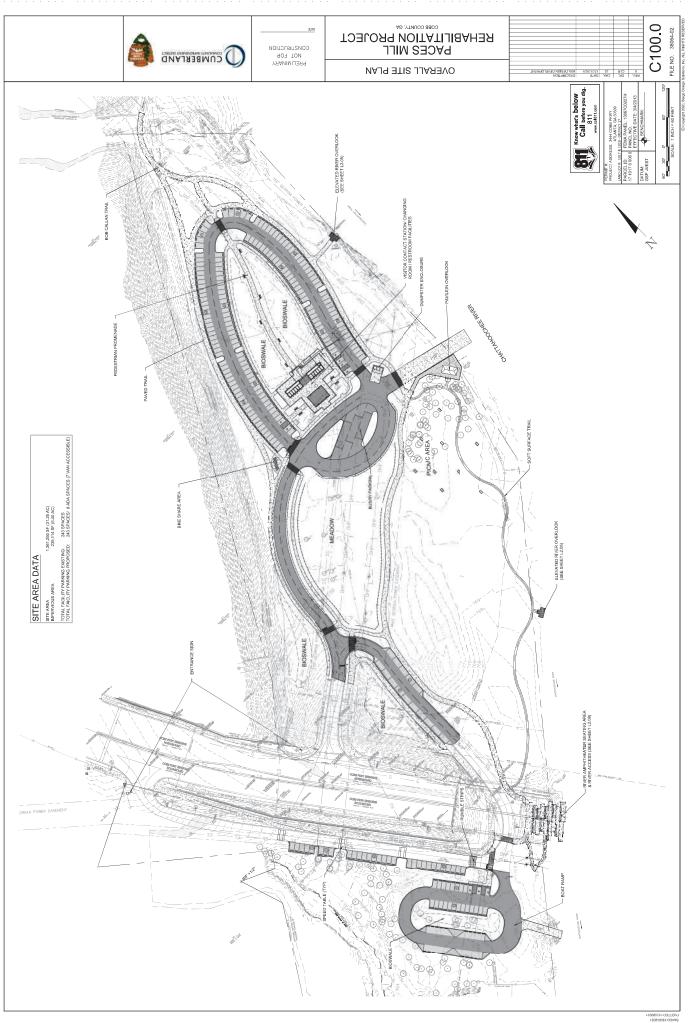
APPENDIX H: ADDITIONAL DESIGN DETAIL

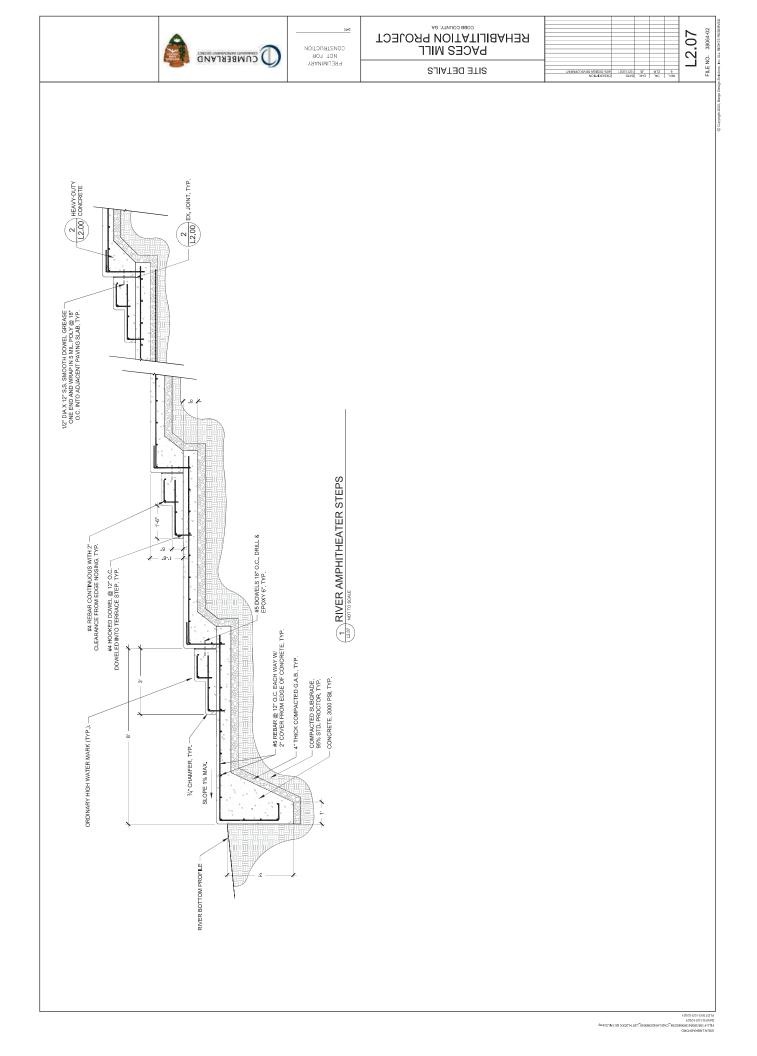
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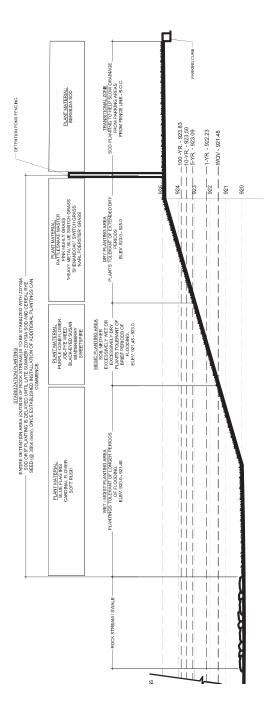
### APPENDIX H: ADDITIONAL DESIGN DETAIL TABLE OF CONTENTS

