figure 4. Based on USGS Web Soils Map. Created by Sherry Russell

Figure 5. Based on USGS Web Soils Map. Created by Sherry Russell

Figure 6. Based on USGS Web Soils Map. Created by Sherry Russell

Figure 7. Photos taken by Sherry Russell, Sarah Turner and Sarah Wallace

Figure 8. USDA Hardiness Zone Map created by Sarah Turner

Figure 9. Montgomery County Department of Environmental Protection

Figure 10. Created by Sarah Turner based on <http://mdpgis.mdp.state.md.us/landuse/imap/index.html>

Figure 11. Based on Google Maps. Created by Sarah Turner

Figure 12. Based on USDA Web Soil Survey. Created by Sherry Russell

Figure 13. Map and calculations based on NRCS Web Soil Survey. Created by Sarah Wallace

Figure 14. Based on Google Maps. Created by Sarah Turner

Figure 15. Based on Google Maps. Created by Sarah Wallace

Figure 16. Timeline Created by Sherry Russell based on Montgomery Parks and Brookside Gardens websites. <http://apps.montgomerycountymd.gov/BASISCAPITAL/Common/Project.aspx?ID=P078702>; www.montgomeryparks.org/uploads/docs/MontgomeryCountyHistoricalSocietyHistoryofWheatonRegionalPark.pdf; <https://www.montgomeryparks.org/parks-and-trails/brookside-gardens/about/history/>

Figure 17. Created by Sarah Wallace, Sarah Turner and Sherry Russell

Figure 18. Created by Sarah Wallace, Sarah Turner, and Sherry Russell

Figure 19. Created by Sarah Turner

Figure 20. Photo from [Artful Rainwater Design](#), by Stuart Echols and Eliza Pennypacker

Figure 21. Photo from artfulrainwaterdesign.psu.edu/project/mount-tabor-middle-school-rain-garden

Figure 22. Photo from grownatives.cnps.org/category/wildflowers

Figure 23. Photo from www.biohabitats.com/wp-content/uploads/GeorgiaTechEBBCommons_11370.01-1.pdf

Figure 24. Photo from www.asla.org/2017awards/323929.html

Figure 25. Photo from www.asla.org/awards/2008/08winners/415.html

Citations

Figure 26. Photo from <http://stephenstimson.com/project/northeast-harbor>

Figure 27. Photo from www.asla.org/guide/site.aspx?id=35760

Figure 28. Photo from <https://worldbeyondwar.org/telling-new-story/>

Figure 29. Photo from <http://crja.com/project/chinatown-park/>

Figure 30. Created by Sherry Russell, Sarah Turner and Sarah Wallace

Figure 31. Created by Sherry Russell

Figure 32. Created by Sarah Wallace

Figure 33. Created by Sherry Russell

Figure 34. Created by Sherry Russell

Figure 35. Created by Sherry Russell

Figure 36. Created by Sherry Russell

Figure 37. Created by Sarah Turner

Figure 38. Created by Sarah Wallace

Figure 39. Created by Sarah Wallace

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Figure 47. Created by Sarah Wallace

Figure 48. Created by Sarah Wallace

Figure 49. Created by Sarah Wallace

Figure 50. Created by Sherry Russell

Figure 51. Created by Sherry Russell

Figure 52. Created by Sherry Russell

Notes

Note 1. About Us. (2018). Retrieved 4 17, 2018, from M-NCPPC:

<http://www.mncppc.org/27/About-Us>

Note 2. <http://planthardiness.ars.usda.gov/PHZMWeb/#>

Note 3. <https://sercc.com/cgi-bin/sercc/cliMAIN.pl?md7705>

Note 4. Area calculated based on Google Earth Maps

Note 5. Numbers calculated based on USGS rainfall information

Note 6. Data provided by UMD Professor Dr. David Myers