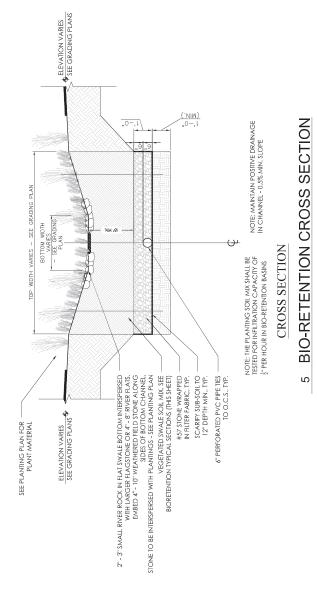
Overall Site Plan Site Details – River Amphitheater Bio-Retention Cross Section Bio-Retention Pond Plantings – Trees and Shrubs (Photos) Bio-Retention Pond Plantings – Herbaceous Plants (Photos) Site Plantings – Small Flowering Trees (Photos) Site Plantings – Shrubs (Photos) Site Plantings – Grasses (Photos) Potential Meadow Planting, Georgia Piedmont Meadow Seed Mix Potential Meadow Planting, Gourgia Piedmont Meadow Seed Mix Site Details – River Overlook Plan (2 pages) Landscape Details – Planting Methods by Type of Plant Exterior Visitor Contact Station Architecture (2 pages) Interior Visitor Contact Station Architecture – Changing Room / Restroom Facilities Paces Mill Prairie Restoration Plan THIS PAGE INTENTIONALLY LEFT BLANK



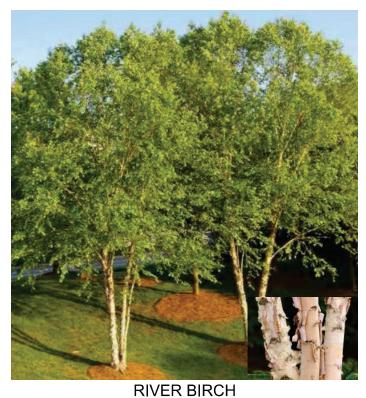
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FRINGE TREE

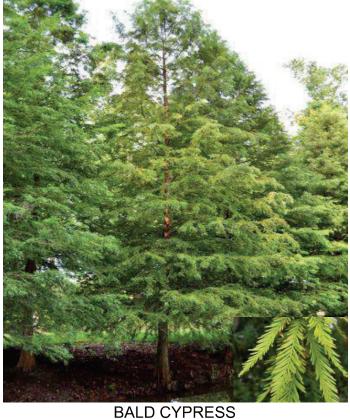


WINTERBERRY



**BIO-RETENTION POND PLANTINGS** 

PACES MILL UNIT - NRPA Cobb County, Georgia September, 2021



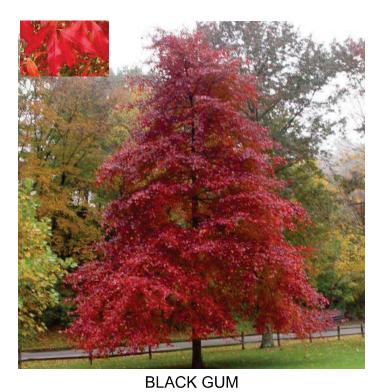


## BIO-RETENTION POND PLANTINGS

- A. Karl Foerster Grass
- B. Purple Cone Flower
- C. Rattlesnake Master
- D. Joe-Pye Weed
- E. Blue Flag Iris
- F. Blue Arrows Juncus
- G. Cardinal Flower
- H. Pink Muhly Grass
- I. Blue Switch Grass
- J. Shenandoah Switch Grass

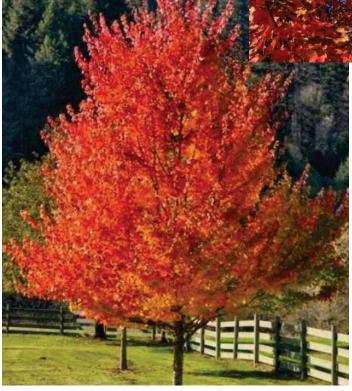
# PACES MILL UNIT - NRPA

Cobb County, Georgia September, 2021





SHUMARD OAK



'OCTOBER GLORY' RED MAPLE



WILLOW OAK

### SITE PLANTINGS SHADE TREES

## **PACES MILL UNIT - NRPA** Cobb County, Georgia September, 2021



FLOWERING DOGWOOD



**RED BUCKEYE** 



PACES MILL UNIT - NRPA Cobb County, Georgia September, 2021

## EASTERN REDBUD



SITE PLANTINGS -

SMALL FLOWERING TREES

## **SITE PLANTING - SHRUBS**

- A. Oakleaf Hydrangea
- B. Anise
- C. Native Hydrangea
- D. Native Azalea
- E. Beautyberry
- F. Bottlebrush Buckeye
- G.Cinnamon Fern
- H. Clethra
- I. American Tea Olive
- J. Southern Shield Fern
- K. St. Johns Wort

### **PACES MILL UNIT - NRPA** Cobb County, Georgia September, 2021

## SITE PLANTING - SHRUBS

- A. Inkberry
- B. Virginia Sweetspire
- C. Fothergilla
- D. Ninebark
- E. Wax Myrtle
- F. Winterberry (Female)
- G. Yucca

### PERENNIALS

- H. Cardinal Flower
- I. Black-eyed Susan
- J. Coneflower
- K. Milkweed

## PACES MILL UNIT - NRPA

Cobb County, Georgia September, 2021









## SITE PLANTINGS - GRASSES

- A. Red October Big Bluestem \*\*
- B. Karl Foerster Feather Grass
- C. Tufted Hair Grass \*\*
- D. Pink Muhly Grass \*\*
- E. Dallas Blues Switch Grass \*\*

\*\* Native Selections



## POTENTIAL MEADOW PLANTING

## GA. PIEDMONT MEADOW SEED MIX

- 1. Butterflyweed -Asclepias tuberosa
- 2. Wild Indigo Baptisia pendula
- 3. Partridge Pea -Chamaecrista fasticulata
- 4. Sensitive Pea Chamaecrista nictitans
- 5. Lanceleaf Coreopsis -Coreopsis lanceolatea
- 6. Virginia Wild Rye- Elymus virginicus
- 7. Mist Flower Eupatorium coelestinum
- 8. Narrowleaf Sunflower -Helianthus angustifolius
- Slender Lespedeza -Lespedeza virginicus (non invasive ecotype)
- 10. Marsh Blazing Star Liatris spicata
- 11. Spotted Bee Balm Mondarda punctata
- 12. Blackeyed Susan Rudbeckia hirta
- 13. Little Bluestem -Schizachyrium scoparium
- 14. Stary Rosinweed Silphium asteriscus
- 15. Showy Goldenrod Solidago speciosa
- 16. Spiderwort Tradescantia ohiensis
- A. Georgia Aster Symphyotrichum georgianum *(LIVE PLANTS)*



## **PACES MILL UNIT - NRPA** Cobb County, Georgia September, 2021

## POTENTIAL MEADOW PLANTING

## SOUTHEAST ANNUAL / PERENNIAL MIX

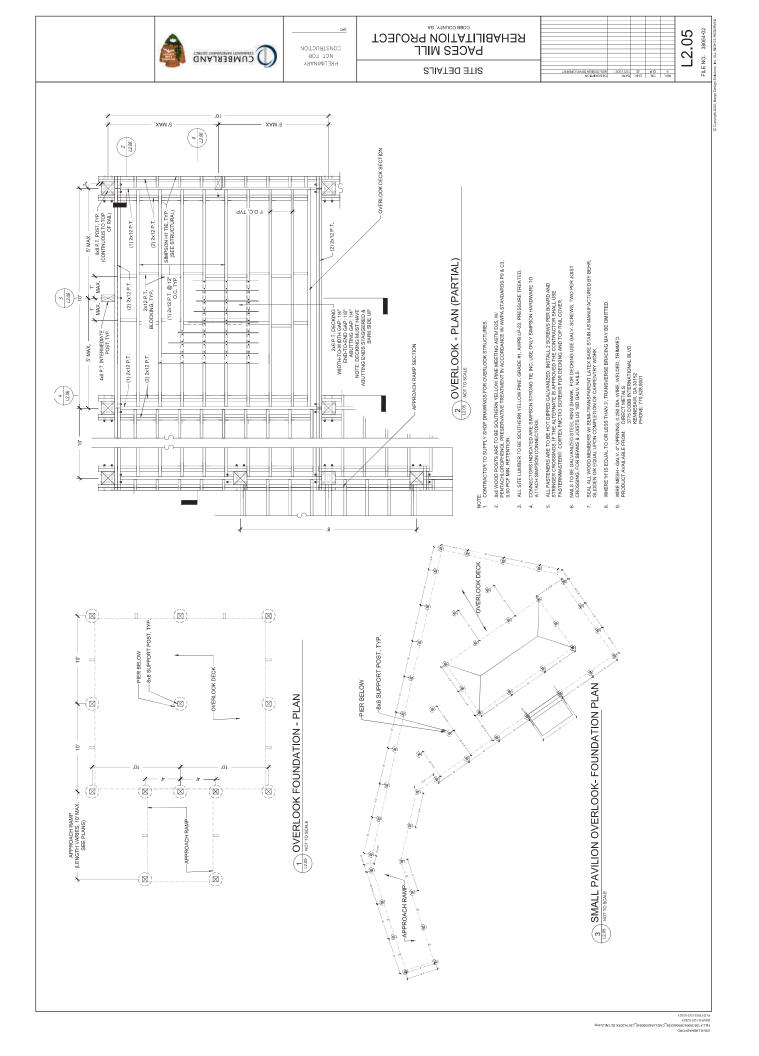
- 1. False Indigo Amorpha herbacea
- 2. Showy Aster Aster spectabilis
- 3. Catbells Baptisia perfoliata
- 4. Bachelors Button Centaurea cyanus
- 5. Largeflower Tickseed -Coreopsis grandiflora
- 6. Plains Coreopsis Coreopsis tinctoria
- 7. Cosmos Cosmos bipinnatus
- 8. Rocket Larkspur Delphinium ajacis
- 9. Purple Coneflower Echinacea purpurea
- 10. Blanketflower Gallardia aristata
- 11. Tree Mallow Lavatera trimestris
- 12. Blue Flax Linum perenne
- 13. Sweet Alyssum Lobularia maritima
- 14. Red Corn Poppy Papaver rhoeas
- 15. Annual Phlox Phlox drummondii
- 16. Clasping Coneflower -Rudbeckia amplexicaulis
  17. Ironwood Vornonia poveboracons

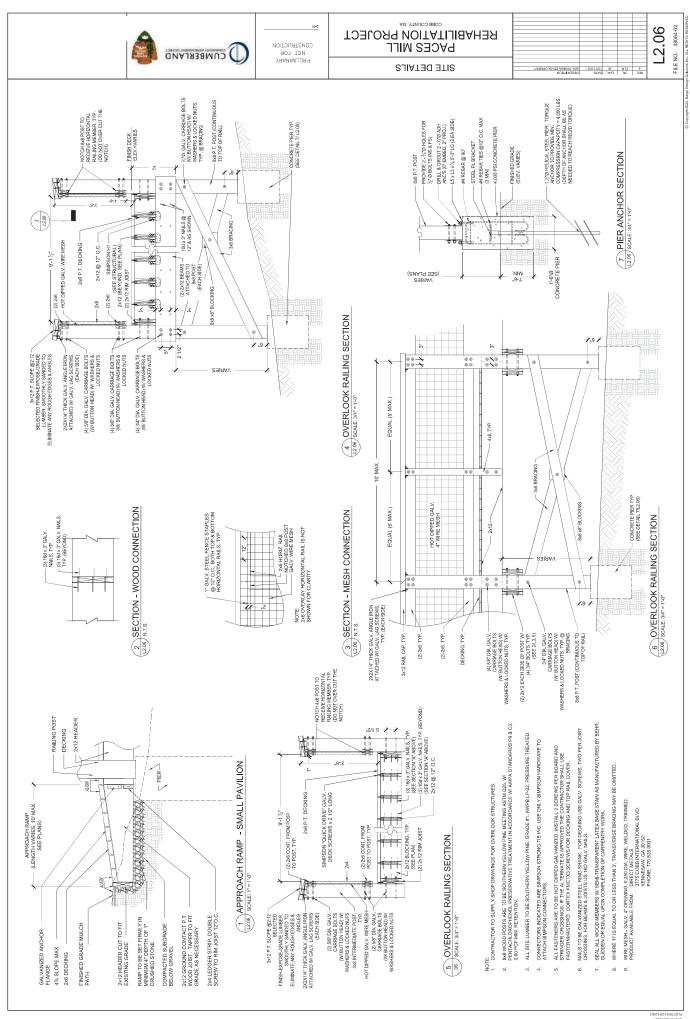
17. Ironweed - Vernonia noveboracensis

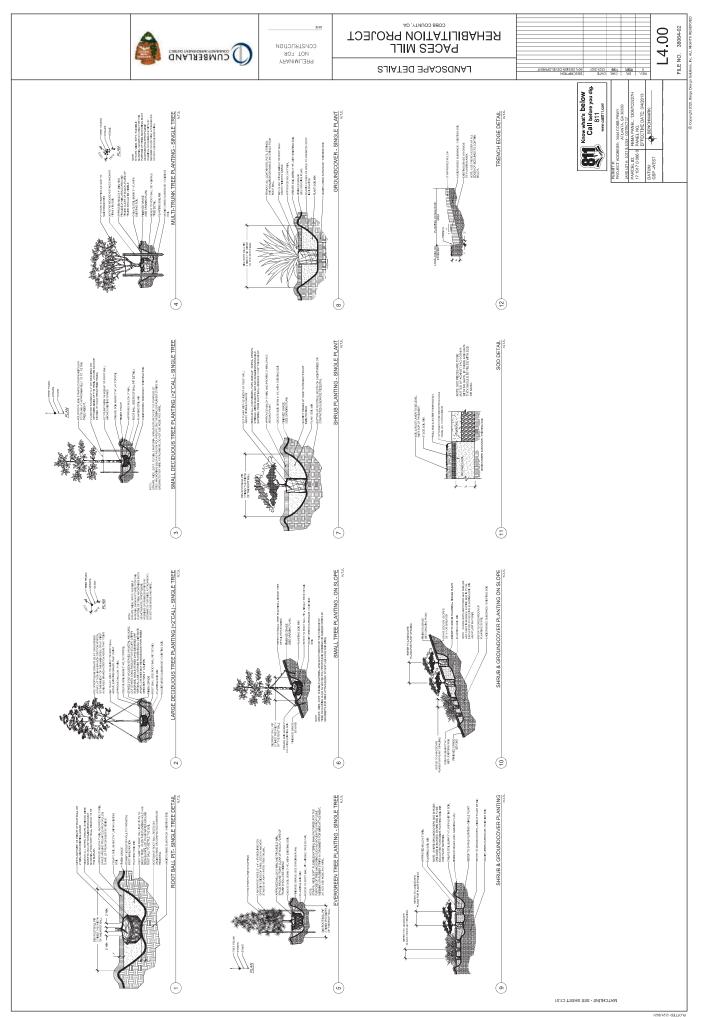
Inclusion of annuals will help ensure interest and root mass the first year of installatioin as the perennial grasses and wildflowers are established.



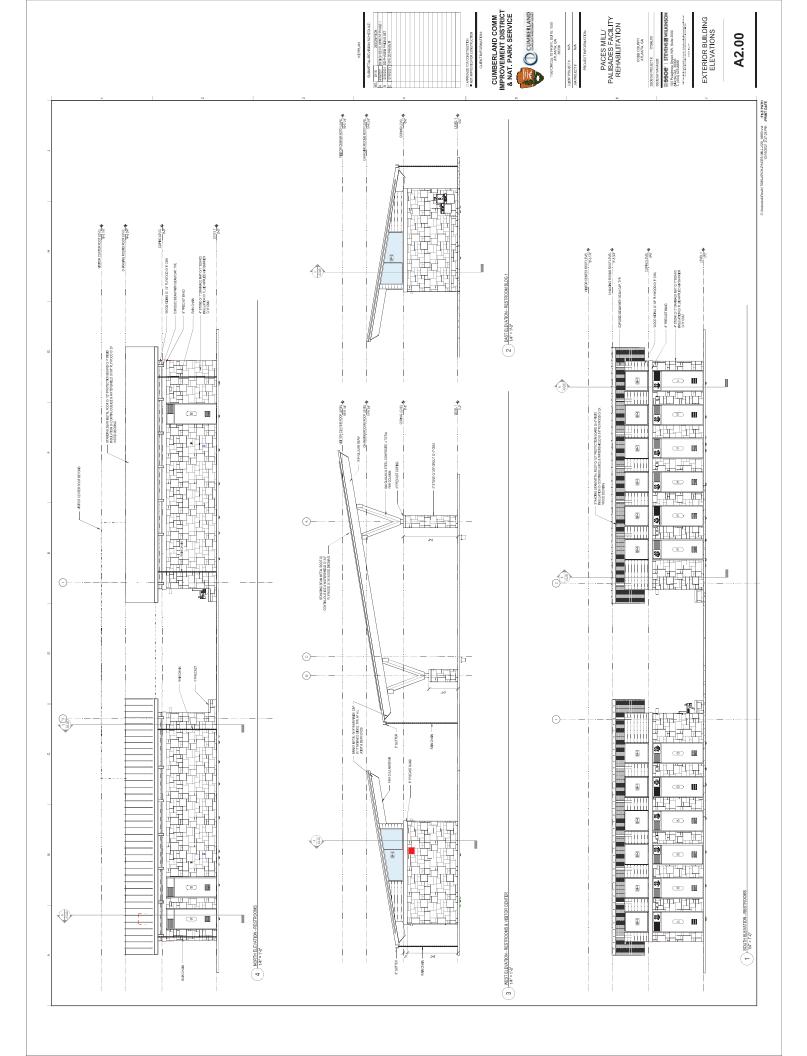


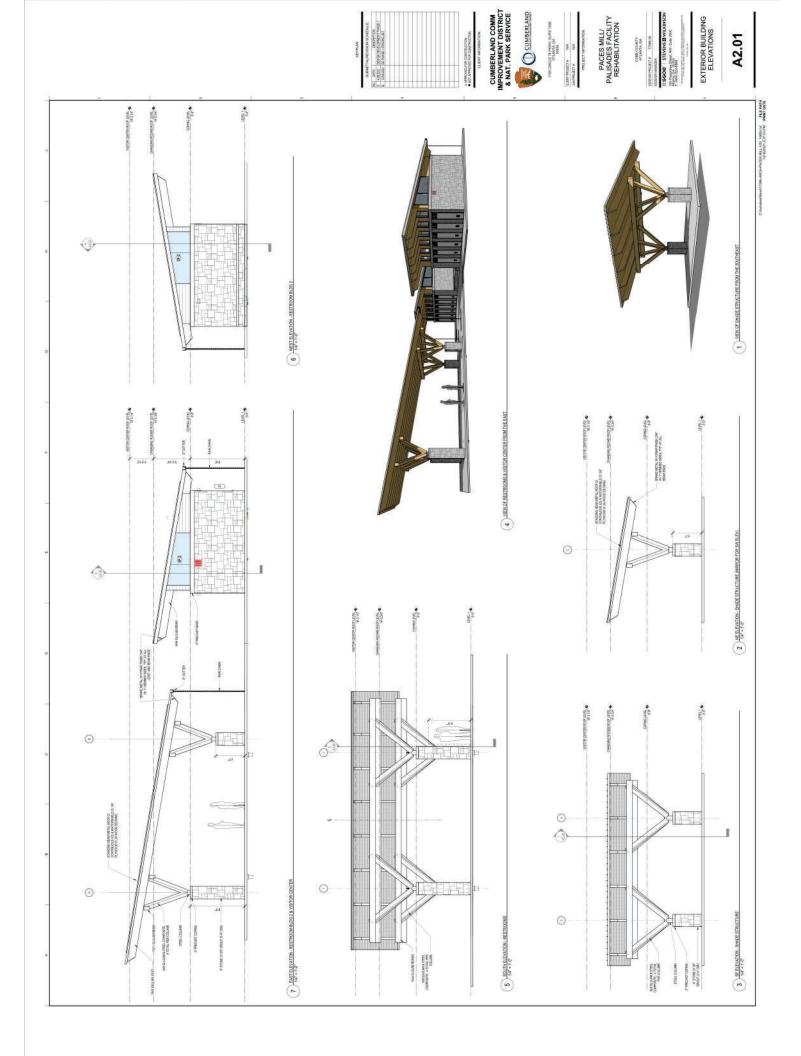


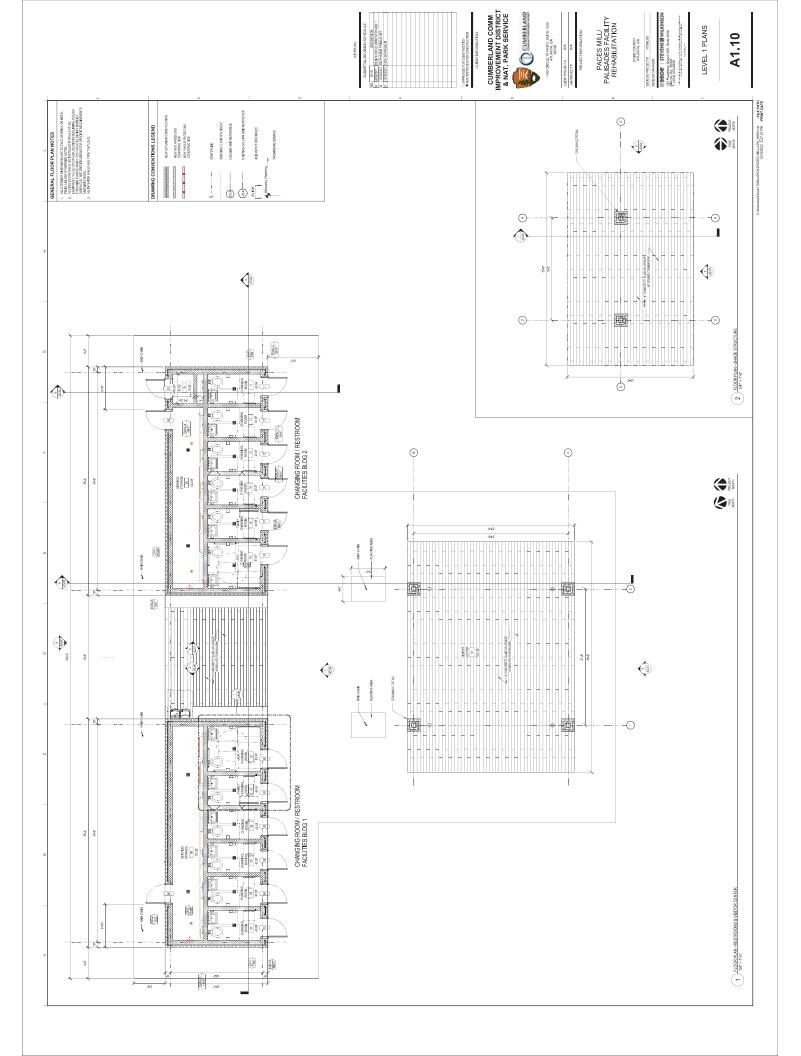




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National Park Service U.S. Department of the Interior Chattahoochee River National Recreation Area 1978 Island Ford Pkwy Sandy Springs, GA 30350 678-538-1200 phone 770-392-7045 fax

### **Paces Mill Prairie Restoration Plan**

December 2021

### **DESCRIPTION OF PRAIRIE AREA**

The National Park Service (NPS) and Cumberland Community Improvement District (CCID) are partnering to rehabilitate the Paces Mill portion of East Palisades unit at Chattahoochee River National Recreation Area (CRNRA). The existing parking lot is slated to be an open prairie in the schematic design.

The plans for the Paces Mill project delineate approximately 1.5 acres for the prairie. The area is a floodplain site that is xeric, sunny, heavily disturbed, and lies within a 150' Georgia Power Company easement. Soils are Toccoa sandy loam, 0 to 2 percent slopes, occasionally flooded. This area previously supported a flourishing piedmont prairie ecosystem translocated from a road widening project near the north entrance road. Prairie soils were biotite-gneiss substrate.

The parking lot was built as a dirt lot in 1971 by the state of Georgia. The National Park Service acquired Paces Mill in 1978 and graveled the lot in 1983. It was paved sometime after that. Soils lie under layers of gravel and are most likely heavily compacted.

### **OBJECTIVE**

Landscaping with native plant species provides a beautiful, hardy, drought-resistant landscape that benefits the natural environment. It requires less water, fertilizer, and pesticides, therefore costs less in maintenance. Furthermore, native plants promote stewardship of our natural heritage by attracting pollinators, birds, and other wildlife while supporting biological diversity and ecological functions.

A prairie is typically an early successional habitat populated primarily with native grasses, forbs, and small shrubs. The goal with this project, in addition to improving overall visitor circulation and infrastructure, is to restore the native piedmont prairie that once occupied this area. Because it lies under the Georgia Power lines it will always be maintained as early successional habitat. Species collected from a remnant prairie along Highway 41 at the park's northbound entrance would be reintroduced to this site. (Refer to the species list at the end of this document.)

The view as one enters the park would be of an open grassy area with abundant wildflowers. It would look natural with vegetation about 3 feet high in late summer. Spring, summer, and fall would bring bursts of color from the wildflowers that attract birds with seeds and insects as

well as foraging, nesting, and feeding pollinators. Winter would bring a quiet season of senescence and an overwintering site for native pollinators.

The overall site would benefit from the ecosystem functions provided by the prairie, too. Infiltration, filtration, nutrient cycling, and soil health are many of these important functions. As many of the southeastern prairies have been lost to growing populations, development, and land use changes, these ecosystem functions have also been lost.

### PARK AND STATE POLICIES SUPPORTING PRAIRIE CREATION

The restoration of the piedmont prairie fulfills the resource mission of the NPS and CRNRA while supporting the purpose and need of the Paces Mill rehabilitation project. Restoration of the piedmont prairie accomplishes many environmentally friendly functions as described above, but it also fulfills the State of Georgia environmental policies and park commitments, too.

The **Organic Act** spells out the NPS mission to preserve natural and cultural resources for the enjoyment, education, and inspiration of future generations. **NPS Management Policies 2006**, **Section 4.1** states "[NPS] will try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems".

For the State of Georgia, Piedmont Prairies are a top three conservation priority in the **Georgia State Wildlife Action Plan.** 

The **Park General Management Plan (2009)** states, "The Chattahoochee River Corridor, including the park, is a biologically significant resource that harbors a variety of protected and rare species of plants and animals. The National Park Service is required under the Endangered Species Act to ensure that federally listed species and their habitats are protected on lands within the agency's jurisdiction. In addition, park policy and management actions include maintaining state- and heritage program-listed species as part of the park's natural heritage."

In addition to these policies, the NPS is a signatory of the **Georgia Aster Candidate Conservation Agreement 2014.** This agreement is a "cooperative effort among state, federal, non-governmental, and private organizations to establish a formal agreement for public and private landowners to cooperate on actions that conserve, manage and improve Georgia aster populations range-wide with the goal of working to preclude the need to list the species under the Endangered Species Act (ESA)."

### **OUTREACH, PARTNERSHIPS, AND EDUCATIONAL OPPORTUNITIES:**

The establishment of a prairie would take 3 – 7 years depending on the site condition. These first years are not going to be visually appealing. The Park will get negative feedback. However, we can off-set some of this with a communication plan, social media, interpretive waysides, and education programs. Engagement from a variety of partner organizations would also help spread the word about the project and its value to the park, the pollinators, and the

environment. A single-track dirt or grass trail within the prairie would invite visitors to experience the wildflowers and pollinators, offer photo opportunities, and provide a place of solitude. The result should highlight the natural environment and give the iconic NPS experience upon entering the unit. **See Paces Prairie Communication Plan.** 

- The Park already partners with the Georgia Power Company (GPC) on several plant and restoration projects throughout the area. GPC has expressed interest in participating in this prairie restoration as of 9/9/2021. In addition, they manage a 150' easement that crosses the prairie area. GPC has also donated gardens to the park in the past (Powers Island).
- Georgia Audubon has expressed interest in restoring and certifying the Headquarters' gardens for interpretive and educational use. May be interested in interpretive and education opportunities at Paces Mill.
- Georgia Plant Conservation Alliance (GPCA) is involved with piedmont prairies across the southeast. The Park is a member and provide safe-guarding sites for species of concern.
- Chattahoochee National Park Conservancy (CNPC) The Park has a robust volunteer program that could direct assistance and perhaps funding to this program.
- Cobb County may have interest since the Park has hosted the Water Festival for many years in Paces Mill.
- The Georgia Native Plant Society, the Georgia Botanical Society, and the Georgia Association of Conservation Districts have expressed interest and possibly funding for this project.
- A list of parties that have expressed interest in the project or have offered subjectmatter expertise is included with this plan.

### **RESTORATION**

Step 1: Test the soils for arsenic, hydrocarbons, cadmium, and lead

- A. Accomplish with geotechnical drilling in advance of construction. Geotechnical testing will be required for other portions of the rehabilitation and could be included during these initial tests. Completed 11/24/2021
- B. Or, we have a contact (Eric Duncan) with the soil biologist at Kennesaw State University

### Step 2: Remove asphalt

- A. Project Contractor would remove asphalt, minimizing rutting and site disruption. Check to see how many lifts or fills were brought onto the site covering the native soil.
- B. Remove all top layers of asphalt bedding / gravel / crusher-run until get to the native soil surface. Do not till or incorporate asphalt bedding into soil.
- C. Control erosion across site.

### Step 3: Remediation

Depending on the results from the soil testing the following may take place:

A. **Complete remediation** involving the complete removal of the soils to bring in healthier soils and amendments. This would be in the case if this is a complex industrial chemical

cleanup. There is no historical documentation of industry at this site that would justify a complete remediation. **Time Frame**: Varies **Costs:** Varies, a rough estimate is about \$500,000.00 (\$200.00/cubic yard x 1.5 acres) Source: <u>Remediation Technology Cost</u> <u>Compendium - Year 2000 (epa.gov)</u>

- B. In Situ Remediation, if soils not very contaminated, remove worst soils and mix in bacteria to feed off hydrocarbons to remediate the rest, then follow up with steps outlined in Step D. (Information from Peter D. Maholland, Deputy Field Supervisor, US Fish and Wildlife Services.). *Time Frame:* depends on bacteria and levels of contaminants. Costs: \$20.00 \$80.00 per cubic yard Source: <u>4-2 Enhanced Bioremediation (frtr.gov)</u>.
- C. **Phytoremediation**: Tested, but not yet fully implemented. *Source:* <u>table3\_2.pdf</u> (<u>frtr.gov</u>)
- D. **Minimal Remediation**. Step-by-step guidance by Dr. Kim Coder, Professor, University of Georgia. *Time Frame several months to a year*. *Costs: minimal*.
  - Subsoil as deep as possible on the site to fracture impervious layers and site compaction. This could be accomplished with bulldozers on site. Get costs from contractor.
  - Till / cultivate and loosen at least top 6 inches of soil. Let the newly exposed open soil surface area aerate / breath for several months. NOTE: Will need to manage weeds during this time. Would a cover crop help? Ask Jennifer Ceska/Heather Alley. Some say that tilling would awaken the seed bank. Does a seed bank live under the asphalt? And if so, is it natives or invasives or both.
  - Stabilize to prevent any erosional soil movement. *Will require silt fencing*. *Contractor should already have this in place.*
  - Place a well composted organic mix to the top of the soil. Compost should be of woodland or tree system organic materials, and not turf cuttings. Compost layer should be thin (<1/2") and raked level across the site. Local pricing = \$28.00 per cubic yard plus delivery fee. Wholesale prices available. 1.5 acres @ <1/2" = 140 cubic yards. Source: Mulch Atlanta | Bulk Compost Supplier in Atlanta, GA | Brown Mulch | Wholesale Wood Products (finestmulch.com)</li>
  - Protect compost with a thin layer (<2") of coarse low density organic mulch (broomsedge). Do not over-apply compost and mulch – thin layers over several years are better than one thick layer at the start. There are a couple of local suppliers. Bails cost can vary, but generally about \$20.00/ea. 100 bails/acre = 150 bails.

Step 4. Establish Target Conditions

- A. Confer with subject matter experts on the target conditions for a piedmont prairie. Sources include the Georgia Plant Conservation Alliance (GPCA), State Botanical Garden of Georgia, Walter Bland, Eric Duncan, Steve Bowling, and local native plant specialists.
- B. Trail/Pathway A trail would invite visitors to enjoy the solitude and beauty of a native piedmont prairie. The trail would be a dynamic mown path that changes with every

mow to lead visitors into different areas of the prairie as well as prevent the compaction, rutting, and loss of plant species found in permanent trail corridors.

- C. Gateways rustic and/or artistic gateways also provide an invitation to explore and area.
- D. Fencing- would be needed as soon as possible to define and protect the area from construction activities. A rustic post and rail or split rail fence would work.

Step 5. Installing Plants, Seed Mixes, and Mulch

- A. A cover crop may be required to stabilize soils until the area can be planted.
- B. Using broomsedge straw as mulch will bring in that seed stock.
- C. The goal is to reach out early (at least 2 years early) in the process to the Georgia Plant Conservation Alliance (GPCA) for sourcing the plant material in the attached list. Seed collection in the park and propagation has already begun for prairie plants. The Atlanta Botanical Garden should have genetic stock from the Georgia asters that were in the parking lot.
- D. A list of the remnant prairie species rescued from the Hwy 441 widening is included in this document. This species list can be edited as needed depending on supply, but we'll need to consult specialists.
- E. Planting will be staged depending on the species available. The prairie is a dynamic system that should be created over a period of years to attain a mature and healthy ecosystem.
  - a. Stage 1 will be a cover crop and/or the broomsedge straw depending on the state of the newly uncovered area.
  - b. Stage 2 will be the planting of available seeds, plugs, plants. This stage will be repeated each spring and fall as new species become available.
- F. Treatment of nonnative plants would occur on an annual basis by park personnel.

Step 6: Management of Site (Step-by-step guidance by Dr. Kim Coder, Professor, University of Georgia.)

- A. Watering until established 2-3 years irrigation, backpack sprayers. Lightly irrigate weekly when there are no rains, and temperatures are above 60°F. Assure drainage and no pooling of water natural soil aeration and drainage are critical.
- B. Do not apply fertilizers (especially N) for at least a full growing season, if at all.
- C. Reapply compost in a thin layer scattered over top of existing mulch during the next growing season.
- D. Mowing per CCA 2014
  - o Frequency
    - No mowing from approximately July 1st to January 1st, per GPCA discussion/ suggestion. It is recommended that prairie remnant habitat allow a second mow up to July 4th. It is also ideal to extend the no-mow period to the end of the year to allow for fruit development and dispersal since GA Aster blooms into November.

- Mowing can occur 3 times/year to limit plant height with timing sensitivities and park approval. Recommended mowing times are late June, early January, and late March/early April.
- Mowing should not be conducted when the soil is wet, as compaction and rutting will occur.
- Clippings from winter mowing should be left on site so seeds produced will have the opportunity to germinate within the population. Exceptions should be made if only non-native invasive plants are reproducing.
- Prior to entering the site, operators of mowers and equipment should clean equipment to remove any accumulated vegetative debris that contains non-native invasive plant seeds.
- Height The mower should be set at a level to avoid scalping the ground and damaging rare plants.
- E. Herbicides No broadcast spraying of herbicides. Spot herbicide treatment can be used with NPS approval as needed with protection of Georgia aster plants to prohibit off-target impacts.
- F. Trimming distance from sidewalk to fence one mower width
- G. Exclude visitors/dogs/deer until establishment and after mowing. The Park should consider fencing the site to keep people and pets out of the area during establishment.

### **MONITORING AND EVALUATION**

- The prairie will take 1-3 years to establish. During this time the area should be monitored for success. After establishment, the prairie should regularly be monitored to evaluate the management regime.
- Develop metrics to evaluate target conditions specified early in the restoration process (Restoration, Step 3.) (*NER Planning for Native Prairie Establishment Regional Approach*)
  - Direct
    - % Cover of native/invasive species
    - Species richness metrics
    - Presence/absence of target species
    - Presence/absence or amount of herbivory
  - Indirect
    - Obligate taxa metrics (pollinators, birds, etc.)
    - Presence/absence
    - Species richness
    - Species abundance
    - Species occupancy
    - Community metrics
    - Measures of breeding success

## **Piedmont Prairie Plant List**

Scientific Name	Common Name	NPSpecies	Bloom	Height
Ambrosia artemisiifolia	ragweed	V	Green,	3'
			summer	
Andropogon virginicus	broomsedge	V	Orange,	2'-4'
			fall	
Arnoglossum	pale Indian plantain	V	White,	3' – 7'
atriplicifolium			summer	
Asclepius amplexicaulis	Clasping milkweed	V	Pink,	1'-3'
			spring -	
			summer	
Asclepius quadrifolia	Whorled milkweed	V	Pink,	1′ – 2.5′
			summer	
Asclepius tuberosa	Butterfly weed	V	Orange,	1'-3'
			summer	
Asplenium platyneuron	ebony spleenwort	V	n/a	<2'
Coreopsis major	greater tickseed	V	Yellow,	3' – 4'
			summer	
Chamaecrista fasciculata	partridge pea	V	Yellow,	3'
			summer	
Collinsonia anisate — C.	southern horsebalm	V	Yellow,	2' – 4'
canadensis, C. tuberosa			summer	
Helenium amarum	sneezeweed	V	Yellow,	1'-2'
			summer- fall	
Helianthus hirsutus	hairy sunflower	X	Yellow,	2' – 5'
	nany sumower	~	summer-	2 5
			fall	
Oxalis floridana	wood sorrel	V	Yellow,	3" – 4"
		· ·	spring	5 -
Packera anonyma	Appalachian ragwort	V	Yellow,	3'
	Appalaeman ragwore	, i i i i i i i i i i i i i i i i i i i	spring	5
Penstemon aff. Smallii	beard tongue	Х	Purple,	2' - 3'
	bedra tongae		summer	2 5
Pseudognaphalium obtusifolium	sweet everlasting	V	White,	1'-2'
	Sweet evenusting		summer-	±
			fall	
Pycnanthemum incanum	hoary mountain mint	V	Purple,	3' - 6'
			summer	
			Junner	

Saccharum alopecuroides	silver plume grass	V	Beige, fall	3' - 8'
Silene stellate	starry campion	V	White,	2' - 3'
			summer -	
			fall	
Solidago rugosa	rough goldenrod	V	Yellow,	2' – 5'
			summer -	
			fall	
Solidago altissima — S. canadensis var. scabra	Canada goldenrod	V	Yellow,	2' - 6'
			summer -	
			fall	
Symphyotrichum	Georgia aster	V	Purple,	1'-3'
georgianum			fall	
Tradescantia hirsuticaulis	hairy spiderwort	V	Blue,	1'-3'
			spring -	
			summer	
Trichostema dichotomum	blue curls	V	Blue,	1'-3'
			summer -	
			fall	
Verbesina occidentalis	Southern	V	Yellow,	3' - 10'
	crownbeard		summer -	
			fall	
Viola walteri - check	blue violet	V	Violet,	1"-6"
appalachiana –- ? 11 Viola				
species in park				

### Resources

Chapin, C, et al. *Planning for Native Prairie Establishment – Regional Approach.* 

Iserhott, H. et al. 2009. *How to Depave, The Guide to Freeing Your Soil*. Updated August 2015. <u>depave.org/learn/how-to-depave</u>

With Special Thanks to: Dr. Kim Coder, Professor, University of Georgia. Peter D. Maholland, Deputy Field Supervisor, US Fish and Wildlife Services Casey Reese, NER IPM Coordinator Eric Duncan, subject matter expert Walter Bland, Rock Springs Restoration